Abstract

FINANCING MIX OF NON-FINANCIAL CORPORATIONS: EVIDENCE FROM EUROPEAN COUNTRIES

by YILMAZ GÜNEY

This study analyses the financing decisions of listed non-financial corporations in France, Germany and the UK over the period 1969 to 2000. These countries represent satisfactorily different financial structures of their classes, i.e., Latinic, Germanic and Anglo-Saxon traditions, respectively. Thus, this thesis attempts to shed light on the impact of institutional differences (accounting and taxation systems, bankruptcy laws, corporate governance structure) on corporate financing mix policies. The empirical investigation comprises three main themes; capital structure (debt versus equity), debt maturity structure (short-term versus long-term debt), and debt ownership structure (public versus private debt). It is obvious that factors influencing financial strategies of firms change overtime and firms are expected to adjust themselves to their target financing structure according to random events. For these reasons we use dynamic panel data and choose Generalised Methods of Moments (GMM) as an appropriate estimation procedure for our autoregressive-distributed lag model. GMM methodology overcomes the problems of endogeneity, heteroscedasticity, normality, simultaneity and measurement errors, which are common for studies using firm-level data.
The empirical evidence shows that corporate financing decisions are determined by both firm-specific (profitability, tangibility and maturity of assets, growth, quality, size, liquidity, payout policy, corporate tax rates, and earnings volatility), and market-related factors (term structure of interest rates, market equity premium, interest rate volatility, stock return volatility, stock price performance). However, the strength and nature of the effect of these factors are dependent on the financial environment and tradition of the countries of interest. Therefore, our research argues that financing mix decisions of firms are not only the product of their own characteristics, but also the outcome of environment and traditions in which they operate.

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Declaration

The material contained in this thesis has not been previously submitted for a degree in this or any other university.

Statement of Copyright

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1. INTRODUCTION

One can regard non-financial corporations as the transformation units dealing with factor inputs conversion into intermediate and final goods and services. These output values are expected to have higher value than the input values. Firms' operations need to be financed for this objective by means of various forms that differ with respect to their characteristics such as contractual conditions, control rights and marketability of transferable claims among agents. Researchers have shown that firms' real performance and their economic market value may be heavily conditioned on their financing decisions and opportunities. This possibility can be considered as the fundamental impetus as to why financing pattern of corporations has been paid attention by financial policy makers and academics.

In real life, there are variations in firms' capital structure, i.e., the composition of debt (fixed-interest loan capital) and equity (share capital). Furthermore, one can recognise the differences with respect to their debt maturity structure, i.e., the proportion of short-, medium-, and long-term debt to total debt. Another perspective is firms' debt ownership structure, i.e., the proportion of private- or public debt to total debt. The following questions have been a matter of debate for many decades: Does the financing mix of corporations matter? Put it differently, is there any optimal mix of financing structure that maximises the enterprise value or minimises the cost of capital? If the answer is affirmative, then, what factors determine this optimal level? These questions serve a pivotal role in this study.

Why do we need to study this subject? We believe that comprehension of the interaction between firms and outside investors is important due to its various corporate sector-wise and society-wise benefits. If one happens to discover the intuitions behind the arguments discussed above, managers will supply financing for the investment opportunities at the minimum cost; investors' savings in the financial markets will be guaranteed to yield maximum return given minimum risk; and financial and institutional regulations will be established accordingly for the efficiency of the economy.

The starting point of this research is Modigliani and Miller [1958] who contend that capital structure of a firm has no impact on its market value given perfect capital markets assumptions. However, if one is to relax the 'frictionless capital markets' assumptions, financing decisions of firms might not be irrelevant, i.e., financial structure matters, as argued by up-to-date vast accumulation of related studies. For instance, the existence of bankruptcy costs, transaction costs, agency costs as being market imperfections may lead to some optimal financial policies. This study aims to empirically investigate the main determinants of financial decisions of corporations. In the literature, most of the empirical evidence is based on the financial data of US firms. Clearly, the studies focusing on a single country cannot perceive the effect of diversity of cultural and economic factors on firms' financial policies. According to the tradition, there is a distinction between Anglo-Saxon countries (USA, UK, and Canada) and other major economies (France, Italy, Japan and Germany) in the sense that the former are considered to have low-levered firms and the latter to have high-levered firms. Furthermore, agency costs and indirect bankruptcy costs tend to be higher in Anglo-Saxon countries, where there is lack of long-term relationship between firms and creditors and of long-term objectives of business management.

In this international study, France, Germany and the UK are chosen as they seem to represent satisfactorily different financial structures of their classes. The UK is in the classification of *Anglo-Saxon* tradition, where there are comparatively large numbers of publicly listed companies and occurrences of hostile takeovers for market for corporate control due to potentially large agency conflicts. Germany is in the classification of *Germanic* tradition (e.g., Austria, the Netherlands), where corporate decision making and restructuring are made through the involvement of universal banks and financial holdings and the capital markets are not effective with relatively low amount of listed companies. Lastly, France is in the classification of *Latinic* tradition (e.g., Italy, Spain), where corporate ownership structure can be characterised by family control, financial holdings, state ownership and cross-shareholdings, and agency problems are internalised unlike in Anglo-Saxon tradition. Thus, we believe that our international empirical evidence will shed light on the impact of *institutional differences* (accounting and taxation systems, bankruptcy laws, corporate governance) across countries on financing decisions of corporations. It aims to contribute to the literature in this respect.

It is obvious that factors influencing firms' financial strategies change overtime. Therefore, it would be necessary but not sufficient to examine the differences in firms' financial structure only across firms. To explain time-varying observed differences in financial structure of firms is another issue to be investigated. It is important to comprehend whether firms react to new circumstances that occur in financial markets and how quick they are in adjusting themselves to their target financial structure according to random events. Once lagged values of dependent and independent variables are incorporated into the analysis, a more complete picture of dynamism in corporate behaviour can be achieved. Thus, we adopt an autoregressive-distributed lag model, by which we are able to examine the determinants of financing policies, the speed of adjustment process to desired optimal financing mix, and to provide the static long-run relationship between dependent and independent variables. As another contribution to the literature, hence, this study investigates whether firms have optimal financing policies. In order to accomplish these objectives, we use dynamic panel data with the estimation method of Generalised Methods of Moments (GMM), which is believed to be the most appropriate procedure for our purpose. Furthermore, GMM methodology utilising appropriate instrumental variables overcomes the problems of endogeneity, heteroscedasticity, normality, simultaneity and measurement errors, which are common for studies using firm-level data. Endogeneity problem should be investigated as it is likely that random shocks affect both dependent variable and independent variables at the same time. It is possible that observed relations between a financing policy and its proposed determinants indicate the effects of that policy on the latter rather than vice-versa. Consequently, this thesis also makes a contribution in terms of the newly-developed methodologies used in the analysis and controlling for endogeneity which is ignored by almost all studies.

In the end, the findings of this study reveal that there are considerable differences in financing patterns of corporations in France, Germany and the UK. Therefore, our research argues that financing-mix decisions of firms are not only the product of their own characteristics, but also the result of environment and traditions in which they operate. More importantly, we find that supposedly effective and strong German corporate governance mechanism does not seem to be as successful as conventional wisdom suggests in mitigating agency problems and information asymmetries.

The outline of the thesis is as follows: Chapter 1 reviews first the fundamental themes of capital structure arguments that debate whether the proportion of debt to equity has any impact on firm value under market imperfections. Second, in the framework of recent developments, the discussion of debt maturity irrelevance is provided, i.e., whether short-term debt is superior to long-term debt or there are any factors that determine optimal corporate debt maturity. Third, factors affecting firms' choices of differences debt sources (public or private), are reviewed. The last section provides a discussion of dynamic debt use in renegotiations between borrowers and financiers. This issue seems to be relevant in real life in case of corporate financial distress since it may lead to bilateral opportunistic incentives through strategic decisions.

Chapter 2 investigates the financial and institutional features of France, Germany and the UK. It appears that in such countries having similar capital markets and financial institutions, financial structure of firms might vary across these countries. On the other hand, in such countries having different financial institutions, financial structure of firms might be quite similar in these diverse capital markets (Rajan and Zingales [1995]). Subsequently, financial researchers have made considerable effort to obtain the underlying reasons for these differences. It is contended that the efforts to explain differences in financial structures of corporations across countries with respect to tax differentials alone have generally failed as there is little relation between tax incentives to use different forms of financing and observed proportions of capital raised. It could be due to the convergent inflation rates at lower levels that reduce the tax systems distortions. Instead, recent arguments tend to suggest institutional factors for the financial structure heterogeneity across countries. International differences regarding the financing patterns of corporations may not be independent from the institutional features. These factors may be related to financial structure affecting the degree of risk to creditors associated with high leverage. For instance, Hoshi et al. [1996] investigate the financial structure of Japan, where there is an organisation of firms' network, *keiretsu.* They find that those firms that are not the members of keiretsu will probably cut back investment when they have not sufficient cash flows. Accordingly, one would argue that this specific institutional factor is likely to influence the financial policies of the Japanese firms. The authors also indicate that firms in industrial groups having close relationship to their banks, suppliers and customers perform better than others and even get more help in times of financial distress. However, such financial coalitions might have incentive to make inefficient decisions at the expense of other shareholders. In order to capture the potential effects of institutional differences on firms' financing policies, we will analyse the characteristics of main components of capital markets in France, Germany and the UK.

Chapter 3 reviews the existing econometric methods for dynamic panel data analysis. There are many areas and relevant theories in finance and economics that should be focused on using dynamic panel data due to their nature. One can discover the dynamics of adjustment process more systematically through this way. This chapter will first discuss the adjustment process with a model using first-differences technique. Then, it will be extended in the framework of error-correction mechanism. The following section will elaborate the alternative estimation methodologies so as to obtain the most appropriate econometric procedure that provides consistent and efficient estimates for the models. For this purpose, we will discuss the properties of Ordinary Least Squares (OLS), Anderson-Hsiao Instrumental Variable technique, and GMM methodology interacted with models in levels and first-differenced equations. Having decided the superiority of GMM in dynamic panel data studies, there will be further discussion of how to improve the GMM results by using additional instruments. Finally, this chapter attempts to find out why we have chosen the GMM methodology to be the best estimation technique for our empirical purposes (see Arellano and Bond [1991], Arellano and Bover [1995], and Blundell and Bond [1998]).

In Chapter 4 we aim to investigate the potential determinants of corporate capital structure. Despite the numerous capital structure papers accumulated after Modigliani and Miller' [1958] seminal study, the theory of capital structure has still been one of the intensively debated topic in corporate finance literature. Modigliani and Miller [1963] argue in their second paper that firms may maximise their market value with a capital structure using no equity. These controversial arguments have led the researchers to examine this issue in a more realistic way. The general tendency seems to argue that optimal capital structure involves balancing the corporate tax advantages of debt financing against the present value of bankruptcy costs and agency costs. The empirical findings of the trade-off theory do not bring about any consensus. The presence of other factors in the optimal capital structure debate, e.g., personal taxes and principal-agent conflicts, makes the debate even more complicated. Hence, it is still worth working on this issue as Myers [1984, p.575] states "How do firms choose their capital structures...We still don't know". One should find out why the observed debt ratios of firms are typically around 20-30 % despite the tax advantage of debt financing, i.e., the disadvantages of debt financing, which seem to outweigh this tax advantage, should be detected. Thus, with further empirical analyses, it would be possible to shed light on this puzzling issue of corporate finance by reconciliating the present controversies. Moreover, further investigation on international capital structure seems necessary as some researchers report significant differences in capital structure of firms in developed countries (McClure et al. [1999] and Wald [1999]).

We analyse the potential determinants of corporate debt maturity structure in Chapter 5. Firms should decide the maturity of the new debt when they choose debt-financing rather than equity-financing. It appears that not much is known about the maturity structure of debt financing, relative to the research on corporate capital structure. Merton [1974] and Stiglitz [1974] theoretically show the irrelevance of corporate debt maturity structure under perfect market conditions. Why firms use both commercial papers and bonds to finance their assets and investment opportunities does not seem to be fully understood in the literature. Debt maturity structure is important to firms, since a badly chosen maturity might lead to inefficient liquidations of their even profitable projects. However, firms may also use it as a signalling mechanism in an imperfect market to provide information about their quality, credibility and future prospects.

The literature tends to suggest short-term debt use as it mitigates asymmetric information and agency problems. One strand of debt maturity theories is interested in tax arguments: Brick and Ravid [1985] contend that when the yield curve is upward sloping long-term debt is optimal since gain from leverage due to interest tax shield is accelerated. Another line is based on information asymmetries: Flannery [1986] and Kale and Noe [1990] predict that high-quality firms choose short-term debt to signal their type. Diamond [1991b, 1993] shows that even low-quality firms would issue short-term debt due to liquidity risk and only medium-rated firms issue long-term debt. Another line focuses on contracting costs arguments: Myers [1977] contends that short-term debt alleviates underinvestment problem if it matures before growth options are exercised as there remains an opportunity for lenders and firms to re-negotiate. Barnea et al. [1980] argue that short-term debt may diminish asset substitution problem since the value of short-term debt is less sensitive to changes in firms' asset value. It is also predicted by asymmetric information arguments and contracting costs hypothesis that firms match the maturity of their assets and liabilities.

There exists no empirical debt maturity study in an international context. In an attempt to fill this gap, this chapter explores cross-country differences in firms' debt maturity decisions in the framework of tax, contracting-costs, signalling, liquidity risk, and maturity-matching hypotheses.

In Chapter 6 we attempt to discover the potential determinants of corporate debt ownership structure with reference to bank debt use. Privately-placed debt is argued to be the most important source of external financing for small firms due to their limited access to capital markets, transaction costs and information asymmetries. However, one should examine why firms use private debt financing even they have access to public debt markets, and why they resort to both types of debt financing.

The literature based on moral hazard and adverse selection argues that monitored bank loans are different from public debt as banks have cost advantage in lending and have more information about the prospects of firms. Fama [1985] argues that bank debt is like inside debt, which may mitigate underinvestment problems due to information asymmetries. Therefore, firms with potential agency conflicts are contended to benefit more from issuing private debt rather than non-monitored public debt. Second line of the literature is based on the liquidation and renegotiation arguments. Financial distress costs of public debt in renegotiations are generally higher than those of private debt, and public debt agreements are more difficult to renegotiate and emphasise more on the liquidation of distressed firms. Thus, such firms are predicted to avoid issuing public debt. Finally, transaction costs hypothesis states that there are economies of scale in issuing substantial amount of public debt. It follows that only large firms are likely to benefit from the cost advantage of public debt.

The following findings seem sufficient to emphasise the relevance of such a topic: James [1987] finds that announcement of bank loan issuance causes positive abnormal stock returns and the evidence of firm-bank relationship increases firm value. Datta et al. [2000] obtain that change in debt ownership structure can influence shareholders' wealth as they report a significantly negative share price response to public debt-IPO announcements. In addition, James [1996] finds that debt-mix is relevant for distressed firms to be able to alter their capital structure through non-court restructurings. Finally, Cantillo and Wright [2000] state that 'understanding how firms choose their lenders may unveil the mechanism through which recessions and booms propagate and persist in the economy'.

There is only one international paper examining the choice between private and public debt (Esho et al. [2001]). In fact, Rajan and Zingales [1995] argue that the difference between market-based and bank-based countries can be obtained in the debt ownership structure. In an attempt to fill the gap, this chapter explores cross-country differences with respect to debt replacement decisions of corporations.

Overall, our research detects that the relationship-type of dependent and independent variables with respect to direction and degree tends to be country-dependent. This general finding can be attributed to the differences in corporate governance mechanisms and institutional features of the countries which are presented in Chapter 2. In summary, the main contributions of this thesis are as follows: It uses dynamic panel data, GMM methodology is performed to control for endogeneity and simultaneity problem, the presence of any optimal financing mix is investigated, and the theories of corporate financing policies are tested in an international context.

"He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may be cast."

Leonardo da Vinci, 1452-1519

2. CHAPTER 1: REVIEW OF CAPITAL STRUCTURE THEORIES AND THE RECENT DEVELOPMENTS

2.1. INTRODUCTION

This chapter discusses first the fundamental themes of capital structure arguments that debate whether the proportion of debt to equity affects firm value under market imperfections, which do not exist in Modigliani and Miller's [1958] (M-M) capital structure irrelevance theory. In the context of recent developments, second, the discussion of debt maturity irrelevance is provided, i.e., is short-term debt superior to long-term debt or are there any firm-specific components that determine optimal corporate debt maturity? Third, the factors affecting the choice of firms between different financing sources, mainly public or private, are examined. Last section provides a discussion of dynamic debt use in renegotiations between lenders and borrowers in case of corporate financial distress as it causes bilateral opportunistic incentives if decisions are taken strategically.

2. 2. THEORIES OF CAPITAL STRUCTURE

In this section, it would be convenient to present firstly the famous propositions of Modigliani-Miller. They mainly state that value of firms in a frictionless and tax-free capital market is in fact independent of the mix of debt and equity. The efforts to introduce a role for financial decision making have focused on challenging the major premise on M-M theory. Because it can be possible that the amount of future cash flows of firms may be altered by financial decisions in the market. On the other hand, despite the corporate tax advantage of debts why firms' debt ratios are still low has been puzzling the corporate finance researchers (e.g., Berens and Cuny [1995], Miller [1977], Myers [1984]). On this direction, we will divide the main capital structure theories into four categories as being 'bankruptcy costs, tax-based, agency costs, and asymmetric information arguments" in order to show how deep the controversies of capital structure theories are.

2.2.1. MODIGLIANI AND MILLER (M-M) PROPOSITIONS

In their seminal paper that initiated the modern capital structure theory, Modigliani and Miller [1958] argue that market value of a firm is independent of its financial structure conditioned upon some assumptions. They mainly attempt to explain how a theory could be used to answer the *cost of capital* question in constituting investment theory of firm under uncertainty. The cost of capital is basically regarded, by the economic theories, as the interest rate on physical assets whose streams are surely known. Furthermore, optimal investment level is attained where market interest rate is equal to the *marginal* yield on physical assets. They highlight the importance of risk in assessing cost of capital in an *uncertain* environment where the profit maximisation and market value maximisation criteria are not equivalent to each other. In this case, only subjective individual utility functions can be used to evaluate different financing decisions giving different profit outcomes. It is not appropriate to analyse the investment opportunities normatively. For instance, a management cannot determine truly the risk preferences of its shareholders in the context of discriminating 'risk-adjusted' or 'certainty-equivalent' yield with market rate of interest. On the other hand, what makes the M-M propositions pathbreaking is their alternative approach based on market value maximisation as it has an operational and objective meaning of cost of capital and investment theory. Thereafter, the investment evaluation criterion is such that if the project is to raise market value of the firm's shares it is worth undertaking it, because otherwise its return would be less than the firm's marginal cost of capital.

Modigliani and Miller [1958, 1963] consider, directly or indirectly, a number of assumptions for their hypotheses:

i) Risk-free debt and risk equity are the only alternatives that firms use for their financial policies.

ii) Capital markets are frictionless.

iii) There are no wealth and personal taxes but corporate tax exists.

iv) Individuals can borrow and lend at risk-free rate.

v) All firms are in the same risk class.[1]

vi) The cash flow streams are perpetuities as there is no growth.

[1] This assumption can be considered as the key point of the M-M model as it implies that firms' shares within given risk class have both the same probability distribution of expected returns and the same expected return. As firms within a risk class differ from each other proportionately, one can argue that firms are perfect substitutes for each other; that is, there are no arbitrage opportunities.

vii) There are no signalling opportunities as there is no asymmetric information between corporate outsiders and insiders.

viii) Since the managers' aim is to maximise shareholders' wealth, there are no agency costs.

ix) There are no bankruptcy costs.

In their first proposition, M-M [1958] show that "market value of the firm is independent of its capital structure and is given by capitalising its expected return at its related risk class, i.e., average cost of capital of the firm is independent of its capital structure and equal to capitalisation rate of its equity stream class". It can be shown algebraically, with their language, that

$$V_j = S_j + D_j = \frac{\overline{X}_j}{\rho_k} \tag{2.1}$$

Where, j stands for firm and k for risk-class. V, S and D represent market value of firm, market value of common shares and market value of debts, respectively. $\overline{X}$ is the expected value of earnings before interest and taxes. ρ_k is equity stream's capitalisation rate.

Following the argument, M-M's second proposition states that "a share's expected yield (i) is equal to related capitalisation rate for equity stream in its class, plus a premium related to financial risk equal to debt to equity ratio times the spread between the premium (r) and interest rate charged for outstanding debt". This proposition could also be shown algebraically that

$$i_j = \rho_k + (\rho_k - r)\frac{D_j}{S_j} \tag{2.2}$$

In their second paper, M-M [1963] include the taxation to their analysis while discussing the effect of corporate taxes on the firm valuation. Instead of saying that the firm's market value in each class must be proportional in equilibrium to its expected returns net of taxes, they show this time that '*arbitrage conditions*' will make values within any class a function of *both* expected after-tax returns and tax-rate with the degree of leverage'. That argument would bring about an extreme solution of almost 100 percent debt financing for investment opportunities due to exemption of interest payments for debts from taxable income by the firm's corporate tax burden. In order to show the first proposition of M-M algebraically with their language, the following equations can be used.

$$V_U = \frac{(1-\tau)\overline{X}}{\rho\tau} \tag{2.3}$$

$$V_L = \frac{(1-\tau)\overline{X}}{\rho\tau} + \frac{\tau R}{r} = V_U + \tau D_L \tag{2.4}$$

Where, V_U, V_L are the present value of an unlevered firm having all equity and the value of levered firm, respectively. D_L is the permanent level of debt. τ is the marginal corporate income tax rate. R is the interest payment for debt; ρ is the discount rate for unlevered firm of equivalent risk. r is the rate at which the market capitalises the sure stream generated by debt, or the ratio of R/D_L.

Thus, the value of levered firm is equal to the value of unlevered firm plus the present value of the tax shield of outstanding debt. If corporate tax is zero, the value of both firms becomes identical to each other. Then, MM-I states that the value of the firm is completely independent of financial decisions in the absence of any market imperfections, specifically corporate taxes.

Apart from the restrictions mentioned above, Stiglitz [1969] also determines several limitations of M-M arguments: first, they depend on the existence of risk class whose use seems to imply objective probability distributions over possible state occurrences. Second, they are based on partial rather than general equilibrium analysis. Third, whether these propositions are valid for competitive markets is not clear. Fourth, it is also not clear that how the possibility of bankruptcy affects the validity of the propositions.

Under the light of these limitations, the M-M findings simply allege that the firm's value is independent of the mix of debt and equity. Because if the firm's value could be changed altering financial mix of debt and equity, this would create a pure arbitrage opportunity by earning higher rate of return without changing the risk at all. As Ross [1988] argues, suppose that one firm is purely capitalised with equity and other with both debt and equity and further suppose levered firm is more valuable than unlevered one. Then, buying an equal percentage share of levered firm's debt and equity would cost less than the same percentage share of unlevered firm, but it would lead an outsider investor to require exactly the same cash flow! Such an arbitrage possibility would increase the price of levered firm's equity and lower the price of unlevered firm's equity until two firms had the same value. Consequently, when a firm increases its debt to equity ratio its value does not change as the risky cash flow pattern in the capital market can be *duplicated* elsewhere in the economy at zero cost.[2]

Taking the practical applications of corporate finance into account, one can say that the assumptions of M-M theory are too unrealistic to be considered. Some authors (e.g., Stiglitz [1974]) support the idea that whether they are important or not, the theoretical importance of the theorem is not diminished. Stiglitz suggests first to assume a world without transaction costs, tax distortions and other frictions, then to observe whether in these circumstances firms ignore their financial structure. In other words, the M-M theory is essential to understand both under which conditions capital structure is irrelevant and whether we might have an optimal capital structure in practice. The extreme predictions of the M-M analysis, yet, have led the researchers to investigate why firms do not have a hundred percent debt in their capital structure. Therefore, in the following sections, by relaxing these assumptions we will discuss and question the validity of the M-M theory in a more realistic conjuncture. We, then, attempt to shed light on the fact that why firms' capital structure do not contain only debt due to tax advantage of debt financing by some potential cost of being highly-indebted.

2.2.2. CAPITAL STRUCTURE AND BANKRUPTCY COSTS

The M-M theory does not consider bankruptcy, in a way the firm may not be able to earn its obligations with certainty, which makes their proofs problematic. If financial markets know that a firm has a positive probability of going bankrupt, it will undergo higher nominal interest rates to be charged for its debt obligations. Optimal capital structure, here, may not exist if an individual borrows collateral securities and if he forfeits the securities in case where his return from securities becomes less than his borrowings (Stiglitz [1969]). That is, their proofs are valid in complete and perfect capital markets where firms are price-taker and there are no bankruptcy penalties. According to the general consensus, the optimisation of capital structure involves a trade-off between the present value of tax rebate associated with a marginal increase in leverage and present value of the marginal cost of the disadvantages of leverage.

[2] Heins and Sprenkle [1969], furthermore, agree with the M-M hypothesis that arbitrage will drive the market values of the two firms together but they argue that M-M's illustration for arbitrage process is wrong.

In their single period model in a complete market, Kraus and Litzenberger [1973] introduce corporate taxes and bankruptcy penalties by considering them as market imperfections that are central to capital structure theory. In the model, the firm's financing mix determines the states where the firm earns its debt obligation and receives its tax savings due to deductibility of interest charges. They regard the determination of specific debt level such that resulting states (solvency, insolvency) give the maximum firm value as the problem of capital structure formulation. They also show that market value of levered firm identical to the unlevered firm's market value, plus corporate tax rate times its debt amount, less the complement of corporate tax rate times present value of bankruptcy costs. Hence, one can say that the mix of debt and equity matters if the capital markets are incomplete and imperfect.

In order to discuss the trade-off between bankruptcy costs and tax savings, there should be a considerable magnitude of bankruptcy costs. This issue was examined by Warner [1977] by working on 11 railroad bankruptcies occurred between 1933-55. He measures bankruptcy costs, on average, as about 1 percent of the firm's market value prior to bankruptcy, which is too low as compared to Baxter's [1967] 20 percent level, referred to his personal bankruptcies data. Warner claims that ratio of direct bankruptcy costs to the firm's market value appears to decline as the firm' value raises. These differences, yet, reveal the fact that not all bankruptcy costs are measurable direct costs as some of the omitted indirect costs may be substantial in determining optimal capital structure (Warner [1977], Altman [1984]).

With respect to bankruptcy costs components, Kim [1978] lists several items; first, depending on whether bankruptcy takes the form of reorganisation or liquidation, there may be either shortfall or indirect cost of reorganisation. Second, arising in the course of bankruptcy proceedings, various administrative expenses must be paid to third parties. Third, firms lose tax credits, which they would have received if they had not gone bankrupt. Since he alleges that optimal capital structure is a meaningful concept only if it can be shown that *optimal debt is strictly less than debt capacity*, then, shareholder wealth maximising firms should search for optimal capital structure rather than simply maximise their borrowings[3].

[3] Turnbull [1979] also finds that optimal capital structure always occurs before the firm's debt capacity, which is defined as the maximum amount of credit that lenders will extend to the firm. He uses a simple option model since the capital asset pricing model (CAPM) is misspecified and misleading in an economy where corporate interest expenses are tax deductible (see, Gonzales et al. [1977]).

On the other hand, Haugen and Senbet [1978] show that all costs related with liquidating or dismantling the assets of unprofitable firm are not related to capital structure or the firm's state. They further contend that any cost associated with bankruptcy, or ownership transfer, must be limited to lesser of (a) cost of bankruptcy and (b) cost of avoiding the transfer. The authors argue that truly significant "penalty" costs to bankruptcy are more appropriately attributed to liquidation, which is a capital budgeting decision that should be considered independent from bankruptcy event. Consequently, they conclude that in the existence of rationality and absence of systematic errors in pricing by capital market, *liquidation* decision is best considered as being independent of firm's state of its capital structure. It follows from this point that present value of expected costs associated with terminating the firm's operations are also unrelated to degree to which the firm employs financial leverage, accordingly, these costs should *not* play a significant role in determining optimal capital structure in the context of these restrictions.[4]

Miller [1977] argues that introduction of corporate and personal taxes do not refute capital structure irrelevance hypothesis in the absence of bankruptcy costs. With the assumption of the existence of bankruptcy costs, the "tax shelter-bankruptcy" hypothesis determines the firm's optimal capital structure as a function of business risk, future earnings' distribution, taxes and default costs. Indeed, according to Castanias [1983], a shift in the distribution of earnings increases the probability of bankruptcy will induce a firm to hold less debt in its financial structure. This gives us to have a testable implication, which can be the existence of an *inverse* cross-sectional relationship between leverage and probability of bankruptcy. Castanias, based on his empirical work, gives credit to tax shelter-bankruptcy model and supports the inconsistency of Miller's irrelevance argument.

The puzzle that why firms or industries occasionally change their debt amounts and how the firms ascertain the debt levels still lead researchers to explore possibly other determinants of capital structure. After the emphasis of Williamson [1988] on the relation between debt capacity and the assets' liquidation value, Shleifer and Vishny [1992] work on the issue of asset sales and liquidations to illuminate the cross-sectional differences of leverage. Their market-based approach implies that liquidated assets of bankrupt firm are underpriced in recessions and thus proposes that asset illiquidity might be an important cost of leverage. It also explains how asset illiquidity reduces the optimal amount of debt

[4] Haugen and Senbet [1988] reconfirm their original idea that bankruptcy costs are unlikely to be effective in valuation and operation of the levered firm provided capital markets perform well.

in the capital structure; as more debt causes costly liquidation and avoids inefficient investment, we might obtain an interior debt level by means of balancing these costs and benefits.

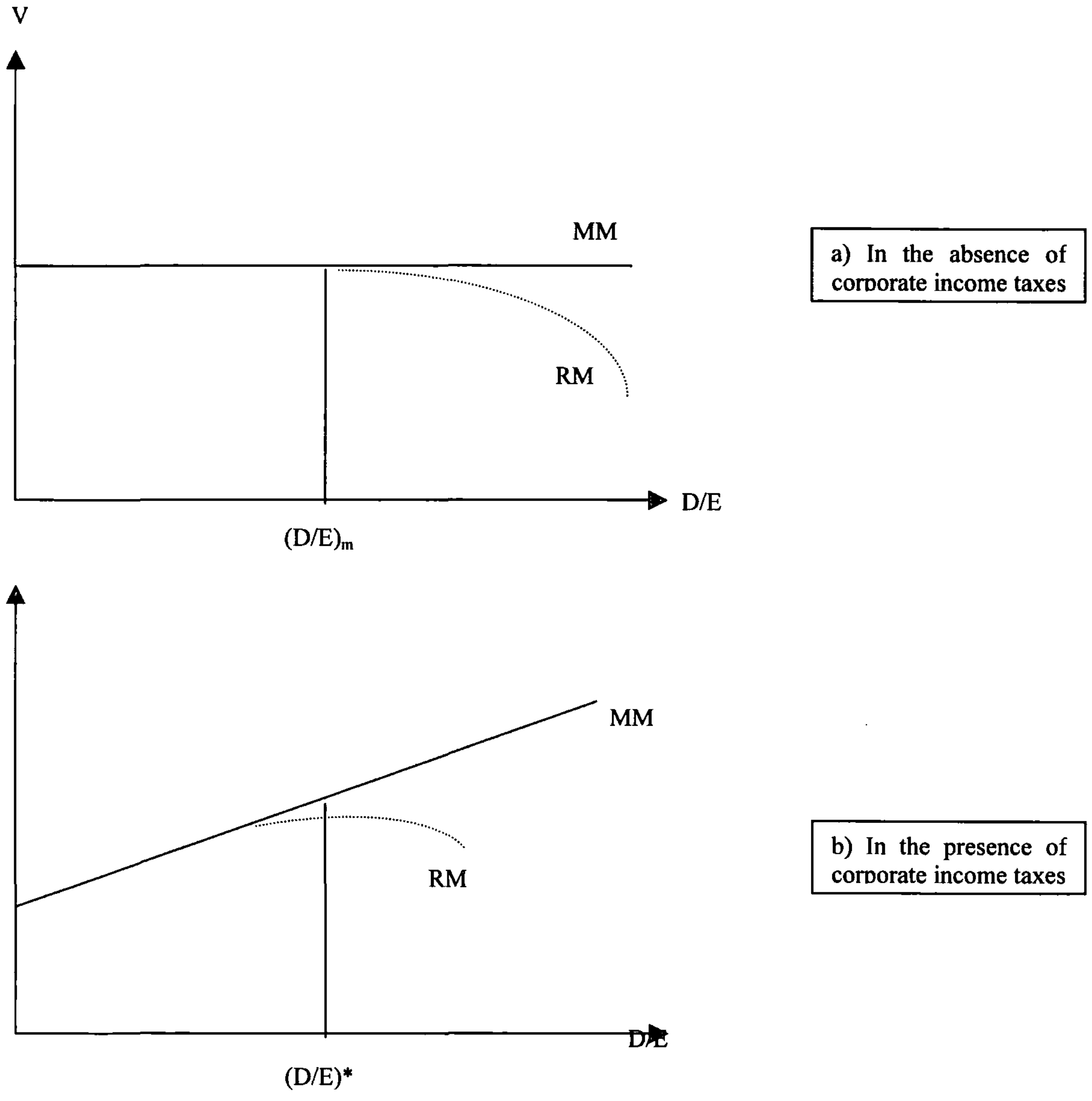
Consequently, since liquid assets are effectively better collateral, one can argue that those firms having more illiquid assets would have relatively less debt capacity. Shleifer and Vishny conclude, also supporting Miller [1977], that optimal capital structure of a firm depends on the leverage of other firms in its industry. It is implied that an industry might have optimal debt capacity even when the individual firm does not, which emphasises the role of industry rather than the economy.

In the end, it seems that there is no an overall consensus on the bankruptcy costs effects to the theory of optimal capital structure despite the numerous works due to, for example, their different measurement methods in quantifying bankruptcy costs and confusion of bankruptcy costs with liquidation costs. Nevertheless, the bankruptcy costs seem significant enough to threaten the validity of hypotheses of capital structure irrelevance.

2.2.3. CAPITAL STRUCTURE AND TAXES

Later, Modigliani and Miller [1963] include corporate tax effect to their analysis. This time they suggest an almost 100 percent debt financing as an optimal capital structure condition because of the deductibility of interest payments on indebtedness from corporate gross income in calculating net taxable corporate earnings. Since then, finance specialists have made steady progress to envisage more realistic and comprehensive models of the relationship between tax system and capital structure decisions. One of the first reactions to M-M [1963] is the study of Robichek and Myers (R-M) [1966], who argue that market value of firms is an *increasing* function of leverage for firms with little or no debt but then ultimately *declining* if debt is used too much. Figure 2.1 illustrates a comparative picture of these arguments. In Panel (a), the M-M [1958] hypothesis argue that firm value is invariant with leverage if corporate tax rate is zero. However, R-M argue that there is no unique point of optimum leverage but the firm should not exceed the point $(D/E)_m$, that is, firm value is unaffected by moderate amounts of leverage but will decline with high leverage. In Panel (b), M-M [1963] suggest % 100 debt financing, if possible. R-M, on the other hand, argues that there is a point (or range) of optimal leverage at point $(D/E)^*$ due to expected bankruptcy or reorganisation costs.

Figure 2.1: The Relation Between Market Value of Firm (V) and Leverage (D/E):
A Comparison of Modigliani-Miller (MM) and Robichek-Myers (RM) Hypothesis.



This controversy has gained a new dimension with the introduction of personal taxes by Miller [1977]. While re-examining the tax advantages of debt financing in his more sophisticated model, Miller determines the gain from leverage, G_L, for the shareholders in a firm holding real assets by the following equation;

$$G_L = \left[1 - \frac{(1-\tau_C)(1-\tau_{PS})}{1-\tau_{PB}}\right] B_L \qquad (2.5)$$

Where, τ_C is the corporate tax rate; τ_{PS} is the personal income tax rate applicable to income from common stock; τ_{PB} is the personal income tax rate applicable to income from bonds; B_L is the market value of levered firm' debt level.

Hence, if neither of these taxes exists, the gain from leverage would disappear giving the same standard M-M no-tax result. If the equation $\tau_{PS} = \tau_{PB}$ holds, the gain from leverage would be provided only by corporate tax, $\tau_C B_L$, implying a 100 percent debt financing.

In his fashionable version of optimal capital structure, Miller argues that even in a world in which interest payments are fully deductible in calculating corporate income taxes, in equilibrium, the firm's value will still be independent of its capital structure! He thinks that the great emphasis on bankruptcy costs in the framework of optimal capital structure has been misplaced since the proposition of the trade-off between tax gains and bankruptcy costs has no sufficient practical implications by giving the examples of giant but low-levered firms. Miller truly asks if optimal capital structure is simply a matter of balancing tax advantages against bankruptcy costs, then, why observed capital structures show so little changes overtime. During the heydays of economy, the debt-equity ratios of firms tend to fall and these ratios vary substantially and persistently across industrial sectors. At this point, Miller demonstrates the reason for including the effect of personal taxes, as an another explanation to capital structure puzzle, by the fact that the failure to close disequilibrium gap cannot convincingly be attributed to bankruptcy costs or agency costs of debt financing[5].

In the analysis, Miller asserts that when the tax rate on income from shares is less than the tax on income from bonds, the gain from leverage disappears wholly or even becomes *negative* in the equation (2.5). This is because investors hold securities for their 'consumption possibilities' they acquire and thus will assess them in terms of their yields net of all tax drains. Specifically, the gains of corporates will be offset by the loss of bondholders, as they will have to pay on their interest income obtained from debt

[5] Earlier to these arguments, Brigham and Gordon [1968] find that investors are not indifferent between leverage on corporate and personal basis. On the other hand, a recent study by Graham [1999] reports that personal taxes do not completely cancel out the advantage of using corporate debt although they reduce the motivation of debt financing. Furthermore, Barnea et al. [1981] generalise Miller's bond market equilibrium by including cost functions for tax avoidance and agency cost of debt, and argue that capital structure affects firms' market value.

borrowings. Thus, the market will not give an opportunity to the firms to increase their value by substituting equity for debt (or vice versa) in equilibrium, which can be defined by the intersection of interest rates and quantity of bonds outstanding. Miller, consequently, concludes that there will be an equilibrium level of *aggregate* corporate debt, i.e., optimal debt-equity ratio for a corporate sector as a whole but the firms individually will *not* have an optimal debt-equity ratio[6].

Afterwards, DeAngelo and Masulis [1980] show that the existence of non-debt corporate tax shields, e.g., investment tax credits and depreciation deduction is sufficient to refute Miller's leverage irrelevance theorem, which is quite sensitive to realistic and simple modifications in the corporate tax code. In their model, these realistic tax code notions imply a unique interior optimal capital structure decision for individual firms in the market equilibrium by considering all supply side adjustments. More strikingly, they support the idea that introduction of bankruptcy costs, agency costs or other leverage-related costs are not necessary fundamentally for the existence of optimal capital structure. Thus, Miller's firm level irrelevance of leverage propositions do not hold with positive corporate tax shield substitutes for debt since market prices will adjust until in market equilibrium, accordingly each firm will have a optimum debt to equity ratio. DeAngelo and Masulis favour the existence of unique interior optimum because there is a constant expected marginal personal tax disadvantage to debt while positive tax shield substitutes suggest that the expected marginal corporate tax benefit decreases as leverage is added to the capital structure. Eventually, the expected marginal corporate tax benefit just equals the expected marginal personal tax disadvantage of debt at unique optimum. Their model predicts that firms will select a debt level, which is negatively related to the level of available tax shield substitutes for debt.[7]

Their leverage optimality condition can be shown as follows:

$$\frac{\partial V}{\partial B}[B^{*}] = \frac{\overline{P}_D}{(1-\tau^{\mu}{}_{PD})}\left[\tau_C\left\{\int_{S^3}^{\overline{S}}\Pi(S)dS + (1-\theta)\int_{S^2}^{S^3}\Pi(S)dS\right\} - \tau^{\mu}{}_{PD}\right] = 0 \qquad (2.6)$$

6 Later, Hodder and Senbet [1990] generalise the Miller analysis to international equilibrium characterised by differential international taxation and inflation and obtain Miller-type equilibrium. They show that there is no optimal capital structure for individual firms provided they engage in international tax arbitrage transactions.

7 Yet, their hypothesis is not supported by the empirical studies of Bradley et al [1984] and Titman and Wessels [1988], among others. One could explain this contrary (positive) relationship with the Secured Debt Hypothesis developed by Scott [1977], and Stulz and Johnson [1985].

Where, τ_{PD} and τ_{PE} represent constant marginal personal tax rates on debt, and equity, respectively; τ_C is marginal corporate tax rate. $P_D(s)$ and $P_E(s)$ are current market prices per unit dollar of before personal tax debt and equity income to be delivered in state (s), respectively; $\overline{P}_E, \overline{P}_D$ are the current market prices of before personal tax expected equity and debt cash flow, respectively. θ is maximum fraction of gross tax liability shielded by tax credits; $\Pi(s)$ is probability of occurrence of state-s. B is the face value of debt. Furthermore, If the investors are risk-neutral with homogenous beliefs, then,

$$P_D(s) = \overline{P}_D\Pi(s) \; and \; P_E(s) = \overline{P}_E\Pi(s) \tag{2.7}$$

That is to say, for relatively *low* levels of leverage, less than B^*, the marginal value of debt is positive since it is highly probable that extra debt acquisition can be fully used so as to decrease tax liabilities of the firm. It is because this corporate tax reduction is more than higher personal taxes paid on additional debt. However, for relatively *high* levels of leverage exceeding B*, marginal value of debt turns out to be negative as additional personal tax liability of debt occurs. Then, DeAngelo and Masulis eventually conclude that the firm's optimal leverage (B*) will maximise the current market value of the firm, $V = D + E$.

In addition to these arguments, Modigliani [1982] discovers serious difficulties with Miller's framework due to its tendency to bring about unstable corner solutions: For instance, if the supply of debt has costs, then, the intersection of demand and supply can only be at a specific point where debt is valuable at the margin. This means that, contrary to MM theory, leverage is a serious issue of financial policy. It is also clear that as capital gearing increases the riskiness of shares also increases as bankruptcy risk comes to agenda by preventing the ultimate benefits of debt financing. Therefore, one can say that taxes seem to play an important role not to be disregarded in the choice of financial leverage[8].

[8] Concerning our present work dealing with the international perspectives of leverage puzzle at the same time, Swoboda and Zechner [1995] derive capital structure equilibrium in a *multinational* setting. They show that firms in countries with relatively higher corporate tax rates and inflation rates have a comparative

2.2.4. CAPITAL STRUCTURE AND AGENCY COSTS

As the firms are run by self-interested agents, the separation of ownership and control results in several types of agency costs. According to Jensen and Meckling (J-M), [1976], that managers hold less than 100 percent of the residual claim creates the conflict of 'managers-shareholders'. Moreover, since equityholders get most of the return from an investment financed partially by debt, another conflict between 'equityholders-debtholders' persists. If there are some deficiencies of debt tax shields, and bankruptcy costs in explaining optimal capital structure, the existence of agency costs might stand for this optimality condition. In their original incentive argument, J-M elaborate the idea that it is possible to attain an optimal capital structure by trading off the agency costs of debt against the benefits of debt. Similarly, if the firm goes bankrupt the manager will no longer be able to enjoy the benefits stream, so, he does not want to spend all the money. By this way, one can detect another trade-off between a higher stream of private benefits versus a higher risk of bankruptcy. Additionally, payment on debt reduces free cash flow available to the managers for perquisites use; high levels of debt force managers to spend more time actively managing the firm and less time enjoying activities that do not raise shareholders' wealth. J-M highlight the importance of agency costs by quoting that 'neither bankruptcy costs nor the existence of tax subsidies can explain the use of preferred stock or warrants which have *no* tax advantages and there is no theory which tells us anything about what determines the fraction of equity claims held by insiders as opposed to outsiders'. They, therefore, suggest that given increasing agency costs with higher propositions of equity and higher propositions of debt, an optimal mix of debt and equity exists even in a taxless world having no bankruptcy costs as it minimises total agency costs. J-M conclude that agency costs of external equity are assumed to decrease as percentage of external equity decreases and agency costs of debt are assumed to increase. Thus, the interior solution is between 0 and 100 percent. If agency costs of external equity are very low, then, optimal capital structure can hold in the trade-off between tax shield benefits of debt and it agency costs. Scott [1976], on the other hand, shows that optimal financial mix might be related to collateral value of the tangible assets owned by firm against secured debt.

In terms of optimality, Myers' [1977] paper is similar to J-M's. He considers the *suboptimal* investment policy as an agency cost induced by risky debt, which was not

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advantage issuing debt and should thus be more highly leveraged. Since stochastic earnings tend to make international tax shields risky they result in firm-specific interior optimal debt levels.

particularly discussed by J-M. According to his observations, in case of the possibility of bankruptcy in near-future, equityholders suffer from the lack of incentives to contribute new capital even to invest in value-increasing projects. It is because all the investment costs are borne by equityholders whereas the debtholders capture the returns from investment. Hence, larger debt levels bring about rejecting the more value-increasing projects, thereby resulting in an *underinvestment problem.*[9] This problem is essential for firms with growth opportunities as too much debt decreases their value. Myers suggests that issuing *risky* debt decreases the firm's market value in some states of nature where it passes up valuable investment opportunities with positive NPV. The reduction in the firm's market value is burdened by existing stockholders. He, then, argues that if there is a tax advantage of debt financing, the optimal capital structure should be based on the *trade-off* between this benefit and the costs of the suboptimal future investment strategy, which are the results of agency costs of risky debt financing.

Grossman and Hart [1982] also focus on incentive effect of debt financing. They argue that the ex-ante conflict between equityholders and management can be mitigated because of the possibility of bankruptcy. Managers will voluntarily choose debt financing so that the funding net of the cost of investment can be available for their private consumption. Further, if their allocated cash flows are limited managers avoid overinvestment by not taking on negative NPV-projects. Then, managers will face with a trade-off between bankruptcy probability and less money for their consumption perks. That's why the investment is financed with both debt and equity even if the financing policy is determined by the management.

Once managers have decided to use debt, they accept this at the expense of the probability of losing their jobs in default, which J-M call this as the *bonding mechanism* of external debt causing the management to perform efficiently. Jensen [1986], then, argues in his managerial incentives-based *Free Cash Flow Theory* (FCFT) that debt reduces the agency cost of free cash flow in excess of required funding for positive–NPV

[9] Myers proposes some patterns to mitigate this underinvestment problem: a) Rewriting the debt contracts, b) Renegotiating the debt contracts, c) Shortening debt maturity, d) Restrictions on dividends, and e) Monitoring and protective covenants. Furthermore, Smith and Warner [1979] propose restrictive bond covenants; Green [1984] suggests warrants or convertible debt; Stulz and Johnson [1985] argue that secured debt collateralisable with tangible assets can be used; and Bergman and Callen [1991] suggest debt renegotiations to mitigate the underinvestment problem.

projects[10]. It is contended that managers have the incentive and opportunity to undertake wasteful projects due to excess (free) cash flow, which is called *overinvestment problem.* His control hypothesis for debt creation alleges that managerial discretion of exploiting extra funds will be reduced especially in organisations having low growth opportunities with large cash flows. As higher leverage might cause firm bankruptcy, Jensen contends that the trade-off between marginal cost and benefit of leverage implies an optimal financing policy.

As Haugen and Senbet [1988] point out, even a well functioning market fails to overcome agency problem and this fact necessitates the existence of complex contracts, for example, convertible-callable bonds which can be explained on the basis of their capability to mitigate conflicts of interests between stockholders and bondholders. They accept that bankruptcy costs should play an *insignificant* role in the valuation and operation of the levered firm. Although the market cannot discipline managers to avoid the risk-associated costs with the risk incentive problem, management could be disciplined without cost by the help of complex contracting, conversion privileges or executive stock options under various circumstances. In that sense, Haugen and Senbet argue that if the firm has a continuous opportunity to alter its risk by changing its production function method, it will move to an *optimal risk level* and incur the optimal agency costs after trading this cost off against the debt's tax benefit or the equity's agency cost.

The discussions on the capital structure puzzle have mainly been based on debt tax shields, debt selection signalling firm quality and agency cost of debt. Focusing on reorganisation versus liquidation, Harris and Raviv [1990] give, alternatively, importance to informational and disciplining role of debt. Their theory is based on the idea that debt makes sure the management disciplined with useful information, which is essential for investors in deciding whether to liquidate the firm or reorganise it. The managers are reluctant to liquidate the firm in any case and do not want to provide information to investors. Harris and Raviv believe that the optimal amount of debt is determined by trading off the information value and opportunities to discipline management against the potential investigation costs. According to this model, the firms having high liquidation

[10] Zwiebel's [1996] model assumes the same benefits of debt with FCFT theory; but the prediction of 'excessive debt may cause managers to forgo good projects' in FCFT is not supported by his model as all good projects are always undertaken.

values (tangible assets, lower investigation costs) will be highly levered and will have relatively high market values despite the probability of default.

According to Stulz [1990], optimal financing policies can reduce the costs shareholders bear due to *overinvestment* of management depending on both the cash flow distributions in each period and their present value. In his model, managers are always willing to invest all existing funds even if paying out cash is better for investors. This causes the reduction of funds for future profitable investment as the 'free cash' exhausts. Therefore, Stulz argues that one can attain an optimal capital structure by trading off the benefits of debt in preventing investment in value-increasing projects against the cost of debt in preventing investment in value increasing projects. This fact implies that for the firms having potential growth opportunities through profitable investments we expect relatively lower debt levels, confirming Jensen [1986], as compared to mature industries lacking good investments. Stulz concludes that capital structure is not irrelevant because it reduces the agency costs of managerial discretion causing overinvestment and/or *underinvestment* costs.

There are other models concerning with the conflict of bondholders and shareholders: Bondholders would prefer firms' less risky projects to finance them. On the other hand, shareholders might prefer extremely risky projects. If the risky project is successful, the bondholders can be paid-off on the maturity of debt; if not, the firm will default. In the end, shareholders will have nothing to lose due to their limited liability and bondholders will be left with a valueless firm. This case or game, in which managers are forced by shareholders to take on riskier project at bondholders' expense, causes an *asset substitution problem.*

In the end, it again seems that the existence of agency costs is prone to invalidate capital structure irrelevance arguments under more realistic conditions.

2.2.5. CAPITAL STRUCTURE AND INFORMATION ASYMMETRIES

The M-M theory suggests that there is no systematic relationship between the value of the firm and financing decisions in a world of symmetric information; market knows the random return stream of firm and values this stream to set firm's value. However, financial markets are characterised by informational asymmetry differences simultaneously between all economic agents in terms of two cases. In case of *moral hazard*, the principal and agent have the same information up to a point, thereafter the principal cannot observe the action that agent made. In case of *adverse selection*, the agent can make use of the information valuable to principal but the principal cannot observe it although they both know that the information favours the principal. Therefore, several models have been developed to understand whether debt- equity ratio signals information about the return distribution. If we assume that financial markets are not fully aggregating; market prices do not reflect all publicly available information, then, it could be possible that managers elect to use financial policy decisions to convey information to market.

Ross [1977] contends that a high-value firm's management can be directed to depend heavily on debt financing through an incentive-based compensation contract. According to Ross, what is valued in the market is *perceived* stream of the returns for the firm. Managers will choose to set up unambiguous signals to public concerning firm's future financial activities.[11] The unsuccessful (low-quality) firm cannot mimic these signals since they do not have enough cash flows to back them up and because managers have incentives to 'tell the truth' in the context of bankruptcy probability and management compensation. He, thus, concludes that there would be *no* signalling equilibrium in financial leverage without the existence of sufficient incentive for managers to tell the truth. If very rich signals can be communicated with complex managerial incentive schemes, then, Ross (theoretically) implies that by changing capital structure and managerial incentives constantly, the market can be provided with perfect information.[12] Miller and Rock [1985] also argue that capital structure changes convey information about firms' future cash flows.

Furthermore, Leland and Pyle [1977] consider a better-informed entrepreneur about the distribution of returns than the outsiders. They say that in equilibrium the entrepreneur's equity position in his project, which has been identified as valuable, is related to project's value. However, this resulting equilibrium is apparently different from the models neglecting asymmetric information. Contrary to M-M [1958, 1963], they imply that value of the firm increases with the share of firm owned by the entrepreneur and capital structure of firm will not be irrelevant even in a taxless world. The model assumes that both lending and debt are at riskless rate in rational expectations signalling

[11] The model assumes that, unlike investors, managers know the true distribution of firm returns. Financial markets are expected to react positively to the new debt issuance increasing the share's market value, which is a motivation for managers. However, due to high debt ratio the firm may go bankrupt. It is also assumed that debt level, bankruptcy probability, profitability and firm value are all positively-correlated.

[12] Ross [1977] argues that his incentive-signalling model should not only be attributed to capital structure determinants of firms but also to the capital asset pricing models and option pricing models to have a more realistic theory of corporate finance.

equilibrium. Firm debt is determined as the residual amount necessary to finance the project. The debt-equity ratio is uniquely determined in this equilibrium. Leland and Pyle show that the debt value will fall as risk increases, i.e., greater project variance implies lower optimal debt even there are no bankruptcy costs! An unconditional regression between the debt value and firm value reveals a positive correlation; more debt will raise the firm's value. However, this fact does not invalidate the M-M theory, they say, since there is a *statistical* but not a *causal* relationship between firm's value and debt, which comes about because a higher debt amount goes in hand with a higher share of equity owned by entrepreneur. They conclude that the debt-equity ratio should not matter in a regression conditioned on that entrepreneur's share but the use of its signal will be positively correlated with the firm's value.

In their classical paper, Myers and Majluf [1984] analyse a model in which the firm's capital structure is established and its shares are publicly traded. They mainly argue that due to adverse selection, there are chronic problems in raising outside equity. This is based on the idea that if investors are not adequately informed than current firm insiders about the value of the firm's total assets, then the market may misprice the equity. If the firm can issue default-free debt it does invest in positive-NPV projects; if the debt is not riskless the firm may not always benefit from positive-NPV projects. Myers and Majluf believe that asymmetric information about a firm value is a stronger determinant of financing behaviour than asymmetric information about risk. The model asserts that if the manager is acting in the interest of old shareholders, then no new equity from new shareholders can be raised when there is no investment to be undertaken. The manager will be willing to issue new shares provided that shares are '*overvalued*'. Paradoxically, if the market knows that the equity is overvalued, there will not be any trading of the shares![13] In this analysis, debt financing is preferred to equity financing even when debt is not riskless. Because of the empirical support, it is said that security prices decline when new issue is raised in the framework of adverse selection.[14] Hence, if the firm is still issuing equity at the expense of lowering its stock price, this means that given manager's private information, a new project is undertaken because the firm was overvalued. This action favours the present shareholders, which they explain this by an

[13] The seminal paper of Akerlof [1970] emphasises this adverse selection problem, which shows how markets can break down when potential buyers cannot be convinced of the quality of the product ('lemon') they are offered.
[14] Krasker [1986], e.g., shows that the larger the stock issue, the worse the signal and the decline in firm's stock price.

information effect. Namely, the issue would not matter in itself but it renders a signal for investment decisions. Myers and Majluf proposes to resolve asymmetric information by the help of the fact that if the firm uses its available liquid assets to finance positive-NPV projects, then all positive-NPV projects should be undertaken since no new equity is issued. The model further implies that firms should retain sufficient *financial slack* (cash and marketable securities holdings) for their future valuable investment opportunities in order not to be negatively affected by the informational asymmetries. In the end, they do not provide a general optimal dynamic issue strategy although the model deems old shareholders as better-off for ex-ante optimal financial policies.

Closely related to these issues, Myers [1984] proposes a '*Pecking Order Theory*', where the investment opportunities will be financed first internally, then with debt (low risk choice) and finally with equity (riskier choice). In this theory, firms adapt their target dividend payout ratios to their investments but there is *no well-defined target debt-equity mix* explanation owing to two kinds of equity; external and internal. According to Pecking Order Theory, the most profitable firms generally borrow relatively less because they do not need outside financing not because their debt ratios are high.[15] The benefits of interest tax shields are in the second-order effect and debt ratios change when the internal cash flow is not balanced in this theory. In this dynamic framework, more profitable firms in an industry with relatively slow growth rates will have low debt-equity ratios. However, unlike in intra-industry differences, the theory is less successful in explaining inter-industry debt-equity ratio heterogeneity. Therefore, one can emphasise that Pecking Order Theory has no certain target debt ratio (no optimal capital structure), contrary to *Static Trade-off Theory*, in which a firm's optimal debt ratio can generally be attained by trading off the benefits and costs of borrowing. Here, the main balancing component of interest tax shields as a cost is bankruptcy. In the Static Trade-off Theory, the firm having more tangible assets and taxable income should have higher target debt ratios. And, if there are no adjustment costs for capital structure, then, each firm should 'always' be at its target ratio. In practice, however, there are costs and lags to adjustment, and the firms may not quickly respond to random events to implement their optimal debt-equity

[15] In their recent paper, Shyam-Sunders and Myers [1999] reconfirm the power of Pecking Order Theory in explaining capital structure differences across firms based on their main empirical results. They argue that the pecking order is an excellent first-order guide to explain corporate financing behaviour especially for mature corporations. Due to unanticipated cash requirements of corporations, the firms might not comply with Pecking order. Thus, their results suggest that firms may borrow when anticipated cash deficits are to occur. As a reaction to this study, Chirinko and Singha [2000] contend that neither Pecking Order nor Trade-off theory can be empirically assessed due to some serious difficulties.

ratios.[16] Myers confesses two clear inadequate points of his theory: First, the modified pecking order theory depends on sticky dividends, but does not give any reason for their stickiness. Second, it fails to explain well that when and why equity shares are issued. Nevertheless, the theory seems to help explain sufficiently the observed corporate behaviour.

In an environment, where there is asymmetric information between lenders and borrowers, Williamson [1986] constructs a link between equilibrium credit rationing and financial intermediation. He does not identify all potential buyers as identical since some get loans and others not but it is not due to moral hazard or adverse selection. Instead, Williamson argues that costly monitoring of borrowers by lending agents implies that debt contracts are optimal, which means that there is a possible credit-rationing equilibrium because of an asymmetry in the payoff functions of lenders and borrowers given risk neutrality.

Blazenko [1987], in his managerial performance based paper, shows that with symmetric information, managers always use equity, like in the M-M world where shareholders are indifferent to financial leverage. Narayanan [1988] tries to explain the use of debt in a different manner. In situations, where there is informational asymmetry in which the outsiders are less informed about the quality of the firms than insiders, the use of dent by profitable firms keeps the inferior firm out of the market without the stipulation of distinguishing firm quality levels. By this elimination, the average quality of firms remaining in the market increase, which, in the end, will benefit these remaining firms by mitigating the adverse effects of asymmetric information. Like in the model of Myers and Majluf, Narayanan shows that when informational asymmetry concerns only the new project's value, one might have overinvestment. Also, when the firm's share is underpriced by the market, it prefers debt to external equity.

In brief, the discussions above give sufficient theoretical background to understand the existence of optimal capital structure even though there is no an apparent consensus on this issue. A possible explanation could be that signalling efficiency can be specifically important in settings where bankruptcy is costly. Some firms may signal their values very efficiently by preferring raising capital with equity, whereas some firms that find signalling too costly will prefer debt to equity.

[16] At this point, Myers notes that 'any cross-sectional test of financing behaviour should specify whether firms' debt ratios differ because they have different optimal ratios or because their actual ratios diverge from optimal ones'.

2.2.6. PRODUCT-INPUT MARKET INTERACTIONS

This approach assumes that a firm's financing decisions are related to its specific industry environment, e.g., its relationships to the rival firms, suppliers, and customers. Apart from debt-equity capital related costs, Titman [1984] proposes that agency costs are important for contracts between the firm and its customers or employers. In his two-period model, the firm can be viewed as a nexus for contracting relationship between the firm' different classes of security holders and its customers, workers and suppliers. He demonstrates that a value-maximising firm's optimal liquidation policy is not, in general, time-consistent. In this context, it could be assured that equityholders continue to operate the firm with relevant capital structure selection when there is no bankruptcy, and that the firm is bankrupt and controlled by bondholders who decide to liquidate the firm in those states of nature. The optimal policy is consistent only in those states with liquidation. Titman's model predicts that the firm which can potentially impose high costs (e.g. computer and automobile sectors) on their customers and business associates in the event that they liquidate choose relatively low debt-equity ratios, unlike those which impose relatively low costs (e.g., hotels and retailers) choose relatively high debt-equity ratios. Thus, capital structure can be used to commit equityholders to an optimal liquidation.

In Brander and Lewis' [1986] model, limited liability effect is modelled such that shareholders of levered firm benefit when fixed payments to debtholders are lower than operating income. They discuss the relationship between corporates' capital structure and their strategy when competing in the product market. It is argued that oligopolists with relatively high leverage will increase risk through more aggressive output policy and monopolists are shown to have less (long-term) debt in competitive industry than oligopolists have.

Maksimovic and Titman [1991] show that producers' reputation for high-quality non-unique and non-durable goods cannot be kept when the firm goes bankrupt. It is argued that firms producing high-quality products tend to be less levered. This in turn implies that increased probability associated with debt will cause firms to sell low-quality products rather than high-quality ones. Thus, the authors emphasise both the influence of product range on capital structure and vice-versa.

2.3. RECENT DEVELOPMENTS: DEBT MATURITY AND SOURCES OF DEBT FINANCING

Financial economics has also made notable progress in illuminating the other aspects of financial decisions of corporations aside from the choice between debt and equity and its mixture. Recent studies show that the maturity structure of corporate debt, the issue of debt renegotiation and source of financing should also be given importance.

2.3.1. THE MATURITY STRUCTURE OF DEBT

It seems we have come to the point that not only the issue of the *amount* of future cash flows of firms to be paid out to debtholders instead of shareholders but also that of the *timing* of future payments to debtholders has been another financial concern. Consequently, the topic of debt maturity choice deals with whether firm value is affected by issuing long or short-term debt.[17]

While explicitly contending the capital structure irrelevance hypothesis, M-M [1958] also implicitly assert the irrelevance of debt maturity. Then, in the absence of market imperfections (especially adverse selection and moral hazard problems), Merton [1974] explicitly confirms the irrelevance hypothesis that firm value changes neither with short-term nor with long-term debt. Stiglitz [1974] obtains the same conclusion by assuming no bankruptcy, perfect bond markets and *given* product-market decisions of firms. His general equilibrium model implies that individuals will alter their equity and bond holdings to offset the changes caused by firms, which will result in the irrelevance of debt maturity. However, with the existence of market imperfections maturity structure of debt may not be irrelevant. The following section discusses this issue by relaxing the unrealistic assumptions.

2.3.1.1. Agency Costs Approach

This approach, also called *Contracting Cost* perspective, predicts that ownership structure, firms' asset structure, financial operations and market access are related to the debt maturity structure of firms.

Morris [1976a] argues that if the covariance between the firm's net operating income and interest rates is sufficiently high, then using short-term debt may cause total interest costs to be variable rather than being fixed, thus reducing the firm's operating leverage and break-even point. He further suggests that short-term (variable rate) debt may reduce the variance of net income and hence reduce shareholders' risk thereby increasing equity value.[18]

In some cases, (especially) firms having substantial growth opportunities may pass up positive-NPV projects due to the conflict between bondholders and shareholders. Myers [1977] argues that short-term debt mitigates this *underinvestment* problem if it matures before growth options are exercised since there remains an opportunity for lenders and borrowers to re-contract. As another way to reduce the investment inefficiency, he proposes the *matching principle* of firms' assets to their liabilities because by this way debt repayments are harmonised with decline in existing assets' future value.[19]

Smith and Warner [1979] argue that restrictive debt covenants reduce moral hazard problems of debt. Thus, it is better for risky firms to place such covenants in their debt agreements.

Barnea et al. [1980] show how debt maturity structure and call provisions can be used to resolve agency problems of debt due to asymmetric information, underinvestment and risk incentive problems. They argue that shortening debt maturity and inserting call provisions in bond issues help curtail agency problems. The authors also argue that agency problems disappear if debt matures before the expiration of investment options, which follows the implications of option pricing considering equity as an option. Their strategy, then, is to roll over short maturity debt claims because this position reduces the incentives for risky asset substitution due to relatively insensitivity of short-term bond prices to shifts in assets' risk.[20]

According to Ho and Singer [1982], although long-term and short-term debt have the same priority if default occurs-since it is paid earlier-short-term debt with relatively high priority is more beneficial for financing new investments. Fama [1990] contends that debt reduces contracting costs of firms that choose both the level and maturity structure of

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[17] See Ravid [1996] for a comprehensive theoretical and empirical survey of debt maturity structure.

[18] These results, however, are valid assuming that term structure of interest rates, investment and leverage decisions are given in a partial equilibrium analysis.

[19] Debt of maturity shorter than asset life may be more risky as sufficient cash flows might not be generated from the asset. Debt of maturity longer than asset life may also be risky as it is not certain that necessary cash flows will be obtained to service the debt after asset retirement (Morris [1976a]). This type of hedging policy allows us to know the cost of financing the asset over its life.

[20] It follows that as smaller firms are more likely to suffer from such agency conflicts and to have relatively more growth opportunities with less tangible assets, they should use more short-term debt to mitigate agency costs (see, Smith and Warner [1979] and Whited [1992]). Titman and Wessels [1988] argue that larger firms generally do not have any problem to access to capital markets. Barclay and Smith [1995] argue that smaller firms choosing bank over public debt owing to lower flotation costs will have more short-term debt. Furthermore, Smith [1986] argues that regulated firms will have relatively longer debt maturity structure since managerial discretion of using assets is restricted more for such firms.

debt by centralising monitoring services with reliable creditors. If the firm is considered to have uncertain growth prospects, it has access to only short-term debt.

Flannery [1994] examines the capital structure of financial intermediary firms financing relatively illiquid and informationally intensive securities. He argues that short-term deposits provide steady market value as their terms are frequently renegotiated to reflect current riskiness of the bank. Therefore, bondholders' wealth expropriation by shareholders, which could be done by changing leverage or asset risk, is mitigated. He also argues that the best way for banks to eliminate the distortions caused by leverage is by issuing short-term debt without considering the matching principle. Houston and Venkatamaran [1996], on the other hand, focus on the benefits and limitations of bank *loan commitments* allowing firms to adopt more efficient liquidation policies to develop an optimal debt maturity model based on shareholder-bondholder conflict. They argue that although commitment financing is superior to short-term debt financing but it is not first-best one especially when firm's assets have a low but positive value and there exists considerable residual uncertainty about terminal cash flows. Despite the benefits of commitment financing (e.g., reducing agency costs of debts and costs of sub-optimal liquidations), they demonstrate that long-term debt is preferred when ex-ante value of the project is high and when projects have high liquidation values.

Leland and Toft [1996] examine optimal capital structure of a firm determining *both* the maturity and amount of its debt in the context of endogenous bankruptcy. They argue that potential agency problems imply firms with higher asset risk will shorten their optimal debt maturity and reduce the optimal debt amount. The reason is that the benefit of optimally use of long-term debt against short-term debt falls in case of higher risk while agency costs of long-term debt remain greater. Leland and Toft, thus, favour the use of short-term debt in order to eliminate asset substitution problem in the presence of longer-term debt. In another study, Leland [1998] focuses on how ex-post flexibility in choosing risk affects leverage, yield spreads and debt maturity. Confirming Barnea et al. [1980] and Myers [1977], among others; he contends that ex-post optimal strategy of debt maturity is to use short-term debt as the existence of agency costs restrict debt maturity.

2.3.1.2. Asymmetric Information Approach

In this approach, the *signalling* models of debt maturity structure focus on the signals implied by debt maturity choice. Investors deduce private information held by borrowers from these signals. In *adverse selection* models which imply a bias toward short-term debt, maturity is chosen to minimise private information effects as private information is not revealed. In Flannery's [1986] model, managers of the strongest firm will issue more short-term debt than will managers in weaker firms. He argues that if transaction costs do not exist, the debt market has a *pooling* equilibrium in short-term debt with no long-term debt issuance even assets have long maturity. It is because low-quality (bad) firms can *mimic* the debt maturity choices of high-quality (good) firms without any cost. This, in turn, implies that low (high)-quality firms are over (under)-valued by the market. However, if positive transaction costs persist, a *separating* equilibrium occurs, where high-quality firms would prefer short-term debt as a good signal to the market. Then, low-quality firms choose long-term debt if they can bear the rollover cost of short-term debt.[21] Furthermore, in the absence of transaction costs, Kale and Noe [1990] extend Flannery's model and indicate the existence of a separating equilibrium where good firms prefer short-term debt and bad firms prefer long-term debt. Moreover, Titman [1992] develops Flannery's [1986] separating equilibrium that good firms borrow short-term and bad firms borrow long-term. He argues, using sequential equilibrium concept, that because of the interest rate uncertainty and financial distress costs, good firms may be driven into a pooling long-term equilibrium. If swaps are allowed, he suggests that good firms can avoid interest rate uncertainty by swapping short-term for long-term debt and default premium is also avoided by separating from bad firms.[22]

Diamond [1991b] models the debt maturity structure choice as a tradeoff between a borrower's desire to issue short-term debt and its *liquidity risk* of losing non-assignable control rents if lenders become unwilling to refinance as a result of current bad news. The model implies nonmonotonic relationship between debt maturity and bond rating that highly-rated firms choose to issue short-term debt, very low-rated firms have no choice but short-term debt, and medium-rated firms issue long-term debt. Short-term financing creates the risk of excessive liquidation such that a solvent but illiquid firm may be unable to obtain refinancing due to potential bad news. Diamond further argues that even borrowers knowing that their credit rating will probably improve can prefer long-term debt, unlike Flannery [1986] who argues that all borrowers choose short-term debt unless short-term debt brings higher transaction costs. In his another study, Diamond [1993]

[21] The reason is that if debt markets cannot distinguish between good and bad firms, good firms are reluctant to issue long-term debt as they think that their long-term debt may be underpriced, and accordingly bad firms prefer more overpriced long-term debt.

[22] In another study, Mitchell [1991] shows that firms facing asymmetric information choose shorter (medium-term) callable bonds for financing of their high-quality projects with or without sinking fund feature. In the absence of asymmetric information, long-term, callable and sinking fund bonds are preferred.

develops his earlier framework by modelling how borrowers having private information about their credit prospects determine seniority and maturity of debt. Again, short-term debt is shown to be optimally *senior* to long-term debt, which is also relevant to increase debt capacity. He argues that a good borrower will be disadvantaged if he issues only long-term debt as good-bad borrowers cannot be distinguished. Yet, short-term debt financing may cause (inefficient) liquidation; thus good firms generally prefer a combination. Consequently, there exists a tradeoff between the control rents which might cause a premature liquidation and the sensitivity to new information allowing the borrower to borrow on better terms.

In his credit rationing-based study, Sharpe [1991] compares short-term and long-term commitments. For instance, repeated short-term financing incurs some costs such as interest rate risk, issue cost and the fear of credit rationing. Furthermore, while long-term debt limits inefficient liquidations, short-term debt can better reflect *new* information as it is more flexible for renegotiations. Although Sharpe discusses the trade-offs between these maturity structures, an optimal structure is not implied.

Rajan [1992] focuses on the choice between bank debt and arm's length debt considering effort incentives. He asserts that firms' owners having public debt outstanding will continue some investments that could be given up with the debt. Optimal liquidation policy is assumed to be based on private information.[23] Rajan argues that optimal maturity of bank debt will be negatively (positively) related to the owner's (bank's) share from bargaining. The owner may have to forgo much of the profit in the good state causing him to exert less effort. Nevertheless, he argues that short-term debt may become optimal provided this problem can be mitigated by increasing the owner's share from the profit.

Houston and Venkatamaran [1994] state that much of the current literature has only focused on the choice between short-term and long-term debt. Alternatively, they investigate a practical fact why firms may also choose to simultaneously issue *multiple debt* claims with different maturities. If short-term debt is issued, debt cannot be re-financed in some states even the continuation is optimal. Issuing long-term debt causes a moral hazard problem since managers will be reluctant to liquidate the firm even it is optimal. Then, the cost of sub-optimal liquidation creates a trade-off between short and

[23] Rajan and Winton [1995] also discuss the relationship between debt maturity, and accuracy of private and public information: even short-term debt is worth monitoring when the public signal is very imprecise. However, short-term debt dominates if the signal is extremely precise.

long-term debt if (costly) renegotiations do not exist. Therefore, due to the existence of renegotiation costs and bankruptcy probability, the authors show that an optimal liquidation policy can be provided through a choice of *combination* of short and long-term debt *ex-ante*.[24]

Goswami et al. [1995a] examine the effect of informational asymmetries on the design of debt contracts with a view by explaining these features of debt financing. Their analysis ascertains that coupon-bearing long-term debt with dividend covenants is optimal when asymmetric information of long-term cash flows is substantial and coupon-bearing uncovenanted long-term debt is optimal when asymmetric information of near-term cash flows does matter. They argue that issuing short-term debt is optimal only when asymmetric information is uniformly distributed overtime, and long-term debt can minimise mispricing and hence be preferred even dissipative costs do not exist.[25] In another paper, Goswami et al. [1995b] model a firm's debt maturity problem using signalling game framework and assuming no transaction costs. They show that, based on several Nash sequential equilibria, debt maturity decision is related to credit rating and sensitivity of cash correlation to firm type. First, when good firms show a sufficiently high positive correlation between cash flows relative to bad firms, good (bad) firms issue short (long)-term debt in a separating equilibrium. Second, when correlation of cash flows of both firms are similar to each other, short-term debt is issued in a pooling equilibrium. Third, if cash flows of good (bad) firms are independent (highly correlated), long-term debt is issued in another pooling equilibrium. More recently, Goswami et al. [1997] examine the effect of cash flow distribution on debt maturity under asymmetric information. They show that a unique short-term debt pooling equilibrium occurs if the degree of intertemporal cash flow correlation is fairly insensitive to expected output. However, if the degree of correlation increases with expected output (cash flow), a separating equilibrium occurs, where issuing short-term debt conveys a positive signal; if it decreases, a long-term debt pooling equilibrium occurs. The authors argue that the debt maturity decision is crucially related to relative sensitivities of long-term and short-term debt to liquidity risk.

[24] Titman [1984] also suggests a mix of securities which precommits corporations to an optimal liquidation policy.
[25] These implications are in contrast to Flannery [1986] and Diamond [1991b] as they argue that if asymmetric information exists, the ex-ante determinations of debt contract originate no advantage.

2.3.1.3. Tax / Bankruptcy Costs Approach

Finance theory has also shed light on how, why and *when* taxes can have different implications concerning different debt maturities since Modigliani and Miller [1963] firstly recognised the tax advantage of debt financing. At earlier, Morris [1976b] attempts to show an optimal debt maturity state where firms minimise the present value of interest payments and flotation costs. He argues that optimal maturity decreases with interest rates when flotation costs are increasing function of maturity. Later, Brennan and Schwartz [1978] argue that short-term debt is optimal since optimal leverage decreases with increase in maturity, assuming the value of all-equity firm follows a Gauss-Wiener (GW) process[26]. They find optimal leverage to be related to optimal maturity such that longer maturity is assumed to increase firm value by decreasing leverage provided transaction costs are zero. Thus, issuing debt and redeeming it continuously would be optimal, which defers principal (not coupon) payment precipitating bankruptcy and also benefits from tax savings. However, Boyce and Kalotay [1979] show that debt maturity structure will affect firm's value if both personal and corporate tax rates differ, and the term structure of interest rates is not flat. They argue that if interest rates are expected to decline (rise), firms should borrow long-term from lenders with high (low) tax rates. Specifically, if the term structure is rising, then, they conclude that long-term debt is optimal. Brick and Ravid [1985] extend these two models and argue on the one hand that, assuming the term structure of interest rates is upward sloping, long-term maturity is optimal since long-term bonds' coupons are currently higher than short-term bonds' coupons and thus gain to leverage is accelerated.[27, 28] Thus, issuing long-term debt reduces firms' expected tax liability and consequently increases firm's market value. On the other hand, the authors also demonstrate a debt maturity irrelevance in which specific

[26] The authors attempt to compute the value of unlevered firm which follows a stochastic process: $V = V(U,t)$ and $dU/U = \mu dt + \sigma dz$, where dz is GW process such that $E[dz] = 0$ and $E[dz]^2 = dt$ (μ is instantaneous expected rate of return; σ is instantaneous variance of return).

[27] Expectations Hypothesis implies that in early years the interest expense of long-term debt is higher than that of rolling short-term debt and the interest expense is less in later years if the yield curve is upward sloping. However, short-term debt becomes optimal if the curve is downward sloping. For a useful discussion of the term structure of interest rates, see Brick and Ravid [1991], Campbell [1986], Campbell [1995] and Cox et al. [1981].

[28] As a caveat, Brick and Ravid [1985] hold leverage constant to see the effect of debt maturity. Some studies (e.g., Morris [1976a, 1976b], and Boyce and Kalotay [1979]) also assume that market value of debt is constant concerning different maturities. However, one can argue that when debt maturity changes, leverage may also change (see, Leland [1994], and Stohs and Mauer [1996]). Wiggins [1990] sets a maturity date, then calculates the optimum leverage for that maturity to avoid the problem of simultaneous setting of optimal maturity and leverage.

tax code may make maturity neutral by allowing deductibility of opportunity loss of bonds.

In their continuous time-model using option valuation framework, Kane et al. [1985] endogenously determine an optimal debt maturity structure in the context of bankruptcy costs, debt issue flotation costs, and personal and corporate taxes. Their initial implication is similar to Brennan and Schwartz [1978]. That is, firms will repeatedly roll over short-term debt thereby maximising tax advantages of debt provided transaction costs and probability of bankruptcy are almost zero. Relaxing the assumption, then, the authors suggest an optimal debt maturity that incorporates a tradeoff between the per-period tax advantage of debt, and bankruptcy and flotation costs. They argue that optimal maturity is negatively associated with tax advantage of debt and the volatility of firm value, and positively correlated with flotation costs. It is because firms increase their maturity as the tax advantage of debt decreases to assure that the remaining tax benefit is not less than amortised flotation costs.

Lewis [1990] challenges the view of Brick and Ravid [1985] and contends that taxes, which are assumed to be only market imperfections, will have no impact on firm value if optimal leverage and debt maturity are determined simultaneously rather than sequentially. The model assumes that taxable income is determined at both corporate and personal level with respect to interest expense. Hence, he argues that there is no distinction between short and long-term debt, and different default risk levels are assumed to have no additional bankruptcy costs. Later, Brick and Ravid [1991] extends their previous tax-based argument to allow for the presence of stochastic interest rates. They demonstrate, under return to maturity hypothesis, that long-term debt will be optimal for wide range of cases; increasing, flat and even sometimes in decreasing term structure. The intuition is that aside from accelerating tax benefits, uncertainty introduces a *capacity* factor always favouring long-term debt: while short-term debt lower debt capacity due to re-financing problem, this factor may outweigh tax advantage short-term debt.

Wiggins [1990] argues that as volatility of firm value increases firms may have to lengthen debt maturity because the (tax-deductible) default risk premium per-unit time on debt becomes more sensitive to volatility at longer maturities.[29] As the model sets a

[29] Roll [1971] combines CAPM with term structure of interest rates and finds a positive relationship between risk coefficient and term to maturity, implying upward-sloping term structure, on average. Although maturity diversification is implied to be optimal, the author does not derive an optimal maturity

maturity date, the problem of simultaneous determination of optimal leverage and optimal maturity is avoided. Then, debt's tax shield on long-term debt becomes incrementally higher than that on short-term debt.[30]

Kim et al. [1995] argue that corporate debt maturity policy affects investor tax-timing options to tax-trade corporate securities. They establish that a long-term debt maturity strategy maximises investor tax-timing option value in a multi-period model with interest rate uncertainty. Their analysis predicts that the firm lengthens debt maturity as interest rate volatility increases and as the slope of the term structure increases.

Leland and Toft [1996] contend that longer-term debt is more favourable as it better exploits the tax advantages of debt as bankruptcy tends to occur at lower asset values. However, they state that as longer-term debt creates an asset substitution problem, optimal debt maturity is determined by the tradeoff between tax advantages, and agency and bankruptcy costs. The authors further contend that higher bankruptcy costs induce higher maturity and the firms with high asset risk will decrease maturity and debt levels.

In brief, the models discussed above seem to be successful with their strong arguments in explaining why firms have different debt maturities. The general tendency favours *short-term* debt as it mitigates asymmetric information and agency costs, particularly underinvestment problems (Myers [1977]); reduces shareholders' risk thereby increasing equity value (Morris [1976a]); its rollover can curtail asset substitution problem (Barnea et al.[1980]) and maximises tax advantage of debt (Brennan and Schwartz [1978]); and signals firms' high quality (Flannery [1986], Diamond [1991b]). There are several studies favouring *long-term* debt as it can decrease firm's tax liabilities and thus increases firm value (Brick and Ravid [1985]); minimises asymmetric information induced mispricing of debt (Goswami et al.[1995a]); and if the project with high liquidation value has a high value ex-ante (Houston and Venkatamaran [1996]). On the other hand, Houston and Venkataraman [1994] suggest the *mix* of long-term and short-term debt financing if bankruptcy costs and liquidation costs exist.

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model. Likewise, Morris [1976a] shows that CAPM type risk measurement will be affected by debt maturity but he does not supply an explicit optimality condition.

[30] Kane et al.[1985] obtain an opposite relationship between optimal maturity and asset risk as they assume that government recaptures interest tax shields in bankruptcy, which offsets the tax benefits of default premium.

2.3.2. THE OWNERSHIP STRUCTURE OF DEBT

Corporate finance has also examined the corporations' choices of funding. Firms can be provided with *indirect* credit by financial intermediaries (e.g., banks) and, *direct* credit by the (short-term) money markets and (long-term) capital markets.[31] The question why firms choose a specific debt source, *private debt* from financial intermediaries or *public debt* from these debt markets, has led the financial researchers to investigate this subject. As there are many choices of debt financing, firms are expected to contrive a way of optimally designing debt ownership structure. One can examine this issue in major three arguments.

2.3.2.1. Information and Monitoring Costs Arguments

It seems difficult, with the existence of a large number of investors, to envisage this issue by the theory of efficient incentive contracts initiated by Grossman and Hart [1982] as it is assumed that investors can develop efficient strategies. In this vein, Diamond [1984] discusses the importance of diversification within the intermediary as a key for possible net advantage even in a risk-neutral economy as it reduces the cost of providing incentives for delegated monitoring. He argues that more efficient external financing would be possible if the intermediary acts in the interest of investors. This delegated-monitoring model asserts the cost advantage over other lenders in producing and transferring information by intermediaries and thus assumes a positive role for their existence since they resolve free-rider and information-duplication problem. Ramakrishnan and Thakor [1984], beside this, identify the conditions sufficient for the existence of financial intermediation in the form of diversified information brokers. They demonstrate that information reliability can be improved provided information producers form *coalitions*.

It is argued that banks can mitigate asymmetric information problems of private firms as they are special in gathering and processing information.[32] Fama [1985] argues that there must be some reasons why (typically small) borrowers pay higher interest rates on bank loans than on open market securities with equivalent risk (why they bear banks'

[31] The existence of indirect credit markets is argued to be due to asymmetric information as a market failure (Leland and Pyle [1977], Campbell and Kracaw [1980] Diamond [1984], Boyd and Prescott [1986], Williamson [1986]).

[32] Myers [1977] argues that asset substitution and underinvestment problems can be mitigated through ex-post monitoring. Fama [1985] contends that overall contracting costs can be reduced by continual bank monitoring. Slovin et al.[1992] show that especially small firms likely to suffer from information asymmetries will increase their market value by issuing bank debt.

cost of reserve requirement). He suggests small firms prefer bank loans creating lower information costs as information production costs for public debt is too high for them. Moreover, the signals of short-term bank loans concerning firm-specific credit worthiness can lower the information costs of other contracts. Accordingly, it is efficient for large firms to produce information for their shareholders via using public debt relatively easily. James [1987] also argues that banks provide some exclusive facilities not available from other lenders, such as maturity, size and default risk of borrowers. He states, another reason for the uniqueness of bank loans: a positive stock price reaction (larger abnormal performance) to the new bank loan announcement is found relative to straight public or private debt announcement, for which James further reports significantly negative abnormal returns if they are to be used for bank debt retirement.[33]

Yosha [1995] contends that high *disclosure* costs of revealing sensitive information from firm financing transactions to rival firms can be mitigated by using private debt, i.e., bilateral financing is preferred to multilateral one. Hence, firms having potentially valuable growth opportunities do not prefer public debt at the expense of setting their rivals into action with, supposedly, the presence of high-quality projects to their rivals.

2.3.2.2. Liquidation and Financial Distress Arguments

Berlin and Loeys [1988] discuss the firm's choice between covenanted loan contracts (bonds) without monitoring and loan contracts (bank loan) with monitoring enforcement. The former cause too many good projects to be liquidated and the latter allow too many bad projects to be re-financed. As bondholders have insufficient incentive to directly monitor on their own, instead, they hire a delegated monitor service to ensure a more efficient liquidation policy. The authors argue that firms can obtain an optimal choice by trading off the inefficiencies of harsh bond covenants and the agency costs of hiring a delegated monitor. Furthermore, they emphasise several predictions: rigid covenants cause premature liquidations of firms having low liquidation values, thereby forcing such firms to use public bonds. Plus, bank debt use is *negatively* correlated with credit quality, agency costs of delegated monitoring, and precision of firm's financial indicators. Similarly, Berlin and Mester [1992] evince the harshness of privately held debt covenants with the argument that they may cause even profitable investments not to mature due to their renegotiation flexibilities. They predict, nonetheless, high credit risk corporations to

[33] Hull and Moellenberndt [1994], later, confirm this negative association.

rely more on private debt as such firms benefit from rigid covenants due to lower interest rates and especially renegotiation options.

Hoshi et al. [1990] and Gilson et al. [1990] argue that banks have relatively more information-based experience toward firms in (costly) financial distress as compared to debtholders.[34] In their debt restructuring model in which public debt is a major impediment to out-of-court restructuring, Gilson et al. [1990] show that firms with relatively more intangible assets issue private bank loan to avoid liquidation through private renegotiation. However, the renegotiations will be less successful to resolve financial distress if the outstanding debt structure has distinct classes. In Detragiache's [1994] model, firms optimally finance investment with *both* public and private debt, which are perfect substitutes *except* private debt can easily be renegotiated in insolvency states while public debt cannot. The option to renegotiate is beneficial *ex-post*, since the firm can prevent inefficient liquidation, but *ex-ante* it may worsen asset substitution. Therefore, large firms use public debt for flotation costs reasons and some private debt if inefficient liquidation costs are high. Similarly, small firms issue private debt for flotation costs reasons and some public debt to mitigate potentially greater risk-shifting problem.

Gertner and Scharfstein [1991] argue that debt composition may affect the outcome of financial distress and ability of debt restructuring, and thus develop a model of a financially distressed firm with public and bank debt. They analyse implicit renegotiation with public debtholders among whom there are coordination problems, when firms offer cash and new securities in exchange for original public debt. It is shown that financial distress may cause inefficient operating policy even exchanges are possible and banks are perfectly informed. To increase efficiency, firms should issue *senior* debt such that these seniority covenants should materialise the exchange offer and strip public debt of its covenant. Asquith et al. [1994], likewise, examine the ways in which financially distressed firms attempt to avoid bankruptcy through private and public debt restructurings, mergers, capital expenditure reductions and asset sales. They argue that the structure of firms' liabilities affects the probability of bankruptcy; specifically, the firms with more complex public debt structure and secured private debt are more likely to

[34] Hoshi et al. [1990] find that firms in Japan with close ties to their banks are less likely to be liquidated than those with no such ties. Peterson and Rajan [1994] find that small firms borrowing from multiple banks are charged significantly higher rates, thus suggest such firms a concentrated borrowing to increase availability of financing and decrease financing costs. It is implied that banks prevent such firms from being financial distressed by mitigating adverse selection and moral hazard problems through close and concentrated monitoring. Similarly, Slovin et al. [1994] contend that banks have a comparative advantage in processing private information acquired through bank-borrower relations.

seek bankruptcy protection. The authors find the combination of secured private debt and many subordinated public debts as seemingly being obstacles to out-of-court restructurings; here, the ability to restructure public (*not* private) debt determines the avoidance from bankruptcy. They conclude that the *composition* of debt structure is very important in affecting outcome of financial distress as well as capital structure decisions.[35]

Thakor and Wilson [1995] examine the effect of bank capital requirement on borrowers' financing choices. They mention a *tension* between the 'benefits' of bank as interim-efficient outcomes can be maintained through restructuring which is unavailable in capital markets owing to coordination problems among multiple creditors and higher 'costs' of banking financing due to bank capital requirements. If these requirements increase, loan interest rates rise holding the probability of debt restructuring of financially distressed firm constant and bank's uniqueness in credit allocation decreases since banks become more reluctant to restructure the debt. Therefore, they assert that especially growth-oriented firms which target long-term borrowing to recover from distress will shift to capital markets due to higher bank capital requirements. The firms with no future growth-options shift to the same direction as well, while the intermediate-quality firms choose bank financing.

Moreover, James [1996] investigates the relation between bank debt restructurings and the composition of public exchange offers in financial distress. He argues that bank participation in restructurings can be effective in resolving information and holdout problems which prevent debt exchange offer. The dependence of public debtholders' behaviours on bank actions may be related even if such problems do not exist. In that, secured banks lenders are unlikely to provide debt forgiveness unless their claims are paired as their secured status implies that they are expected to be less flexible against distressed firms. Yet, if the firms are in severely greatest distress of debt reduction necessity, then, bank concessions becomes more likely to avoid bankruptcy. Then, bank concessions may appear in conjunction with public bondholders' concessions due to 'share the pain' hypothesis. As a wealth transfer is implied by senior bank' unilateral concession, banks might not do it unilaterally if the firm has outstanding public debt. Hence, the bank participation through offering debt forgiveness in restructuring has some

[35] In a related study, Houston and Venkatamaran [1996] argue that loan commitments are useful since they provide firms with a pre-arranged source of financing enabling them to continue operations without being liquidated.

impacts on the resolution of information and holdout problems impeding public debt exchange offers. James predicts that banks can be flexible in restructurings for firms with public debt, and this flexibility increases with the proportion of total debt held by bank and reduction public debt and decreases with senior debt being offered. Thus, one can argue that the *mix* of public and private debt is assumed to be significant to avoid bankruptcy of distressed firms, which may diminish the importance of expected bankruptcy costs and agency costs in capital structure decisions.

2.3.2.3. Reputation and Borrowers' Incentives Arguments

The more recent studies consider the role of firm reputations on the choice of source of corporate debts. Diamond's [1989] model, which analyses the joint effect of moral hazard and adverse selection, is one example focusing on the firm's reputation for choosing projects returning positive net present value to repay the debts. The model argues that, if initially there is prevalent adverse selection, reputation effects will be insufficient to mitigate the conflict between lenders and borrowers with *short*-track records. However, the sufficiency can be obtained by *long*-track record of repayments without default resulting a good reputation. If a firm is known as having strong capacity to repay its debts based on historical payment performance, then, it can borrow at relatively low rates. Consequently, for the sake of being known as reputable firm in debt payments, older and more established firms find it optimal to select the safe, or at least, less risky projects to increase market value of the firm. Therefore, Diamond predicts that firms with short-track record borrow from relatively flexible financial intermediaries to have a reputable long-track record and the ones with high bond rating and long-track records will directly borrow from open markets to pay less interest on their bonds.

In his more recent paper, Diamond [1991a] provides a theory of bank loan demand (considering public debt choice) and of the role of monitoring in cases where reputation effects are important. According to Diamond, borrowers with higher credit ratings have a lower cost of capital and such a rating should be available in reserve not to miss the opportunity of higher present value of future profits. Thus, in order to have high credit ratings, the firms should rigorously select their debt levels, or, the mix of debt and equity, in line with minimising cost of capital and establishing a good reputation of debt repayment for future references. Diamond contends that as banks are expected to alleviate moral hazard through monitoring, (particularly small and new) firms first use bank loans and then resort to publicly trade loans after gaining good reputation from successful bank loan repayments. However, while Rajan [1992] gives credence to bank control benefits, he asserts that banks can also distort borrowers' incentives, as they may not rollover the short-term debt of ongoing unprofitable investment. Thus, firms sometimes diversify away from bank financing even banks offer to lend more. Although better informed banks can prevent inefficient liquidations, Rajan argues that costs of bank loans are not well understood in that banks' *bargaining* power after the launch of project may create bank credit costs. For instance, if the borrower has only one bank as a (short-term) source of finance, he might be enforced to share some of the project's surplus to continue borrowing.[36] Consequently, a fundamental tradeoff emerges between informed bank debt and uninformed arm's length funds as firms attempt to optimally restrict the banks' power. Hoshi et al. [1993] argue that banks efficiently monitor firm managers as they have incentives to continue unprofitable investments. However, managers of the firms with more profitable investment opportunities find it costly to invest in unattractive opportunities. In this case, using public debt is optimal as monitoring is not necessary. That is, they predict a positive correlation between asset tangibility and public debt.

Chemmanur and Fulghieri [1994a] develop a model in which banks get an endogenous incentive through the capability of having reputation acquisition to allocate larger amount of resource to gather information about financial distressed firms than bondholders do, as banks stay in the debt markets for longer-periods. The model assumes that 'lenders look for sound borrowers and borrowers look for sound lenders to help them in hard times.[37] The authors demonstrate that firms optimally prefer bank loans to public debt despite higher bank interest rates if their assessment of probability of being bankrupt is relatively high, and if the perceived probability of bankruptcy is low they issue public debt to exploit relatively low interest burdens. It is further shown that corporations willingly pay higher interest rates for bank loans provided these banks have greater reputation for flexibility in cases of financial distress.[38] In addition, Ozkan [1996] argues that banks attempt to form reputation by inefficiently liquidating even the firms having temporary financial difficulties. The model considers the reputation as a commitment device allowing banks to credibly threaten borrowers that they will be liquidated once

[36] This point is also empirically confirmed by Houston and James [1996], who argue that banks can create costs when borrowing is concentrated with a single lender. They also contend that bank information monopolies impose offsetting costs of bank financing benefits.

[37] Note that in Diamond's [1991a] model, the focus is reputation acquisitions by borrowers; here, the authors focus on reputation acquisitions by banks. Moreover, unlike Rajan [1992], and Berlin and Loeys [1988], they assume that lenders find it worthwhile to monitor.

[38] In their another study, Chemmanur and Fulghieri [1994b] develop a model of reputation acquisition by investment banks and show that moral hazard problems can be alleviated through the ability of financial intermediaries to get a reputation for honesty.

they default on their debt obligations. Correspondingly, banks' optimal lending policies are determined by the tradeoff between establishing a *reputation,* known as being tough against defaults at the expense of losing some parts of debt and interest income; and *rescheduling* the debt contracts to increase the repayment proportion at the expense of weakening the position against future defaults.

In conclusion, this section gives some insights about the relationship between capital structure and the source of debt (mix of public and private debt). The related models propose strong relationships between source of finance, and debt restructurings of financially distressed firms in line with reducing asymmetric information and avoiding premature liquidations. There are some implications which do not directly refer to optimal capital structure. First, small firms uses unique bank loans as they are relatively more flexible in renegotiations and have some other facilities (Fama [1985], James [1987]); and to avoid disclosure costs (Yosha [1995]). Second, high-credit risk firms issue private debt to benefit from low interest rates (Berlin and Mester [1992]) and so do the ones with more intangible assets to avoid liquidation (Gilson et al. [1990]). Third, large firms issue public debt to employ their flotation costs advantage (Detragiache [1994]). Fourth, firm-specific characteristics may stipulate the combination of public and private debt against financial distress (Asquith et al. [1994], Thakor and Wilson [1995), James [1996]). Fifth, small firms first use bank loans to get a reputation by regular repayments and then resort to capital markets for lower interest burdens (Diamond [1991a]).

2.3.3. BARGAINING-BASED THEORIES AND STRATEGIC USE OF DEBT

It is argued that the corporate bankruptcies are costly *both* to the shareholders of firms and to the creditors as they cause significant deadweight costs.[39] Therefore, both parties find pragmatic reasons and opportunistic incentives to renegotiate in case of borrower's default. Minimising the bankruptcy costs or agency costs to maximise firm value is traditionally done by *ex-ante* capital structure decisions. However, dynamic nature of strategic debt use with opportunistic modifications *ex-post* has been given relatively less attention.[40] One exception is the study of Bergman and Callen [1991] who provide a debt

[39] See, for example, Kraus and Litzenberger [1973], Scott [1976], Kim [1978]. Furthermore, Haugen and Senbet [1978,1988] argue that debtholders and equityholders will find it beneficial to negotiate informally to avoid such costs.

[40] Welch [1997] states that the significant size of the market for legal services implies negotiation and bargaining over power 'rent-seeking' is a fact of corporate life.

renegotiation model of bargaining game between equityholders-oriented management and debtholders. The managerial discretion of suboptimal investment decisions as a threatening way through enervating firm value would be optimal if it is unlikely that the firm will have sufficient returns for debt repayments. It is found that even solvent firms find such opportunistic behaviours optimal if the firm value falls below a certain cutoff level. On the other hand, lenders can predict this behaviour when the firm increases the debt face-value while keeping the same investment plan. Since this will create a disadvantageous situation for lender in highly potential renegotiations, firms will be constrained with an upper bound on debt amount or *debt capacity*, which is less than firm value and inversely related to shareholders' bargaining power. Assuming tax-advantage of debt financing, the authors predict an *interior* optimum capital structure that pushes the debt level to the debt capacity even in the absence of realised bankruptcy costs. Another prediction is that leverage is positively related to corporate tax rate and tangibility, which means high-tech and service sectors with relatively high intangible assets will have less debt financing as compared to capital-intensive sectors.

Another exception is the study of Hart and Moore [1994] which focuses on a case where an entrepreneur with a profitable project cannot be forced ex-ante to provide sufficient surplus for promised future payments as s/he has the opportunity to repudiate the contract by withdrawing her/his human capital. Hence, this study endogenises the non-pecuniary benefits of control with entrepreneur's bargaining power to quit. The authors distinguish between *physical assets* (project capital) and *human assets* (entrepreneur's human capital, e.g., special skills) which cannot be replaced without costs. If the entrepreneur repudiates the contract, s/he loses control of the project's physical assets and the creditor can (not necessarily efficiently) liquidate them. It is argued that, then, renegotiation potentially creates gains as the assets are worth more in combination with the entrepreneur than in any other use. Assuming perfect certainty concerning the project's return stream and its liquidation value, and only one creditor, they argue that there are continuous optimal debt contracts in the form of renegotiable short-term contracts or non-negotiable long-term contract.

In their more recent model, Hart and Moore [1998] examine the role of debt in persuading an entrepreneur to pay out cash flows rather than diverting the project returns, unlike in the previous model in which an entrepreneur could quit by withdrawing his/her human capital. If s/he defaults, the investor can seize and liquidate the project assets in which case they can renegotiation the contract. It is assumed that there exists neither ex-ante nor ex-post asymmetric information between the entrepreneur and the investor concerning contract terms. Yet, many variable interests e.g., project returns, asset liquidation, cannot be verified by outsiders (e.g., courts). The authors argue that symmetric information between these two groups does not necessarily bring first-best efficiency by renegotiation. If the entrepreneur cannot find a way (e.g., sufficient cash flows) to compensate the investor for not liquidating the assets where the value of retaining the assets exceeds their liquidation value, inefficient liquidation occurs as the investor thinks that s/he will default again. It is argued that every dollar that investor gets is a dollar that the entrepreneur cannot reinvest, and the entrepreneur must be given maximum resources in good states (high return) provided the investor is repaid and the investor's payoff must be maximised in bad states (low return). For instance, bargaining power of the investor to liquidate the assets can be reduced if the entrepreneur has low-P (promised repayment) value strengthening his/her position to continue using the assets in exchange for small repayments in good states. High-T (size of loan) value is also advantageous for the entrepreneur as s/he gets extra liquidity in bad (default) times. Therefore, the authors propose some optimal debt contracts through the tradeoff between the size of loan and its promised repayment.

Similarly, Berglöf and Thadden [1994] examine the problem of financial contacting and renegotiation between a firm and outside investors when the firm with collateralisable assets cannot commit to future repayments. They show that firms prefer to have multiple investors who separate their claims across time and *states* (one investor holding secured short-term claims and another junior long-term claims). It is because ex-post bargaining position of an investor having short-term claims is weaker if s/he also holds long-term claims. Their bargaining-based theory assumes that the firm's capital structure affects potential future negotiations and this anticipation may have impact on financial decisions. The tradeoff between the motivation of discouraging ex-post renegotiation (strategic default) and the motivation of preventing inefficient liquidation (liquidity default) results an optimal financial contracting and as well as endogenously determined optimal cost of financial distress. The theory asserts that capital structure is irrelevant if only firms' bargaining power is zero when creditors extract all *ex-post* surplus from firms. It is important to note that this analysis is based on the assumption that the firms has all the bargaining power in *ex-post* renegotiation (outside influences are constant) as it limits the lenders' payoffs of liquidation proceeds and produces motivation for firms to behave strategically ex-post.

Giammarino [1989], on the other hand, models the resolution of financial distress as a noncooperative game of incomplete information played by a firm and its creditor. The objective is to determine whether financial distress-related costs will be avoided through costless renegotiation. He argues that the bargaining problem remains important since enforcing the contracts is costly and agents are asymmetrically informed even debt contracts are assumed to be complete in a specified state-contingent resolution. He concludes that bondholders will not trust equityholders and thus need a costly arbitrator for an appropriate reorganisation, which means that financial resolution will be costly.

Perotti and Spier [1993] examine the bargaining role of high leverage in the dynamic conflict between shareholders and more senior claimants (creditors, employees, suppliers). They show that underinvestment effect can be used as a bargaining tool to force the senior claimant into renegotiation by the shareholders as they can change their incentives to invest through substituting junior debt for equity. This strategy is especially relevant when firms have low current profits and future investment is needed to ensure the workers' full payment. Shareholders can retain a large proportion of positive investment returns by threatening (retiring equity through a junior debt) not to undertake positive-NPV projects if unions do not accept lower wages. This *ex-ante* strategy of risk-bearing is assumed to be efficient as high leverage generates value redistribution while *ex-post* renegotiations cause inefficiency. The model suggests this strategy to the industries currently not profitable but have strong future investment options. In case of the absence of *both* growth options and current profitability, high leverage does not create strategic use as controlling investment does not induce much surplus.

Bester [1994] analyses the relationship between prospects of future debt renegotiation and creditors' security interests *at* contracting-date assuming asymmetric information between lenders and borrowers. He argues that the relationship between lenders and borrowers is strategically affected by the *initial* terms of debt contract as such terms indirectly determine the likelihood of renegotiation and the terms of renegotiated contract. The absence of precommitment prevents the borrowers in default from being bankrupt, which in turn necessitates a renegotiation to prevent an ex-post inefficient outcome and then borrowers think that creditors might forgive some part of the debt instead of imposing bankruptcy. Therefore, Bester argues that lenders cannot distinguish whether borrowers may strategically default or they are really unable to repay since borrowers assume that default will not always be penalised by bankruptcy. Hence, to mitigate this cheating motivation, Bester proposes a secured debt with collateralisable assets and existence of bankruptcy imposition by lenders to have an optimal limited liability arrangement. By this way, the deadweight costs of inefficient liquidation is reduced since creditors will be inclined more that borrowers do not behave strategically with unrealistic defaults and thus the option of taking over the firm is considered to be less profitable as compared to partial debt forgiveness. The model predicts that high-risk firms will prefer to offer secured debt with collateral to their creditors and these bilateral motivations may cause welfare to increase.

Furthermore, Bolton and Scharfstein [1996] examine corporate debt structure regarding ideal number of creditors, allocation of security interests among creditor and type of voting rules based on an optimal but incomplete contracting framework. They argue that debt contracts mitigate the strategic default motivations by providing lender with a right to liquidate firms' assets if default ever occurs. The tradeoff between benefits of preventing strategic default and costs of inefficient liquidation creates an optimal debt contract, which can also be obtained by appropriate selection of voting rules and security interests. As debt structure affects the sale price of firm's assets after default, it has also repercussions both on the manager's incentive to default strategically and firm's expected liquidation value. The liquidation value can be lower in case of multiple creditors since they seek to find a second-best user of these assets, thus causing the firm to pay more for the assets. However, as the manager will have to pay more to creditors to avoid liquidation if there are many creditors, multiple sources of borrowing can discipline managers by reducing their payoffs from strategic default. Consequently, the authors mainly conclude that *low*-credit quality firms should, optimally, borrow from single creditor, give only one creditor a security interest and have voting rules facilitating the asset sale completion or debt restructuring to maximise liquidation values. On the other hand, *high*-credit quality firms should, optimally, borrow from multiple creditors, give each equal security interests and have voting rule providing some creditors with block sales to reduce strategic default motivation. The model implies that low-credit quality firms with highly complementary assets in noncyclical industries should issue bank debt and the firms with opposite characteristics should issue public debt.

Mella-Barral and Perraudin [1997] also analyse the opportunistic behaviour of firms and argue that shareholders may behave strategically by forcing concessions from bondholders and reducing the originally-contracted interest payments in financial distress. Their standard-continuous asset-pricing model assumes *no* tax advantage of debt-financing and costless renegotiation that avoids bankruptcy and agency costs. They argue that shareholders can persuade bondholders to accept the coupon payment-related offer of *take-it-or-leave-it* if risky debt and positive bankruptcy costs exist. However, when direct bankruptcy costs are virtually zero, shareholders can do no better than in the absence of renegotiation even if they maximum bargaining power to enforce the offer. It is shown that debt capacity is determined by the assets' expected liquidation value in that attainable debt level is negatively correlated with liquidation value. In addition, in his continuous time pricing model of dynamic debt restructuring, Mella-Barral [1999] discusses a moral hazard problem such that debt contacts do not induce ex-post optimal timing of default to coincide with ex-ante optimal time to sell-off the firm. He shows that bargaining power between creditors and borrowers is a key factor in corporate asset pricing as it can change bonds' risk premium and potential loss in firm value in liquidation. Thus, it directly affects the ex-ante ability of firms to borrow.

In a different approach, Fulghieri and Nagarajan [1996] investigate the strategic role of high leverage and bankruptcy threats in deterring entry into generally monopolistic or collusively oligopolistic markets based on infinite-horizon entry games. The model asserts that moderate levels of leverage may not have significant value for strategic advantage for an incumbent in the monopolistic market, emphasised particularly in airline and retailing industries. However, bankruptcy threats due to high leverage can pre-empt the entry to potential competitors with strategic advantages. The model has two empirical implications: first, the incumbent's debt levels may be higher in profitable industries where either the cooperative or monopoly profits tend to be high. Second, leverage tends to be high if costs induced by price wars are high or if discount rate is low especially in concentrated industries where bond covenants are less restrictive. The overall results imply that the agency costs of leverage must be traded-off against its strategic advantages in product markets.

Bolton and Scharfstein [1990] provide a theory of predation based on agency problems in financial contracting.[41] The model focuses on strategic debt use where the penalty for nonpayment of debt is not asset liquidation but cutting the future finance by creditors. They argue that firms cannot costlessly commit to terminate their rivals funding in a competitive environment. A tradeoff between deterring predation (rivals' incentives to prey) and mitigating incentive problem is argued to occur, i.e., discouraging predation by

[41] Since this study is also related to the interaction between product-market competition and the capital market, referring to the studies of Brander and Lewis [1986], Maksimovic [1988] and Maksimovic and Zechner [1991] would be useful. They mainly argue that investors can use capital structure to induce managers to compete more aggressively subject to the impact on product-market equilibrium

reducing the sensitivity of refinancing decision to the firm's performance is counterbalanced by the worsening incentive problem.

To conclude, bargaining-based theories of capital structure mainly analyse the strategic advantage of debt to the firm's equityholders. One can summarise their implications as follows: First, the anticipation of potential future negotiations can affect the optimal capital structure choice (Berglöf and Thadden [1994]). Second, firms' opportunistic behaviour may put an upper limit on debt capacity (Bergman and Callen [1991]). Third, strategic debt use has also benefits aside from tax advantages, such as deterring new entrant in the market (Fulghieri and Nagarajan [1996], Bolton and Scharfstein [1990]); forcing concessions from debtholders (Mella-Barral and Perraudin [1997]); changing the seniority of claims on firms (Perotti and Spier [1993]). Fourth, ex-post bargaining may cause optimally a wedge between short-term and long-term borrowers (Hart and Moore [1994], Berglöf and Thadden [1994], Houston and Venkatamaran [1994]).

On the other hand, one can take a step further by arguing that strategic information bargaining models are not sufficient enough to explain the observed capital structure variations of firms. In fact, Welch [1997] asserts that as a result of the inability of these theories, *Conflict Theory* pioneered by Hirshleifer [1994], which assumes a mechanistic outcome as a response to 'lobbying' activity, can be another framework to understand the insights about observed bargaining.

Another point, strategic debt use can be *jointly* analysed with the maturity and seniority structure, capital structure, and debt ownership structure of corporations, which are not seemingly separate issues as argued by Fama [1990] and Park [2000].

2.4. CONCLUSION

Since the celebrated capital structure irrelevance theory of Modigliani and Miller [1958], capital structure puzzle has remained to be enigmatic. Following this theory under some unrealistic assumptions, researchers have relaxed these conditions by including market imperfections to examine it more realistically. According to Static-tradeoff theory, capital structure is shown to be relevant in affecting firm value with an optimal capital structure. This optimality is attained by trading off the benefits of debt finance (tax deductibility of interest payments) with its costs (agency costs, expected costs of financial distress). Pecking Order theory, on the other hand, argues that there is a financial hierarchy in which firms first use internal retentions, then debt and lastly external equity.

Put capital structure puzzle aside, a series of papers has investigated other ambiguous issues related corporations' financing decisions. On one hand, strong arguments have emerged in explaining why firms have different debt maturities. The general tendency favours short-term debt as it mitigates asymmetric information and agency costs, particularly underinvestment problems; reduces shareholders' risk; its rollover can reduce asset substitution problem and maximises tax advantage of debt; and signals firms' high quality. There are several studies favouring long-term debt as it can decrease firm's tax liabilities and thus increases firm value; and minimises asymmetric information induced mispricing of debt. On the other hand, there are some arguments rendering insights about the relationship between capital structure and the source of debt. The related models propose strong relationships between source of finance, and debt restructurings of financially distressed firms in line with reducing asymmetric information and avoiding premature liquidations. The models provide some implications. First, small firms uses unique bank loans as they are relatively more flexible in renegotiations and have some other facilities; and to avoid disclosure costs. Second, high-credit risk firms issue private debt to benefit from low interest rates and so do the ones with more intangible assets to avoid liquidation. Third, large firms issue public debt to employ their flotation costs advantage. Fourth, firm-specific characteristics may stipulate the combination of public and private debt against financial distress. Fifth, small firms first use bank loans to get a reputation by regular repayments and then resort to capital markets for lower interest burdens.

As being another perspective, bargaining-based theories of capital structure mainly analyse the strategic advantage of debt to the firm's shareholders. They briefly imply the followings: First, the anticipation of potential future negotiations can affect the optimal capital structure choice. Second, firms' opportunistic behaviour may put an upper limit on debt capacity. Lastly, strategic debt use has also benefits aside from tax advantages, such as deterring new entrant in the market; forcing concessions from debtholders and changing the seniority of claims on firms.

In the end, it is apparent that there are conflicting implications stemming from the various arguments concerning capital structure, debt maturity structure and debt ownership structure discussed so far. In what follows, there needs to be a series of elaborate empirical studies to evaluate the validity of these arguments in a systematic manner.

3. CHAPTER 2: INSTITUTIONAL AND FINANCIAL TRADITIONS OF COUNTRIES

3.1. INTRODUCTION

It is interesting to note that in such countries having similar capital markets and financial institutions, the capital structure of firms might vary across these countries. On the other hand, in such countries having different financial institutions, the capital structure of firms might be quite similar in these diverse capital markets (Rajan and Zingales [1995]). Being aware of that fact, financial researchers have made considerable effort to obtain the underlying reasons for these differences. It is argued that the efforts to explain differences in financial structures of corporations across countries in terms of tax differentials alone have generally failed as there is little correlation between tax incentives to use different forms of financing and observed proportions of capital raised[42]. The reason could be the converging inflation rates at lower levels, which mitigate the tax systems distortions. Instead, the recent explanations tend to suggest institutional factors for the financial structure heterogeneity across countries. International differences in the extent of financial leverage might depend on the institutional factors related to financial structure affecting the degree of risk to creditors associated with high leverage. For instance, Hoshi et al. [1991, 1996] examine the financial structure of Japan, where there is an organisation of firms' network, called *keiretsu*. They find that those firms that are not the members of keiretsu will probably cut back investment when they have not sufficient cash flows. Thus, one can say that this specific institutional factor may well affect the financial policies of the Japanese firms (Corbett, [1987]). In their more recent study, Hoshi et al. show that those firms with close relationship to their banks, suppliers and customers in industrial groups perform better than others and even get more help in times of financial distress. However, as White [1989] argues, such financial coalitions might have incentive to make inefficient decisions at the expense of other shareholders.

In addition, Schmidt et al. [1999] investigate the role of banks in Europe to find whether such institutional differences exist and change overtime, and whether there are common tendencies toward disintermediation and securitization in France, Germany and the United Kingdom. They find a trend toward increased specialisation by banks in lending operations differing from country to country and argue that a transition from bank-based

[42] See, e.g., Fukao [1995], Mayer [1990], Mayer and Alexander [1990] and Remolona [1990].

to a market-based financial system might increase the efficiency of entire financial structure.

In order to capture the potential effects of *institutional differences* (accounting rules, corporate tax structures, bankruptcy procedures and corporate governance systems) on financing policies of the firms, in this section we will analyse, and then compare, the characteristics of main components of capital markets for France, Germany and the UK.

3.2. THE DOMINANT FINANCIAL STRUCTURE OF COUNTRIES

If we examine the financial systems of countries around the world, there exist some striking differences in terms of their financial institutions, corporate laws, taxation systems, governance mechanisms and so forth, in conjunction with their economic performance. One can classify these financial structures into three main categories[43].

i) Market-oriented Systems: There is an arm's length relationship between the creditors and companies and most of the corporate financing is done through relatively more efficient capital markets[44]. The disclosed information about firms is reliable and can be found in financial markets by the diverse investors. Managers do not have control over the information processed by creditors.

ii) Bank-oriented Systems: Generally, there is a close tie between companies and their external financiers (banks and other financial institutions) who supply most of the capital needs of firms. Thus, banks have some active interests in corporations' structure by having representatives on the board of directors. The information with respect to the fundamentals of the firms is of high quality, but not higher than it is in the market-based systems. Managers (insiders) have strategic advantage over the information processed by creditors (outsiders).

iii) Underdeveloped Systems: Financial institutions, financial markets, accounting systems and corporate governance mechanisms have yet not developed. The information based on their rating agencies or financial analysts is not reliable and information transmission in the economy is poor. Corporate financing is mostly done through banks and other financial institutions.

[43] See Allen and Gale [1995], Berglöf [1990], Berkovitch and Israel [1999], Corbett and Jenkinson [1996], De Bondt [1998], Demirgüç-Kunt and Levine [1999], Mayer [1988, 1990, 1998] and Moerland [1995], among others.

[44] Mayer [1999] suggests that arm's length relation can be measured by bank-ownership of corporate equity, which is 6%, 13%, 2% in France, Germany and the UK, respectively, during the period 1980-1990.

In this study, France and Germany and the UK were chosen, as we believe that they represent satisfactorily different financial structures of their classes. The UK is in the classification of *Anglo-Saxon* tradition (e.g., USA, Canada), where there are comparatively large numbers of publicly listed companies and occurrences of hostile takeovers for market for corporate control due to potentially large agency conflicts. Germany is in the classification of *Germanic* tradition (e.g., Austria, the Netherlands[45];), where corporate decision making and restructuring are made through the involvement of universal banks and financial holdings and the capital markets are not effective with relatively low amount of listed companies. Lastly, France is in the classification of *Latinic* tradition (e.g., Italy, Spain), where corporate ownership structure of the firms can be characterised by family control, financial holdings, state ownership and cross-shareholdings, and agency problems are internalised unlike in Anglo-Saxon tradition (See Moerland [1995]). Moreover, Cobham and Serre [2000] argue that the French financial system is different from their counterparts in the Anglo-Saxon countries as corporations have more autonomy and control over the allocation of financial resources.

It is argued that agency costs and indirect bankruptcy costs are less in Latinic and Germanic countries than in Anglo-Saxon ones due to ownership structure of firms, and their close and long-term relationship between external financiers[46]. Borio [1990] contends another classification and argues that the Anglo-Saxon countries are relatively low-levered as there has been both comparatively early stock market developments in these countries and the availability of external equity finance has been limited due to some institutional impediments[47]. He calculates market value of 'net debt-to-total assets' ratios of non-financial corporations in France, Germany and the UK as 0.53, 0.75 and 0.16, respectively, taking the average of values in the period 1970-87. A related argument by Friedmann et al [1984] notes that traditional institutional investors like pension funds or mutual funds were not present in Germany in 1980s, unlike in the UK where the central government policies are less effective in influencing firms' debt ratios.

Until recently, restrictions on non-bank finance in Germany were significant in that issuance of commercial paper and longer-term bonds were discouraged by the requirements of the issue authorisation procedure and the securities transfer tax[48].

[45] See Rad and Stekelenborg [2001].
[46] Indeed, Borio [1996] reports that the proportion of long-term credit to total credit in the corporate sector is 78 % for Germany, 73 % for France and 50 % for the UK.
[47] See also, Demirguc-Kunt and Maksimovic [1996].
[48] Monthly Report of the Deutsche Bundesbank, March 1992.

Furthermore, secondary trading of equities and equity issuance were historically subject to various taxes. As a result, bank loans were advantageous as a way of external financing with comparison to issuing equities. Germany is, thus, known as bank-oriented country since the role of its universalised banks is substantial in constituting the financial system of Germany. Indeed, the close relationships between the concentrated banks and industrial firms are generally regarded as a distinctive feature of the German economy (Edwards and Fischer [1994], Edwards and Ogilvie [1995]). As a result of these close and long-term relationships, German firms can benefit from lower cost of interest on short-term bank loans as well as greater debt capacity as compared to British firms (Fukao [1995])[49]. Underlying this view, one can argue that the German system of investment finance has institutional features which might be the best way of dealing with the problems of asymmetric information that are unavoidable when investment is financed by external funding sources. What is more, in their international survey, Frankel and Montgomery [1991] discuss that apart from dealing with corporate borrowings, banks in Germany are also engaged in equity investments both for their own accounts and for custody accounts. Therefore, German banks have not only discretionary investment authority but also the exercise of *proxy voting* rights (representation on companies' supervisory boards), which makes them very strong in corporate control (see, Immenga [1979]). By this way, banks cause the firms to run efficiently because of their ability to monitor and control the management on behalf of shareholders (large debtholders can also be large equityholders to ease agency problems). Accordingly, as the bank-based German financial structure is assumed to reduce asymmetric information problems, it should enable banks to supply more external borrowing to firms at a lower cost, and hence to stimulate investment[50].

Baums [1999] notes that Deutsche Bank, Dresner Bank and Commerzbank hold 16 % of about 231 positions reserved for the stockholders on the supervisory board of 24 non-financial industrial companies constituting DAX-30 Index. However, he argues that this should not mean that these firms are bank-oriented because of the factors (the co-determination regime and the network of personal interlocks among all publicly held

[49] However, Lichtenberg and Pushner [1992] show that such relationships may also have costs due to the potential reduction in profitability and efficiency of firms. It is also widely known that the decisions maximising the value of (bank) loans often reduces the market value of equity.

[50] Demirguc-Kunt and Maksimovic [1996] confirm this argument as they find a positively significant relationship between size of banking sector and leverage.

firms) mitigating the role of banks. Moreover, Franks and Mayer [1996] find no evidence that either banks or large blockholders act on behalf of other shareholders.

On the other hand, the UK is known as a market-based country, where the banks are supposed to be less closely involved with the firms for supplying external funds than are in Germany[51]. In market-oriented systems, there exist numerous diverse investors having no direct access to corporations' information. One can say that the development of active stock market in the UK can be caused by the requirement of the disclosure of much more information than it is the case in Continental Europe and Japan (Prowse [1994]).

Considering these two polar cases, Yafeh [1997] argues that France seems to be a middle case in the bank-oriented and market-oriented financial structures. In addition, Gedajlovic and Shapiro [1998] show that the ownership dispersion is low in Germany, medium in France and high in the UK. Since 1945 all the major French banks have experienced periods of state ownership and this nationalisation was justified in 1982 on the grounds that small and medium-sized firms were at a persistent disadvantage and that the banks were reluctant to finance strategic industrial sector. Since 1986 the movement towards private ownership has been justified but still the state has retained large stakes, directly or indirectly, in the privatised banks (Howells and Bain [1999]). Edwards and Fischer [1994] argue that there is no a relatively strong long-term relationship between a bank and a firm for enabling the bank to recognise the nature of business of the individual firm so as to assess the risk of its loans in the United Kingdom, as compared to Germany[52]. Instead, in the UK, the perceived relationship is a short-term horizon causing the bank to have difficulties in mitigating agency costs of external borrowing due to lack of institutional arrangements. Unlike German banks, the UK banks have no direct involvement in the supervisory boards of firms owing to a number of regulatory restrictions (Frankel and Montgomery [1991]). This would eventually imply that the UK banks might be more reluctant to support the firms for their investment opportunities. In what follows, there will be some quantitative illustrations in a comparative pattern to understand the precision of these statements.

[51] Prowse [1994] notes that German banks may lend up to 50 percent of their capital to any borrower whereas, in the UK, exposures exceeding 10 percent are subject to close examination by the authorities.
[52] A recent evidence by Schmidt et al [1999] emphasises that British banks have fairly recently transformed themselves into universal banking conglomerates, whereas the large German banks have already been truly universal banks for quite some time.

Table 3.2.1: Net Sources of Finance in France, Germany and the UK (in %).

	France				
	1970-74	1975-79	1980-84	1985-89	1990-94
Internal	60.9	67.4	65.6	84.7	92.1
Bank Finance	36.0	31.5	37.4	30.3	22.8
Bonds	2.5	2.4	0.4	1.4	5.6
New Equity	6.6	9.0	6.0	6.9	2.1
Trade Credit	-1.0	-3.5	-3.5	-2.9	-3.4
Capital Transfers	1.1	2.2	1.8	3.9	6.9
Other	-04.	-2.0	-3.8	-22.1	-24.7

	Germany				
	1970-74	1975-79	1980-84	1985-89	1990-94
Internal	68.6	82.8	79.8	89.1	71.8
Bank Finance	15.7	8.2	11.1	9.3	16.9
Bonds	1.9	-2.8	-2.1	0.4	-2.8
New Equity	0.7	0.5	-0.5	2.4	-3.1
Trade Credit	-1.4	-1.5	-2.8	-1.8	2.1
Capital Transfers	6.3	9.5	9.7	8.4	9.6
Other	8.3	3.2	4.7	-7.9	-0.9

	United Kingdom				
	1970-74	1975-79	1980-84	1985-89	1990-94
Internal	98.2	102.3	115.4	81.0	81.2
Bank Finance	26.1	6.8	12.4	29.9	0.2
Bonds	3.3	-1.3	2.0	8.8	6.3
New Equity	-7.3	-3.3	-7.6	-20.6	12.4
Trade Credit	-0.2	-2.6	-3.1	-0.6	1.0
Capital Transfers	6.2	2.1	1.6	0.4	-0.4
Other	2.3	-3.2	-12.2	-0.8	8.7

Source: Corbett and Jenkinson [1996, 1997] for Germany and the UK; Cobham and Serre [2000] for France.

Table 3.2.1. shows that the proportional amount of internal financing for investment opportunities has risen and always been the most dominant way of raising capital overtime in France. In addition, bonds and equity raised only by public companies are not of importance overtime in Germany. Furthermore, bank borrowing ratios in Germany are unstable during 1970-94 being relatively unimportant in aggregate. This finding contradicts the conventional wisdom that Germany is a bank-based economy. On the other hand, again, the internal sources have always been the mostly resorted way to finance the investment in the UK. Interestingly, the amount of bank finance has generally been more in the UK than in Germany. More strikingly, there has been a negative contribution of new equity issuing to finance physical investment during 1970-89 in the

UK probably due to equity use (not source) in takeover actions, which contradicts the conventional wisdom that the UK is a market-based country[53]. For these reasons stated above, it would not be straightforward that Germany is a bank-based and the UK is a market-based country since in both countries internally generated retentions are quite dominant sources of finance. Considering three countries, France has the lowest internal financing \ highest equity financing (not UK) during 1970-1984. Another interesting point, France, not Germany, has the highest bank-financing ratios during 1970-94. Only in 1990-1994, the UK has the positive net equity issuance, which is also highest across sample countries for this period.

Table 3.2.2: Gross and Net Financing Proportions of Private Non-financial Corporations, 1970-87. (Source: Borio [1990]).

	France		**Germany**		**United Kingdom**	
	gross	net[1]	gross	net[1]	gross	net[1]
Retained Earnings	39	74	65/58	83/74	68	108
Share Issues	8	9	2	1	5	1
Direct Investment	2	0	1	-1	1	-6
Total Debt	51	28	32	15	27	10
credit institutions	22	26	20	12	20	14
securities	2	2	1	0	2	3
trade credit	19	-2	2	-2	2	-2
other	7	2	10	5	2	-5
Residual	-	-11	1	1	-	-14
Memorandum item						
depreciation	n.a.	n.a.	54	70	66	106

[1] These figures are obtained after subtracting the accumulation of financial assets from the change in financial liabilities.

[53] Similarly, Mayer and Alexander [1990] argue that, large UK firms raise more equity finance in their more developed stock market than German firms do to associate them with acquisitions. Since net equity issuing is the same in these countries, the UK firms should raise more debt finance. Furthermore, Mayer [1988] reports that new equity was raised more in Germany and France than in the UK to finance domestic investment.

Table 3.2.3: Unweighted Average Net Financing of Non-financial Enterprises[1], 1970-1985

	France	Germany	The UK
Retentions	61.4	70.9	102.4
Capital Transfers	2.0	8.6	4.1
Short-term Securities	-0.1	-0.1	1.7
Loans	37.3	12.1	7.6
Trade Credit	-0.6	-2.1	-1.1
Bonds	1.6	-1.0	-1.1
Shares	6.3	0.6	-3.3
Other	-1.4	10.9	3.2
Statistical Adjustment	-6.4	0.0	-13.4

[1] Numbers are in percentages and unweighted as a proportion of capital expenditures and stock building. (*Source*: Mayer [1990]).

If one is to scrutinise the differences across countries further, Table 3.2.2. and Table 3.2.3. show that in all countries, seemingly as result of improvement in profitability, retained earnings have been the main sources of financing; followed by borrowing and issuing shares[54]. The low-levered British firms rely most on retained earnings and least on shares among others. On a both gross and net basis, French firms are mostly levered and British firms are leastly levered. Short-term borrowing has mostly been done by British firms (Table 3.2.3.), which confirms the idea that there is a short-term relationship between firms and creditors in Anglo-Saxon countries. In addition, Mayer [1990] reports that the most dominant source of external financing is bank finance in all countries, especially in France not in Germany.

Consequently, although it is argued that debt is important in ensuring effective governance in corporations[55], Mayer [1988] shows the weakness of this proposition with the fact that retained earnings are the most important source of finance of firms. Then, he asserts that studies based on comparative financial structures should regard high internal financing ratios as a demand (not supply) side problem in order to understand international differences. Thus, it would be useful to examine the investment expenditure of corporations in the context of their countries' growth rates and investment rates.

[54] This can be a supportive evidence of Myers' [1984] Pecking Order Theory. Besides this, Graham [2000] discerns a persistently conservative debt policy that large, liquid, profitable firms with low expected distress costs use debt conservatively because of the product market factors, growth options, low asset collateral, and planning for future expenditures.

[55] See, e.g., Grossman and Hart [1982] and Jensen [1986].

Table 3.2.4: Non-financial Enterprise Sector Balance Sheet, as a % of annual GDP. (Source: Kneeshaw [1995]).

	France		Germany		United Kingdom	
	1983	*1993*	*1983*	*1993*	*1983*	*1993*
Assets:						
Tangible, total	156.6	137.6	150.3	145.2	107.9	123.7
Fixed Capital	89.9	83.3	125.3	125.7	39.0	47.8
Inventories	27.5	21.1	25.0	19.5	21.7	17.5
Financial, total	48.4	189.3	46.4	69.2	43.9	61.6
Debt Claims	8.3	18.3	24.8	33.4	12.7	15.2
of which: Long-term	1.2	1.6	2.4	7.2	..	..
Equity	34.0	169.7	13.2	18.1	8.3	19.0
Liabilities:						
Financial, total	53.1	67.9	77.0	93.9	41.1	81.5
Debt Claims	53.1	67.9	52.7	73.2	21.8	49.3
of which :Long-term	34.9	41.8	37.6	55.9	1.6	21.4
Memorandum items:						
Equity	48.7	215.2	20.4	29.8	50.6	121.9
Trade credit granted	42.4	49.3	7.5	5.7	19.4	14.7
Trade credit received	40.2	39.4	4.6	3.5	20.3	15.5

Table 3.2.4. reveals the cross-country differences in non-financial firms' internal financing capacity and in their external financing choices. These values indicate the differences in the cost of equity, short-term and long-term financing caused by country-specific regulatory and institutional factors. The fixed-capital/GDP ratio of British corporations is considerably smaller than that of French and German ones (fixed-capital is useful collateral for borrowings). Furthermore, Debt-liabilities/GDP ratio is the smallest one in the UK, which confirms that British firms are relatively low-levered. The smallest Equity-liabilities/GDP ratio is in Germany, which might be evidence that Germany is not a market-based country. In addition, the lowest Long-term Liabilities/GDP ratio in the UK might confirm the argument there is a distant and short-term relationship between the creditors and corporations in market-oriented economies. Consequently, it can be asserted that one cannot purely attain a country to a specific group of dominant financial structure due to contradictory figures discussed above.

3.3. ACCOUNTING SYSTEMS ACROSS COUNTRIES

3.3.1. Introduction

Accounting systems can be seen as part of the socio-economic system of countries, which are determined by environmental factors. Thus, one should not be surprised to the differences in accounting systems as they develop through time as a result of distinct economic, social and historical conditions of countries and adapt themselves to the new environmental factors. In general, accounting rules are oriented toward protecting creditors, employees and other stakeholders by restricting dividend payouts and conservative measurements of company's net assets, and marketable securities are usually evaluated at historical prices in France and Germany. On the other hand, accounting rules are oriented toward providing economic information to the investors in the market and marketable securities are usually evaluated at market prices in the UK (Fukao [1995]).

3.3.2. Accounting Systems Compared

In 1993, Daimler-Benz reported DM615 million net profit under HGB (German-GAAP, Generally Accepted Accounting Principles) but a DM1.84 billion net loss under US-GAAP. This fact has naturally received lots of attention to focus more on different accounting systems around the world. Based on Table 3.3.1., one can understand why financial accounting values may vary substantially depending on the related accounting systems. Glaum [2000] argues that in Roman-Law originated German accounting system, there is a deliberate action to undervalue assets and overvalue liabilities in order to reduce 'accounting' earnings due to tax burden concerns. Thanks to wide scope of options, which are a few in Anglo-American accounting systems, German firms can pursue conservative valuation policies. As an example, reported profits of German corporations tend to be lower than if they would be reported using US-GAAP. Another example, German firms can capitalise the accumulated reserves later in less profitable years, which would smoothen the volatile profits. This is why profitability in Anglo-American firms is more volatile and higher due to lack of fewer possibilities for accumulating hidden reserves. Indeed, Dietl et al. [1998] state that creditor protection is enforced by a series of principles that result in substantial hidden reserves, and reported accounting earnings often do not accurately reflect economic reality (*true and fair view* requirement is jeopardised). Furthermore, Ball et al. [2000] argue that code-law accounting standards (in Germany, France, Japan) give greater discretion to managers in deciding when economic gains/losses are included in accounting income.

Table 3.3.1: Traditional differences between German and Anglo-American[56] Accounting and its determinants (Source: Glaum [2000]).

	German Case	Anglo-American Case
Dominating Accounting Principle	Prudence Principle/ Determination Principle	Relevance/ Reliability
Accounting Policy	Numerous Options, Relatively wide scope	Few options, Relatively little scope
Owners' equity	Lower	Higher
Profit	Less volatile, lower	More volatile, higher
Disclosure Requirements	Limited	Extensive
Capital Market Organisation	Bank Dominated/ Low importance of private investors	Securities-market dominated/ Greater importance of private investors
Legal System	Code Law	Common Law
Standard Setter	Legislature	Delegated to private Institution (FASB)
Role of Taxation	Financial and Tax Accounting closely interlinked	Financial and Tax Accounting clearly separated
Dominant view of firms	Stakeholder Approach	Shareholder Approach

As Germany follows the tradition of Roman law it has a different focus than that of the US and the UK and its accounting standards are defined by codified legal provisions contained in the Commercial Code' and 'Stock Act'. Accounting rules which are creditor-oriented are strongly influenced by political groups, e.g., labour unions and banks (Mueller et al. [1997]). Besides, Choi et al. [1999] argue that financial accounting in Germany is completely subordinate to tax law. Available tax provisions can be used provided they are actually recorded for financial reporting purposes. Consequently, there is no distinction between financial statements prepared for tax purposes and those published in financial reports. That is, taxation depends on financial reporting in most of the EU member states including France and Germany. However, in the Anglo-American countries including the UK, fiscal (tax) rules and accounting rules are independent of each other.

[56] The author specifically compares Germany and USA, and he puts the USA into the tradition of Anglo-American Case.

Table 3.3.2: Legal and economic factors, selected countries
(Source: Guenther and Young [2000])

Country	*Law Type*	*Anti-director Rights Index*	External Cap'n to GNP	Market Cap'n to Sales	Debt/Asset Ratio	Tax Conformity
France	Code	2	0.23	0.29	0.16	Yes
Germany	Code	1	0.13	0.21	0.14	Yes
Japan	Code	3	0.62	0.63	0.08	Yes
UK	Common	4	1.00	0.64	-0.01	No
US	Common	5	0.58	0.67	0.00	No

As for explaining Table 3.3.2., giving fundamental implications about countries, accounting standards in common-law countries are based on GAAP, in which the influence from the public sector on both standard setting and enforcement is relatively small. The main objective is to meet the *market* demand for accounting information as accounting standards are originated in the accounting market. The third column is due to La Porta et al. [1997] who develop an 'index of antidirector rights' to measure a country's investor protections. The index aggregates shareholder rights, with 5 being the strongest protection and 0 being the weakest protection. Hence, the US has strongest shareholder protection while Germany has the weakest one. Accordingly, one can argue that due to the strong shareholders protection the UK and that US have large equity markets and large external shareholder populations. This can be confirmed by the fourth and the fifth columns. The two indicators *'external capitalisation to GNP'* measures the ratio of the stock market capitalisation held by minorities in a country to the country's gross national product and the aggregate *'market capitalisation to sales'* measures the median ratio of the stock market capitalisation held by minorities to sales for all non-financial firms in the country. Both of these measures are low for France and Germany relative to the US and the UK. The sixth column reports median debt/asset ratios for the different countries, relative to the US, to classify bank-oriented and market-oriented countries. France and Germany seem to be bank-dominated countries, unlike the UK and the US as being seemingly market-oriented countries whose debt/asset ratios are lowest. The last column shows that, to a large extent, reported accounting income is not affected by tax considerations in the UK and the US since financial accounting and tax accounting are separated.

France's accounting system has been described as macro-uniformed, government-driven, tax-dominated, and plan-based (Nobes and Parker [1995]). The development of French accounting has been characterised by the search for a consensus among various interested parties. Fortin [1991] argues that the first official accounting plan was established in 1947, motivated primarily by the need to

i) develop better statistics for national economic planning,

ii) appraise the results of economic policies of the government, and

iii) prevent firms from avoiding taxes.

Since the French government plays an important role in managing the country's resources and satisfying companies' needs for capital, financial accounting is oriented toward better decision-making by the government, and companies must follow uniform accounting procedures that are designed to demonstrate companies' compliance with the government's plans (Mueller et al. [1997]). According to Table 3.3.2., investor protection is weak for shareholders. This is also reflected in the small size of external shareholders in the capital market. The ratio of external capitalisation to GNP and the ratio of market capitalisation to sales are both low. Fortin [1991] states that financial accounting in France is heavily influenced by tax provisions as financial statements must meet the needs of tax authorities.

In an earlier study, Doupnik and Taylor [1985] assess the extent to which 16 westerns European countries conformed to a 'basic core of accounting practice'. The survey supports the view that many differences exist in accounting practices in these countries. Another related study by Emenyonu and Gray [1992] examines the extent to which accounting measurement practices in France, Germany and the UK are harmonised in terms of great effort exerted for EC accounting harmonisation. They test the hypotheses whether there are significant differences by large French, German and British corporations with respect to depreciation methods, stock valuation methods, methods of treating goodwill, methods of treating R&D expenditure and valuation bases for fixed assets. Again, the test results show that there are significant differences between these countries based on all the practices evaluated.

Herrmann and Thomas [1995] conduct a similar research by considering eight EC countries including France, Germany and the UK. Their first conclusion indicates that accounting for foreign currency translation of assets and liabilities, treatment of translation differences and inventory valuation have some similarities. On the other hand, the second conclusion reveals that the policies related to accounting for fixed asset valuation, depreciation, goodwill, R&D expenditure, inventory costing and foreign currency translation of revenues and expenses in these countries are not harmonised, i.e., have dissimilarities[57].

In addition, based on the study of Buijink et al. [1999] one could extract the following differences: As European countries have developed in different ways, one can expect that their financial accounting and tax accounting statements have some different causalities. As a consequence, the financial accounting and the tax financial statements of a company can be related in several ways in the EU. Germany and some other countries in the EU (Austria, Finland, Italy and Luxembourg) use the *Maßgeblichkeitsprinzip* (authoritativeness) principle. According to this principle, the financial accounting accounts are binding for the tax accounts. Hence, the tax accounts do not form an independent set of accounts, but are derived from the commercial accounts. In practice this often works out just the other way around, i.e., the commercial accounts will follow the tax accounts, because of the fact that companies strive to pay as little tax as possible[58]. In countries where the authoritativeness principle is applied, differences between tax expense and taxes payable will arise only in special circumstances. In France, the relationship between the tax and financial accounting statements is fixed by an accounting plan that prescribes one general financial statement format for both the tax and financial accounting accounts. As a result, both accounts are the same. In the United Kingdom, tax and financial accounting statements are not closely related[59]. The financial accounting statements of a company should above all provide a 'true and fair view' of the company's assets, liabilities, financial position, and profit or loss. In contrast, the legislation for tax financial statements of a company is aimed at a fair distribution of the tax burden and often serves political goals. As companies want to pay low corporate income taxes, while at the same time trying to report high financial accounting income to shareholders, the use of separate financial statements may lead to higher financial accounting income than tax income.

57 Archer et al. [1995] confirm this lack of harmonisation with their study about the areas of deferred taxation and consolidated goodwill. McLeay et al. [1999] argue that disharmony in countries' accounting policy exists if economic conditions of countries are dissimilar.

58 Eberhartinger [1999] notes that this principle is not a general rule requiring expenses to be included in the financial statement to be tax deductible. Rather, it states that in case the same option exists in the financial reporting and in the tax requirements, the choice made in the financial report is normative for the tax report.

59 There are some advantages of closely related financial accounting and tax financial statements, such as, less administration costs, less confusion on what the real income figure is, less risk on conflicts (fines) with the fiscal authorities, and prevention of conflicts with individuals or organisations entitled to part of the profit.

As the international differences between accounting systems seem very apparent, Guenther and Young [2000] investigate empirically how cross-country differences in financial accounting standards affect the relation between financial accounting earnings and real economic value-relevant events that underlie those earnings. They mainly find that the association between aggregate return on assets and the economic growth rate is high in the UK and the US, and low in France and Germany. The authors believe that these results make an important contribution to research in international accounting by providing evidence that the association between financial accounting earnings and real economic activity in a country is related in predictable ways to the legal and economic systems that underlie financial accounting standard setting and the demand for financial accounting information. Guenther and Young [2000] further argue that the high association for the UK and the US and the low association for France and Germany are consistent with expectations that accounting earnings in common-law countries having legal systems that protect external shareholder rights, countries with market-oriented financial systems, and countries where financial accounting rules are independent of tax rules better reflect underlying economic activity.

Another recent study by Ball et al. [2000] examines the differences in the demand for accounting income in different institutional environments. Mainly, under code-law countries (e.g., France, Germany) the demand is influenced *more* by payout preferences of agents for labour, government and capital, and *less* by public disclosure as compared to common-law countries (e.g., the UK). They argue that asymmetric information is more likely to be resolved in code-law countries due to corporations' close relations with major stakeholders in terms of financial statement disclosures. Yet, agency costs of monitoring managers become less in common-low countries due to their enhanced 'transparent' disclosure standards in which the false signalling is penalised. Their empirical study shows that common-low accounting income exhibit significantly greater *timeliness* (quick incorporation of economic losses/gains, making leverage and dividend restrictions more binding, etc.) than code-law one.

A further empirical study conducted by Ali and Hwang [2000] investigates the relations between the measures of value relevance of financial accounting data and some country-specific factors based on 16 countries including France, Germany and the UK. The results show that the value relevance of financial reports is *lower* for countries whose financial system is bank-dominated (France, Germany); where private sector bodies are not involved in the standard-setting process; where the accounting system is originated from

Continental model; where tax rules have significant effects on financial accounting measurements; and where auditing services' expenditures are low.

In brief, there exists a strong consensus arguing that international differences in accounting systems have not disappeared despite some efforts for harmonisation of the accounting principles. Thus, international financial researcher should be cautious in interpreting their results if they are using company accounts from different countries. It is because the different financial structures of countries might be *partially* due to differences in accounting principles[60,61].

3.4. THE ROLE OF TAXATION SYSTEMS

3.4.1. Introduction

Taxation systems, as well as accounting systems, are related to the need to assess the operating results of institutions in an economy. Tax rules followed by policy objectives take their formation according to the economic conditions they pertain. The research conducted by Daly and Weiner [1993] about corporate tax harmonisation reveals the fact that, despite some measures, significant tax obstacles to cross-border activities and wide differences in taxation between European Community still exist. The institutional differences make the rate for tax purposes, depreciation rules, the tax treatment of losses, stock and other expenses, the taxation of capital gains, the definition of corporate tax base, etc., differ significantly between countries. As a consequence, the authors depict the variations in corporate tax revenues among countries, which can be realised by examining Table 3.4.1.

[60] A study by Deutsche Bundesbank in 1994 about the capital structures of firms in Germany and other European countries reveals that the differences in accounting standards helps to explain a substantial amount of the observed differences in capital structure. In that, book-value based capital structures differ more than market-value based capital structures.

[61] Friderichs et al. [1999] argue that there are markedly differences between corporate accounting policies in Germany and France in some aspects. They state that the accounting discrepancies related to the disclosure of assets and liabilities, and the valuation concepts, to some extent, can be eliminated. However, it is argued that substantial differences still persist despite the major efforts of harmonising the balance sheet data by readjustments and recalculations.

Table 3.4.1.: Corporate Tax Revenues in 1991, selected countries.
(Source: Daly and Weiner [1993]).

Country	Corporate Taxes (% of GDP)	Total Taxes (% of GDP)	Corporate Taxes (% of Total Tax Revenues)
France	2.0	20.4	9.7
Germany	0.7	12.5	5.3
UK	3.2	27.8	11.5
EC (unweighted)	2.6	25.0	10.2

Furthermore, Haufler and Schjelderup [2000] report that statutory corporate tax rates have been reduced considerably in many OECD countries while effective marginal tax rates have remained stable over the past decade. Due to different taxation systems in terms of capital allowances, tax rates and tax bases, they argue that one can envisage the strategic transfer pricing and profit shifting activities by multinational corporations. Thus, as recognised by theoreticians and analysts, it is likely that the basic construct of taxation systems of countries differing can influence corporations' financial and investment decisions.

3.4.2. Corporate Taxation in the UK[62]

3.4.2.1. Overview

Since 1973, the UK operates a partial *Imputation System* of corporate taxation (CT), under which individual shareholders receive a credit for their share of part of the tax paid by the company. Such credits can be regarded as offsetting the shareholder tax liability. Part of the corporate tax liability on distributed profits is imputed to shareholders, which is considered as a prepayment to shareholders' personal income tax. This system was introduced to replace the previous *classical* system as it involved the double taxation of dividend income.

A UK company is liable to corporate tax on all of its profits (income and capital gains). Unlike individuals, corporations are not subject to capital gains tax (CGT). However, they are liable to pay CT on their chargeable gains computed under the same rules as for CGT. A chargeable capital gain does not arise on the disposal of an asset eligible for capital allowances unless the proceeds of sale exceed acquisition cost. Claiming a capital loss is not possible for such an asset. Gains due to the sale of certain business assets may be rolled over provided further purchases of business assets are made, hence deferring the

[62] This section is based on the studies of KPMG [1998]; Deloitte Touche Tohmatsu [1999]; Acker et al. [1997], and La Porta et al. [2000].

gain until the disposal of the new asset. The old and new assets must be used for the purpose of corporation's trade, and must fall within certain specified categories. Other provisions give relief on the transfer of a UK trade between companies resident in different EC member states. Relief can also be given on the transfer by a UK company of trade carried on elsewhere in the EC. Asset transfers between group companies are deemed to be made at a price which results neither a loss nor a gain. Capital losses are computed in the same way as gains.

3.4.2.2. ***Deductions***

In general, tax relief is available only for expenses which are exclusively and wholly incurred for the purpose of corporation's trade or in the case of an investment company as management expenses. Further items are available to be specifically excluded from relief or where adjustment must be made to the accounts figures for tax purposes.

Capital expenditure is not deductible, nor is any depreciation charge made for account purposes. Capital allowances (tax depreciation) are given on a wide range of fixed assets at specified rates. Expenditure is normally treated as incurred on the same basis for account purposes, yet, there is legislation to prevent undue acceleration of allowances. Capital expenditure for which allowances are given includes the following:

a) *Machinery and plant* (in the past this was not, in general, statutorily defined, but Finance Act 1994 introduced legislation which attempts to define plant). The allowance is 25% of the reducing balance of expenditure. For expenditure incurred after 25 November 1996 on long-life assets (i.e. assets with an expected working life when new of 25 years or more) the allowance is 6% of the reducing balance (subject to exceptions and transitional provisions).
b) *Ships* (a 25% allowance with special provisions for postponement if desired). Finance Act 1995 introduced a relief which allows balancing charges on ships to be deferred in certain circumstances where the ship owner reinvests in new shipping within 6 years of disposal.
c) *Industrial buildings and hotels* (4% of cost).
d) *Industrial and commercial buildings* in a designated 'enterprise zone', where expenditure is incurred within ten years of the designation (or within the following ten years under a contract entered into during the first ten years): a 100% allowance;
e) *Scientific research* (100%), patents and know-how (25% of the reducing balance).
f) *Mines and oil wells* (10% or 25% of reducing balance depending on the nature of the expenditure).

3.4.2.3. Dividends and Distributions

The related basic principles of dividends are as follows:

a) A company pays corporation tax on all its profits (including capital gains), whether distributed or undistributed.

b) Until 5 April 1999 a resident company distributing profits to its shareholders in the form of a dividend had to account to the Inland Revenue for advance corporation tax ('ACT') at the rate of 1/4 (or 20% of the gross amount) (for the years to 5 April 1998 and 5 April 1999). ACT has now been abolished with effect from 6 April 1999.

c) ACT on dividends paid during an accounting period (irrespective of the year in respect of which they are paid) would be set off against the company's corporation tax liability for that accounting period up to a limit of 20% of taxable profits (for the years to 5 April 1998 and 5 April 1999).

d) A UK resident who receives a dividend is normally entitled (for the year to 5 April 2000) to a tax credit of 1/9 of the dividend (or 10% of the aggregate of the dividend and the tax credit). For individuals the aggregate of the dividend and the tax credit is liable to income tax, but the normal basic rate liability of 23% is reduced to 10% for dividend income. The result is that the tax credit discharges this liability leaving only a higher rate liability of 32.5% (where relevant) to be paid (i.e., an additional 22.5%). For the year to 5 April 1999 a UK resident was entitled to a tax credit of ¼ of the dividend (or 20% of the aggregate of the dividend and the tax credit). For individuals the aggregate of the dividend and the tax credit was subject to the lower rate of 20% for dividend income. This tax credit discharged the lower rate liability leaving a higher rate liability to be paid. An individual was able to reclaim the tax credit if it was in excess of his eventual liability but this is no longer possible after 5 April 1999.

e) For companies the dividend is not subject to corporation tax, but prior to 6 April 1999 the tax credit could effectively be set off against the recipient's own liability to account for ACT on dividends paid.

The term 'distribution' can include a number of matters other than a dividend, such as the transfer of assets to a shareholder at an undervalue, and certain payments of interest or premiums; e.g., interest in excess of a commercial return.

In addition, interest paid to a 75% overseas affiliate will be treated as a distribution in cases of thin capitalisation. These rules (which were introduced in Finance Act 1995) will generally apply regardless of the provisions of the relevant double tax agreement. There is no necessity under the UK's tax system to determine the period out of the profits of which the dividend is paid; the relevant question is the year in which it is paid.

Advance Corporation Tax (ACT) paid by a company in respect of distributions made before 6 April 1999 during an accounting period could be set off against the corporation tax liability on its profits for that period. The ACT set off for an accounting period could not exceed the ACT which would have been payable if a 'franked payment' (i.e., a qualifying distribution plus ACT) equal to the profits of the period were made by the company at the end of that period. Double taxation relief was allowed before ACT set-off, which could give rise to surplus ACT in companies with significant amounts of foreign income.

Surplus ACT is ACT in excess of the amount which can be set against the company's corporation tax liability for an accounting period. The company could claim to set off all or part of the surplus against its corporation tax liability for any accounting period beginning in the six preceding years, more recent accounting periods having priority over more remote ones. Any surplus ACT which was not dealt with as above may be carried forward and set against future corporation tax liabilities, subject to the rules regarding 'shadow ACT' discussed below. In certain circumstances, ACT (not only surplus ACT) could be surrendered to other companies in the same group. There was anti-avoidance legislation to deny the benefit of surplus ACT carried forward or backward in certain cases, where there was a change in the ownership of the company together with a major change in the nature or conduct of the business. This legislation also countered arrangements under which a group could purchase a company with surplus ACT, and transfer assets to it shortly before their sale, in order to set the ACT against the tax arising on the chargeable gain. Following the abolition of ACT from 6 April 1999, surplus ACT which had accumulated at that date may be used in subsequent accounting periods, subject to a restriction under a "shadow ACT" regime which, broadly, requires a company to calculate the ACT which would have been payable if the system had not been abolished, and then to utilise that "shadow ACT" against its corporation tax liability in priority to real ACT brought forward.

There is also *Franked investment income (FII)* which is dividend income (or other qualifying distributions) received by a resident company from another resident company, and comprises the amount of the dividend together with the related 'tax credit'.

Foreign income dividend scheme: Finance Act 1994 introduced a foreign income dividend (FID) scheme for dividends paid on or after 1 July 1994. This was abolished from 6 April 1999. Under the scheme, a company could opt before payment of a dividend for it to be treated as a FID. ACT would then be payable on the dividend in the normal way, but if it was subsequently established that it was payable out of foreign source profits, any amount of the ACT which proved to be surplus in the period would be repaid. A company could match a FID with the foreign source profits of its current or immediately preceding accounting period or, if those profits were insufficient, out of the foreign source profits of any subsequent accounting period, or provided certain conditions were met, out of the foreign source profits of any of its 51% subsidiaries. Shareholders who received a FID were treated as receiving income which had borne income tax at 20%. This satisfied the liability of lower rate and basic rate taxpayers (at the reduced 20% rate then applicable to dividends) but higher rate taxpayers were liable to pay an additional 20% (to bring the total up to the 40% higher rate). The FID did not carry a tax credit, so no refund was available to tax exempt shareholders. Like an ordinary dividend, a FID received by a UK company did not form part of that company's taxable profits. Neither, however, did it form part of its FII available for offset against franked payments in accounting for ACT. If a company both received and paid FIDs, it had to pay ACT only in respect of the excess of payments over receipts, and any surplus of receipts was available for carry forward to the following period.

3.4.3. Corporate Taxation in Germany[63]

3.4.3.1. Overview

Germany operates the *Two-Rate Taxation* System in which the corporate tax rate on earning distributed as dividends is less than on retained earnings. The aim is to alleviate the tax advantage of retentions in the classical system. As in the imputation system, the taxes paid by corporations can be credited by shareholders to offset personal taxes.

In a detailed manner, the German corporation tax system, *Körperschaftsteuersystem*, is based on a full tax credit system with a split tax rate regime, a standard rate for retained earnings (currently 45 % plus 3.38 % solidarity surcharge) and a reduced rate for distributed profits (currently 30 % plus 2.25 % solidarity surcharge). The full tax credit system was introduced in 1977 in order to avoid the problem of double taxation for distributed profits, firstly at the level of the company through corporation tax and additionally at the level of the shareholder through personal income tax.

[63] This section is based on the studies of KPMG [1998], Deloitte Touche Tohmatsu [1999], Federal Ministry of Finance of Germany [2000], and La Porta et al. [2000].

Corporations are treated as taxable entities and are subject to corporation tax, *Koerperschaftsteuer*. The corporate income tax is completely integrated with the income tax so far as dividends which are distributed to resident individual shareholders are concerned. This means corporate income distributed to resident individuals bears only the income tax at the tax bracket applicable to the individual's total income and that the corporate income tax burden is completely eliminated. The corporate income tax is a separate and self-contained tax and not just a withholding tax on corporate income. The corporate income taxpayers are the AG, the GmbH, the KGaA, co-operatives, mutual insurance companies, and comparable foreign entities. Tax may also apply to unincorporated associations and conglomerations of property, such as foundations which, in certain respects, may resemble a trust under Anglo-American law. Corporations resident in Germany are subject to taxation on their worldwide income (unlimited tax liability). Corporations not resident in Germany are subject to taxation on income from sources in Germany (limited tax liability).

The underlying philosophy of the German tax system can be described by the pay out-take back principle: the higher rate for retained profits should provide an incentive to firms to distribute earnings which subsequently, by using the allocational function of capital markets, should try to reabsorb the distributed amounts via capital increases.

3.4.3.2. Deductions

In general, a corporation can deduct all expenses incurred by it in conducting its business operations, irrespective of whether they are ordinary or necessary. Nevertheless, in the case of related parties, the tax authorities will closely scrutinise expenditure to see whether such expenses reflect arm's length standards and whether they are paid on the basis of a clear-cut written agreement between the parties. In addition, certain expenses are allowed, while other expenditures are specifically disallowed.

Allowable deductions: Organisation expenses incurred as a result of forming a corporation or increasing its capital may not be capitalised. Rather, they are deductible in the year incurred, to the extent that they exceed premiums paid on capital stock. Organisation expenses include accountants' and lawyers' fees and registration fees. These deductions are only allowed if so stated in the articles of association including the gross amount of these expenditures. Salaries and other compensation for services by shareholder employees are deductible.

The compensation paid, has to be at arm's length, or a constructive dividend may be imputed. Rental expenses may be deducted as incurred. Interest payments are generally deductible unless they relate to tax exempt income. Interest payments to related parties may be disallowed to the extent that the rate is not at arm's length. Interest payments to non-resident shareholders holding more than 25% of the company's share capital may not be deductible under the thin capitalisation rule of sec. 8a Corporate Income Tax Act. Payments to silent partners and on profit-participation loans are deductible. Under the thin capitalisation rule, payments to non-residents could also be disallowed as deductions and treated as constructive dividends. Repair and maintenance expenses are deductible in the period incurred. Repairs that, in effect, result in a new asset, have to be capitalised. Depreciation is, in general, allowed in the case of tangible or intangible fixed assets with a useful life of more than one year. Land and investments in other corporations cannot be depreciated, but may be written down to a lower (going-concern) value. The goodwill acquired for consideration can be amortised on a straight-line basis over 15 years. The basis for amortisation is the last balance sheet value before beginning the depreciation. Depreciation is based on acquisition or production costs. Accepted methods are straight-line method, declining-balance method, or units-of- production method. A taxpayer may change from the declining- balance to the straight-line method, but not vice versa. Rates under the declining-balance method may not exceed 3 times the applicable straight-line rate, or 30%, whichever is less. Except for buildings, depreciation rates are not fixed by statute, however, the Federal Ministry of Finance publishes guidelines of useful lives.

Typically accepted straight-line rates are:

a) Buildings and factories, 4%; Office buildings 2% or 2.5% (4% in 1985 and subsequent years where the building permit was applied for subsequent to 31 March 1985; the declining-balance rates decrease from 10 to 2.5%, from 7 to 1.25% and from 5 to 1.25% in cases where the building is located in Germany and is built by the taxpayer or acquired within the year of completion; which rates apply depends on the actual acquisition date/ date of application for the building permit and whether the building serves residential purposes;

b) Plant and equipment, 5 to 20%; Machinery, 10 to 20%; Motor vehicles, 20 to 25%.

3.4.3.3. Dividends and Distributions

A *two-rate* imputation system is followed in Germany to eliminate the economic double taxation of distributed profits. A company must pay corporate income tax at an effective rate of 30% on the amount of its profits distributed as dividends and, additionally, a solidarity surcharge of 5.5% on the amount of the corporate income tax (the total tax burden is 31.65%). From those dividends, the company must deduct withholding tax at

25% plus a solidarity surcharge on the withholding tax of 5.5%. Dividends are grossed up by 3/7 for tax purposes and the individual can claim credit for up to 3/7 of the dividend's cash amount. Resident shareholders that receive dividends from a resident company must include in their taxable income the actual amounts received, grossed up by a tax credit for the under-lying corporate income tax, the 25% withholding tax, and the 5.5% solidarity surcharge on the withholding tax. All three taxes, excluding the surcharge on the corporate income tax, are creditable against the shareholders' own corporate income tax liabilities. Dividends received from non-resident companies must also be included in taxable income. Dividend payments deemed to be distributions of foreign-source income do not trigger an increase of corporate income tax in the payer company's sphere. This treatment applies both when the shareholder is a domestic or foreign company and when the shareholder is an individual. When the recipient is a corporation subject to unlimited taxation, the revenue is still regarded as foreign-source income, thereby allowing a tax-neutral distribution of foreign-source income within German group companies. However, dividends received by a resident individual are still subject to the personal income tax rate of the shareholder.

Foreign dividend withholding taxes levied on the distribution to the German company are, in general, creditable against German tax payable. Additionally, if the German recipient company has held at least 10% of the shares of a foreign active business company for at least twelve months, a credit is given for the foreign corporate income tax levied on the profits out of which the dividend was paid, subject to various restrictions. This rule may also apply to distributions from second-tier foreign associates. If, however, a double tax treaty between Germany and the country from which the dividend was paid applies and the resident recipient company owns a substantial interest in the non-resident company (usually 25% or more, but reduced to 10% under German domestic law), dividends from the non-resident company are exempt from German taxation, and no tax credits are then available. If dividends are exempt from corporate income tax under a tax treaty or domestic law, 15% of the gross dividend received is deemed to be a non-deductible expense and is therefore subject to corporate income tax.

Shares received as a result of a capitalisation of free reserves do not constitute taxable income for the shareholder. A capitalisation of profits instead of reserves, however, does constitute taxable income.

3.4.4. Corporate Taxation in France[64]

3.4.4.1. Overview

After following several reforms, the French corporation tax system, *impots sur les sociétés*, developed in 1993 into a 'full tax credit' system. A partial imputation system was effective between mid-1960s and that time.

The French tax system is based on a *territorial* basis of taxation. Thus, industrial and commercial profits are subject to French tax only if earned in France or if a tax treaty attributes the right to tax the profits to France. Activities performed abroad by a French company, i.e., through a foreign branch, are not subject to corporate tax in France. Accordingly, no tax credit is available in France for foreign corporate tax paid abroad, or tax losses realised abroad by a branch or a permanent establishment. In addition, ordinary tax losses of companies may be carried forward or carried back, whereas net long-term capital losses may only be carried forward.

Under the current version of the French corporation tax system, dividends and retained earnings are subject to a standard tax rate of 33.3 %. As a countermove to that, the shareholder receives a tax credit of 50 % of the dividend which corresponds to the 33.3 % corporation tax already levied at the company level.

3.4.4.2. Deductions

A deduction is available for all purchases made during the fiscal year, even those not paid at the end of the financial year. As a general rule, all expenses which meet each of the three following conditions are deductible:

a) Incurred in the interest of the company or required for the business operations.
b) Correspond to an effective charge and justified by supporting documents
c) Lead to the diminution of the equity.

Examples of expenses which qualify as deductible general expenses include:

a) Rent.
b) Repairs (except for those which increase the capital value of the goods repaired), tools, light equipment and software whose unit value is under FF 2,500 including VAT.
c) Salary expenses and related social security and pension contributions.
d) Taxes, except for corporate income tax, yearly company tax, CSG, CRDS, company car tax and penalties.

[64] This section is based on the studies of Deloitte Touche Tohmatsu [1999], Delbreil et al. [2000], Friderichs et al. [1999] and KPMG [1999].

e) Financial expenses, except for, interest paid to shareholders which is subject to various limitations.

Expenses resulting from transactions with affiliated non-resident parties are deductible only if based on the arm's length principle. This applies, for example, to purchases from an affiliated company and to fees or royalty payments. France is now strictly applying the OECD recommendations on transfer prices between affiliated companies. Management services are often subject to close scrutiny. The French tax authorities have recently made further comments on transfer pricing which strengthen the authorities' position and give information on the documentation which a French company is obliged to show a tax auditor if requested.

Depreciation: Assets should be depreciated on the basis of their expected useful life and sound commercial usage. In order to be tax deductible, depreciation must fulfil the three following conditions:

a) The depreciated items must be assets accounted for as such and are effectively subject to depreciation, which excludes intangible assets such as goodwill.
b) The depreciation is designated to compensate the reduction in the value of the assets.
c) The depreciation must be effectively accounted for.

Goodwill and trademarks cannot be depreciated as their value does not decrease with time. However, a reserve may be established should special circumstances arise. It is possible to use the double-declining balance method of depreciation for certain categories of assets, including;. equipment used for industrial operations, manufacturing and transportation of goods,. handling equipment, safety devices, certain office equipment, scientific and research equipment, storage and warehouse facilities (with the exception of the buildings themselves). Such assets are eligible for the declining balance method if they are new, and their expected useful life is at least three years.

3.4.4.3. Dividends and Distributions

When a corporate shareholder of a French company receives a dividend, it is entitled to a tax credit (*avoir fiscal*) which is equal to 45% (50% until 1998) of the dividend received. The rationale behind this is to alleviate the double taxation which results from taxation at the corporate level and at the shareholder level.

Dividends paid by a French company to its shareholders carry an imputed tax credit (*avoir fiscal*) equal to 50% of the amount distributed to individuals and 45% of the amount distributed to corporations (other than those subject to the affiliated privilege regime).

The avoir fiscal in certain circumstances renders the distributing company liable for the dividend equalisation tax *précompte mobilier*. Dividends paid by a subsidiary to a parent company holding at least 10% of the capital of the subsidiary, are not subject to corporate tax at the parent company level apart from a disallowance of expenses equal to 2.5% for accounting period ending since December 31st December 1998. Consequently the parent company does not benefit from the avoir fiscal. Dividends paid to non-residents may be subject to a 25 % withholding tax.

3.4.5. Corporate Taxation Systems Compared

In order to observe the relevance of different tax systems, there should be classification of tax parameters such as interest payments, dividends and capital gains affecting after-tax income stream of financial investors. The amount of after-tax income that investors receive depends on the form of distribution. Taking the studies of Modigliani and Miller [1963], and Miller [1977] into account, one can differentiate the tax advantages of debt *subject to* dividend earnings in (3.1), retained earnings in (3.2), and retained earnings without capital gains in (3.3) [τ_{ct} is corporate tax rate, τ_{dt} is dividend tax rate, τ_{pt} is personal tax rate, τ_{cg} is capital gain tax rate].

$$[1-(1-\tau_{ct})(1-\tau_{dt})/(1-\tau_{pt})] \tag{3.1}$$

$$[1-(1-\tau_{ct})(1-\tau_{cg})/(1-\tau_{pt})] \tag{3.2}$$

$$[1-(1-\tau_{ct})/(1-\tau_{pt})] \tag{3.3}$$

International comparisons of the role of taxes on capital structure may be difficult as the complexity of different tax codes, such as tax exemption, tax exhaustion and non-linear tax schedules, raises some problems. Despite these difficulties, there exist some important studies. Rajan and Zingales [1995], for instance, present a comparative tax treatment for the G–7 countries. The substantial differences of tax advantage of debt subject to tax parameters between Germany and the UK are examined in the study. As an implication, a tax-exempt investor in Germany is stated to use more debt than the one in the UK. Furthermore, investors in the United Kingdom prefer retained earnings to external borrowing, as compared to ones in Germany. Analysing the financial structure of the industrial countries, Borio [1990] also finds that borrowing is superior to all equity forms and retained earnings dominate new issues on the basis of statutory income taxes, *except* in Germany where for income tax reasons alone financial investors would be indifferent between debt and equity while retained earnings would be inferior to both.

In their recent international study, La Porta et al. [2000] calculates the tax preference of dividends. They report that there is a considerable difference among countries especially between the UK and Germany because of their different taxation systems. In addition, considering France, Germany and the UK, Mayer [1990] reports that although Germany has the highest tax incentives in debt-to-retentions and new equity-to-retentions, the observed highest related financing ratio is in France, which implies that tax incentives cannot solely explain the observed financing patterns.

Swoboda and Zechner [1995] derive a capital structure equilibrium in a multinational setting. They argue that firms in countries with relatively higher corporate tax rates and inflation rates have a comparative advantage of issuing debt and should be more highly-levered. According to Swoboda and Zechner, as being different from in the UK, the German tax system comprises not only corporate tax and income tax but also other taxes which may affect the firms' financial decisions: For instance, the German *general property tax* incorporates shares, bonds, saving accounts, real estate and notably firm's equity. Municipal tax rates (16 %, on average) on corporate income are deductible. The property tax is not deductible from the taxable income; since only the equity is taxed, this tax can lead firms to borrow more. Likewise, Nobes and Parker [1995] state that the international differences in corporate income tax bases (taxable income) and tax systems are very great, which could lead to several important effects on investment plans, dividend policies and capital raising methods. For example, in the UK, capital gains are added to taxable income and dividends from firms in the affiliated tax group are not taxed. In Germany, capital gains are also added to taxable income *in full* and dividends are fully taxable.

Buijink et al. [1999] study the differences between European Union member states in terms of corporate average effective tax rates (ETRs) based on consolidated financial statements between the period 1990-1996. They find that the use of tax credits differ substantially and effective tax range is more centred than statutory tax range among EU member states. In that, while the UK is in the medium level of difference between ETRs and STRs, Germany is in the large differences level. In addition, companies having high international sales have higher ETRs in the UK, possibly because of the usage of worldwide tax basis for UK tax code. The situation is opposite in Germany as tax incentives are provided more for international sales. Another statistical implication shows that there tend to be no systematic links between firm characteristics and effective tax rates within EU states. However, Mayer [1990] argues that the role of taxation differentials should not be considered in financing decisions even he knows that Germany has an exceptionally high rate of taxation on retentions.

As Rajan and Zingales [1995] note, whether taxes are considerably effective in capital structure decisions depends heavily on the assumptions about marginal investor's tax rate in the context of personal taxes. More importantly, in order to obtain some possible conclusions about the role of taxes in affecting firms' financial decisions, one should determine a proxy for effective tax rate as accurate as possible regarding the institutional differences[65].

3.4.6. International Perspectives in Taxation Rules and Financial Reporting[66]

In general, there are similarities between French and German taxation systems (*continental* approach) in affecting financial reporting. However, the different historical developments cause some considerable differences which have direct influence on debt-equity ratios, asset ratios and profitability. In fact, financial reporting is authoritative for taxation in Germany, a fact rooted to the late 19th century fiscal laws. In France, fiscal laws were effective in the absence of detailed accounting rules until middle of 20th century. Although there is the problem of deferred taxation[67] in the UK, in Germany and France company profits and tax profits differ only slightly. In France, expenses have to be accounted for in the financial statement in order to be tax deductible but there is no such a requirement in Germany. Unlike in Germany, French corporations traditionally do not draw up a separate statement; instead, they pragmatically adjust the commercial profit to measure taxable income for more tax benefits. In Germany, tax-driven depreciation may be deducted from the asset value and assets which have been written down in earlier years for economic reasons need not be written up again once the reason for their creation has ceased to apply. This can cause substantial tax-induced undervaluation of the assets and overvaluation of liabilities of German firms owing to the prudence principle. Furthermore, according to Stock Company Law, *Aktiengesetz*, by means of the reversal of the authoritative principle, German companies can reduce the distributable profits in which there is a partial tax exemption (Haller [1992]). Here, the aim is to promote

[65] As emphasised by Buijink et al. [1999], statutory tax rates (STRs) only provide an incomplete representation of differences in corporate taxes. For a complete representation of taxes, STRs and tax credits should be integrated, which would warrant the inevitable use of effective tax rates.

[66] This section is mainly based on the studies of Delbreil et al. [2000], Eberhartinger [1999], Frydlender and Pham [1996], Lamb [1996], and Pfaff and Schröer [1996].

investment as corporations are forced to reinvest the untaxed parts of their profits. In France, however, the influence of taxation is always identifiable. In the UK, commercial income is not binding for taxation. In terms of the connection between accounting and taxation, and true value distortion of balance sheets, France is in between the highest case of Germany and lowest case of the UK.

Whereas the German system systematically tends to promote profit distribution via the pay out-take back mechanism, the French system clearly provides incentives for a direct retention of profits at the company level by reducing tax rates (e.g., from 50 % in 1987 to 33.3 % in 1993). In Germany, the respective reductions in corporation tax rates were introduced in 1990 but did not reach the low French level in terms of distributed profits (45 % against 33.3 %). As a result, the spread between the retention rate and the top rate of income tax was much less pronounced and hence did not provide strong incentives for the improvement of the capital structure of German businesses, unlike in France. French system taxes profits at an identical rate, irrespective of whether profits are distributed or retained. Contrary to Germany, it was conversely conceived by subjecting distribution to the higher corporation tax rate than profit retention. This can be regarded as an additional evidence that the French system is primarily designed to promote the direct retention of corporate profits without bypassing capital markets.

3.5. INSOLVENCY CODES ACROSS DIFFERENT ECONOMIC SYSTEMS

3.5.1. Introduction

An insolvency and debt recovery procedure is one of the aspects of financial architecture in an economy. These procedures comprise informal rules for enforcement of debt contract, formal laws, liquidation, bankruptcy and rehabilitation of distressed firm. National bankruptcy rules mainly incorporate the reorganisation and liquidation of a firm, and informal workout arrangements. It is fairly possible that these formal laws markedly differ in terms of theoretical and practical implications across different economies. In fact, national jurisdictions on bankruptcy procedures are very different, so that the existing insolvency proceedings can be divided into pro-creditor and pro-debtor related systems.

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[67] It is the case where taxable income is lower than commercial income before tax because of timing differences; higher taxes are paid in later years to equalise the resulting tax expenses. If taxable income is higher than commercial income, less taxes will be paid later.

Pro-creditor related systems are systematically oriented towards the protection of creditors due to a debtor default. Such type of proceedings is mainly concentrated on the liquidation of the debtor's assets and the distribution of the proceeds realised to the creditors involved. Thus, these insolvency regulations are currently classified as *liquidation* procedures. Pro-debtor related systems, in contrast, are designed to save defaulters and their employees from the viewpoint that the creditors. That type is customarily called a *restructuring* or *rehabilitation* insolvency procedure, as the maintenance of economic activity together with the goal of finally rehabilitating the ailing enterprise and safeguarding the jobs at risk, has priority over the detrimental effect on creditor rights (Friderichs et al. [1999]).

In the end, cross-country differences in the level of capitalisation and leverage of companies tend to depend directly on the legal conventions related to the priority and degree of protection of creditors' rights provided by the national insolvency procedures. Consequently, the existence of bankruptcy laws differing from country to country should, undoubtedly, also be considered in financial decisions and debt contracts.

3.5.2. Overview of Insolvency Law of the UK[68]

Prior to the 1986 Insolvency Act, there possible routes were available: Liquidation, receivership or administrative receivership and voluntary reconstruction. With 1986 Insolvency Act, which contains guidelines for both liquidation and reorganisation, an additional procedure was incorporated requiring the appointment of an administrator. Although this act is intended to encourage reorganisation of failing firm, the absolute priority is generally preserved and creditors are well-protected even in cases of the strongest rehabilitation processes. Strict sanctions are applied to directors of failed firms in that courts may impose personal liabilities to a director who has traded wrongfully. Banks are discouraged from participating in informal corporate rescues as a consequence of these sanctions stating that company's banker will also be liable in unlawful trading provisions.

The liquidator is appointed by any creditor to supervise the distribution of funds to creditors and an orderly winding up of the business. The receiver appointed by a secured creditor only must have a particular type of security on the firm's assets. A receiver is appointed over a particular asset whereas an administrative receiver is appointed over the

[68] This section is mainly based on the studies of Franks et al. [1996], Franks and Torous [1996], Fukao [1995] and White [1996].

firm's all assets. Although the liquidator and the receiver can deal with same company at the same time, the liquidator's appointment will generally prevent the receiver managing the firm as an ongoing concern as a decision. Since the decision has to be made quickly with insufficient data, liquidation is chosen as a potentially inefficient option in general. If it is clear that the firm has no going-concern value, e.g., if net cash flow is not positive, then the receiver will sell the assets. The responsibility of liquidator is to all creditors in order of priority of their claims whereas the receiver is responsible to repay the creditor who appointed him/her. The power of the receiver to maintain the firm as a going concern is greater than that of the liquidator.

A workout can be an alternative to formal reorganisation through the insolvency legislation, in which case the firm's problems are resolved with the agreement of the principal creditors. However, the agreement is subject to approval by the court. On the other hand, the powers of the receiver are significant as s/he does not require permission from the court or from the other creditors for his/her actions.

3.5.3. Overview of Insolvency Law of Germany[69]

In general, German bankruptcy law contains a liquidation process whereas there exists no strong reorganisation process. It is difficult to rehabilitate a failed firm due to strong protection of collateral. Formal court proceedings are sought to be avoided thereby private arrangements among creditors and management.

The current German insolvency procedure distinguishes between bankruptcy proceedings and composition proceedings. The objective of the judicial composition proceedings is to avoid bankruptcy by reaching a composition agreement. As 'composition proceedings' play virtually no role in Germany today, the German insolvency regulations can essentially be classified as a liquidation procedure.

Judicial composition proceedings can only be set up with the request of the debtor. Unlike bankruptcy proceedings, the debtor's assets remain free from expropriation and continue to be administered by him/her. Before composition proceedings can be instituted a composition proposal has to be made which guarantees fulfilment of at least 35 % of the claims of the creditors with whom a composition is being sought (at least 40 % in the case of payment terms of more than one year). All creditors who are entitled to separate and recover property belonging to them from the debtor's estate or who are entitled to separate satisfaction from the asset are excluded from composition proceedings

[69] This section is mainly based on the studies of Delbreil et al. [2000], Franks et al. [1996], Friderichs et al. [1999], Fukao [1995] and White [1996].

because their claims have to be satisfied in full in advance. Due to these preferential rights, the assets remaining hardly ever suffice to meet the statutory composition quotas of creditors who do not have preferential rights to the debtor's estate. Consequently, composition proceedings usually develop into bankruptcy proceedings.

Bankruptcy proceedings can be initiated upon the application either of a creditor or of the debtor himself if he is insolvent or (in the case of legal persons) over-indebted. However, bankruptcy proceedings are initiated only if the available assets suffice to cover the cost of the proceedings or if the creditor pays a corresponding advance. The proceedings are terminated if it becomes apparent that the available assets do not suffice to cover the cost of the proceedings or if all the creditors agree not to seek a declaration of bankruptcy. Once bankruptcy proceedings are initiated, the debtor is deprived of access to and control over all his assets that belong to the estate, although his rights of ownership and possession are not affected. The liquidator appointed to administer the bankruptcy proceedings controls and manages the debtor's assets in his/her place. In parallel with this the court issues instructions to secure all the available assets, i.e. it places a general ban on sales of assets and seizes all the goods it can find. Any attachment or debt enforcement orders in favour of individual creditors are suspended for the duration of the bankruptcy proceedings. All that the creditors concerned can do for the time being is to ensure that their claims are recorded in the schedule of creditors.

One can note that even if bankruptcy proceedings are set aside, the creditors whose claims have not been satisfied are free to assert their outstanding claims against the debtor without restriction since under German bankruptcy proceedings, the debtor is not freed from his residual debt. Furthermore, under the German insolvency procedure the claims of creditors are protected to a very large extent by the legal concepts of separation and separate satisfaction from the asset.

3.5.4. Overview of Insolvency Law of France[70]

In France, the bankruptcy law of 1985 favours the rehabilitation of corporations through reorganisation rather than liquidation. Due to this strong emphasis, the position of creditors is relatively weak as compared to that of employees. Even secured creditors are generally forced to accept large reductions in the value of their claims in the commercial courts (*tribunal de commerce*). If the court believes that the mismanagement has caused the failure, the managers may be asked to make up the shortage in the net assets.

[70] This section is mainly based on the studies of Delbreil et al. [2000], Friderichs et al. [1999] and Fukao [1995].

The fundamental theme of the French restructuring insolvency procedure is to save the ailing enterprise. The maintenance of economic activity and hence the safeguarding of the jobs involved is the second most important goal, whereas satisfying creditors comes only in third place. Despite the marked strengthening of creditors' rights introduced by the reform of 1994, creditor interests remain explicitly subordinated under French insolvency proceedings.

The structure and sequence of the proceedings of French insolvency law show that it is adapted primarily towards preventing liquidation. A law introduced in 1985 created a special early warning procedure to be applied whenever an enterprise is manifestly in financial difficulties. This procedure is composed to draw the management board's attention to imminent financial problems without notifying a third party. The same law introduced a procedure for the enterprise to reach an amicable settlement with its creditors by way of a voluntary composition agreement (eased payment terms and partial debt forgiveness) to avoid debt enforcement through a court. If the enterprise fails to reach a friendly settlement with its creditors and is no longer able to meet its obligations and is technically insolvent, the restructuring insolvency proceedings can be initiated. Following a preliminary examination by a court, an adjudication on the initiation of bankruptcy proceedings is given. As a result either the liquidation of the enterprise is ordered or an observation phase is initiated. At the end of the observation period a business and social assessment of the enterprise is presented containing a plan for restructuring or liquidation. The judicially approved restructuring plan lays down the modalities either for the continued operation of the enterprise by the debtor or its sale to a third party. However, a plan for continued operation is approved only if there is a genuine prospect of restructuring the enterprise and satisfying the claims of its creditors. The debt owed to the creditors is restructured.

Debtholders agree to write off a fraction of their loan and may also agree to reschedule payments. By contrast, if the sale of the firm is ordered, the firm as such disappears. The debt and equity are totally written off. The assets of the firm are sold. The price paid by the company rescuer is used to repay the creditors, who cannot necessarily expect their claims to be satisfied in full or even in part. They share in the proceeds of the sale in accordance with their creditor ranking. The same priority ranking prevails in the case of liquidation which the court orders when there is no hope of rescuing the firm. On completion of the liquidation procedure, the debtor is discharged from his/her remaining liabilities. Unpaid creditors may take individual legal action against the debtor solely in the event of fraud or personal bankruptcy. Debts are paid in the following order; senior preferential creditors, secured creditors, unsecured creditors, holders of subordinated debt, shareholders.

A new law on the prevention and treatment of difficulties influencing businesses was passed in 1994. It introduced two main changes to bankruptcy law:

a) Modernisation of the procedure, including greater transparency and tighter ethical standards for business reorganisations and disposals.
b) Restoration of creditors' rights and hence of the confidence of credit institutions, often justified by the need to encourage business lending.

The second aspect of the reform took the form of an extension of creditors' powers during the procedure by allowing them to take individual action and by improving the situation of creditors holding security interests on property. As well as introducing measures in favour of secured creditors, the law also tried to improve the lot of unsecured creditors.

The new law caused uncertainty as to the future value of guarantees and hence of bank loans, bringing a number of banks about to stop lending to small and medium-sized businesses (SMEs). The increase in the number of business failures gave rise a corresponding increase in administrative costs resulting from the requirement to assert claims, two-thirds of them in connection with leasing business. Moreover, the observation period introduced by this law meant that creditors had to wait longer before they could recover leased assets and collateral for loans. The increase in risk borne by credit institutions led to a rise in the cost of borrowing for businesses. In addition, the banks, faced with deteriorating operating accounts, tightened their selection criteria, contributing further to a slowdown in lending.

3.5.5. Insolvency Laws Compared

In general, German bankruptcy laws allow for liquidation, but not for reorganisation; and collateral is strongly protected. On the other hand, in order to protect employment, French bankruptcy law (at least of 1985) emphasises through rehabilitation. In the UK, both reorganisation and liquidation are provided by bankruptcy law. As Frankel and Montgomery [1991] argue, there are apparent differences between Germany and the UK in terms of bankruptcy procedures: Bankruptcy laws in the United Kingdom penalise banks that form close relationships with a customer; if the customer envisages financial problems, the provisions impose greater losses on the bank than on other lenders. However, in Germany, these laws support banks against such potential losses; banks often take responsibility for organising creditor coalitions for financially distressed companies. In Germany, a debtor is expected to present a schedule planning the insolvency of the firm within fifteen days of learning it, this code can be regarded as quite creditor friendly (Rajan and Zingales [1995]).

Edwards and Fischer [1994] state that German insolvency law does not distinguish between personal and corporate bankruptcies, in contrast to the United Kingdom. As assets serve as collateral for loans and can be sold outside independent of legal bankruptcy or court procedures, a strong position is given to secured creditors in Germany. They further argue that German legal framework for dealing with insolvencies makes survival of a firm very difficult. That is, the fact that reorganisation of a firm having financial problems is very difficult due to lack of conviction of the management's quality, the secured creditors have rights to foreclose on assets collateralised for their claims.

Edwards and Fischer discuss the evidence on German bank behaviour and argue the assumption that banks are capable of reducing the cost of financial distress and bankruptcy via close control and monitoring of the firms' management in financial difficulty are *not* supported by the evidence.

Franks and Torous [1996] examine the UK Bankruptcy Code in comparison with the US and assert that the highly credit-oriented UK bankruptcy laws might cause too many 'premature liquidations'. They discuss that there are incentives for firms in the United Kingdom to reorganise privately although the current legislation does not provide sufficient incentives to reorganise voluntarily. Thus, one can debate that there are stronger incentives to keep the firms as an ongoing concern in Germany than in the United Kingdom even if it is worth more in liquidation (see, Rajan and Zingales [1995]).

Balz [1999] states that a unitary proceeding with a very large measure of creditor control over key issues in the course of proceeding can provide the most flexible and economically sensible legal framework for insolvencies in Germany. Frankel and Montgomery [1991] argue that the Insolvency Act of 1986 of the UK makes a financial firm liable with wrongful trading provisions for any of its directions contradicting the objective of minimising potential losses of the firm's creditors.

Table 3.5.1: A Comparison of the Main Characteristics of the Insolvency Process in the UK and Germany, selected columns. (Source: Franks et al. [1996]).

Characteristics	United Kingdom: Receivership	Germany: New Code
Control Rights	Creditors in control: board of directors steps down. Receiver has strong powers over the firm except concerning secured assets.	Creditors committee in control. Creditors vote on the proposed plan.
Solvency Requirements	Firm cannot meet payments to creditors. Penalties for directors who trade while firm is insolvent	Firm cannot meet payments to the creditors. Overindebted.
Automatic Stay Against Creditor Claims	None is receivership.	Automatic stay for unsecured: minimum of three months for secured.
Renegotiation of Liabilities	No discretion in receivership.	Renegotiation may take place with all creditors.
Constraints on Firm as a Going Concern	Secured creditors can liquidate even if firm is worth more as a going concern to all creditors.	All creditors vote on plan.
New Financing in Reorganisation	Constrained because new financing will probably come from senior creditors and its junior to existing claims.	New finance can be arranged.
Preservation of Residual Claims of Equityholders	Equity unlikely to have claim in receivership.	Deviations can be proposes but must be agreed by a creditors' vote.
Direct Costs	Lower because i) short period and ii) court is not involved in the process.	Creditors have the ability to shorten procedure, but court heavily involved.
Private Benefits of Firm's Shareholders	Takes no account of the private benefits of the distressed firm's stakeholders.	May play an important role in the restructuring of the distressed firm

Franks et al. [1996] describe the insolvency codes of Germany, the UK and the US and compares their efficiency based on some benchmarks. By examining the Table 3.5.1., one can realise the clear differences between insolvency codes:

i) Control Rights: In the UK, absolute control is given to the secured creditor in receivership over the asset his/her debt has a lien. This prevents receivers appointed by creditors from using asset to maintain the firm as a going concern. The debtor has few controls in insolvency.

In Germany, no participation of secured creditors is required in compulsory liquidation (*Konkursordnung*) or composition proceedings (*Vergleichsordnung*). Therefore, the rights of insolvency administrator (raising new senior financing, maintaining the firm as a going concern, staying unsecured claims) are voided by secured creditor's right to take possession of assets.

ii) Solvency Requirements: If there is a default on the debt covenants (requirement of minimum financial ratios, e.g., debt-equity ratio), the creditor can appoint a receiver in the UK. The receiver can exercise his/her control rights provided an administration right is given by the court under the conditions that a) the firm cannot pay its debt and b) the whole or part of the firm may survive as a going concern or liquidation is not efficient. In Germany, statutory bankruptcy proceedings start if the firm is overindebted (book value of liabilities is greater than market value of assets) such that it will not meet its obligations even in the future or cannot repay its creditors. Due to strict entry requirements of composition proceedings, their use is seldom. Another reason for rare use is that as most assets are collateral secured creditors' cooperation is needed to enter composition. As a result, German bankruptcy laws may lead to more going concerns of corporations.

iii) Automatic Stay Against Creditors' Claims: The receivership code in the UK holds on automatic stay provisions and secured creditors may lead premature liquidations by repossessing their assets. As the administrator represents all the creditors in the UK, the potential conflicts in receivership are mitigated. In Germany, there is a three-month automatic stay against all claims.

iv) Management of Liabilities: In the UK, quite little discretion in renegotiating the distressed firms' liabilities is given to the receiver who represents the interests of only one creditor. However, as there exists court-administered process to obtain the creditors' agreements concerning new financing arrangements, the court-appointed administrator holds more discretion in managing liabilities. In Germany, the insolvency administrator can redeem a creditor's claim in cash to prevent the potential asset repossession. Therefore, a renegotiation of all claims against the distressed firm is permitted by German bankruptcy laws.

v) Liquidation versus Going-Concern Value: In the UK, the receiver may liquidate a firm without the approval of the court or other creditors. Thus, inefficient liquidations are likely to occur due to given emphasis on creditors' rights. Although the current German code allows secured creditors to take possession of the firm's assets in the form of the firm's termination, the insolvency administrator has still effective powers to keep the firm as a going-concern.

vi) Bankruptcy Financing: In the UK, the receiver can raise additional funds junior to the existing loans to finance the distressed firms continuing operations during bankruptcy. Yet, especially large firms try to avoid court-administered process due to difficulties of arranging new funds and lack of automatic stay. Consequently, underinvestment problems might occur due to lack of incentive of raising junior new financing. It is also possible to raise new financing in current German Code.

vii) Deviations From Absolute Priority: The adherence to the priority and speedy settlements of claims is allowed in the UK Code. The deviations are substantial in workouts (especially with bank creditors) whereas no deviation in receivership is found based on the empirical study of Olsen [1996]. In Germany, large deviations may occur particularly in favour of unsecured creditors. Recontracting can be reflected in wealth transfers between the parties measured as deviation from absolute priority. In this vein, although to little extent, the UK receivership system leads recontracting, which is not encouraged in German system.

viii) Direct Costs of Each System: In the UK, the lack of communication between the receiver and creditors makes the receivership process relatively fast, sometimes it takes only several weeks. As it stipulates the agreement of creditors to any plan of reorganisation, administration takes longer in the UK. In essence, the UK code was developed to reduce bankruptcy costs. On the other hand, in Germany, the current liquidation process can be very costly and lengthy as unsecured creditors cannot easily terminate the proceedings. The new German code allows creditors to liquidate the distressed firm after the compulsory stay of three-months. In the UK, the low costs are in favour of large firms and small firms are disadvantaged because of economies of scale. In Germany, legal and administrative costs tend to be low at the expense of underinvestment problems.

ix) Private Benefits of Creditors and Other Stakeholder: In Germany, as the debtor stays in control, private benefits become significant in resolving financial distress. Externalities are taken into consideration by insolvency administrators due to the existence of 'social' prestige and benefits of keeping the German firms as running in the business. In the UK, the private benefits of stakeholders are not given importance.

In the course of emphasising the significance of the different bankruptcy procedures in affecting capital structure of firms, Berkovitch and Israel [1999] provide optimal bankruptcy laws in terms of fundamental differences across economic regimes. They propose, on the one hand, an optimal bankruptcy law for developed countries with a bank-oriented system (e.g., Germany) where information acquisition technologies are well-developed and most of the financing is done through banks, can be attained with the inclusion of a 'creditor' chapter only. On the other hand, an optimal bankruptcy law for developed countries with a market-oriented system (e.g., the UK) where information acquisition technologies are well-developed and the financing is mostly arm's length, can be attained with the inclusion of both 'creditor chapter and debtor chapter'. As for underdeveloped countries (e.g., Brazil, Thailand) having poor information acquisition techniques and concentrated financing, again, the inclusion of both 'creditor chapter and debtor chapter' is suggested. In case of potential inefficient liquidations, more protection is given to managers in underdeveloped countries than in market-dominated systems by including debtor chapter.

What Rajan and Zingales [1995] state is not in contrast with the hypotheses of Berkovitch and Israel [1999] in that virtually all of the G-7 countries have a creditor chapter whereby the creditor can file for bankruptcy, the debtor loses control and the firm is liquidated by a third party. In France, the bankruptcy code consists of a creditor chapter only whereas in the UK there also exists debtor chapter whereby debtor files for bankruptcy and stay in control during the bankruptcy proceedings. German Code seems not clear in terms of the effectiveness of debtor chapter as both debtors and creditors can file for liquidation and only debtor can file for reorganisation.

White [1996] examines comparatively the bankruptcy procedures of US and Europe (France, Germany, and the UK): At least a mandatory period of six months under a court-appointed outside administrator is required for liquidation decisions of French firms. If liquidation is decided, then bankruptcy judge appoints a liquidator to sell the firm's assets. It is again bankruptcy judge who adopts rehabilitation plans if decision is to save the firm. Hence, creditors in France have little dominance on the reorganisation process. However, liquidation generally occurs outside of bankruptcy with non-collective procedure in Germany and in the UK. As filing for bankruptcy in Germany is costly, bankruptcy courts reject many bankruptcy petitions owing to the fact that firms have insufficient assets to afford to the costs. The primary objective of French bankruptcy code is to 'safeguard the business' and maintain the firm's operations. To aid the failing firms to reorganise is emphasised most by French bankruptcy code among the German and British ones.

Recently, Friderichs et al. [1999] compare the insolvency procedures of France and Germany. In contrast to the provisions of French insolvency law, certain categories of creditors in Germany (especially the banks) enjoy extensive protection against bad debt losses in the event of bankruptcy since, by making use of the provisions of current bankruptcy legislation, they can limit their default risk to a large extent (not least to the detriment of unsecured creditors) by establishing liens to real property and movable goods. In France, a comparable protection from bad debt losses in the event of bankruptcy exists only for the simple reservation of ownership and (at least following the reform of 1994) for creditors with rights of lien. As a consequence, the insolvency losses of French banks are considerably larger than those of their German competitors. If the growing trend towards the over-securitisation of lending risks that has been evident in recent years is also taken into account, the real loss rates sustained by German institutions is probably even lower. Yet, the downside of the extremely creditor-friendly provisions of German insolvency legislation is that the bankrupt's estate is systematically depleted by the right to separation and the right to preferential satisfaction enjoyed by privileged creditors, with the result that fewer than 0.5 % of insolvency cases lead to composition proceedings in more than 70 % of cases.

3.6. CORPORATE GOVERNANCE ACROSS COUNTRIES

3.6.1. Introduction

The separation of ownership and control in the corporations is the main theme of corporate governance to set to work. It generally deals with the divergence of interests between the managers and shareholders, misallocation of resources, under-performance of firms to get optimal performance out of managers. Corporate governance systems are markedly important in economic life as they influence the mechanism of the returns on investment by firm's external financiers and growth rates in real output. According to the conventional wisdom, the corporate governance systems operating in different countries are distinct. This can be attributed to the facts of different development of individual economies, factor markets, legal structures, public and private institutions. It is believed that the US and the UK corporate laws ensure that corporations operate for the benefit of shareholders whereas the Continental Europe (e.g., France and Germany) laws require that corporations operate for that of common shareholders, creditors, workers and the society. For instance, unlike for British managers, there is no duty for German managers to maximise the value of shares as they may and must consider the interests of employees, creditors and the community. Edwards and Nibler [2000] argue that corporate governance systems differ significantly even in developed countries. It is asserted that German corporate governance is designed more efficiently to reduce corporate governance problems (e.g., asymmetric information problems and monitoring costs) than the Anglo-American system. Moreover, in their survey article, Shleifer and Vishny [1997] conclude that the corporate governance systems in Germany, Japan and the USA are more effective than the other ones elsewhere due to the combination of large shareholders and a legal system protecting investor rights. Similarly, based on the study of La Porta et al. [1998], one can contend that the quality of shareholder and credit rights are lowest in France; shareholder rights are highest in the UK; and credit rights are highest in Germany considering these three countries.

The following sections discuss the different corporate governance structures based on their administrative structures, role of shareholders, market for corporate control mechanisms, management compensation and ownership concentration.

3.6.2. The Main Corporate Governance Systems[71]

The variations in corporate governance systems can be attributed to the differences in how and why countries allocate power among participants in the firm as well as the roles of institutional investors, financial institutions, and markets in limiting managerial discretion and monitoring. A range of national differences in practice and law exists on these issues, e.g., the role of managers, lenders and labour; the effect of different qualities of capital markets in corporate performance. As a result, the following section will discuss the most dominant corporate governance systems in the world.

3.6.2.1. The Outsider Model

This model can also be called as capital market-based or shareholder-market model. The USA and the UK are typical countries for this model. The rights of shareholders concerning the control of company and shaping the board of directors are clearly supported by corporate laws in these countries. Regulations are formed to provide as complete information as possible to the market so that the investors can be equally informed about the current state of firms through this disclosure-based system to make precise decisions. As it relies on a liquid capital market with disciplinary mechanism, the heart of this system is the market for corporate control by buying shares and establishing a controlling majority and threatening with takeovers The discernible features of this type of model:

1. Dispersed equity ownership with large institutional investors.
2. Recognised dominance of shareholder interest.
3. Strong emphasis on the protection of minority investors.
4. Relatively strong requirements for disclosure.
5. Dominant ownership of industry by institutional investors.

[71] This section is mainly based on the studies of Alcouffe [2000], Allen and Gale [1999], Boehmer [1999], Cunningham [2000], Franks and Mayer [1990], Fukao [1995], Krainer [1997], Nestor and Thompson [2000], Prowse [1994], Schmidt and Tyrell [1997].

6. Borrowings from banks tend to be short-term and there is "arm's length" relationship between banks and their corporate clients.
7. Equity financing is relatively important with low debt-equity ratios and high equity-GDP ratios.
8. Control of the firm is difficult due to the fragmentation of ownership among shareholders. Thus, in case of poor management and neglecting shareholders' value, hostile takeovers become common.
9. The distant relationships between shareholders and relatively less permanent incumbent managers exacerbate the agency problems thereby leading poor corporate performance because of managers' short-term strategies.
10. A large number of listed companies and relatively few cross-holdings of equity between companies.

3.6.2.2. The Insider Model

This model is also called network system or bank-labour model. France and Germany are included in this type of corporate governance. Here, the ownership and control are closely held by insiders who have long-term relationships with the firm. Insider group members are small in number and have some connections to the company. The basis of group is the combination of family interests, industrial concerns, banks and holding companies. Supervisory board, composed of representatives of the different stakeholders, performs the task of aligning interests and control the management.

The discernible features of this type of model:

1. Because of the close relationships, agency problems are relatively less important. Thus, cost of capital tends to be lower.
2. There is relatively less institutionalisation in terms of owning corporations since such institutions face regulatory limits to invest in equity.
3. There is a high dependency upon bank financing in corporate finance patterns of this bank-centred system. Thus, debt-equity ratios are high.
4. Banks have more complex and longer-term relationships with corporate clients, unlike arms' length lenders. As the same bank can occupy seats as both debtholder and shareholder, the potential conflict of interests disappear. In general, capital markets are less developed.

5. Relatively weak requirements for disclosure persist due to selective exchange of information among insiders.[72]
6. Insiders can control the company by owning either an outright majority of voting shares or significant minority holding.
7. Concentrated equity ownership with small institutional investors.
8. Apart from shareholder interests, there exist wage-setting policies and worker protection.
9. Market for corporate control plays a minor role and there are relatively many cross-holdings of equity. Thus, there are relatively few listed companies.

3.6.3. The Governance Mechanisms

3.6.3.1. Board of Directors

It is common in all countries that the board of directors is responsible for monitoring management on behalf of shareholders to make sure that the company is run in their interest. However, the way that boards are structured and chosen differs substantially across countries.

In Germany, there exists a *two*-tiered (board of managing directors and supervisory board) nature of boards to formalise the different roles of outside and inside directors. No one can be a member of both ties and cross-company board memberships are restricted. The supervisory board, as being controlling body, consists of people outside the current management while the management board consists of serving managers. Supervisory board appoints the management board and monitors business strategy of managers. Management board formulates and implements operating strategy and financing strategy of firms. The practical importance of directors' liability under German Law seems to be limited. As a distinctive particularity, banks representing both themselves and their trustees are almost always on the board and often provide the chairman. Informational problems are minimised by including former managers on the supervisory board. In firms with more than 2,000 employees, shareholders elect half the supervisory board and employees elect the other half. Thus, labour representation in management is strongest in Germany considering France and the UK.

[72] Kleimeier-Ros and Whidbee [2001] argue that despite the effort to limit insider trading (e.g., the collusion of managers and large blockholders), inefficiencies still exist in improving financial transparency in Germany.

In the UK, there is a *single*-tiered boards of structure meaning that shareholders directly elect the members of the boards of directors. These members are elected for relatively short periods (usually three years). They can be removed by the shareholders with a simple majority vote. As the share ownership is so diffuse, the board is effectively chosen by the Chief Executive Officer (CEO). It is argued that British (broadly, Anglo-American) boards might be more assertive in their monitoring role if they were restructured along the lines of German supervisory board. Due to the existence of large shareholders and creditors motivated to protect their investment in Germany, British Corporate governance is regarded as less successful and effective.

In France, both single-tiered and two-tiered boards are allowed but single-tiered structure tends to dominate. In case of two-tiered structure, the members of the supervisory board are appointed by the shareholders' meeting and employees cannot elect members. The supervisory board appoints the members of the executive board. A member of supervisory board can be removed by a simple majority vote in the shareholders' meeting. In the case of single-tiered structure, shareholders can dismiss any director of the board. In both French and German two-tiered systems, the board of managing directors is more insulated from the pressures of shareholders than in British single-tiered structure. Furthermore, employee rights are greater in France than in UK but less than in Germany.

Among European countries, France is characterised by comparatively strong power structure as the same person both presides over meetings and assumes general management control. There are sets of French companies in a hierarchical order of control tied together by complex financial links and controlled by a sole centre.

3.6.3.2. Executive Compensation

Appropriate compensation policies are useful in ensuring that managers pursue the shareholders' interests even if the board cannot completely dictate the managers' action. Management compensation is an internal device, which consists of paying management for their performance using, e.g., cash bonuses, salary revisions, stock options to provide an incentive to maximise shareholders' wealth.

In German family-founded corporations, management has a clear incentive related to its own wealth to maximise value. However, management ownership in such firms not-majority owned by individuals appears low. In the UK, management ownership seems fairly substantial, which makes managers be more entrenched and less responsive to shareholders interests than otherwise. In Germany, compensation of the member of the supervisory board is determined by the shareholders and compensation of managing board by the supervisory board. In France, total compensation for directors or members of supervisory board is decided by shareholders ' annual meeting. Likewise, remuneration of the directors is determined by a shareholders' meeting in the UK.

An empirical study, by Goodhart [1992], of salaries plus bonuses of the highest paid directors in the largest UK firms shows a weak relationship between executive compensation and corporate performance. In addition, Kaplan [1993a, 1993b] analyses the relationship between the turnover of top executives of largest firms in the USA, Japan and Germany in line with their stock performance, sales growth, net income and changes in pretax income. Income losses and poor stock returns are found to increase the likelihood of top management turnover in three countries.

3.6.3.3. Corporate Ownership Structure

The concentration of ownership and the identity of large shareholders constitute corporate ownership structure, which is important in determining how managers are disciplined. If a firm is diffusely held by a large number of shareholders, monitoring of management by shareholders becomes unattractive as the amount of stake per shareholder is small. On the other hand, if a firm is sufficiently concentrated by a few large shareholders, monitoring becomes worthy. If there is concentrated equity ownership, which is potentially more powerful than concentrated debt, firms tend to pay out more dividends. La Porta et al. [1999] report that, in countries where shareholders protection is high (especially the USA and the UK), publicly-traded company ownership is both widely held and the ownership by state and family do not exist, contrary to the countries where shareholders protection is relatively weak (e.g., France and Germany). Similarly, Modigliani and Perotti [2000] argue that a sign of strong shareholders protection (low voting premium) makes equity markets greater and reduces the dominance of bank lending.

If we look at the statistics illustrated in the tables below, substantial differences can be realised across countries. First of all, the number of listed corporations and the size of their market capitalisation relative to the size of the economy have always been much greater in the UK (market-oriented country) than in Germany (bank-oriented country) and France (seemingly, in between) (Table 3.6.1). One can also say that the UK has more fragmented and less stable ownership structure than those of France and Germany where there are substantial deviations from 'one-share-one-vote' paradigm.

Table 3.6.1: Banking Sector and Stock Market Indicators of Selected Countries. (Source: The World Bank, World Development Report 2000-2001).

Countries	*Market Capitalisation*				*Value Traded*		*Turnover Ratio*		*Listed Companies*		*Bank Credit*	
	$-billions		*% of GDP*		*% of GDP*						% of GDP	
	1990	**1999**	**1990**	**1998**	**1990**	**1998**	**1990**	**1999**	**1990**	**1999**	**1990**	**1999**
France	314.4	991.5	26.3	69.5	9.8	40.1	n.a	68.7	578	711	106.1	103.1
Germany	355.1	1093.9	22.9	51.3	22.1	65.2	139.3	144.9	413	741	108.5	146.9
The UK	848.9	2374.3	87.0	174.9	28.6	86.0	33.3	53.4	1701	2399	123.0	129.1

Market Capitalisation: The share price times the number of shares outstanding. *Value Traded*: The total value of shares traded during the period. *Turnover Ratio*: The total value of shares traded during the period divided by the average market capitalisation (average of the end-of-period values for the current and past values) for the period. *Listed Companies*: The number of domestically incorporated companies listed on the country's stock exchanges at the end of the year. This indicator does not include investment companies, mutual funds or other collective investment vehicles. *Bank Credit*: Domestic credit provided by the banking sector.

Moreover, because of virtual absence of restrictions on investors taking large equity shares of corporations, ownership concentration is much higher in Germany than in the UK (Table 3.6.2). Although it is argued that the larger the firm, the greater the cost of achieving a given fraction of ownership, this is not the case in Table 3.6.2. Hence, the low levels of concentration observed in the UK might be due to the legal and regulatory factors of large institutional investors (e.g., taking a large and active position in a firm might be costly). It is important to note that, in Germany where there is no effective market for corporate control, highly concentrated share-ownership can be a good motivation to monitor the firm due to agency problems[73].

[73] According to Rajan and Zingales [1995], the effect of ownership concentration is not clear. Agency costs can be reduced by the existence of large shareholders on the board of directors however, since there might be some banks as shareholders, the firm may not resort to external borrowing but might be enforced to borrow from that bank. Yet, Frankel and Montgomery [1991] support the residual claimant of banks by holding equity to make value-increasing decisions. McConnell and Servaes [1995] find that the allocation

Table 3.6.2.: Ownership concentration of large non-financial corporations, selected countries (*Source*: Prowse [1994]).

	Germany	The UK
Mean	41.5	20.9
Median	37.0	15.1
Standard Deviation	14.5	16.0
Minimum	15.0	5.0
Maximum	89.6	87.7
Mean Firm Size[1] (US$-millions, 1980)	3483	1031
Mean Firm Size[2] (US$-millions, 1980)	1497	n.a.

[1] *Measured by total assets.* [2] *Measured by market value of equity. Sample: Germany; 41 non-financial corporations in 1990 and UK; 85 manufacturing corporations in 1970.*

Table 3.6.3 shows the role of institutional investors and distribution of share ownership among three countries. On one hand, the percentage of share ownership by insurance companies and pension funds is about five times greater in the UK than it is in other countries. The private pension funds having strong positions in the UK behave as fund managers and criticised to cause short-term investment and trading relationships. British institutional investors are also more influential in terms of their financial assets and their shares in the stock market relative to the size of the economy than German and French ones. On the other hand, most of the shares of German corporations are held by non-financial institutions rather than financial sector, where the position of non-financial sector is dramatically low in the UK[74]. France is in the middle case in terms of the share of non-financial institutions. In France, there is high weight of family and State control over firms and the main categories of ownership is the firms' owners and non-financial companies. As for the banking sector, Germany has the highest percentage of share ownership, where, again, France seems to be a middle case where banks are neither the dominant investors in large non-financial enterprises nor the primary monitor. It is known that small enterprises owned and controlled mostly by family members and close business associates are dominant in France. Unlike in the UK, such types of shareholders are interested more in long-term relationship in Germany[75].

of equity ownership is more important for low-growth firms than high-growth ones in affecting corporate value.

[74] Allen and Gale [1999] argue that the data on concentration of ownership seem to understate the significance of the bank's effective position. It is because many bank customers keep their shares 'on-deposit' at banks and allow banks to exercise their proxies on their behalf. Consequently, banks control a higher proportion of voting equity and have more representation on boards of large industrial enterprises.

[75] It is important to note that Edwards and Nibler [2000] report sort of conflicting evidence that German banks play no role in firms' corporate governance and German firms make very little use of bank loan finance.

Table 3.6.3.: Panel a) Distribution of Outstanding Listed Corporate Equity among Different Categories of Shareholders, selected countries (percent at year-end 1996). (Source: Nestor and Thompson [2000]).

Owner	France	Germany	The UK
Financial Sector	30	30	68
Banks	7	10	1
Insurance Companies and Pension funds	9	12	50
Investment Funds	11	8	8
Others	3	-	9
Non-financial Entreprises	19	42	1
Public Authorities	2	4	1
Households	23	15	21
Rest of the World	25	9	9
Total	100	100	100

Panel b) Institutional Investor's Financial Assets in 1995. (Source: OECD [1997], Institutional Investors Statistical Yearbook.)

Countries	US$-billion	Percent of GDP	Percent held in equities
France	1158.8	75.3	22
Germany	1132.2	46.1	12
The UK	1788.7	162.3	69

Panel c) Institutional investors' Share of Stock Market, percent in mid-1997. (Source: OECD Economic Surveys [1998]; The United Kingdom).

	France	Germany	The UK
All institutions as percent of market	39.8	39.0	76.5
Top-25 institutions as percent of market	14.4	9.5	31.9
Top-25 institutions as percent of institutions	24.1	24.4	41.7

Another difference stems from the level and form of impediments to corporate restructuring in these countries. In France, there are few impediments to shareholder control although some restrictions exist in the transfer of ownership due to government intervention and concentration of voting rights. In Germany, limitations on transferability of ownership are less highlighted but the transfer of control is restricted by the power of banks, workers and managers. In the UK, yet, the transfer of both ownership and control is slightly restricted by few impediments.

3.6.3.4. Market For Corporate Control

The threat of an unwanted takeover is generally recognised an important mechanism by which capital markets ensure management discipline in maximising firms' value. A bidder, through a takeover, can pay more for the firm's shares than its current market price in order to control the company. Hence, it is believed that takeovers can facilitate the transfer of firms' control from inefficient to efficient management. There are three main ways by which market for corporate control can operate. First one is 'proxy contests' in which there is a group of shareholders trying to convince the remaining shareholders to act in cooperation with them and unseat the existing board of directors. 'Friendly mergers' is the second way, which occurs when both firms agree that their combination would value more. The last one is 'hostile takeovers', which occurs when there is conflict between the acquirers and acquirees over, e.g., the price that should be paid and the policy effectiveness to be implemented.

Not surprisingly after all, there are considerable differences in the occurrences of takeovers across countries. One of the most striking differences between continental Europe and Anglo-American financial systems could be in the frequency of takeovers driven by management failure, as the market for corporate control is much more active in the latter system. Although the hostile takeovers are virtually unknown or rare in Germany and France, they are commonplace in the United Kingdom, where the presence of a well-developed market for corporate control induces firms to maintain higher dividend distributions in order to avert the danger of being taken-over. As being the evidence, Table 3.6.4 would be useful to quantify these statements.

Table 3.6.4: The Market for Corporate Control Transactions for Different Systems (Source: Prowse [1994]).

	Germany	The UK	Rest of Europe
Volume (US$-billions)[1]	4.2	107.6	n.a.
As a percentage of total market capitalisation[1]	2.3	18.7	n.a.
Hostile Takeovers[2]	n.a	37.1	9.6
Leveraged Buyouts[2]	n.a	5.9	2.7

[1] Average annual volume of completed domestic mergers and corporate transactions with disclosed values, 1985-89.
[2] As a percentage of all attempted transactions, 1985-89.

Further evidence is reported in Table 3.6.5, which depicts large and increasing level of cross-border acquisitions. Overall, the UK is net purchaser of overseas firms during 1987-88, Germany is a net seller of domestic firms during 1987-88 and France in balance in 1987 and net purchaser in 1988. Another difference is that while Germany and France have bought European firms, British firms have acquired North American firms.

Table 3.6.5: Cross-border Takeovers for the UK, Germany and France (Source: Franks and Mayer [1990]).

	The UK			Germany			France		
Years	Total	North America	Europe	Total	North America	Europe	Total	North America	Europe
Sellers									
1987	138	32	83	269	54	190	178	43	127
1988	230	40	155	360	83	250	235	51	170
Buyers									
1987	427	256	156	137	43	85	194	58	133
1988	767	390	260	180	53	109	372	82	277

Franks and Mayer [1990] contend that there is a very different pattern of both ownership and control changes between France, Germany and the UK due to differences in regulation, company law, labour law, competition policy and stock exchange rules. On the other hand, they argue that the most important distinction between France, Germany and the UK does not lie in the level of takeover activity but in the nature, whether hostile or friendly takeovers. They state that in the UK, there is an active market in hostile takeovers, and there are more serious regulatory and institutional impediments to hostile acquisitions in Germany than in France.

Mayer [1990] argues that, instead of the arguments 'taxation differentials and asymmetric information between managers and shareholders', the theories of 'corporate control' can best explain the differences between financial systems of countries. Thus, it would be important to find out the reasons for these differences. According to a common belief, the main reason is the more conductive legal impediments and regulatory restrictions on takeover attempts in France and Germany than in the UK. Beside this, the level of *ownership* concentration is higher in Germany than in the United Kingdom; that is why hostile takeovers are almost unheard in Germany where there are active owner-investors. In addition, the existence of cross-shareholdings in Germany and France, and shareholder voting rules, the ability of large shareholders to monitor management and strong labour participation in Germany makes it difficult to acquire the sufficient shares for a takeover.

Control theories are also relevant to medium-sized firms, which raise appreciably more equity finance from stock markets in the UK than in Germany. Mayer also notes that large German firms enjoy a considerable 'degree of autonomy' for their financial operations thereby retaining a higher proportion of their self-generated funds than the large UK firms. He further argues that while large UK firms raise more new equity finance than large German firms, they also spend more of it on takeover activity.

3.7. CONCLUSION

It seems clear that France, Germany and the United Kingdom have specific financial and economic structures markedly differing from each other. While financial and tax accounting are interlinked in Germany, it is clearly separated in the UK in which the disclosed information reveals best about the economic reality of the firm. The value relevance and the outside demand of financial-accounting data is lower for French and German corporations. As for taxation, due to historical developments taxation systems have taken different implications in these countries. German Prudence system leads to undervaluation of assets and overvaluation of liabilities. The principles of tax deductibility and deferred taxation are sufficiently different to affect firm's financial ratios. Furthermore, it is the French bankruptcy procedures which mostly emphasise to safeguard the failing firm. In the UK, the direct bankruptcy costs tend to be lower and the design of insolvency procedures might cause premature liquidations. In Germany, it is difficult to rehabilitate the failing firm due to strong protection of collateral. Because of the two-tiered corporate governance system in Germany, labour management representation is strongest in this country. In the shareholder-based British corporate governance system, potential agency costs are higher than in Germany and France where there is a stakeholder approach. Although market for corporate control is important in the UK, there is a lack of long-term relationship between the firms and their creditors. Ownership concentration is much higher in Germany than in the UK where there are large institutional investors. On the other hand, the family and state control over the firms is highest in France.

At the end of the comparative discussion of country-specific institutional factors in detail, it seems we have come to the point to assert that, apart from firm-specific factors, corporate policies are also influenced by the domestic institutional environments where firms operate. Having investigated the financial structures of the countries, the following related empirical chapters will be good opportunity to assess how important the distinct financial structures are in affecting firms' financial strategies.

4. CHAPTER 3: METHODOLOGY FOR DYNAMIC PANEL DATA ANALYSIS

4.1. INTRODUCTION

In financial economics, there are many areas and relevant theories which should be investigated using dynamic panel data due to their nature. By this way, one can discover the dynamics of adjustment process more systematically in these areas. In this chapter, we will first discuss the adjustment process with an appropriate model using first-differences technique. This will be further elaborated in the framework of error-correction mechanism in the penultimate section. In the next step, there will be an elaboration of alternative estimation methodologies in order to obtain the best econometric procedure which will result in consistent and efficient estimates for the models. Specifically, we will discuss the properties of Ordinary Least Squares (OLS), Anderson-Hsiao Instrumental Variable technique, and Generalised Methods of Moments (GMM) methodology interacted with models in levels and first-differenced equations. Having discussed the superiority of GMM in dynamic panel data studies, there will be further discussion of how to improve the GMM results by using additional instruments. In the end, this chapter aims to document why we have chosen the GMM methodology to be the best estimation technique for our empirical purposes.

4.2. THE ADJUSTMENT MODEL

In economic theory, there exist some flexible accelerator models which deal with, in equilibrium, whether there is an *optimal*, desired or long-run value of a dependent variable given explanatory variable(s). Consider the following simple model;

$$Y_t^* = \beta_1 + \beta_2 X_t + u_t \tag{4.1}$$

where Y_t* is the "unobservable" desired level of Y_t at time t. The disturbance term u_t is assumed to be serially uncorrelated with mean zero and variance σ^2. As this target level is not directly observable, the following stock adjustment or *partial adjustment* model can be considered:

$$Y_t - Y_{t-1} = \theta(Y_t^* - Y_{t-1}) \tag{4.2}$$

or

$$Y_t = \theta Y_t^* + (1-\theta)Y_{t-1} \tag{4.3}$$

According to this hypothesis, $Y_t - Y_{t-1}$ is actual change and $Y_t^* - Y_{t-1}$ is desired change. θ is the coefficient of speed or degree of adjustment, such that $\theta > 0$. Thus, the model assumes that the actual change in Y at time t is some fraction θ of the desired change. Alternatively, one can state that the actual value of Y at time t is the *weighted* average of the desired value of Y at time t and actual value of Y at time t-1. Thus, the level of Y is adjusted overtime with the amount of underlying adjustment coefficient. If $\theta > 1$, optimality is not attained due to over-adjustment, and the lagged coefficient is not stable and diverging from its target value. If $\theta < 1$, the optimal level is not achieved due to the slower adjustment than required but the lagged coefficient is stable and converging to its target value. If $\theta = 1$, there has been a complete adjustment within one period and the target level is attained (see, e.g., Banerjee et al. [2000]). A positive and highly significant coefficient of the lagged variable can be regarded as the confirmation of dynamic specification.

Substituting (4.1) into (4.3), we get (4.4);

$$Y_t = \theta\beta_1 + \theta\beta_2 X_t + (1-\theta)Y_{t-1} + \theta u_t \tag{4.4}$$

More precisely,

$$Y_t = \lambda_1 + \lambda_2 Y_{t-1} + \lambda_3 X_t + \varepsilon_t \tag{4.5}$$

It is important to note that ε_t has the same properties with u_t. Otherwise, the existence of autocorrelation can cause downward bias in estimated adjustment speeds. Likewise, one might not distinguish between a model with strong (little) serial correlation and fast (slow) adjustment (see, Blinder [1986]).

4.3. A CRITIQUE OF ALTERNATIVE METHODOLOGIES

One can extend (4.5) by including k exogenous variables into this partial adjustment model and furthermore arrange it for panel data studies (*t* stands for time and *i* stands for an individual, say, firm):

$$Y_{i(t)} = \lambda_1 Y_{i(t-1)} + \sum_{k=2} \lambda_k X_{kit} + v_i + v_t + \varepsilon_{it} \tag{4.6}$$

Here, v_i represents 'unobservable' individual firm-specific effects (e.g., performance of managers, reputation, capital intensity, growth opportunities) which do not change overtime. Similarly, v_t represents some effects (e.g., stagflation, interest rates, inflation rate, demand shocks) which are common to all firms and can change through time. ε_{it} is the third component of the model's error term affecting individual i during time t.
According to Hsiao [1985], OLS methodology would result in biased coefficients in (4.6) because of the assumptions that v_i is not directly observable, and of the correlation between unobservable firm-specific effects and regressors [Cov (v_i, X_{kit}) $\neq$ 0][76]. Since $Y_{i(t-1)}$ is correlated with v_i, this would be another reason for the inconsistent estimation of coefficients. In order to get rid of these problems, one could take the first differences thereby eliminating time-invariant fixed effects (v_i) and get (4.7).

$$\Delta Y_{(it)} = \lambda_1 \Delta Y_{i(t-1)} + \sum_{k=2} \lambda_k \Delta X_{kit} + \Delta v_t + \Delta \varepsilon_{it} \tag{4.7}$$

However, the OLS estimators (λ_k's) are still inefficient because there is a correlation between $\Delta\varepsilon_{it}$ and $\Delta Y_{i(t-1)}$ due to the terms $\varepsilon_{i(t-1)}$ and $Y_{i(t-1)}$[77]. OLS method leads to another estimation problem as it assumes that all the explanatory variables are strictly exogenous. Yet, this is a naive presumption since the random events affecting the dependent variable is likely to have influence on the independent variables as well. For this case, Anderson and Hsiao (1982) propose instrumental variables (IV) technique such that $\Delta Y_{i(t-2)}$ or $Y_{i(t-2)}$ can be used as instruments for $\Delta Y_{i(t-1)}$. It is because $\Delta Y_{i(t-2)}$ or $Y_{i(t-2)}$ is correlated with

[76] Blundell and Bond [1999], for instance, also argue that the likely sources of bias in the OLS estimator are unobserved heterogeneity and simultaneity.

$\Delta Y_{i(t-1)}$ but *not* with $\Delta\varepsilon_{it}$. If ε_{it} is not serially correlated *per se*, the IV estimation results will be *consistent*. Yet, they might not be efficient estimators since IV technique does not use all the related moment conditions.

Consequently, Arellano and Bond [1991] suggest another technique, Generalised Methods of Moments (GMM) with which they link the IV procedure to improve efficiency. They argue that GMM estimation utilises additional instruments arising from using the *orthogonality conditions* between the disturbances and the lagged values of dependent variable (see next section). In general, one can find a GMM estimator of the true parameter by finding the element of the parameter space which sets linear combination of the sample cross products 'as close to zero as possible' (Hansen [1982]). Thus, the advantage of GMM stems from the fact that it optimally exploits all the linear moment restrictions specified by the model[78]. It is argued that $E(\varepsilon_{it}\varepsilon_{it-1})$ in (4.7) is not necessarily zero but it is strictly assumed that $E(\varepsilon_{it}\varepsilon_{it-2})$ is zero as the consistency of GMM procedure (GMM-DIF) is based on the absence of second-order correlation in differences and that of first-order correlation in levels. Assuming that the disturbances are not correlated, it is expected that $\Delta\varepsilon_{it}$ is orthogonal to the past history of the variables x and y so that $(y_{it-2}, \; y_{it-3,\ldots} \; x_{it-2}, x_{it-3,\ldots})$ can be used as valid instruments for $\Delta\varepsilon_{it}$. If ε_{it} follows a MA (1) process, the first valid instruments start from the third lag not from the second since the differenced disturbances follow an MA (2) process. As a result, it is essential to make sure that there is no higher-order serial correlation to have a valid set of instruments independent from the residuals, which can be investigated by the Sargan test of overidentifying restrictions (see Sargan [1958] and Hansen [1982]).

This two-step GMM methodology can control for the correlation of errors overtime, heteroscedasticity across firms, simultaneity and measurement errors due to the utilisation of orthogonality conditions on the variance-covariance matrix.[79]

[77] As the introduction of the lagged dependent variable raises the problem of the simultaneity of this variable and the residual, Nickell [1981] reports that there is a potential downward-bias in the estimation of the autoregressive coefficient in panels with small number of time periods with the estimation bias of 1/T.

[78] Mairesse et al. [1999], for instance, ascertain three important possibilities as to why GMM estimator is preferred; i) random measurement error in the regressors, which probably causes downward bias in the coefficients of the variables inaccurately measured, ii) simultaneity between current values of regressors and disturbance term, which probably causes upward bias in the coefficients of the variables positively correlated, iii) endogeneity of the current value of regressors with respect to the past disturbances.

[79] Two-step GMM estimators, which use one-step residuals to construct asymptotically optimal weighting matrix, are more efficient than one-step estimators if the disturbances are expected to show heteroscedasticity in the large sample data with a relatively long time span. See Arellano and Bond [1991], Blundell and Bond [1998] and White [1982] for further discussion.

4.4. GMM SYSTEMS APPROACH (GMM-SYS)

The studies following Arellano and Bond [1991] have shown that one could further improve and go beyond the standard-GMM methodology estimates by dealing with weak instruments problem. Arellano and Bover [1995] argue that the absence of information concerning the parameters in the levels-variables causes substantial efficiency loss in models estimated in first-differences using instruments in levels. Therefore, they propose to use instruments in first-differences for equations in levels *in addition* to instruments in levels for equations in first-differences. Furthermore, Blundell and Bond [1998] document that the extended GMM (GMM-SYS) estimator of Arellano and Bover [1995] reveals dramatic efficiency gains in cases where standard first-differenced GMM estimator performs poorly (e.g. for short sample periods and persistent data). In addition, Mairesse and Hall [1996] find that GMM-DIF specification results in unsatisfactory estimations using panel data for a large sample of firms with small number of time periods[80].

Blundell and Bond [1999] document that once lagged first-differenced and lagged levels instruments are included in the instrument set, one could reduce the finite sample bias substantially due to exploiting the *additional* moment conditions in this system approach. Their results with respect to production function application show that the instruments used by GMM-DIF estimator contain little information about the endogenous variables in first-differences, and lagged first-differences are informative instruments for the endogenous variables in levels. Under GMM-SYS technique, the model is estimated in both levels and first-differences (level-equations are simultaneously estimated using differenced lagged regressors as instruments). By this way, apart from controlling for individual heterogeneity, variations between firms could partially be retained.

Following Blundell and Bond [1998], and Blundell et al. [2000], for the analysis of linear dynamic panel data model and the properties of estimators of the parameters, we have the following autoregressive-distributed form;

$$Y_{it} = \alpha Y_{it-1} + \beta_1' X_{it} + \beta_2' X_{it-1} + \eta_i + v_{it} \qquad (4.8)$$

[80] Earlier, Griliches and Hausman [1986] emphasised another problem of differencing concerning measurement error. They argue that differencing may exacerbate the bias because of errors in variables (EIV) as a result of decrease in signal-to-noise ratio.

for i = 1,..., N and t = 2,..., T; N is large and T is fixed; $|\alpha| < 1$; $u_{it} = \eta_i + \upsilon_{it}$ is error components decomposition of the error term. This model has the corresponding 'common factor' restricted form ($\beta_2 = -\alpha\beta_1$) such that

$$Y_{it} = \beta_1' X_{it} + f_i + \phi_{it}; \quad \phi_{it} = \alpha\phi_{it-1} + v_{it}; \quad \eta_i = (1-\alpha) f_i \tag{4.9}$$

Although we include X_{it} regressors into our empirical model, an AR(1) model with unobservable individual effects will be considered in order to examine the various estimators;

$$Y_{it} = \alpha Y_{i,t-1} + \eta_i + \upsilon_{it} \tag{4.10}$$

The error component structure and other assumptions are as follows;

$$E(\eta_i) = E(v_{it}) = E(v_{it}\eta_i) = E(v_{it}v_{is}) = E(Y_{i1}v_{it}) = 0 \tag{4.11}$$

for i = 1,...,N; t = 2,...,T and $t \neq s$.

In case of first-*differenced* GMM estimator (GMM-DIF) there are $m_d = (T-1)(T-2)/2$ orthogonality conditions which are linear in α-parameter assuming the absence of serial correlation in v_{it};

$$E(Y_{i,t-s}\Delta u_{it}) = 0; \; for \; t = 3,...,T \; and \; 2 \leq s \leq t-1 \tag{4.12}$$

in which the moment restrictions can be written as $E(Z'_{di}\Delta u_i) = 0$; where Δu_i is the (T-2) vector $(\Delta u_{i3}, \Delta u_{i4},..., \Delta u_{iT})'$ and Z_{di} is $(T-2) \times m_d$ matrix;

$$Z_{di} = \begin{bmatrix} Y_{i1} & 0 & 0 \; \ldots & 0 \; \ldots & 0 \\ 0 & Y_{i1} & Y_{i2} \; \ldots & 0 \; \ldots & 0 \\ . & . & . \; \ldots & 0 \; \ldots & 0 \\ 0 & 0 & 0 \; \ldots & Y_{i1} \; \ldots & Y_{iT-2} \end{bmatrix}.$$

or alternative illustration;

Equations	Instruments available
$\Delta Y_{i3} = \alpha\ \Delta Y_{i2} + \Delta v_{i3}$	Y_{i1}
$\Delta Y_{i4} = \alpha\ \Delta Y_{i3} + \Delta v_{i4}$	Y_{i1}, Y_{i2}
.	.
.	.
.	.
$\Delta Y_{i,T} = \alpha\ \Delta Y_{i,T-1} + \Delta v_{i,T}$	$Y_{i1}, Y_{i2}, \ldots, Y_{i,T-2}$

The GMM estimator based on these moment conditions 'minimises the quadratic distance' $\mathbf{\Delta u'Z_d W_N Z_d'\Delta u}$ for some metric $\mathbf{W_N}$;
where $\mathbf{Z_d'}$ is md×N(T-2) matrix $\{Z'_{d1}, Z'_{d2},\ldots, Z'_{dN}\}$;

$\mathbf{\Delta u'}$ is N(T-2) vector $(\Delta u_1', \Delta u_2',\ldots, \Delta u_N')$.
There are alternative choices for W_N. In general, the optimal weights are given by;

$$W_N = \left(\frac{1}{N} \sum_{i=1}^{N} Z_{di}' \,\Delta\hat{u}_i\, \Delta\hat{u}_i' Z_{di} \right)^{-1} \tag{4.13}$$

where $\Delta\hat{u}_i$ are residuals from initial consistent estimator.

As a result, two-step GMM estimator α is found by[81];

$$\hat{\alpha}_d = (\Delta Y_{-1}' Z_d W_N Z_d' \Delta Y_{-1})^{-1} \Delta Y_{-1}' Z_d W_N Z_d' \Delta Y \qquad (4.14)$$

Blundell et al. [2000] and Blundell and Bond [1998] show that the instruments used in the standard GMM-DIF estimator become 'less informative' in two cases; *i)* as the value of autoregressive parameter-α increases towards unity and *ii)* as the variance(η_i), σ^2_η, increases relative to variance(v_{it}), σ^2_v. To show this, they consider T = 3, in which the moment conditions of GMM-DIF reduce to single orthogonality condition and the moments estimator reduces to simple two-stage least squares (2SLS) estimator. The first stage is instrumental variable regression;

$$\Delta Y_{i2} = \pi_d Y_{i1} + r_i \quad for\ i = 1,\ldots,N.$$

If "α" in (4.10) or "var(η) / var(v)" is sufficiently high, then the least squares estimate of the reduced form coefficient (π_d) can be made arbitrarily close to zero. Accordingly, the instrument Y_{i1} is only weakly correlated with ΔY_{i2}, which can be understood from the following;

$$\Delta Y_{i2} = (\alpha-1) Y_{i1} + \eta_i + v_{i2} \quad for\ i = 1,\ldots,N.$$

As one expects $E(Y_{i1}\ \eta_i) > 0$, the least square estimator (α-1) is generally biased upwards (towards zero)[82]. Assuming covariance stationarity and letting k = (1- α)/(1+ α);

[81] In the first step of two-step GMM estimator, an initial positive semidefinite weight matrix is used to find consistent estimates of parameters. Then, an efficient weight matrix can be constructed to use for the asymptotically efficient two-step estimates, given the consistent estimates. As discussed by Arellano and Bond [1991], and Windmeijer [1998], the two-step estimated standard errors have small sample downward bias in dynamic panel data models and thus one-step estimates with robust standard errors are generally preferred. Under GMM-DIF estimator assuming homoscedasticity and no-serial correlation in the errors, an efficient weight matrix can easily be derived, unlike for the GMM-SYS estimator. For this case, the inverse of the moment matrix of the instruments as an initial weight matrix is commonly used.

[82] The concentration parameter of Nelson and Startz [1990] and Staiger and Stock [1997] is used by Blundell and Bond [1998] to identify the weak instrument problem causing bias and imprecise estimates. Furthermore, Blundell and Bond [1999] report that the GMM-DIF estimator is biased in the direction of Within Groups if the instruments are weak, implying the superiority of GMM-SYS estimator.

$$p\lim \hat{\pi}_d = (\alpha - 1)\frac{k}{\frac{\sigma_\eta^2}{\sigma_v^2} + k} = -\frac{\sigma_v^2(1-\alpha)^2}{\sigma_v^2(1-\alpha) + \sigma_\eta^2(1+\alpha)}$$

Consequently, the bias term effectively scales the estimated coefficient on the instrumental variable Y_{i1} toward zero. It is found that 'plim π_d' tends to zero as α tends to unity or as $\sigma^2_\eta / \sigma^2_v$ tends to infinity. Furthermore, IV performs poorly when the concentration parameter, τ, approaches zero and GMM-DIF estimator deteriorates as α approaches unity;

$$\tau = \frac{(\sigma_v^2 k)^2}{\sigma_\eta^2 + \sigma_v^2 k}$$

In case of *levels* GMM estimator (GMM-LEV), consider the additional assumption of $E(\eta_i \Delta Y_{i2}) = 0$. If this initial conditions holds, we have valid (T-2) linear moment conditions;

$$E(u_{it} \Delta Y_{i,t-1}) = 0; \textit{ for } t = 3,\ldots,T \tag{4.15}$$

The moment conditions remain informative even α approaches unity and var(η) / var(v) becomes large (Blundell et al. [2000]). Under GMM-LEV, there are m_l = (T-1)(T-2)/2 moment conditions;

$$E(\Delta Y_{i,t-s} u_{it}) = 0; \textit{ for } t = 3,\ldots,T \textit{ and } 1 \le s \le t-2 \tag{4.16}$$

in which the moment restrictions can be written as $E(Z'_{li}u_i) = 0$; where u_i is the (T-2) vector $(u_{i3}, u_{i4},\ldots, u_{iT})'$ and Z_{li} is (T-2) × m_l matrix;

$$Z_{li} = \begin{bmatrix} \Delta Y_{i2} & 0 & 0 & \dots & 0 & \dots & 0 \\ 0 & \Delta Y_{i2} & \Delta Y_{i3} & \dots & 0 & \dots & 0 \\ . & . & . & \dots & 0 & \dots & 0 \\ 0 & 0 & 0 & \dots & \Delta Y_{i2} & \dots & \Delta Y_{iT-1} \end{bmatrix}.$$

The system GMM estimator exploits full set of ($m_s = [T+1][T-2]/2$) linear moment conditions in (4.12) and (4.15), which forms the basis for GMM-SYS. The calculation of GMM-SYS estimator can be done by a stacked system consisting of (T-2) equations in first-differences and (T-2) equations in levels for the period t = 3,...,T. These moment conditions can be written as ***$E(Z'_{si}q_i) = 0$***, where $q_i = [\Delta u_i \; ui]'$ and Z_{li}^P is subset of Z_{li}.

$$Z_{si} = \begin{bmatrix} Z_{di} & 0 \\ 0 & Z_{li}^{p} \end{bmatrix} = \begin{bmatrix} Z_{di} & 0 & 0 & \dots & 0 \\ 0 & \Delta Y_{i2} & 0 & \dots & 0 \\ 0 & 0 & \Delta Y_{i3} & \dots & 0 \\ . & . & . & \dots & 0 \\ 0 & 0 & 0 & \dots & \Delta Y_{i,T-1} \end{bmatrix}.$$

Consequently, in addition to the instruments available for the first-differenced equations, we also have the following extra instruments for the equations in levels[83];

Equations	Instruments available
$Y_{i3} = \alpha \; Y_{i2} + \eta_i + v_{i3}$	ΔY_{i2}
$Y_{i4} = \alpha \; Y_{i3} + \eta_i + v_{i4}$	ΔY_{i3}
.	.
.	.
.	.
$Y_{i,T} = \alpha \; Y_{i,T-1} + \eta_i + v_{i,T}$	$\Delta Y_{i,T-1}$

[83] The level instruments for all variables in level equations are not used since the level of dependent variable must be correlated with firm-specific effects and the potential correlation between explanatory variables and these effects are allowed. On the other hand, in autoregressive-distributed lag models, first-differenced

Therefore, the GMM-SYS estimator is the combination of GMM-DIF estimator and GMM-LEV estimator, i.e.;

$$\hat{\alpha}_{SYS} = \rho\,\hat{\alpha}_{DIF} + (1-\rho)\,\hat{\alpha}_{LEV-P} \qquad (4.17)$$

4. 5. THE DETERMINATION OF THE INSTRUMENT SET[84]

Let us consider the model simplified from (4.8), which have additional regressors apart from lagged dependent variable.

$$Y_{it} = \alpha Y_{it-1} + \beta X_{it} + \eta_i + v_{it} \qquad (4.18)$$

The error components satisfy the assumptions in (4.11) and X_{it} is correlated with individual effects η_i ($u_{it} = \eta_i + v_{it}$). In order to determine the instruments for the estimation of α and β, consider the following three cases:

i) X_{it} is *strictly exogenous* if

$$E(X_{is}v_{it}) = 0 \text{ for } s = 1,\ldots,T \text{ and } t = 2,\ldots,T \qquad (4.19)$$

Apart from (T-1)(T-2)/2 moment conditions in (4.12), there are additional (T)(T-2) moment conditions for GMM-DIF estimator in the following:

$$E(X_{is}\Delta u_{it}) = 0 \text{ for } t = 3,\ldots,T \text{ and } 1 \leq s \leq T \qquad (4.20)$$

ii) X_{it} is *weakly exogenous* or *predetermined* if

$$E(X_{is}v_{it}) = 0 \text{ for } s = 1,\ldots,t \text{ and } t = 2,\ldots,T \qquad (4.21)$$

$$E(X_{is}v_{it}) \neq 0 \text{ for } s = t+1,\ldots,T \text{ and } t = 2,\ldots,T \qquad (4.22)$$

variables can be uncorrelated with such effects if there is a mean stationarity in the variables (Blundell and Bond [1998], Bond et al. [1999]).

[84] This section is mainly based on Arellano and Bond [1991], Blundell and Bond [1998], Blundell et al. [2000] and Windmeijer [1998].

Apart from (T-1)(T-2)/2 moment conditions in (4.12), there are additional (T+1)(T-2)/2 moment conditions for GMM-DIF estimator in the following:

$$E(X_{i,t-s}\Delta u_{it}) = 0 \text{ for } t = 3,\ldots,T \text{ and } 1 \leq s \leq t-1 \tag{4.23}$$

iii) X_{it} is *endogenous* if

$$E(X_{is}v_{it}) = 0 \text{ for } s = 1,\ldots,t-1 \text{ and } t = 2,\ldots,T \tag{4.24}$$

$$E(X_{is}v_{it}) \neq 0 \text{ for } s = t,\ldots,T \text{ and } t = 2,\ldots,T \tag{4.25}$$

Apart from (T-1)(T-2)/2 moment conditions in (4.12), there are additional (T-1)(T-2)/2 moment conditions for **GMM-DIF** estimator in the following:

$$E(X_{it,s}\Delta u_{it}) = 0 \text{ for } t = 3,\ldots,T \text{ and } 2 \leq s \leq t-1 \tag{4.26}$$

For **GMM-SYS** estimator, we should detect under which conditions both ΔY_{it} and ΔX_{it} are uncorrelated with η_i. Consider the following process for this purpose;

$$X_{it} = \rho X_{it-1} + \tau\eta_i + e_{it} \tag{4.27}$$

If $\tau \neq 0$, then, X_{it} is correlated with η_i and the covariance properties between v_{it} and e_{is} indicate whether X_{it} is strictly exogenous, predetermined or endogenous.

In (4.28), ΔX_{it} will be correlated with η_i if and only if ΔX_{i2} is correlated with η_i.

$$\Delta X_{it} = \rho^{t-2}\Delta X_{i2} + \sum_{s=0}^{t-3}\rho^{s}\Delta e_{i,t-s} \tag{4.28}$$

As we expect $E(\Delta X_{i2}\,\eta_i) = 0$, the following initial conditions should be satisfied under the mean stationarity of X_{it};

$$E\left[\left(X_{i1} - \frac{\tau\eta_i}{1-\rho}\right)\tau\eta_i\right] = 0 \tag{4.29}$$

Similarly, (4.30) shows that ΔY_{it} will be correlated with η_i if and only if ΔY_{i2} is correlated with η_i.

As we expect $E(\Delta Y_{i2}\ \eta_i) = 0$, the following initial conditions should be satisfied under the mean stationarity of Y_{it};

$$E\left[\left(Y_{i1} - \frac{\beta\left(\frac{\tau\eta_i}{1-\rho}\right) + \eta_i}{1-\alpha}\right)\eta_i\right] = 0 \qquad (4.30)$$

Therefore, when X_{it} and Y_{it} are both mean stationary, there are additional moment restrictions available for the equations in levels. For the GMM-SYS estimator, there are also additional moment conditions when both ΔX_{it} and ΔY_{it} are uncorrelated with η_i, which depends on the way X_{it} is determined[85]:

If X_{it} is strictly exogenous or predetermined,

$$E(u_{it}\Delta Y_{it-1}) = 0;\ \text{for } t = 3,\ldots,T \qquad (4.31)$$

and

$$E(u_{it}\Delta X_{it}) = 0;\ \text{for } t = 2,\ldots,T \qquad (4.32)$$

If X_{it} is endogenously determined,

$$E(u_{it}\Delta X_{it-1}) = 0;\ \text{for } t = 3,\ldots,T \qquad (4.33)$$

To summarise with a case, we would have the following moment conditions for GMM-SYS estimator if X_{it} is endogenously determined.

$$E(Y_{it-s}\Delta u_{it}) = 0;\ \text{for } t = 3,\ldots,T \text{ and } 2 \leq s \leq t-1 \qquad (4.34)$$

$$E(u_{it}\ \Delta Y_{it-1}) = 0;\ \text{for } t = 3,\ldots,T \qquad (4.35)$$

$$E(X_{it-s}\Delta u_{it}) = 0;\ \text{for } t = 3,\ldots,T \text{ and } 2 \leq s \leq t-1 \qquad (4.36)$$

$$E(u_{it}\Delta X_{it-1}) = 0;\ \text{for } t = 3,\ldots,T \qquad (4.37)$$

[85] It is important to note that using too many instruments may result in small sample overfitting biases. Hence, it would be more appropriate not to use all available instruments in the later cross-sections. This is especially relevant for models incorporating endogenous variables. One could investigate this possibility by comparing the GMM and within-groups estimates (see Arellano and Bond [1991,1998]).

Apart from the restrictions in (4.35) and (4.37), moment restrictions based on other lagged differences are redundant for GMM-SYS estimator (see, Arellano and Bover [1995]).

4.6. TESTING THE VALIDITY OF INSTRUMENTS

As shown above, it is the relationship between disturbance term and regressors that construct the instrument set. As it is unlikely that the firm-specific characteristics (explanatory variables) are uncorrelated with past, present and future values of the disturbance term, the assumption of strict exogeneity of the variables would cause misleading results. It is also important to determine whether there are predetermined variables, in which case current shocks are uncorrelated with past values of the dependent variable, and with current and past values of the independent variables but have some effects from the lagged dependent variable. In order to allow for the possibility that current shocks are correlated with past and current values of the regressors, one should take the possibility of the endogeneity of the variables into account. This is a sensible assumption as the variables might be simultaneously determined.

One can use a similar approach to Blundell et al. [1992], and Devereux and Schiantarelli [1990] to investigate these possibilities for GMM-DIF estimator. We analyse whether the regressors are predetermined or strictly exogenous with respect to the error term. Consider the model (4.7) with the inclusion of lagged regressors to present the steps to be followed. The valid instrument set will be $Z_{it}=\{Y_{i1},\ldots,Y_{it-2}, X_{ik1},\ldots, X_{ikt-1}\}$ assuming ε_{it} is serially uncorrelated and X_{ikt} is predetermined such that $E(X_{kit}\ \varepsilon_{is}) \neq 0$ for $s < t$ and zero otherwise. If X_{ikt} is strictly exogenous such that $E(X_{kit}\ \varepsilon_{is}) = 0$ for all s, t; then, all regressors are valid instruments and the instrument set becomes $Z_{it}=\{Y_{it},\ldots,Y_{is}, X_{ik1},\ldots, X_{ikT}\}$ for s=1,...,T-2. To determine the appropriate instruments, instruments dated t-2 are used for each regressor. Then, X_{it-1} is added to the current instrument set to investigate the potential biases originating from the correlation between $\Delta\varepsilon_{it}$ and X_{it-1}. This procedure is performed for each regressor. If the estimated coefficient of X_{it} falls in the presence of the measurement errors, this downward bias is the result of the simultaneous determination of ε_{it-1} and X_{it-1}. In this case, X_{it-1} is not included to the instrument set. At the end of this repeated procedure, one can conclude whether or not there are predetermined variables. Therefore, the instruments dated t-2 are normally expected to be chosen for the related variable. However, in principle, including X_{it-2} in the instrument set may also create measurement error as it appears as a regressor in the differenced equation. In such cases,

X_{it-3} would be more appropriate rather than X_{it-2} as an instrument since the downward bias because of the measurement error in X outweighs the upward bias due to its possible endogeneity, i.e., simultaneous determination of ε_{it-1} and X_{it-1}[86]. We can also investigate the possibility of strict exogeneity by including only X_{it} to the instrument set and conclude whether any regressor is strictly exogenous.

At the end of this procedure, one can decide whether the instrument set is valid by examining Correlation tests and Sargan test. If ε_{it} are serially uncorrelated in the model in levels, first-differenced transformation generates first-order serial correlation in $\Delta\varepsilon_{it}$. However, there should not be second-order serial correlation in order to rely on the implication of Sargan statistics.

As we discussed previously, the standard statistics to test the validity of instruments under GMM-DIF is performed by using Sargan test (Sar_d), which is defined as

$$Sar_d = \frac{1}{N} \hat{\Delta u}' Z_d W_N Z_d' \hat{\Delta u}$$

where W_N is optimal weight matrix and estimated Δu are the two-step residuals of GMM-DIF estimator[87]. Sar_d is asymptotically chi-squared distributed with m_d-k degrees of freedom (m_d; number of moment conditions, k; number of estimated parameters) under the null hypothesis of instrument validity. The test procedure is the same for GMM-SYS estimator, Sar_d. Consequently, in order to test the validity of the additional level moment conditions which are utilised by GMM-SYS estimator, we can use the Difference-Sargan test asymptotically chi-squared distributed with m_s-m_d degrees of freedom, which is found by; Difference-Sargan = Sar_s-Sar_d.

[86] See, e.g., Blundell et al. [1992] and Bond and Meghir [1994].
[87] Note that only the Sargan-test based on the two-step GMM estimator is heteroscedasticity-consistent (See Arellano and Bond [1991] for further discussion).

4.7. SHORT-RUN AND LONG-RUN MODELS[88]

Consider the following simple autoregressive-distributed model;

$$Y_{it} = \alpha_0 + \alpha_1 Y_{it-1} + \beta_1 X_{it} + \beta_2 X_{it-1} + \varepsilon_{it} \tag{4.38}$$

where ε_{it} is the white noise error term. In this *dynamic* model, the coefficient "β_1" represents the *short-run* reaction of Y_{it} to a change in X_{it}. Hence, it does not incorporate long-run implications. In order to examine long-term effects, the following *static* model, instead, would be useful.

$$Y_{it} = \theta_0 + \theta_1 X_{it} \tag{4.39}$$

Based on (4.38) and (4.39), one can determine the long-run relationship between X and Y by the related elasticity of Y with respect to X;

$$\theta_1 = \frac{\beta_1 + \beta_2}{1 - \alpha_1} \tag{4.40}$$

As we discussed in section 4.2, α_1 should be less than unity so that the short-run model will converge to long-run equilibrium. However, the dynamic model has some problems. The first one is the potential multicollinearity between lagged and current variables due to the likely high correlation[89]. Secondly, as they are in levels, the variables are likely to be non-stationary causing potential spurious regression problem. As a remedy, one could take the first-differences of the dynamic model but this would result in the elimination of any information about the long-run solution. Therefore, one can conveniently reparameterise (4.38) in the error-correction mechanism (ECM) (see, Bean [1981]). After some rearrangements, the following error correction model separates out the short-run and long-run effects.

[88] See, e.g., Bårdsen et al. [2001], Bond et al. [1999], Calderòn et al. [1999], Harris [1995, 2000], and Pesaran and Smith [1995] for further discussion on the long-run and short-run models and their implications.

[89] As a technical note, high R^2 but insignificant coefficients with low t-values could imply the possibility of multicollinearity.

$$\Delta Y_{it} = \beta_1 \Delta X_{it} - (1-\alpha_1)(Y_{i,t-1} - \hat{\theta}_0 - \hat{\theta}_1 X_{i,t-1}) + \varepsilon_{it} \tag{4.41}$$

where $\hat{\theta}_0 = \hat{\alpha}_0 / 1 - \hat{\alpha}_1$. This error correction model can specify the desired long-run target level of Y taking short-run and long-run effects into account. In the long-run equilibrium, $[Y_{i,t-1} - \hat{\theta}_0 - \hat{\theta}_1 X_{i,t-1}]$, one-period lagged value of the residual from regression (4.39) as an empirical estimate of the equilibrium error term, should be zero. If it is not, it means Y is not at target level and we are away from optimal point, which implies the existence of costly adjustment process. The speed of adjustment can be detected based on the information through the estimation of $(1-\alpha_1)$. It implies what proportion of the disequilibrium in Y in one-period is corrected in the next-period. If $(1-\alpha_1)$ tends to move toward unity, the adjustment process is speedy in order to correct for the disequilibrium. If $(1-\alpha_1)$ tends to move toward zero, then, the adjustment process toward long-run equilibrium is slow due to some substantial transaction costs.

GMM-DIF results in downward bias in the estimates of the coefficients under the conditions that α approaches unity and var(η)/var(v) increases. This downward bias is especially crucial for adjustment models in which the coefficient of lagged dependent variable has long-run implications with relevant elasticities. Thus, GMM-SYS is proposed, which combines levels equations using lagged first-differences as instruments with differenced equations using lagged levels as instruments. In this estimator, deviations of the initial conditions from their long-run values are assumed to be uncorrelated with their long-run values as affected by individual effects. It is important to note that as we can do levels-regression in this system GMM, one should control for the presence of unobservable (say, country-specific, firm-specific) factors by using *additional* instruments. In addition, we cannot use the error terms obtained from the *levels*-regressions for correlation tests as they contain individual effects.

4.8. CONCLUSION

It is known that the estimated coefficients of the fixed effects models are imprecise as such models cause substantial loss in variability and also the variables that lack any change overtime cannot be precisely estimated. The OLS procedure is relatively weak in panel data estimations in which there is inherent heterogeneity problem and estimated parameters are assumed to be stable through the time period. On the other hand, the estimations based on Within Groups and GLS Procedure are consistent only if the model contains neither lagged dependent variables nor endogenous independent variables, and the number of observations tend to infinity with fixed time-period. In the end, considering the problems of measurement errors, simultaneity bias and endogeneity, it can be argued that the GMM estimation technique can be regarded as the best methodology of our interest for the dynamic panel data models. The traditional practice in dynamic panel data models' estimations is to use GMM-DIF estimator in which the first-differences are taken to eliminate the time-invariant unobservable individual effects. Recent studies, however, show that using system GMM approach that combines the differenced equation with the level equation will result in more efficient estimates than does GMM-DIF. The reason can be attributable to the fact that GMM-SYS estimator overcomes the problem of weak instruments while under GMM-DIF estimator the information of the instruments decreases as the series become more persistent. In the end, this *system* GMM approach controls for the presence of unobservable firm-specific effects and the endogeneity of explanatory variables without eliminating valuable information.

"There is no universal theory of the debt-equity choice, and no reason to expect one".
Stewart C. Myers (2001)

5. CHAPTER 4: DETERMINANTS OF CORPORATE CAPITAL STRUCTURE

5.1. INTRODUCTION

Despite the accumulation of hundreds of capital structure papers written within over four decades after the pathbreaking paper of Modigliani and Miller [1958], the theory of capital structure has still been one of the most controversial issues in modern corporate finance theory. The controversy is mainly based on the idea whether optimal capital structure exists for the purpose of minimising weighted average cost of capital and maximising market value of the firms.

The M-M propositions assert that the market value of firms is independent of their capital structure and the expected rate of return on equity share increases as debt-equity ratio increases under some unrealistic assumptions. In their second corporate tax-corrected paper, Modigliani and Miller [1963] argue that firms may maximise their market value with a capital structure formed *only* by debt. These conditional propositions have led the finance researchers to work on this issue in a more realistic manner in order to discover, if any, the optimal financial decisions. Although there is no overall consensus, the general tendency seems to argue that optimal capital structure involves balancing the corporate tax advantages of debt financing against the present value of bankruptcy costs and agency costs. The empirical findings of this trade-off theory are somewhat conflicting. For instance, although Bradley et al. [1984] find no strong clear evidence, Trezevant [1992] obtains supportive empirical results for the theory. The existence of other components incorporating in a possible optimal capital structure, e.g., personal taxes and principal-agent conflicts, makes the debate even more complicated rather than mitigating it through both theoretical and empirical contributions (See Miller [1977], DeAngelo and Masulis [1980]).

The present paper aims to investigate the main *determinants* of capital structure with empirical evidence. In their survey paper, Harris and Raviv [1991] generalise the main findings of the existing literature of capital structure determinants. Financial leverage is *positively* related to non-debt tax shields, firm size, tangible assets and investment opportunities; and *negatively* related to bankruptcy probability, R&D and advertising expenditures, firm uniqueness in terms of production and profitability. Obviously, this generalisation is not homogenous enough as some conflicting empirical results prevail. Unfortunately, such comparisons have some shortcomings in the empirical literature because the time-periods, proxies for variables, the extent of data sets and the methodologies are different from each other. Consequently, in spite of the numerous papers based on the determinants of capital structure, it is still worth working on this issue. Because, as Berens and Cuny [1995] argue, we still do not know why the observed debt ratios of the firms are typically around 20 to 30 percent despite the tax advantage of debt financing. One must obtain the disadvantages of debt financing, which are probably outweighing aggregately this tax advantage. Thus, with further empirical analyses, it would be possible to shed light on this puzzling issue of corporate finance by reconciliating the present controversies.

In the literature, most of the empirical evidence is based on the financial data of US firms[90]. Obviously, the studies focusing on a single country cannot perceive the effect of diversity of cultural and economic factors on firms' financial policies. According to the tradition (e.g., Borio [1990], Mayer [1988,1990]), there is a distinction between Anglo-Saxon countries (USA, UK, and Canada) and other major economies (France, Italy, Japan and Germany) in the sense that the former are considered to have low-levered firms and the latter to have high-levered firms. Furthermore, agency costs and indirect bankruptcy costs tend to be higher in Anglo-Saxon countries, where there is lack of long-term relationship between firms and creditors and of long-term objectives of business management (See, e.g., Borio [1996], and Edwards and Nibler [2000]).

Further investigation on international capital structure seems necessary as some researchers (e.g., McClure et al. [1999], Wald [1999]) report significant differences in capital structure of firms in developed countries. In this international study, France, Germany and the UK were chosen, as they are supposed to represent satisfactorily different financial structures of their classes. The UK is in the classification of *Anglo-Saxon* tradition, where there are comparatively large numbers of publicly listed companies and occurrences of hostile takeovers for market for corporate control due to potentially large agency conflicts. Germany is in the classification of *Germanic* tradition (e.g., Austria, the Netherlands), where corporate decision making and restructuring are made through the involvement of universal banks and financial holdings and the capital

[90] The main international studies of capital structure are by Booth et al. [2001], McClure et al. [1999], Rajan and Zingales [1995], Rutterford [1988], Toy et al. [1974] and Wald [1999].

markets are not effective with relatively low amount of listed companies. Lastly, France is in the classification of *Latinic* tradition (e.g., Italy, Spain), where corporate ownership structure of the firms can be characterised by family control, financial holdings, state ownership and cross-shareholdings, and agency problems are internalised unlike in Anglo-Saxon tradition (See Moerland [1995]). Therefore, we believe that our international empirical evidence will analytically shed light on the impact of *institutional differences* (accounting and taxation systems, bankruptcy laws, corporate governance) across countries on capital structure choice of corporations.

It is apparent that factors influencing firms' capital structure change overtime. Hence, it would be necessary but not sufficient to examine only the different debt-equity ratios across firms. To explain time-varying observed difference in capital structure of firms is a further issue to be investigated[91]. It is important to understand whether corporations react to new circumstances that occur in financial markets. Another matter would be to identify how quick they are in adjusting themselves to random events towards their desired financing structure. Once lagged values of dependent and independent variables are incorporated into the model, a more complete picture of corporate behaviour dynamism can be achieved. Due to these reasons, we use dynamic panel data with the estimation method of Generalised Methods of Moments (GMM), which is believed to be most appropriate procedure for our purpose[92]. Furthermore, GMM methodology, which utilises appropriate instrumental variables, overcomes the problems of endogeneity, heteroscedasticity, normality, simultaneity and measurement errors, which are common for studies using firm-level data based on balance sheets.

Results reveal that there are considerable differences in financing patterns of corporations in France, Germany and the UK. It is found that firms, especially in France, tend to adjust their debt ratios quickly to attain their targeted capital structure. There are some findings common to all sample countries: The significantly negative association of leverage with profitability confirms the Pecking Order theory; earnings volatility has no significant impact upon firms' financing decisions; term-structure and share price

[91] Some celebrated studies, e.g., by Rajan and Zingales [1995] and Titman and Wessels [1988] do not focus on this issue, although they partially account for the leverage adjustment by taking the year-average of the explanatory variables. On the other hand, Fischer et al. [1989] and Jalilvand and Harris [1984] attempt first to study dynamic capital structure. Moreover, Marsh [1982] focuses on the deviations from long-term target debt levels. Recently, Hovakimian et al. [2001] examine whether firms adjust toward a target debt ratio reflecting the costs and benefits of debt financing proposed by static tradeoff models. As another recent study, Goldstein et al. [2001] design a model for dynamic capital structure in a theoretical framework, and they emphasise the weakness of static models.

[92] See, especially, Baltagi [1995] and Hsiao [1985] for the discussion of the benefits of the panel data.

performance are negatively associated with leverage. However, our findings related to firm size, fixed-assets ratio, tax rate, dividend payout ratio, market-to-book ratio and market equity premium have different influence upon leverage across countries. Hence, the results indicate that the institutions and the degree of agency and monitoring problems varying across countries may lead to different consequences in firms' capital structure. More importantly, contrary to conventional wisdom, we find that supposedly effective and strong German corporate governance seem to fail to mitigate agency problems and information asymmetries.[93]

5.2. CONSTRUCTION OF THE DETERMINANTS OF CORPORATE CAPITAL STRUCTURE AND THE UNDERLYING THEORIES

5.2.1. Proxies for Dependent Variable

In order to test the null hypothesis of Modigliani and Miller, which argues that capital structure is irrelevant in perfect capital markets, two relevant different definitions of capital structure were used as a proxy. First definition is *book-capital ratio;* Book Value of Total Debt to Book Value of Total Assets. Second one is *market-capital ratio;* Book Value of Total Debt to Book Value of Total Debt plus Market Value of Equity. With these commonly used main definitions, one can test whether capital structure is independent from any financial factors listed below considering market imperfections, i.e., whether capital structure is random and no variable is significant.

5.2.2. Proxies for Explanatory Variables

The attributes below have been predetermined in terms of their explanatory coherence in testing the existing theories of capital structure and appropriateness to compare our results with other empirical findings.

Although it is not easy to find exact proxies for the arguments discussed in the previous section, we argue that the present proxies covered in this empirical analysis have sufficient explanatory power to be taken into account. While analysing the empirical results, one should emphasise the fact that the nature of empirical studies of optimal capital structure differs in terms of time-period, firm characteristics, leverage definition, methodology and so forth.

[93] In fact, German-Japanese models of corporate governance seem to lose its arguments which favour them. Although such economies were performing better in 1980s than the Anglo-American ones, it happened to be the reverse case in 1990s. (The Economist: Survey; Global Equity Markets, 5 May 2001).

5.2.2.1. Lagged Dependent Variable

The inclusion of lagged dependent variable can have both short-term and long-term interlinks with other explanatory variables. It could be a benchmark to understand whether firms have optimal capital structure, and if any, the degree of divergence or convergence from (to) the target level may potentially be detected in the framework of adjustment costs. A recent study by Hovakimian et al. [2001] reveals that firms adjust their capital structure towards target debt ratios. Fama and French [2002] examine the capital structure models in the framework of the target leverage and mean-reversion leverage. Furthermore, Banerjee et al. [2000] argue that if the adjustment costs (legal fees, flotation costs etc.) are too high, then, dividend policy can be used to change the current capital structure without transactions in capital markets. MacKie-Mason [1990b] argues that firms targeting high debt ratios will have high lagged leverage. In this study, if the lagged coefficient is statistically significant, positive and below unity, then, one can conclude that firms tend not to change capital structure overtime. If it is greater than one, it implies firms do not have a target debt-equity ratio.

5.2.2.2. Profitability

The level of profitability of a firm indicates the amount of earnings to finance its investment opportunities and to be distributed to shareholders as a past performance. According to the Pecking Order Theory (POT) (Myers [1984], Myers and Majluf [1984]), firms finance their investment first internally by their retained earnings, then by debt if retained earnings are not enough, and equity as a last resort when there are borrowing limits. That is, as greater availability of internal capital is acquired by more profitability, one should expect a *negative* relationship between leverage and profitability as being the proxy for internally generated funds. This theory does not assume an optimal debt-equity ratio since there are two types of financing; internal at the top and external at the bottom of the hierarchy.

This inverse relation is also confirmed by Rajan and Zingales [1995]. They further argue that if debt is used mostly among alternatives and if dividends and investment are fixed in the short-run, leverage and profitability should again be negatively correlated. Moreover, Jordan et al. [1998] test the POT and find no supportive evidence for this hypothesis in general. As small and medium-sized enterprises (SMEs) have restricted access to financial capital markets, however, they argue that capital structure of SMEs is consistent with a pecking order approach to financial structure.

On the other hand, Free Cash Flow Theory (Jensen [1986]) argues that debt reduces agency costs of free cash flow in excess of required funding for investment. An increase in the debt ratios of profitable firms can be a quality signal to the market due to information asymmetries. In addition, debt financing make sure the management disciplined in giving efficient investment decisions and not pursuing individual objectives due to bankruptcy probability (Grossman and Hart [1982], Harris and Raviv [1990], Williamson [1988]). Therefore, these arguments imply that there should be a positive association between leverage and profitability, which contradicts the findings by Kester [1986], Rajan and Zingales [1995], and Titman and Wessels [1988]. We define profitability as operating income (earnings before interest, taxes, and depreciation; EBITD) to total assets.

5.2.2.3. Non-Debt Tax Shields

Modigliani and Miller [1963] state that the main incentive for external borrowing is the tax advantage of interest payments. In their analysis, DeAngelo and Masulis [1980] argue that the existence of non-debt tax shields such as depreciation deductions, depletion allowances can be sufficient to reject the theory of capital structure irrelevance. They further argue that, tax deductions for depreciation and investment tax credits can be considered as substitutes for tax benefits of debt financing. These features lead to market equilibrium, where each firm has an interior optimal leverage. Accordingly, firms with higher amount of non-debt tax shield will have lower debt levels. It implies that non-debt tax shields are *negatively* related to debt ratios since tax advantage of debt diminishes in this case. On the other hand, in their empirical analysis, Bradley et al. [1984] find a positive relationship between leverage and non-debt tax shields as contradicting the theory. They explain this contradiction by arguing that non-debt tax shields are an instrumental variable in securing assets of the firms; i.e., more securable assets may increase the debt ratio. We measure the non-debt tax shields by the ratio of depreciation to total assets to examine its effect on capital structure.

5.2.2.4. Effective Tax Rate

If we relax the assumption of M-M theory that corporate tax rate is zero and do not consider Miller's [1977] neutrality argument, we expect that firms having higher tax liabilities will use higher amounts of debt in order to benefit more from tax advantages of debt financing. Goldstein et al. [2001] show that in a dynamic framework tax advantages to debt increase significantly when firms have the option to increase future debt levels. Therefore, there is a *positive* relationship between effective tax rate and debt ratio (Haugen and Senbet [1986], Swoboda and Zechner [1995], Taub [1975], Zimmerman [1983]). Yet, this is true if firms have sufficient amount of taxable income. Another argument follows that the higher the corporate tax rate, the less is the firm's internal funds and the higher the cost of capital. Then, *ceteris paribus*, the fixed capital formation and the demand for external funds tend to decrease (Kremp et al. [1999]). In this case, although it is believed that taxes should have influence upon corporate financing decisions, the overall relationship between tax rate and leverage is ambiguous due to the complexities.[94] The ratio of total tax charge to total taxable income is used as a proxy for effective tax rate of the corporations in this analysis.

5.2.2.5. Market-to-Book Ratio

This factor can be useful in measuring investment opportunities, proxy for intangible assets, of a firm since it can be regarded as extra value retained by investors into firm value. Whether the investment project will be successful in the future with positive-NPVs concerns the creditors, which in turn pushes the market-to-book ratios upward in the capital markets as higher quality projects will be preferred more. Johnson [1997], thus, suggests that the firms having high market-to-book ratios will probably have lower liquidation costs. In addition, Ozkan [1998] uses this ratio as a proxy for the expected liquidation costs. Generally, higher market-to-book ratios follow high growth options.

Johnson [1997] highlights the problem of *asset substitution* in this conjuncture since the growth opportunities related to market-to-book ratios are deemed as intangibles in the sense that firms with proportionately more collateralisable tangible assets for secured debt would experience some difficulties in shifting to riskier projects. Rajan and Zingales [1995] discuss two main reasons for why there should be a *negative* relationship between market-to-book ratio and financial leverage according to the theory. First, it is expected that as the market-to-book ratio increases, so does the cost of financial distress. Second, firms prefer to issue equity when they think that the stock has been overvalued relative to its book value or earnings. In fact, Hovakimian et al. [2001] argue that, if stock price is low relative to its earnings or book value, manager are reluctant to issue equity as it decreases book value or earnings per share. According to Ozkan [1998], higher growth opportunities for firms would mean higher expected liquidation costs, then, debt ratios would negatively associated with expected liquidation costs. Furthermore, Maksimovic et al. [1999] find that firms in a high (low)-growth industry have low (high) debt ratios due to market imperfections of external finance and information acquisitions. Titman and Wessels [1988]

[94] In fact, many studies, e.g., Ang and Peterson [1986], Bradley et al. [1984], Fischer et al. [1989], Titman and Wessels [1988] cannot find significant corporate tax effects on financial decisions.

contend that firms with greater growth opportunities suffer more from suboptimal investment policies as high debt financing causes wealth expropriation from bondholders to shareholders. What is more, this variable can be used as a proxy for underinvestment problem and agency costs, where Myers [1977] argues that firms with growth opportunities should use less debt in order to mitigate these problems. Thus, the expected relationship between market-to-book ratio and debt ratio is negative.

However, one can argue that faster growing firms are less likely to be financially constrained due to their higher expected future profits. Furthermore, it is likely that such firms need excessive external financing for their investment opportunities. In this case, market-to-book ratio is positively associated with leverage (see, Kremp et al. [1999]). We define this ratio as the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets.

5.2.2.6. Fixed Assets Ratio

As the value of intangible assets disappears in case of bankruptcy, the presence of tangible assets is expected to be sufficiently important in external borrowing as it is easy to collateralise them because of their credible characteristics (see, e.g., Harris and Raviv [1991] and Titman and Wessels [1988]). It is possible that issuing equity can be costly when the (insider) agencies have better information than outside shareholders. Thus, Myers and Majluf [1984] argue that selling secured debt would be advantageous for the firms. By this way, it can be possible to reduce agency costs since the debts secured with known tangible assets, which have alternative redeployable uses in defaults, will avoid these costs. Furthermore, according to Stulz and Johnson [1985], a firm's opportunity to engage in asset substitution is reduced by secured debt. For firms having more intangible assets, the costs to controlling capital outlays would be higher as its monitoring is more difficult to tackle with. Asset structure is important in case of liquidation in that tangible assets of insolvent firms are valued more than in intangible assets (Alderson and Betker [1995], Shleifer and Vishny [1992]). Similarly, Detragiache [1994] and Johnson [1997] argue that it is more difficult for firms holding secured debt to shift to riskier projects if they have more tangible assets. In that sense, the creditors, e.g., banks, might bring restrictions to the firms having relatively more intangible assets whilst supplying debt for their financing. As Scott [1977] asserts that a firm will issue as much secured debt as possible for its optimal capital structure, the general discussion converges to conclude that there is a positive relationship between debt ratio and fixed asset ratio. We define the fixed assets ratio as the ratio of net tangible assets to total assets to capture its potential association with leverage.

5.2.2.7. Size

In general, larger firms are more diversified and faces lower probability of bankruptcy, and thus may have higher debt capacity. Fama [1985] argues that the information content of small and large firms is not the same regarding the monitoring costs, which are relatively higher for small ones. Thus, well-diversified large firms are expected to have easier access to financial borrowing in the capital markets. Titman and Wessels [1988] explain the reason for the logarithmic transformation of sales; if it exists, size effect should mainly concern the very small firms. Numerous studies argue that size can be a powerful explanation for cross-sectional differences in debt-equity ratios (Johnson [1997], Marsh [1982], Michaelas et al. [1999]). It is generally accepted that size may be an inverse proxy for the probability of bankruptcy (Rajan and Zingales [1995], Warner [1977]). This is based on the idea that direct bankruptcy costs should not be neglected in determining the value of the small firms. Since the probability of bankruptcy is inversely related to size, such costs might not be effective for large firms whilst borrowing debt (Warner [1977], Ang et al [1982]). It follows that (more diversified) large firms can borrow more than small firms as they have low risk of default. In that sense, size is positively related to leverage. Yet, Rajan and Zingales [1995] state that if the costs of financial distress are low, this positive relationship should not be strong[95]. In the context of asymmetric information, another argument states that large firms should have low debt ratios as issuing informationally sensitive equities would be more appropriate for them. Johnson [1998] confirms this by reporting a negative relationship between debt-ratio and size.

On the other hand, one can think that size is also related to the cost of issuing equity and debt, then, the cost of issuing equity can be too high for small firms considering the capital market accessibility and economies of scale restrictions (Smith [1977], Marsh [1982]). Hence, it is possible that smaller firms rely on their internal sources or bank loans due to lack of maximum debt usage. In addition, Jordan et al. [1998] provide an alternative argument about agency theory by saying that 'equity-controlled firms have a tendency to invest suboptimally to expropriate wealth from the bondholders, and thus agency costs are higher for the firms in growing industries. Although its relation to leverage is not sufficiently straightforward as well as the accuracy of proxy, size is generally agreed to be positively associated with debt. To capture the size effects on the capital structure of

[95] In fact, Chung [1993], Ferri and Jones [1979], and Kim and Sorensen [1986] cannot find a strong association between size and leverage.

firms, two alternative definition of the size of firms can be used; the logarithm of total sales or logarithm of total assets as a proxy.

5.2.2.8. Earnings Volatility

Corporations with high earnings volatility carry a risk of earnings level dropping below the level of their debt service commitment. This may result in arranging funds at high cost to service the debt or face the risk of bankruptcy. On the other hand, companies financed by equity may choose not to pay dividend during the period of financial difficulties. Therefore, firms with highly volatile earnings borrow the least and prefer equity to debt. This suggests an inverse relation between earnings volatility and leverage ratio. However, the potential cost of failing to service debt depends upon the source of debt and the relationship of the firm with its lender. A close relation between the firm and its lender reduces such costs. The cases of German firms fall in this category as they have close ties with the banks. Therefore, the effective cost of failing to service debt is expected to be relatively low for German firms. On the other hand, British firms raise loan capital from capital markets and have arms-length relations with lenders. Therefore, the cost of failing to service market debt is high. For these reasons, the British firms are expected to be more concerned with earnings volatility than their German counterparts while deciding their capital structure. We measure earnings volatility as the first-difference of earnings minus average of the first-differences.

5.2.2.9. Dividend Payout Ratio

In most empirical studies of capital structure, dividend policies of firms have not been taken into account. However, in a world with market rigidities (e.g., taxes, agency conflicts, information asymmetries) one may expect the relevance of dividend policy to firm value and capital structure decisions. In fact, Miller and Rock [1985] show that dividend and financing policies are closely related. Boyle and Eckhold [1997] demonstrate that firms with high payout ratios will also have high debt ratios in their capital structure if capital gain taxes are higher than dividend income taxes. It is because, in this case, higher payout ratio would mean higher tax rate on total stock returns. Consequently, cost of equity relative to debt rises due to the extra premium required by shareholders, which discourages the use of equity and thus increases leverage.

A change in dividend payout ratio of a firm may have implications about its expected future income stream. An increase in payout ratio may either signal the absence of future growth opportunities to invest or abundant future cash flows sufficient to meet debt payments without having liquidity problems. Low dividend payout ratio may imply high growth opportunities of immature firms and therefore low debt ratios due to potential agency conflicts. Accordingly, one may expect a *positive* correlation between leverage and payout ratio.

Myers and Majluf's [1984] pecking order theory suggests that debt should be preferred to equity due to more informationally-sensitive equity. However, assuming that paying dividends signals the forthcoming of future earnings, the 'lemons' premium associated with equity may be curtailed by increasing payout ratio. This in turn implies a *negative* relation between leverage and payout ratio due to being able to employ more equity in the capital structure.

In Bhattacharya's [1979] model, a possible optimal dividend policy is implied: Paying dividends is assumed to be a positive signal and this benefit can be traded-off against the tax disadvantage of dividends relative to capital gain taxes. If a firm is issuing debt and paying dividends at the same time, this may convey different signal than if it is only paying dividends. One interpretation could be that there are substantial agency costs of free cash flows. This is discussed by Jensen [1986] who argues that it is better for firms lacking future investment opportunities and having free cash flows to pay more dividends. In a related framework, Rozeff [1982] suggests a negative relationship between leverage and payout ratio. He proposes an optimal dividend policy by trading-off the issuance costs of debt against the benefits of mitigating agency costs through increased payout ratio.

Debt contracts (especially long-term) generally restrict firms to pay cash dividends by setting certain limits. This is because of the bondholders' agency-problems concerns stemming from the high payout ratios. Thus, this argument implies that leverage and payout ratio should be negatively correlated.

Unlike in France and Germany, corporate share ownership is dominated by institutional investors (e.g., pension funds) in the UK. As discussed in Short et al. [2002], institutions in the UK require certain levels of dividends apart from capital gains to meet their liabilities. It is criticised that UK institutional shareholders have short-term objectives and prefer higher amount of tax-advantaged dividend payments. Not surprisingly, UK firms have the highest average payout ratios among our sample countries. Institutional shareholders may force managers to pay out dividends due to agency costs of free cash flows. They may also do so in order to let the capital markets monitor the company when managers require external financing. If paying dividends disciplines the management, there remain fewer roles for the debt to do the same job. Thus, one may expect a *negative* relationship between leverage and payout ratio in the UK. This is especially valid if the flotation costs of debt issuance is considerable. In France and especially in Germany, corporate ownership is not dispersed as many firms are held by large shareholders. In this case, the scrutiny of management by capital markets is less needed since large shareholders may monitor firms instead without resorting to high dividend payments for signalling purposes. As a consequence, at least we can say that the expected relation between leverage and payout ratio in France and Germany may be non-negative.

Germany has operated two-rate taxation system since 1977. Currently, corporate tax rate on dividends is (30 %), which is less than that on retained earnings (45 %). Thus, according to the tax arguments, *ceteris paribus*, leverage and payout ratio should be positively correlated. France and the UK have similarities with respect to the taxation system in which double taxation of shareholders' income is mitigated by an imputed tax credit. In France, there is a standard rate for both types of taxable income, which is currently 33.3 %. However, shareholders receive a tax credit of 50 % of the dividend income. In the UK, tax-exempt shareholders prefer dividends to retentions contrary to the higher rate taxpayers who prefer retentions (see, e.g., Short et al. [2002]).

After all, the direction and significance of this association depend on the entire impact of information asymmetries, agency costs and tax bias towards paying dividends, which is an empirical issue. We measure payout ratio as dividends to net income.

5.2.2.10. Control (Market-related) Variables

5.2.2.10.1. Equity Premium

Equity premium measures the cost of equity in relation to the return on risk free investment. Evidence shows that the equity premium varies over time. Higher equity premium causes higher cost of equity capital. Thus, if a firm requires external capital during the period of high equity premium managers are likely to opt for debt than for equity. This implies a positive relationship between leverage ratio and equity premium. On the other hand, if the observed high equity premium is due to bullish stock market (stocks are overvalued), managers are likely to issue equity. This implies an inverse relation between equity premium and leverage. Therefore, the nature of the effects of equity premium on leverage is dependent on the source of change in equity premium. In order to allow for decision time we use six-month lagged equity premium.

5.2.2.10.2. Term-structure of Interest Rates

Despite the tax savings on interest, higher interest rates cause higher weighted average cost of capital resulting in a decline in the value of the firm. As the interest on loan is a relatively long-term fixed commitment, firms do not prefer to raise loan capital when the market rate of interest is high. Moreover, firms with higher interest commitments face higher risk of bankruptcy if the earnings level drop below the level of interest liability. Such liability increases with the increase in the rate of interest. Hence, managers are likely to consider the market rate of interest while deciding the capital structure. Since the term-structure of interest rates contains more information than the rate of interest on a particular type of financial asset, we include the term-structure as an explanatory variable in the model and expect an inverse relationship between this variable and financial leverage ratio in all countries. This variable is also measured with a six-month lag.

5.2.2.10.3. Share Price Performance

It is generally argued that managers choose to issue equity after share price increase. In fact, Marsh [1982] states that in choosing between debt and equity, firms are heavily affected by the past history of stock prices and market conditions. As explained by POT, information asymmetry between managers and outside investors forces managers to sell the equity at a discount. Managers offer such discount when the benefit of raising external equity capital outweighs the cost of discount. When shares are overvalued discount could be offered without any loss in the wealth of existing shareholders. This is possible if equity is issued after a share price increase. This suggests an inverse relationship between the increase in share price and leverage ratio. However, such an inverse relationship with market-leverage may be observed due to artificial statistical distortions as the market value of equity increases with the change in market price even if there has not been any further equity issue. Yet, book leverage should remain independent of this statistical relationship. These two taken together should be able to reveal the cause and nature of the relationship between leverage and change in share price. We use annual price change to account year-end of the firm.

5.3. ANALYSIS OF THE DATA SET

5.3.1. Construction of Variables

All the relevant data have been retrieved from *Datastream International* (DI) database, which is useful to get both accounting data and market data. The steps in the construction of panel data are as follows. First of all, in order to avoid the *survivorship bias*, dead firms for which both market and accounting data are available were also included in the database. The number of *dead* companies recorded in DI as of 20.06.2001 are 1133 for France, 2362 for Germany, and 3667 for the UK. In addition, the number of publicly traded domestic firms having company accounts data in DI are 418 for France, 832 for

Germany, and 1604 for the UK. The number of remaining non-financial corporations from the combination of dead and current firms is 1235 for France, 1590 for Germany, and 3153 for the UK.

Consequently, we have eliminated the firms in financial sectors[96]. It is because the financial structure of such firms cannot systematically be compared to non-financial firms due to their nature of debts and quasi-debts outstanding and that of investors. Obviously, the firms having any missing data for any of the Datastream items during the sample period have been excluded from the data set. Clearly, the observations either contradicting the definition of variables or taking quite extreme values have been considered as outliers and dropped from the data set. For the purpose of studying dynamic panel data structure, the firms not having at least three *continuous* time-series observations during the period have been excluded. Eventually, we were left with 359 firms from France, 565 firms from Germany and 2417 firms from the UK fitting best to our data set. The panel data set is unbalanced in the sense that there are more observations on some firms than on others[97]. For all countries, size variable proxied by total assets or total sales in local currency have been deflated by Producer Price Index (PPI) taking the earliest year as the base year, which is 1969, 1983 and 1987 for the UK, France and Germany, respectively.

5.3.2. Descriptive Statistics

With respect to the both definitions of leverage (book; market), Table 5.1 reveals that while French firms have the highest leverage ratios (23.2 % ; 31.1 %), the UK firms have the lowest debt-ratios (16.7 % ; 24.4 %), and German firms are in between (19.7 % ; 25.2 %)[98]. This fact confirms the conventional classification of continental European countries (France, Germany) as being a highly-levered countries and of the Anglo-Saxon countries (United Kingdom) as being a low-levered countries (See, for example, Borio [1990]). The results are also in line with what Guenther and Young [2000] and Kneeshaw [1995] report. The highest ratios in France confirm the idea that family-controlled firms, which are common in this country, tend to have relatively high debt ratios. Similarly, lowest ratios in

[96] The firms in the following Datastream sectors were excluded: Consumer-Mining-Mortgage Finance, All Banks, Investment Trusts, Unit Trusts, Property Agencies, Asset Managers, Life Assurance, Insurance, Real Estate Holding &Development, Real Estate Investment Trust. See Appendix for further explanations.

[97] For full details, see Table 5.A1 in the Appendix.

[98] These figures can be compared with the same leverage definitions of Rajan and Zingales [1995]. They also find that French firms have the highest debt-ratios (26%, 23%) while German (20%, 16%) and British (21%, 16%) firms have almost the same ratios.

Table 5.1: Descriptive Statistics for France, Germany and the United Kingdom.

FRANCE	Mean	Median	Std. Dev	Kurtosis	Skewness	Minimum	Maximum
LEV1	0.2321	0.2198	0.1446	0.4392	0.6157	0.0000	0.9985
LEV2	0.3106	0.2737	0.2276	-0.4271	0.6187	0.0000	0.9968
PROFIT	0.1144	0.1101	0.0969	43.9620	-2.6324	-1.4142	0.9935
ETR	0.3123	0.3538	0.4363	60.5760	2.6000	-3.9682	6.5758
MBR	1.5725	1.2219	1.1569	49.0590	5.4343	0.3968	20.602
FAR	0.2303	0.2040	0.1558	1.8161	1.1628	0.0016	0.9855
SIZE	14.8403	14.8525	1.9284	0.1192	-0.1489	5.2407	20.5264
NDTS	0.0483	0.0406	0.0378	22.894	3.5126	0.0001	0.5467
EARNV	1.2365	0.3074	4.6324	199.074	12.6348	0.0004	94.674
DIVID	0.1093	0.2353	3.2818	195.290	-8.2583	-66.896	51.768
CHSHP	0.0940	0.0781	0.4094	2.6823	0.0906	-2.3535	2.3690

GERMANY	Mean	Median	Std. Dev	Kurtosis	Skewness	Minimum	Maximum
LEV1	0.1973	0.1494	0.1880	0.4019	0.9746	0.0000	0.9996
LEV2	0.2519	0.1798	0.2479	-0.2054	0.8806	0.0000	0.9942
PROFIT	0.1171	0.1172	0.1316	63.818	-2.1810	-2.9200	1.7416
ETR	0.3931	0.4495	1.0381	113.26	-0.3143	-16.467	16.638
MBR	1.9219	1.3018	3.7442	254.49	14.0100	0.2536	93.883
FAR	0.3353	0.3017	0.2041	0.5071	0.8494	0.0000	0.9985
SIZE	12.3946	12.438	2.3296	0.6298	-0.2775	1.2306	19.402
NDTS	0.0608	0.0540	0.0474	16.4930	2.5279	0.0000	0.7070
EARNV	5.9120	0.5320	69.171	624.4	22.7510	0.0000	2694
DIVID	0.2992	0.0990	11.414	413.168	-1.7404	-301	272.66
CHSHP	0.0046	0.0000	0.3441	4.4444	0.3460	-2.2276	2.7783

UK	Mean	Median	Std. Dev	Kurtosis	Skewness	Minimum	Maximum
LEV1	0.1674	0.1515	0.1368	2.4206	1.1689	0.0000	0.9948
LEV2	0.2438	0.1891	0.2212	0.2243	0.9531	0.0000	0.9991
PROFIT	0.1238	0.1295	0.1322	572.39	-13.4690	-6.8947	1.0557
ETR	0.3586	0.3601	0.5449	473.63	-3.4540	-18.5	18.43
MBR	1.4872	1.1122	1.6339	187.5	10.5780	0.1318	48.143
FAR	0.3489	0.3118	0.2040	0.3003	0.8144	0.0000	0.9921
SIZE	9.0331	8.8623	1.8970	0.7053	0.1656	0.1174	16.224
NDTS	0.0356	0.0303	0.0263	45.593	3.8377	0.0000	0.8237
EARNV	1.6490	0.3280	21.166	14343	104.732	0.0000	3094
DIVID	0.4000	0.3626	3.2077	359.291	2.1072	-94.25	98.6
CHSHP	0.0549	0.0700	0.4658	3.3877	-0.3385	-4.0134	3.3032

Book-leverage (LEV1) is the ratio of book value of total debt to book value of total assets. Market-leverage (LEV2) is the ratio of book value of total debt to market value of equity plus book value of total debt. Profitability (PROFIT) is the ratio of operating profit to book value of total assets. Effective Tax Rate (ETR) is the ratio of total tax charge to total taxable income. Market-to-Book Ratio (MBR) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. Fixed Asset Ratio (FAR) is the ratio of net tangible assets to book value of total assets. SIZE is the natural logarithm of total sales. NDTS is the ratio of depreciation to total assets. Earnings Volatility (EARNV) is the first-difference of earnings minus average of the first-differences. Dividend payout ratio (DIVID) is ordinary dividends to net income. Change in share price (CHSHP) is the difference between share prices at times [t] and [t-1] to share price at time [t-1]. The number of observations (firms) is 3171 (359), 6033 (565), 34957 (2417) for France, Germany and the UK, respectively.

the UK, where there is dispersed share ownership, verify the idea that concentrated corporate ownership structure tends to be accompanied with higher leverage[99].

On the other hand, the standard deviation of both types of debt-ratios is highest in Germany and lowest in the UK. Thus, one could state that the capital structure varies most (least) across German (UK) firms. Moreover, the highest profitability ratios (return on assets) and the highest volatility in earnings pertain to the British firms, and German firms are once more in the middle case in both respects. This finding justifies the traditional idea that Anglo-American firms are more profitable and have more volatile profits than the continental European firms (see, e.g., Glaum [2000]).

Based on the descriptive statistics of countries in each year, the following pronounced differences come into the view[100]. There seems a decreasing trend in the debt ratios of French firms over the period with respect to Leverage2 but Leverage1 remains relatively stable. The figures show that Leverage1 is highest in 1984 with 26.4 % and lowest in 1987 with 21.2 %, and Leverage2 is highest in 1983 with 47.3 % and lowest in 1999 with 24.0 %. The decreasing trend in Leverage2 tends to imply that France is moving towards market-oriented system as net increase in equity outweighs net increase in debt. But it may also be due to the increased bankruptcy risk, higher real interest rates, reduction in tax benefits of debt (see, Cobham and Serre [2000]). On the other hand, there is an increasing trend in German firms' debt-ratios for both types. (Leverage1 is lowest in 1987 with 13.7 % and highest in 1999 with 21.3 %; Leverage2 is lowest in 1989 with 18.2% and highest in 1996 with 29.5 %). This upward trend could indicate that German firms have been using more debt relative to equity issuance, which may emphasise the bank-oriented structure of Germany.

As for the UK, Leverage1 is relatively stable during the period but it tends to increase slightly, it takes its lowest value in 1978 with 13.6 % and the highest value in 1999 with 20.1 %. However, Leverage2 is unstable which ranges from 15.7 % in 1987 to 45.0 % in 1974. Yet, unlike in Germany, the overall trend is downward implying the dominance of equity over debt financing in a market-oriented country. The instability of Leverage2 is basically due to its definition as its denominator includes market value of equity. Consequently, the initial impression seems to reveal that the capital structure of firms in

[99] New debt is preferred to new equity in order to minimise the dilution of ownership stake, to benefit from controlling corporations, and to prevent potential hostile takeovers, which are not common in France and Germany. See Kim and Sorensen [1986], and Stulz [1988] for further discussion.
[100] See Tables 5.A2, 5.A3 and 5.A4; and Figures 5.A1, 5.A2 and 5.A3 in the appendix for details.

these countries is different in terms of both the magnitude and the tendency to change overtime.

5.3.3. Correlation Matrix

According to Table 5.2., leverage is negatively associated with profitability in all countries, irrespective of its definition. This finding is predicted by the Pecking Order theory. The significantly positive correlation between leverage and non-debt tax shields in France is inconsistent with the prediction of DeAngelo and Masulis [1980]. The significantly negative relationship between leverage and effective tax rate in all countries is not in line with the theory. The association between leverage and market-to-book ratio is significantly negative in all cases, which is again predicted by the theory. In all countries, there is a positive and significant relationship between leverage and fixed asset ratio, which, again, confirms the theory. Finally, the theory is also successful in predicting the positive and significant relationship between leverage and size in France and in the UK. At this stage, although not being substantial, the statistics show that there are some differences in these countries with respect to the association between debt-ratios and the capital structure determinants.

Table 5.2: Correlation Matrix for France, Germany and the United Kingdom.

France	*LEVER1*	*LEVER2*	*PROFIT*	*NDTS*	*ETR*	*MBR*	*FAR*	*SIZE*
LEVER1	1							
LEVER2	0.7002*	1						
PROFIT	-0.1010*	-0.2110*	1					
NDTS	0.0719*	0.0568*	0.3179*	1				
ETR	-0.0730*	-0.056*	0.1557*	-0.0066	1			
MBR	-0.2060*	-0.469*	0.1614*	-0.0324	-0.0038	1		
FAR	0.3251*	0.2443*	0.1213*	0.3192*	-0.049**	-0.1732*	1	
SIZE	0.1192*	0.3072*	0.0438**	-0.0793*	0.0509**	-0.2188*	0.1456*	1
Germany	*LEVER1*	*LEVER2*	*PROFIT*	*NDTS*	*ETR*	*MBR*	*FAR*	*SIZE*
LEVER1	1							
LEVER2	0.791*	1						
PROFIT	-0.0993*	-0.154*	1					
NDTS	-0.031**	-0.031**	0.3901*	1				
ETR	-0.0178	-0.032**	0.1217*	0.0514*	1			
MBR	-0.1003*	-0.192*	-0.050*	-0.0615*	0.0001	1		
FAR	0.2316*	0.1775*	0.1162*	0.4115*	0.0428**	-0.046**	1	
SIZE	-0.0742*	0.1341*	0.0985*	0.0964*	0.0276	-0.2549*	-0.029	1
UK	*LEVER1*	*LEVER2*	*PROFIT*	*NDTS*	*ETR*	*MBR*	*FAR*	*SIZE*
LEVER1	1							
LEVER2	0.7017*	1						
PROFIT	-0.146*	-0.178*	1					
NDTS	0.0415*	-0.049*	0.1091*	1				
ETR	-0.071*	-0.014	0.1125*	-0.0190	1			
MBR	-0.066*	-0.313*	-0.094*	0.0855*	-0.0540*	1		
FAR	0.1725*	0.1086*	0.0577*	0.283*	-0.016	-0.1151*	1	
SIZE	0.1708*	0.1676*	0.2166*	0.0049	0.0661*	-0.1356*	0.0729*	1

The statistics reported here are the **Pearson** correlation coefficients between the variables used in the analysis. Not all variables are included in the matrix. (*) and (**) represent that the correlation coefficient is significant at 1 percent level and 5 percent level, respectively. See Table 5.1 for variable definitions.

5.4. EMPIRICAL ANALYSIS

5.4.1. THE MODEL

For the purpose of having more complete dynamic specification which allows the possibility of AR-process of the stochastic term and of adjustment costs effects, consider equation (5.1)[101]. This autoregressive distributed lag model (ARDL) is not estimated only in a first-differenced equation due to superiority of GMM-SYS estimator over GMM-DIF estimator, which is discussed in detail in terms of methodology comparisons in the previous chapter.

[101] See Devereux and Schiantarelli [1990] for a coherent discussion of this issue. Furthermore, Rajan and Zingales [1995], and Titman and Wessels [1988] lag the independent variables indirectly by taking their average of past values to control for potential reverse causality between dependent and independent variables.

$$Y_{(it)} = \lambda_1 Y_{i(t-1)} + \sum_{k=2} \lambda_k X_{kit} + \sum_{k=2} \lambda_k' X_{ki(t-1)} + \eta_i + v_{it} \quad (5.1)$$

for i =1,..., N and t =2,..., T (N is large and T is fixed); $|\lambda_1| < 1$; and $\omega_{it} = \eta_i + v_{it}$ is the standard fixed effects decomposition of the error term. As discussed by Blundell and Bond [1998], this has the corresponding common factor restricted form, where $\lambda_k = -\delta \lambda'_k$. In the end, our general dynamic model for the empirical study of capital structure is as follows (subscript-i stands for firm-*i*; β's are the unknown parameters to be estimated and ω_t is the disturbance term):

$$\begin{aligned} LEVERAGE_{it} = {} & \beta_1[LEVERAGE]_{it-1} \\ & + \beta_2[PROFITABILITY]_{it} + \beta_3[PROFITABILITY]_{it-1} \\ & + \beta_4[NON\text{-}DEBT\ TAX\ SHIELDS]_{it} + \beta_5[NON\text{-}DEBT\ TAX\ SHIELDS]_{it-1} \\ & + \beta_6[EFFECTIVE\ TAX\ RATE]_{it} + \beta_7[EFFECTIVE\ TAX\ RATE]_{it-1} \\ & + \beta_8[MARKET\text{-}TO\text{-}BOOK\ ]_{it} + \beta_9[MARKET\text{-}TO\text{-}BOOK\ ]_{it-1} \\ & + \beta_{10}[FIXED\ ASSETS\ RATIO]_{it} + \beta_{11}[FIXED\ ASSETS\ RATIO]_{it-1} \\ & + \beta_{12}[SIZE]_{it} + \beta_{13}[SIZE]_{it-1} + \omega_{it}. \end{aligned} \quad (5.2)$$[102]

Furthermore, in order to investigate the existence of target debt level in the framework of adjustment costs, the following procedure will be used. Assume that desired target debt-ratio, $LEVERAGE^*_{it}$, is determined by several explanatory variables, x_s.

$$LEVERAGE^*_{it} = \sum_{k=1} \psi_k x_{kit} + \omega_{it} \quad (5.3)$$

where ω_{it} is disturbance term serially correlated with mean zero and possibly heteroscedastic, and ψ_k's are estimable unknown parameters which are common to each firms. The model assumes that firms adjust their current debt-ratios, $LEVERAGE_{it}$, with the degree of adjustment coefficient "θ" to attain the desired capital structure.[103]

$$LEVERAGE_{it} - LEVERAGE_{it-1} = \theta(LEVERAGE^*_{it} - LEVERAGE_{it-1}), \quad (5.4)$$

If θ =1, then, the actual change in debt ratio will equal to the desired change and firms will have a complete adjustment with zero transaction costs, being in equilibrium. If θ = 0, however, there will not be any change due to unaffordable high transaction costs and firms will set their current debt-ratios to the past level, $LEVERAGE_{it-1}$.

[102] In the next section, for the sake of simplicity, we will estimate the model (5.2) with only the stated variables here in order to compare the methodologies. Later, the model will be extended by including more variables.
[103] See Miguel and Pindado [2001], and Özkan [2001] who also use this model.

Substituting (5.3) into (5.4), we get the following equation:

$$LEVERAGE_{it} = (1-\theta)LEVERAGE_{it-1} + \sum_{k=1} \theta\psi_k x_{kit} + \theta\omega_t \tag{5.5}$$

This adjustment model assumes that θ lies between zero and unity due to the existence of transaction costs. If the cost of being in disequilibrium is higher (lower) than the cost of adjustment, θ, which is inversely proportional to transaction costs, tends to unity (zero).

What is more, as we want to compare the alternative methodologies, our model (5.2) will be estimated by OLS, Anderson-Hsiao Instrumental Variable technique, GMM-differences and GMM-level estimation procedures.

It is known that some industries are identified by high leverage (e.g., capital-intensive manufacturing firms, utilities) and some by low leverage (e.g., hi-tech companies, mining companies)[104]. As it is expected that industry effects can also be important in determining capital structure of the firms, we have included industry dummy variables to the analysis to control industry-specific effects[105]. Obviously, the existence of such effects can only be investigated through the models in levels, not in differences. In this context, Jordan et al. [1998] argue that industry effects are not important in explaining capital structure of small firms. They propose, on the other hand, small and medium-sized firms will not be able to borrow more if they are diversified more with the engagement of different industrial sectors. This is because financial sources (e.g., banks) are more willing to lend when the firm is occupied with well-known industrial activities. In addition, Ferri and Jones [1979] emphasise the statistical relationship between relative debt structure class and generic industry class. Harris and Raviv [1991] also account for the industry classification by commenting that 'firms within an industry are more alike than those in different industries, and that industries tend to retain their leverage rankings overtime'. What is more, in order to control for the influence of time periods and for modelling time effects, time dummies will be utilised to test whether the corporate decisions are related to time-varying elements, say, macroeconomic factors or aggregate business cycles.

[104] See Bradley et al. [1984], Gaver and Gaver [1993], and Smith and Watts [1992], among others.

5.4.2. EMPIRICAL RESULTS

5.4.2.1. Comparison of the Results of Alternative Estimation Procedures

In Table 5.3 to Table 5.8, we report estimation results of the dynamic capital structure for France, Germany and the UK, based on both leverage definitions. In these tables, Model 1 presents the OLS-type estimates in levels, where unobservable firm-specific fixed effect are not eliminated and all explanatory variables (including lagged dependent variable) are assumed to be strictly exogenous. Models 2 and 3 give Anderson-Hsiao (AH)-type estimates in first differences, which uses $\Delta LEVERAGE_{it-2}$ (model-2) and $LEVERAGE_{it-2}$ (model-3) as an instrument for $\Delta LEVERAGE_{it-1}$[106]. Models 4 and 5 show the GMM estimates in levels and in differences, respectively, where all explanatory variables except the lagged dependent variable (LDV) are treated as exogenous. Thus, in both models only $LEVERAGE_{it-1}$ is instrumented, in which case GMM instruments used increase in each period through the panel, unlike in case of AH instruments. In Model 6, we report GMM estimates in levels, where all right-hand side variables are treated as endogenous. The number of observations and the estimation period change according to the models, which are given in the tables. Six different type of test statistics were reported, three of which (Wald Tests) test the joint significance of the estimated coefficients, time and industry dummies, and time dummies only, respectively; distributed as chi-square under the null hypothesis of 'no relationship'. Two tests (Correlation Tests) are performed for the first and second order autocorrelation of residuals; distributed as standard normal N(0,1) under the null hypothesis of 'no serial correlation'. The last statistics (Sargan Test) is to test the validity of the instrument set (overidentifying restrictions); distributed as chi-square under the null hypothesis of 'valid instruments'. Only the *two-step* GMM estimates will be reported as they are more efficient than one-step estimates and Sargan Test is consistent only in this specification. All estimation procedures were executed using **PcGive** (Doornik and Hendry [2001]).

Firstly, considering all countries, Correlation Tests reveal that in many cases the OLS and GMM-Level specifications violate the assumption of 'no serial correlation'. Apart from serial correlation in the error terms, OLS specification suffers from endogeneity problem

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[105] See, e.g., Bennett and Donnelly [1993], Bradley et al. [1984], Johnson [1998] and Titman [1984]. Furthermore, see the Appendix for industry classification and the number of firm in each industry.

[106] Arellano and Bond [1991] note that in a model containing an exogenous variable in addition to the lagged dependent variable there is no correlation between $\Delta y_{i,t-1}$ and $\Delta y_{i,t-2}$, then $\Delta y_{i,t-2}$ is not a valid instrument and AH-D is not identified. Thus, in such cases we used $\Delta LEVERAGE_{it-3}$ as an instrument, instead of $\Delta LEVERAGE_{it-2}$.

too. The former is not surprising since LDV might be correlated with seemingly existent unobservable and time-invariant firm-specific effects. Furthermore, the estimated coefficient of LDV is relatively too high and significant in all OLS specifications (model-1) ranging from 0.82 to 0.92. The same problem exists in the GMM estimates in levels (model-4) and the upward bias is even higher in almost all cases as compared to the OLS coefficients. This upward bias, in spite of the industry dummies inclusion, can be attributed to the correlation between LDV and unobservable fixed effects. Moreover, the Sargan Test of GMM-Level (model-4) estimation results reveal that the instruments used are invalid. This is because we assumed the strict exogeneity of all variables except LDV. However, it is likely that the explanatory variables constructed on the basis of balance sheet data of firms are endogenous. Therefore, due to the reasons stated above one can conclude that the OLS and GMM specifications in levels are not appropriate for a study of dynamic capital structure model.

In what follows, in order to overcome the problem in levels-specification, first-differences of the variables were taken to control for fixed effects and the estimation results were reported in Models 2, 3 and 5. The coefficient of LDV in Model 2 is poorly determined, being insignificantly greater than unity in Germany; being insignificantly close to zero and greater than unity in France. Furthermore, the examination of standard deviation of the coefficients of model-2 in these six tables (Table 5.3 to Table 5.8) exhibits the fact that AH-type estimates using differenced instrument (AHD) result in larger variances than GMM estimates in differences (GMM-DIF). The inference from this comparison can be regarded as a strong finding and is consistent with the findings of Arellano and Bond [1991] that AHD causes substantial efficiency loss. As for the model-3 of AH-estimates using level instrument (AHL), it performs better than AHD and in some cases the standard deviation of the coefficients of AHL is lower than that of GMM-DIF. However, this AH instrumental variable technique does not use all available moment conditions, which is not the case for GMM methodology. In the end, as discussed earlier, although AH-type estimates do not suffer from serial correlation and are consistent, they are far from being efficient. As for GMM estimates in differences (model-5), all Sargan Tests in these tables except Table 5.5 indicate that the instruments used are not valid. The reason for the rejection of instrument validity is apparent as we assumed that all the variables, except LDV by definition, are exogenous. We allowed the possibility that the past and current values of the regressors are uncorrelated with current shocks by this way but that turned out to be a wrong assumption[107]. In model-6, the Sargan Tests again reject the validity of instruments in Germany and the UK, and the Correlation Tests show the presence of serial correlation problem in France. This, in turn, implies that even if we relax the exogeneity of variables by using GMM-instruments as lags of all variables dated (t-2) and earlier, the test statistics show the presence of misspecification in GMM-Level estimation[108]. Therefore, if serial correlation exists and the coefficient of LDV is too high in GMM-Level, controlling for firm heterogeneity is necessary despite the absence of endogeneity problem. In this case, GMM-DIF is used to control for potential unobserved firm-specific effects as the serious upward bias on the LDV of model-6 suggests its presence (it is 0.93, in Germany).

The discussion above shows that the specification of the OLS, AH, the GMM-Levels specification and GMM-Differences specification assuming strict exogeneity of the variables are not appropriate for our dynamic capital structure model. In the next section, we will relax the assumption of exogeneity in GMM-Differences models thereby using some more instruments to determine the most appropriate estimation procedure.

[107] As discussed in Blundell and Bond [1998,1999], the pattern of signs on current and lagged regressors in the unrestricted models are consistent with the AR(1) specification as the signs are reverse in most cases.

[108] We did not, and will not in the next sections, use all available instruments in order to reduce finite sample biases due to having too much instruments relative to the cross-sectional sample size. This is discussed by Alonso-Borrego and Arellano [1999], Kiviet [1995]. As time dummies are added in all models and thus used as additional instruments. If level instruments dated (t-2) in GMM-DIF is rejected by Sargan, it shows the presence of measurement errors.

Table 5.3: Dynamic capital structure in France: Alternative Estimations (Leverage1)

		Dependent Variable:	LEVERAGE1$_{i,t}$				
Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-DIF	(3) AH-LEV	(4) GMM-LEV1	(5) GMM-DIF1	(6) GMM-LEV2
LEVERAGE1$_{i,t-1}$	+	0.8613***	0.0924	0.6925***	0.8899***	0.7822***	0.8904***
		(0.0135)	(0.3145)	(0.0695)	(0.0176)	(0.0886)	(0.0137)
PROFIT$_{i,t}$	-/+	-0.4019***	-0.5243***	-0.5096***	-0.3901***	-0.4815***	-0.6163***
		(0.0426)	(0.0728)	(0.0660)	(0.0451)	(0.0725)	(0.1035)
PROFIT$_{i,t-1}$	-/+	0.3138***	0.0351	0.2085***	0.3147***	0.2339***	0.4965***
		(0.0431)	(0.1859)	(0.0547)	(0.0463)	(0.0567)	(0.0925)
NDTAX-SHIELD$_{i,t}$	-	0.1940*	0.2955**	0.2575**	0.2046*	0.2902**	0.3577*
		(0.1073)	(0.1187)	(0.1301)	(0.1125)	(0.1252)	(0.1871)
NDTAX-SHIELD$_{i,t-1}$	-	-0.1483	0.0494	0.0402	-0.1360	0.0301	-0.2815
		(0.1191)	(0.1837)	(0.1953)	(0.1258)	(0.1908)	(0.1819)
TAXRATE$_{i,t}$	+	-0.0008	-0.0034	-0.0008	-0.0014	-0.0013	0.0112*
		(0.0027)	(0.0028)	(0.0033)	(0.0031)	(0.0037)	(0.0067)
TAXRATE$_{i,t-1}$	+	0.0058**	-0.0011	0.0024	0.0056*	0.0017	0.0039
		(0.0026)	(0.0023)	(0.0033)	(0.0029)	(0.0035)	(0.0027)
MKT-TO-BOOK$_{i,t}$	-	-0.0060***	-0.0013	0.0028	-0.0058***	0.0027	-0.0020
		(0.0019)	(0.0046)	(0.0029)	(0.0019)	(0.0030)	(0.0040)
MKT-TO-BOOK$_{i,t-1}$	-	0.0090***	0.0048	0.0122***	0.0090***	0.0153***	0.0067*
		(0.0027)	(0.0044)	(0.0045)	(0.0027)	(0.0052)	(0.0037)
FIXASSETS$_{i,t}$	+	0.0205	-0.0221	-0.0016	0.0696	0.0420	0.0740
		(0.0547)	(0.0752)	(0.0759)	(0.0599)	(0.0841)	(0.1134)
FIXASSETS$_{i,t-1}$	+	0.0283	0.1294	0.1024	-0.0329	0.0811	-0.0268
		(0.0553)	(0.0666)	(0.0765)	(0.0585)	(0.0858)	(0.1118)
SIZE$_{i,t}$	+	0.0405***	0.0611***	0.0391***	0.0437***	0.0435***	0.0373***
		(0.0109)	(0.0110)	(0.0126)	(0.0137)	(0.0149)	(0.0138)
SIZE$_{i,t-1}$	+	-0.0389***	-0.0058	-0.0266***	-0.0418***	-0.0334***	-0.0354***
		(0.0108)	(0.0207)	(0.0099)	(0.0137)	(0.0109)	(0.0134)
Correlation1		-2.906***	-0.6537	-7.188***	-2.423**	-6.642***	-2.880***
Correlation2		1.477	-0.7384	1.531	0.8670	1.714*	0.1006
Sargan Test (df)		-	-	-	24.56 (15)*	27.90 (15)**	232.8 (399
Wald Test-1 (df)		6284 (13)***	109.7 (13)***	224.8 (13)***	4340 (13)***	192.5 (13)***	6444 (13)**
Wald Test-2 (df)		166.2 (31)***	-	-	147 (31)***	-	151 (31)***
Wald Test-3 (df)		100.1 (16)***	73.83 (15)***	96.61 (16)***	100.8 (16)***	85.29 (16)***	92 (16)***
R^2		0.8047	-	-	0.8001	-	0.7973
Firms / Observations		359 / 2812	299 / 2094	359 / 2453	359 /2812	359 / 2453	359 / 2812
Estimation Period		1984-2000	1986-2000	1985-2000	1984-2000	1985-2000	1984-2000

Leverage1 is the ratio of book value of total debt to book value of total assets. *Profitability* is the ratio of operating profit to book value of total assets. *Non-debt Tax Shields* is the ratio of depreciation to book value of total assets. *Effective Tax Rate* is the ratio of total tax charge to total taxable income. *Market-to-Book Ratio* is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. *Fixed Asset Ratio* is the ratio of net tangible assets to book value of total assets. *Size* is the natural logarithm of total sales. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Model-1 is OLS estimation in levels. Models 2 and 3 are Anderson-Hsiao type estimation in differences, where $\Delta LEVERAGE1_{it-2}$ and LEVERAGE1$_{it-2}$, respectively, is instrumented for $\Delta LEVERAGE1_{it-1}$. Models 4 and 5 are GMM estimates in levels and first differences, respectively, where only LEVERAGE1$_{t-1}$ is treated as endogenous. Model 6 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 4 and 6. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 5.4: Dynamic capital structure in France: Alternative Estimations (Leverage2)

		Dependent Variable: LEVERAGE2$_{i,t}$					
Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-DIF	(3) AH-LEV	(4) GMM-LEV1	(5) GMM-DIF1	(6) GMM-LEV2
LEVERAGE2$_{i,t-1}$	+	0.8497***	1.8416	0.7438***	0.8631***	0.7604***	0.8600***
		(0.0122)	(1.7230)	(0.0813)	(0.0208)	(0.0908)	(0.0149)
PROFIT$_{i,t}$	-/+	-0.5170***	-0.6772***	-0.6824***	-0.4487***	-0.6742***	-0.6455***
		(0.0972)	(0.1951)	(0.1085)	(0.1049)	(0.1464)	(0.1553)
PROFIT$_{i,t-1}$	-/+	0.4297***	1.1850	0.1975***	0.3843***	0.1326	0.5430***
		(0.0765)	(1.2580)	(0.0751)	(0.0843)	(0.0826)	(0.1260)
NDTAX-SHIELD$_{i,t}$	-	0.1593	0.0862	0.1919	0.0458	0.0654	0.5414**
		(0.1498)	(0.4320)	(0.2080)	(0.1843)	(0.2916)	(0.2193)
NDTAX-SHIELD$_{i,t-1}$	-	-0.0550	-0.3352	0.2353	0.0327	0.1744	-0.3726*
		(0.1501)	(0.7392)	(0.2149)	(0.1886)	(0.3227)	(0.1945)
TAXRATE$_{i,t}$	+	-0.0003	0.0006	-0.0009	-0.0002	0.0006	0.0179*
		(0.0045)	(0.0104)	(0.0058)	(0.0053)	(0.0068)	(0.0107)
TAXRATE$_{i,t-1}$	+	0.0041	-0.0029	-0.0008	0.0026	0.0002	-0.0007
		(0.0034)	(0.0084)	(0.0055)	(0.0041)	(0.0065)	(0.0036)
MKT-TO-BOOK$_{i,t}$	-	-0.0264***	-0.0173	-0.0113**	-0.0266***	-0.0107*	-0.0073
		(0.0052)	(0.0145)	(0.0053)	(0.0058)	(0.0056)	(0.0061)
MKT-TO-BOOK$_{i,t-1}$	-	0.0137***	0.0571	0.0185***	0.0147***	0.0171**	-0.0004
		(0.0045)	(0.0633)	(0.0059)	(0.0049)	(0.0071)	(0.0050)
FIXASSETS$_{i,t}$	+	0.1331*	-0.1340	0.0749	0.1553*	0.0903	0.2979**
		(0.0755)	(0.2831)	(0.1107)	(0.0913)	(0.1374)	(0.1410)
FIXASSETS$_{i,t-1}$	+	-0.0838	-0.2819	-0.0580	-0.1176	-0.0441	-0.2355*
		(0.0772)	(0.3319)	(0.1074)	(0.0914)	(0.1391)	(0.1380)
SIZE$_{i,t}$	+	0.0918***	0.1367***	0.1038***	0.0843***	0.0955***	0.0935***
		(0.0104)	(0.0314)	(0.0180)	(0.0126)	(0.0180)	(0.0239)
SIZE$_{i,t-1}$	+	-0.0898***	-0.2118	-0.0705***	-0.0827***	-0.0670***	-0.0903***
		(0.0102)	(0.2015)	(0.0152)	(0.0124)	(0.0153)	(0.0234)
Correlation1		-0.5281	-1.115	-6.840***	-0.5405	-6.227***	-0.6163
Correlation2		-1.880*	-0.7293	-1.393	-2.057**	-1.323	-1.805*
Sargan Test (df)		-	-	-	38.64 (15)***	65.62 (15)***	235.8 (399
Wald Test-1 (df)		9301 (13)***	100.8 (13)***	319 (13)***	4539 (13)***	262.3 (13)***	6383 (13)**
Wald Test-2 (df)		422.1 (31)***	-	-	291.5 (31)***	-	421 (31)***
Wald Test-3 (df)		361.7 (16)***	91.86 (15)***	331.6 (16)***	223.2 (16)***	158.6 (16)***	355 (16)***
R^2		0.8303	-	-	0.8294	-	0.8229
Firms / Observations		359 / 2812	299 / 2094	359 / 2453	359 /2812	359 / 2453	359 / 2812
Estimation Period		1984-2000	1986-2000	1985-2000	1984-2000	1985-2000	1984-2000

See Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Model-1 is OLS estimation in levels. Models 2 and 3 are Anderson-Hsiao type estimation in differences, where $\Delta LEVERAGE2_{it-2}$ and LEVERAGE2$_{it-2}$, respectively, is instrumented for $\Delta LEVERAGE2_{it-1}$. Models 4 and 5 are GMM estimates in levels and first differences, respectively, where only LEVERAGE1$_{t-1}$ is treated as endogenous. Model 6 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 4 and 6. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 5.5: Dynamic capital structure in Germany: Alternative Estimations (Leverage1)

		Dependent Variable: LEVERAGE1$_{i,t}$					
Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-DIF	(3) AH-LEV	(4) GMM-LEV1	(5) GMM-DIF1	(6) GMM-LEV2
LEVERAGE1$_{i,t-1}$	+	0.8919***	1.4348*	0.8402***	0.9112***	0.8088***	0.9256***
		(0.0093)	(0.8443)	(0.0834)	(0.0104)	(0.0798)	(0.0107)
PROFIT$_{i,t}$	-/+	-0.0809**	-0.0590	-0.0723	-0.0737**	-0.0536	-0.0815**
		(0.0343)	(0.0553)	(0.0458)	(0.0341)	(0.0444)	(0.0389)
PROFIT$_{i,t-1}$	-/+	0.0401	0.0577	0.0130	0.0429	0.0168	0.0384
		(0.0277)	(0.0716)	(0.0282)	(0.0279)	(0.0286)	(0.0316)
NDTAX-SHIELD$_{i,t}$	-	0.1388*	0.3807**	0.2887**	0.1471*	0.3309***	0.1254
		(0.0742)	(0.1932)	(0.1205)	(0.0757)	(0.1125)	(0.0997)
NDTAX-SHIELD$_{i,t-1}$	-	-0.1911***	-0.1351	-0.0525	-0.1913***	-0.0461	-0.1617**
		(0.0627)	(0.1208)	(0.0595)	(0.0615)	(0.0575)	(0.0703)
TAXRATE$_{i,t}$	+	0.0002	0.0012	0.0004	0.0004	0.0005	0.0064
		(0.0008)	(0.0019)	(0.0011)	(0.0008)	(0.0011)	(0.0048)
TAXRATE$_{i,t-1}$	+	0.0016	0.0011	0.0006	0.0013	0.0007	0.0012
		(0.0011)	(0.0020)	(0.0014)	(0.0011)	(0.0015)	(0.0011)
MKT-TO-BOOK$_{i,t}$	-	-0.0012*	-0.0016*	-0.0007	-0.0008	-0.0007	-0.0028
		(0.0007)	(0.0010)	(0.0009)	(0.0008)	(0.0009)	(0.0017)
MKT-TO-BOOK$_{i,t-1}$	-	0.0004	0.0025	0.0003	0.0002	-0.0002	0.0015
		(0.0007)	(0.0025)	(0.0014)	(0.0007)	(0.0015)	(0.0012)
FIXASSETS$_{i,t}$	+	0.1703***	0.1462**	0.1580***	0.1736***	0.1661***	0.1706**
		(0.0357)	(0.0682)	(0.0494)	(0.0383)	(0.0488)	(0.0700)
FIXASSETS$_{i,t-1}$	+	-0.1338***	-0.1658	-0.0860*	-0.1423***	-0.0960**	-0.1400**
		(0.0357)	(0.1390)	(0.0455)	(0.0387)	(0.0470)	(0.0652)
SIZE$_{i,t}$	+	0.0173***	0.0063	0.0111*	0.0158***	0.0105	0.0304**
		(0.0051)	(0.0099)	(0.0067)	(0.0055)	(0.0073)	(0.0123)
SIZE$_{i,t-1}$	+	-0.0176***	-0.0208	-0.0147*	-0.0157***	-0.0143*	-0.0307**
		(0.0052)	(0.0185)	(0.0081)	(0.0056)	(0.0079)	(0.0124)
Correlation1		-1.602	-1.775*	-9.423***	-1.814*	-8.936***	-2.465**
Correlation2		-1.070	-0.1199	-0.3623	-1.512	-0.4109	-1.617
Sargan Test (df)		-	-	-	13.53 (11)	13.92 (11)	328 (287)*
Wald Test-1 (df)		14570(13)***	40.61 (13)***	137.8 (13)***	12240(13)***	173.6 (13)***	12520(13)**
Wald Test-2 (df)		79.76 (26)***	-	-	60.62 (26)***	-	57.6 (26)**
Wald Test-3 (df)		24.27 (12)***	7.913 (11)	20.81 (12)*	19.52 (12)*	24.30 (12)**	25.51(12)*
R^2		0.8094	-	-	0.8089	-	0.8050
Firms / Observations		565 / 5468	510 / 4338	565 / 4903	565 / 5468	565 / 4903	565 / 5468
Estimation Period		1988-2000	1990-2000	1989-2000	1988-2000	1989-2000	1988-2000

See Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Model-1 is OLS estimation in levels. Models 2 and 3 are Anderson-Hsiao type estimation in differences, where $\Delta LEVERAGE1_{it-2}$ and LEVERAGE1$_{it-2}$, respectively, is instrumented for $\Delta LEVERAGE1_{it-1}$. Models 4 and 5 are GMM estimates in levels and first differences, respectively, where only LEVERAGE1$_{t-1}$ is treated as endogenous. Model 6 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 4 and 6. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 5.6: Dynamic capital structure in Germany: Alternative Estimations (Leverage2)

		Dependent Variable:			$LEVERAGE2_{i,t}$		
Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-DIF	(3) AH-LEV	(4) GMM-LEV1	(5) GMM-DIF1	(6) GMM-LEV2
$LEVERAGE2_{i,t-1}$	+	0.9172***	11.65	0.9188***	0.9128***	0.7203***	0.9316***
		(0.0078)	(61.41)	(0.0845)	(0.0098)	(0.0715)	(0.0099)
$PROFIT_{i,t}$	-/+	-0.0935**	0.5668	-0.0396	-0.1094*	-0.0896	-0.0247
		(0.0473)	(3.4320)	(0.0589)	(0.0650)	(0.0819)	(0.0524)
$PROFIT_{i,t-1}$	-/+	0.0414	1.1754	0.0164	0.0440	-0.0437	-0.0001
		(0.0369)	(6.732)	(0.0416)	(0.0519)	(0.0475)	(0.0399)
$NDTAX\text{-}SHIELD_{i,t}$	-	-0.0490	-0.5818	-0.0394	-0.0418	0.0049	-0.1870*
		(0.0581)	(3.004)	(0.0868)	(0.0690)	(0.1002)	(0.1109)
$NDTAX\text{-}SHIELD_{i,t-1}$	-	-0.0688	-0.4422	0.0286	-0.0582	0.1046	0.0090
		(0.0473)	(2.7330)	(0.0685)	(0.0540)	(0.0709)	(0.0715)
$TAXRATE_{i,t}$	+	-0.0002	0.0047	-0.0007	-0.0002	-0.0010	0.0097
		(0.0011)	(0.0339)	(0.0016)	(0.0011)	(0.0016)	(0.0063)
$TAXRATE_{i,t-1}$	+	0.0017	0.0123	0.0003	0.0010	-0.0003	0.0016
		(0.0014)	(0.0715)	(0.0020)	(0.0016)	(0.0021)	(0.0016)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-	-0.0030***	0.0103	-0.0022	-0.0032***	-0.0025*	-0.0032*
		(0.0010)	(0.0772)	(0.0013)	(0.0010)	(0.0015)	(0.0019)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$	-	0.0014*	0.0291	0.0010	0.0016*	0.0009	0.0016
		(0.0008)	(0.1597)	(0.0011)	(0.0009)	(0.0010)	(0.0014)
$FIXASSETS_{i,t}$	+	0.1947***	0.0294	0.1921***	0.1939***	0.1407***	0.2230**
		(0.0415)	(0.8646)	(0.0532)	(0.0416)	(0.0530)	(0.0880)
$FIXASSETS_{i,t-1}$	+	-0.1554***	-1.9088	-0.0880	-0.1570***	-0.0641	-0.1845**
		(0.0409)	(10.48)	(0.0549)	(0.0411)	(0.0527)	(0.0831)
$SIZE_{i,t}$	+	0.0322***	-0.1049	0.0202**	0.0346***	0.0273***	0.0326***
		(0.0055)	(0.7043)	(0.0087)	(0.0054)	(0.0093)	(0.0122)
$SIZE_{i,t-1}$	+	-0.0304***	-0.3688	-0.0278***	-0.0327***	-0.0191**	-0.0310**
		(0.0056)	(1.9650)	(0.0096)	(0.0055)	(0.0091)	(0.0122)
Correlation1		0.3645	-0.1904	-10.13***	0.3996	-7.716***	0.0734
Correlation2		-0.1097	-0.1611	-0.1501	0.0817	-0.2487	-0.6961
Sargan Test (df)		-	-	-	43.56 (11)***	44.98 (11)***	343 (287)*
Wald Test-1 (df)		23540(13)***	1.027 (13)	216.6 (13)***	14740(13)***	225.7 (13)***	14390(13)**
Wald Test-2 (df)		315.9 (26)***	-	-	224.3 (26)***	-	208 (26)***
Wald Test-3 (df)		263.9 (12)***	1.637 (11)	195.6 (12)***	184 (12)***	133.8 (12)***	169 (12)***
R^2		0.8357	-	-	0.8354	-	0.8325
Firms / Observations		565 / 5468	510 / 4338	565 / 4903	565 / 5468	565 / 4903	565 / 5468
Estimation Period		1988-2000	1990-2000	1989-2000	1988-2000	1989-2000	1988-2000

See Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Model-1 is OLS estimation in levels. Models 2 and 3 are Anderson-Hsiao type estimation in differences, where $\Delta LEVERAGE2_{it-2}$ and $LEVERAGE2_{it-2}$, respectively, is instrumented for $\Delta LEVERAGE2_{it-1}$. Models 4 and 5 are GMM estimates in levels and first differences, respectively, where only $LEVERAGE1_{t-1}$ is treated as endogenous. Model 6 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 4 and 6. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 5.7: Dynamic capital structure in the UK: Alternative Estimations (Leverage1)

		Dependent Variable:	LEVERAGE$1_{i,t}$				
Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-DIF	(3) AH-LEV	(4) GMM-LEV1	(5) GMM-DIF1	(6) GMM-LEV2
LEVERAGE$1_{i,t-1}$	+	0.8183***	0.5585***	0.6670***	0.8448***	0.6534***	0.8590***
		(0.0058)	(0.0975)	(0.0266)	(0.0067)	(0.0228)	(0.0068)
PROFIT$_{i,t}$	-/+	-0.1588***	-0.2166***	-0.1722***	-0.1490***	-0.1669***	-0.1136***
		(0.0384)	(0.0490)	(0.0450)	(0.0377)	(0.0492)	(0.0392)
PROFIT$_{i,t-1}$	-/+	0.1090***	0.0351	0.0577**	0.1068***	0.0469**	0.0916***
		(0.0287)	(0.0240)	(0.0235)	(0.0287)	(0.0237)	(0.0288)
NDTAX-SHIELD$_{i,t}$	-	0.0564	-0.2444**	-0.2440***	0.0586	-0.2225**	0.3145**
		(0.0683)	(0.0964)	(0.0920)	(0.0701)	(0.0900)	(0.1432)
NDTAX-SHIELD$_{i,t-1}$	-	-0.0892	-0.1893***	-0.2307***	-0.0776	-0.1976***	-0.2787**
		(0.0715)	(0.0697)	(0.0690)	(0.0744)	(0.0704)	(0.1272)
TAXRATE$_{i,t}$	+	-0.0030***	-0.0002	-0.0003	-0.0027***	-0.0003	-0.0002
		(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0051)
TAXRATE$_{i,t-1}$	+	-0.0019**	-0.0014	-0.0013	-0.0014	-0.0008	-0.0017*
		(0.0008)	(0.0011)	(0.0010)	(0.0009)	(0.0011)	(0.0009)
MKT-TO-BOOK$_{i,t}$	-	-0.0020**	-0.0008	-0.0011	-0.0017**	-0.0015	-0.0029
		(0.0008)	(0.0017)	(0.0014)	(0.0008)	(0.0013)	(0.0019)
MKT-TO-BOOK$_{i,t-1}$	-	-0.0010	-0.0019	-0.0013	-0.0011	-0.0017	-0.0013
		(0.0008)	(0.0013)	(0.0010)	(0.0008)	(0.0010)	(0.0012)
FIXASSETS$_{i,t}$	+	0.1091***	0.1267***	0.1292***	0.1213***	0.1504***	0.0212
		(0.0151)	(0.0205)	(0.0199)	(0.0156)	(0.0199)	(0.0444)
FIXASSETS$_{i,t-1}$	+	-0.0855***	-0.0032	-0.0204	-0.1010***	-0.0389**	-0.0143
		(0.0151)	(0.0190)	(0.0171)	(0.0158)	(0.0175)	(0.0419)
SIZE$_{i,t}$	+	0.0325***	0.0380***	0.0363***	0.0323***	0.0356***	0.0569***
		(0.0032)	(0.0044)	(0.0041)	(0.0034)	(0.0041)	(0.0086)
SIZE$_{i,t-1}$	+	-0.0295***	-0.0115**	-0.0156***	-0.0295***	-0.0141***	-0.0542***
		(0.0032)	(0.0047)	(0.0035)	(0.0033)	(0.0035)	(0.0085)
Correlation1		-5.444***	-7.601***	-22.33***	-5.783***	-21.28***	-6.675***
Correlation2		-1.262	1.602	0.9325	-2.982***	0.8623	-3.444***
Sargan Test (df)		-	-	-	64.03 (29)***	59.45 (29)***	955 (791)***
Wald Test-1 (df)		30640(13)***	373.2 (13)***	1139 (13)***	27030(13)***	1782 (13)***	27880(13)**
Wald Test-2 (df)		467.4 (45)***	-	-	444.4 (45)***	-	388.6 (45)**
Wald Test-3 (df)		406.9 (30)***	303.1 (29)***	283.8 (30)***	393.6 (30)***	269.8 (30)***	357 (30)***
R^2		0.6861	-	-	0.6854	-	0.6769
Firms / Observations		2417 / 32540	2201 / 27706	2417 / 30123	2417 / 32540	2417 / 30123	2417 / 32540
Estimation Period		1970-2000	1972-2000	1971-2000	1970-2000	1971-2000	1970-2000

See Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Model-1 is OLS estimation in levels. Models 2 and 3 are Anderson-Hsiao type estimation in differences, where $\Delta LEVERAGE1_{it-2}$ and LEVERAGE1_{it-2}, respectively, is instrumented for $\Delta LEVERAGE1_{it-1}$. Models 4 and 5 are GMM estimates in levels and first differences, respectively, where only LEVERAGE1_{t-1} is treated as endogenous. Model 6 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 4 and 6. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 5.8: Dynamic capital structure in the UK: Alternative Estimations (Leverage2)

Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-DIF	(3) AH-LEV	(4) GMM-LEV1	(5) GMM-DIF1	(6) GMM-LEV2
		Dependent Variable:	LEVERAGE2$_{i,t}$				
LEVERAGE2$_{i,t-1}$	+	0.8277***	0.9079***	0.7537***	0.8168***	0.7305***	0.8509***
		(0.0046)	(0.1400)	(0.0190)	(0.0072)	(0.0236)	(0.0068)
PROFIT$_{i,t}$	-/+	-0.2490***	-0.2723***	-0.2211***	-0.2232***	-0.2489***	-0.1300***
		(0.0557)	(0.0564)	(0.0521)	(0.0666)	(0.0914)	(0.0404)
PROFIT$_{i,t-1}$	-/+	0.1573***	0.1522***	0.1173***	0.1390***	0.0996***	0.0961***
		(0.0383)	(0.0493)	(0.0272)	(0.0459)	(0.0341)	(0.0259)
NDTAX-SHIELD$_{i,t}$	-	-0.2747***	-1.0934***	-0.9445***	-0.2016**	-0.8668***	-0.0011
		(0.0737)	(0.2047)	(0.1530)	(0.0839)	(0.1713)	(0.1585)
NDTAX-SHIELD$_{i,t-1}$	-	0.1756**	-0.1634*	-0.1874**	0.0734	-0.2127**	-0.0259
		(0.0786)	(0.0941)	(0.0809)	(0.0902)	(0.0980)	(0.1343)
TAXRATE$_{i,t}$	+	-0.0025	0.0008	0.0002	-0.0030	0.0003	0.0071
		(0.0015)	(0.0017)	(0.0016)	(0.0018)	(0.0020)	(0.0080)
TAXRATE$_{i,t-1}$	+	-0.0018	-0.0015	-0.0019	-0.0014	-0.0013	-0.0023
		(0.0014)	(0.0018)	(0.0016)	(0.0017)	(0.0020)	(0.0015)
MKT-TO-BOOK$_{i,t}$	-	-0.0156***	-0.0100***	-0.0113***	-0.0136***	-0.0108***	-0.0110***
		(0.0014)	(0.0016)	(0.0014)	(0.0013)	(0.0014)	(0.0024)
MKT-TO-BOOK$_{i,t-1}$	-	0.0057***	0.0097***	0.0055***	0.0046***	0.0044***	0.0025*
		(0.0009)	(0.0028)	(0.0009)	(0.0010)	(0.0010)	(0.0015)
FIXASSETS$_{i,t}$	+	0.0991***	0.1162***	0.1219***	0.0889***	0.1112***	0.0457
		(0.0163)	(0.0262)	(0.0219)	(0.0190)	(0.0256)	(0.0605)
FIXASSETS$_{i,t-1}$	+	-0.0729***	-0.0013	0.0101	-0.0600***	0.0075	-0.0323
		(0.0164)	(0.0269)	(0.0196)	(0.0191)	(0.0225)	(0.0567)
SIZE$_{i,t}$	+	0.0536***	0.0747***	0.0704***	0.0517***	0.0716***	0.1017***
		(0.0039)	(0.0064)	(0.0053)	(0.0047)	(0.0068)	(0.0111)
SIZE$_{i,t-1}$	+	-0.0490***	-0.0390***	-0.0278***	-0.0473***	-0.0246***	-0.0970***
		(0.0038)	(0.0101)	(0.0046)	(0.0046)	(0.0056)	(0.0110)
Correlation1		-1.063	-7.250***	-27.29***	0.5532	-23.55***	-1.569
Correlation2		-3.504***	0.2649	-0.0852	-2.019**	-0.1678	-3.777***
Sargan Test (df)		-	-	-	328.6 (29)***	307.8 (29)***	1145(791)**
Wald Test-1 (df)		50450(13)***	826.6 (13)***	2992 (13)***	22600(13)***	2223 (13)***	25470(13)**
Wald Test-2 (df)		2625 (45)***	-	-	1858 (45)***	-	1971 (45)***
Wald Test-3 (df)		2509 (30)***	2285 (29)***	2321 (30)***	1745 (30)***	1585 (30)***	1851 (30)***
R^2		0.7467	-	-	0.7459	-	0.7362
Firms / Observations		2417 / 32540	2201 / 27706	2417 / 30123	2417 / 32540	2417 / 30123	2417 / 32540
Estimation Period		1970-2000	1972-2000	1971-2000	1970-2000	1971-2000	1970-2000

See Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Model-1 is OLS estimation in levels. Models 2 and 3 are Anderson-Hsiao type estimation in differences, where $\Delta LEVERAGE2_{it-2}$ and LEVERAGE2$_{it-2}$, respectively, is instrumented for $\Delta LEVERAGE2_{it-1}$. Models 4 and 5 are GMM estimates in levels and first differences, respectively, where only LEVERAGE1$_{t-1}$ is treated as endogenous. Model 6 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 4 and 6. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

5.4.2.2. The Comparison of System-GMM and Difference-GMM Estimators

In Table 5.9, we report the GMM-DIF estimation results assuming the endogeneity of explanatory variables. Correlation Tests confirm the validity of the assumption of serially uncorrelated errors in levels as Correlation1 is significant but Correlation2 is insignificant in all cases. Furthermore, two-step Sargan Tests accept the validity of lagged level instruments dated (t-2) and earlier in France-Germany but in (6) the validity of instruments is rejected for the UK.

Although the results in Table 5.9 do not suffer from serial correlation, endogeneity problem and instrument invalidity, recent econometric studies document that standard GMM-DIF estimator has the problem of weak instruments[109]. As discussed by Blundell et al. [2000], the weak instruments problem can be seen by comparing GMM-DIF estimates with Within Groups (deviation from individual means)(WG) estimates in Table 5.10. The results in these tables are generally similar and the estimated coefficient of lagged leverage of GMM-DIF is not substantially higher than that of WG. It is known in the presence of firm-specific effects that OLS-Levels specification appears to cause an upward bias in the estimate of LDV while WG appears to cause a downward bias in the same coefficient's estimate. Consequently, one can expect this coefficient to be biased *downwards* in case of weak instruments usage. Therefore, as also discussed in the footnote below, system GMM (GMM-SYS) estimation procedure, in the end, has been shown to be the most efficient and consistent methodology for our dynamic capital structure model.

[109] Arellano and Bover [1995] argue that the absence of information concerning the parameters in the levels-variables causes substantial efficiency loss in models estimated in first-differences using instruments in levels. Hence, they propose to use instruments in first-differences for equations in levels *in addition* to instruments in levels for equations in first-differences. Furthermore, Blundell and Bond [1998] document that the extended GMM (GMM-SYS) estimator of Arellano and Bover [1995] reveals dramatic efficiency gains in cases where standard GMM-DIF estimator performs poorly (e.g. for short sample periods and persistent data). In addition, Mairesse and Hall [1996] find that GMM-DIF specification results in unsatisfactory estimations using panel data for a large sample of firms with small number of time periods. Blundell and Bond [1999] document that once lagged first-differenced and lagged levels instruments are included in the instrument set, one could reduce the finite sample bias substantially due to exploiting the *additional* moment conditions in this system approach. Their results show that the instruments used by GMM-DIF estimator contain little information about the endogenous variables in first-differences, and lagged first-differences are informative instruments for the endogenous variables in levels.

Table 5.9: Dynamic capital structure using GMM-DIF Estimations.

Dependent Variable		LEVERAGE1$_{i,t}$			LEVERAGE2$_{i,t}$		
Independent Variables	Predicted Sign	(1) FRANCE	(2) GERMANY	(3) UK	(4) FRANCE	(5) GERMANY	(6) UK
LEVERAGE$_{i,t-1}$	+	0.6127***	0.6214***	0.6667***	0.5845***	0.6008***	0.6638***
		(0.0474)	(0.0554)	(0.0226)	(0.0466)	(0.0373)	(0.0183)
PROFIT$_{i,t}$	-/+	-0.5272***	-0.1148**	-0.1756***	-0.6611***	-0.1304**	-0.2693***
		(0.0674)	(0.0461)	(0.0442)	(0.1314)	(0.0536)	(0.0643)
PROFIT$_{i,t-1}$	-/+	0.1846***	-0.0228	0.0607***	0.1050*	-0.0528	0.0874***
		(0.0521)	(0.0331)	(0.0219)	(0.0552)	(0.0330)	(0.0302)
NDTAX-SHIELD$_{i,t}$	-	0.1207	0.1855**	0.1393	0.0280	0.0235	-0.1943
		(0.1687)	(0.0939)	(0.1597)	(0.2874)	(0.0880)	(0.1891)
NDTAX-SHIELD$_{i,t-1}$	-	-0.0619	-0.0358	-0.1259*	0.1377	0.0457	-0.0303
		(0.1564)	(0.0485)	(0.0651)	(0.1845)	(0.0487)	(0.0906)
TAXRATE$_{i,t}$	+	-0.0017	-0.0005	0.0073	0.0016	-0.0014	0.0161
		(0.0038)	(0.0010)	(0.0079)	(0.0060)	(0.0016)	(0.0107)
TAXRATE$_{i,t-1}$	+	0.0036	0.0008	0.0032	0.0032	0.0000	0.0072
		(0.0033)	(0.0010)	(0.0039)	(0.0050)	(0.0012)	(0.0054)
MKT-TO-BOOK$_{i,t}$	-	0.0102**	-0.0009	0.0025	-0.0010	-0.0019**	0.0001
		(0.0048)	(0.0010)	(0.0024)	(0.0067)	(0.0010)	(0.0028)
MKT-TO-BOOK$_{i,t-1}$	-	0.0151***	-0.0000	-0.0003	0.0121**	0.0009	0.0079***
		(0.0054)	(0.0009)	(0.0013)	(0.0052)	(0.0008)	(0.0015)
FIXASSETS$_{i,t}$	+	0.0173	0.0982**	0.1010***	0.3282**	0.1668***	0.0600
		(0.1082)	(0.0438)	(0.0350)	(0.1395)	(0.0543)	(0.0535)
FIXASSETS$_{i,t-1}$	+	0.1536**	-0.0658*	-0.0416**	0.0172	-0.0601	-0.0144
		(0.0760)	(0.0355)	(0.0163)	(0.1042)	(0.0415)	(0.0198)
SIZE$_{i,t}$	+	0.0409***	0.0361***	0.0443***	0.0997***	0.0398***	0.0835***
		(0.0151)	(0.0110)	(0.0081)	(0.0181)	(0.0107)	(0.0108)
SIZE$_{i,t-1}$	+	-0.0233***	-0.0108*	-0.0206***	-0.0488***	-0.0160**	-0.0243***
		(0.0082)	(0.0062)	(0.0042)	(0.0122)	(0.0068)	(0.0052)
Correlation1		-6.719***	-7.704***	-18.13***	-6.539***	-8.064***	-20.93***
Correlation2		1.328	-0.3948	0.7203	-1.532	-0.1831	-0.9795
Sargan Test (df)		241.9 (399)	300.1 (287)	444.5 (392)**	243.2 (399)	466.8 (434)	893 (581)***
Wald Test-1 (df)		359.1 (13)***	289.2 (13)***	1270 (13)***	462.9 (13)***	445.4 (13)***	2032 (13)***
Wald Test-2 (df)		95.13 (16)***	22.05 (12)**	333.5 (30)***	334.7 (16)***	181.4 (12)***	1439 (30)***
Firms / Observations		359 / 2453	565 / 4903	2417 / 30123	359 / 2453	565 / 4903	2417 / 30123
Estimation Period		1985-2000	1989-2000	1971-2000	1985-2000	1989-2000	1971-2000

See Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 5.10: Dynamic capital structure using Within Groups Estimations.

Dependent Variable		LEVERAGE1$_{i,t}$			LEVERAGE2$_{i,t}$		
Independent Variables	Predicted Sign	(1) FRANCE	(2) GERMANY	(3) UK	(4) FRANCE	(5) GERMANY	(6) UK
LEVERAGE$_{i,t-1}$	+	0.5374***	0.6127***	0.6175***	0.5720***	0.6652***	0.6561***
		(0.0281)	(0.0195)	(0.0088)	(0.0247)	(0.0173)	(0.0071)
PROFIT$_{i,t}$	-/+	-0.4716***	-0.0974***	-0.1839***	-0.6776***	-0.1145**	-0.2930***
		(0.0476)	(0.0369)	(0.0429)	(0.1127)	(0.0514)	(0.0637)
PROFIT$_{i,t-1}$	-/+	0.1322***	-0.0095	0.0391**	0.1298*	-0.0247	0.0567***
		(0.0467)	(0.0221)	(0.0179)	(0.0665)	(0.0239)	(0.0212)
NDTAX-SHIELD$_{i,t}$	-	0.2137**	0.1525*	0.0042	0.2585*	-0.0393	-0.3617***
		(0.0996)	(0.0821)	(0.0714)	(0.1503)	(0.0698)	(0.0779)
NDTAX-SHIELD$_{i,t-1}$	-	-0.0600	-0.1034*	-0.1272*	0.0845	-0.0287	0.0609
		(0.1251)	(0.0567)	(0.0666)	(0.1478)	(0.0483)	(0.0791)
TAXRATE$_{i,t}$	+	-0.0011	-0.0007	-0.0035***	0.0006	-0.0008	-0.0032**
		(0.0030)	(0.0009)	(0.0010)	(0.0047)	(0.0011)	(0.0015)
TAXRATE$_{i,t-1}$	+	0.0038	0.0006	-0.0028***	0.0045	0.0007	-0.0029**
		(0.0026)	(0.0011)	(0.0009)	(0.0038)	(0.0013)	(0.0014)
MKT-TO-BOOK$_{i,t}$	-	-0.0023	-0.0012*	-0.0016*	-0.0214***	-0.0032***	-0.0167***
		(0.0021)	(0.0007)	(0.0010)	(0.0054)	(0.0011)	(0.0015)
MKT-TO-BOOK$_{i,t-1}$	-	0.0105***	-0.0002	-0.0015**	0.0050	0.0008	0.0031***
		(0.0039)	(0.0008)	(0.0008)	(0.0047)	(0.0009)	(0.0008)
FIXASSETS$_{i,t}$	+	-0.0037	0.1761***	0.1162***	0.1230	0.2065***	0.1235***
		(0.0554)	(0.0379)	(0.0154)	(0.0773)	(0.0421)	(0.0169)
FIXASSETS$_{i,t-1}$	+	0.1490***	-0.0738**	-0.0395***	0.0291	-0.0860**	-0.0244
		(0.0538)	(0.0360)	(0.0141)	(0.0814)	(0.0401)	(0.0160)
SIZE$_{i,t}$	+	0.0460***	0.0153***	0.0342***	0.0996***	0.0307***	0.0597***
		(0.0085)	(0.0054)	(0.0035)	(0.0119)	(0.0060)	(0.0043)
SIZE$_{i,t-1}$	+	-0.0183***	-0.0119**	-0.0178***	-0.0474***	-0.0205***	-0.0278***
		(0.0070)	(0.0051)	(0.0032)	(0.0106)	(0.0058)	(0.0038)
Correlation1		-2.020**	1.369	-1.969**	0.0464	1.826*	4.332***
Correlation2		-1.019	-1.451	-1.256	-3.137***	-2.072**	-2.717***
Wald Test-1 (df)		790.1 (13)***	1541 (13)***	7517 (13)***	1335 (13)***	2341 (13)***	14630(13)**
Wald Test-2 (df)		126.1 (16)***	21.34 (12)**	358.3 (30)***	382.1 (16)***	220.2 (12)***	2399 (30)***
Firms / Observations		359 / 2812	565 / 5468	2417 / 32540	359 / 2812	565 / 5468	2417 / 32540
Estimation Period		1984-2000	1988-2000	1970-2000	1984-2000	1988-2000	1970-2000

See Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Standard GMM-DIF estimator is biased either when the lagged and current dependent variables are highly correlated or when heteroscedasticity is high across cross-sections. It causes downward bias as the coefficient of lagged dependent variable (LDV) increase or relative variance of fixed effects increases. This is very important with respect to our adjustment coefficient which has long-run implications (see equation (5.6)). It also eliminates valuable information by taking first-differences and uses weak instruments.

The results in Table 5.11 show that GMM-SYS estimates, which are produced as a result of the shortcomings of GMM-DIF, are more reasonable than GMM-DIF estimates. This is particularly apparent in the estimated coefficient of lagged leverage, which is substantially higher in GMM-SYS case than in WG case. Hence, GMM-SYS estimator produces higher estimated coefficient of LDV than GMM-DIF does, which is higher than WG estimate and below than OLS estimate. Consequently, the reported results are consistent with the analysis of Blundell and Bond [1998] that in autoregressive models with persistent series, GMM-DIF can cause serious finite sample biases due to weak instruments and these biases can be greatly reduced by including level equations in the system estimator. In what follows, therefore, we will report only the results of system-GMM estimator specification in the next section.

It would be noteworthy to mention about the implications of test statistics in Table 5.11. All Correlation and Sargan Tests are robust for France and Germany and, thus, the models are not misspecified. It implies that the instruments used (lagged-levels dated [t-2] and earlier for differenced equations, and lagged-differenced dated [t-1] for level equations) are valid and there is no second-order correlation. Similarly, the Correlation tests are also robust for the UK. The validity of lagged levels dated [t-3] and earlier as instruments in the first-differenced equations combined with lagged first-differences dated [t-2] as instruments in levels seems to be marginal in GMM-SYS and GMM-DIF estimators for UK using Leverage1 as LDV. What is more, the Sargan Test rejects the validity of instruments at 1% level using Leverage2 as LDV. However, these tests tend to overreject the instrument validity in such a large sample size or in the presence of heteroscedasticity (see e.g., Arellano and Bond [1991], Blundell et al. [2000])[110].

Table 5.11: Dynamic capital structure using GMM-SYS Estimations

Dependent Variable		LEVERAGE1$_{i,t}$			LEVERAGE2$_{i,t}$		
Independent Variables	Predicted Sign	(1) FRANCE	(2) GERMANY	(3) UK	(4) FRANCE	(5) GERMANY	(6) UK
LEVERAGE$_{i,t-1}$	+	0.7532***	0.7578***	0.7599***	0.7353***	0.80750***	0.7670***
		(0.0368)	(0.0304)	(0.0168)	(0.0316)	(0.0265)	(0.0128)
PROFIT$_{i,t}$	-/+	-0.5762***	-0.1558**	-0.1371***	-0.6687***	-0.1471*	-0.1501***
		(0.0892)	(0.0729)	(0.0498)	(0.2184)	(0.0804)	(0.0560)
PROFIT$_{i,t-1}$	-/+	0.3905***	0.0399	0.0862***	0.4163***	0.0219	0.0880***
		(0.0596)	(0.0385)	(0.0274)	(0.1194)	(0.0445)	(0.0271)
NDTAX-SHIELD$_{i,t}$	-	0.5195**	0.1918	0.3042	0.6675**	-0.1074	-0.1242
		(0.2101)	(0.1599)	(0.2003)	(0.2579)	(0.1813)	(0.1750)
NDTAX-SHIELD$_{i,t-1}$	-	-0.3333**	-0.1737***	-0.2043	-0.2714	-0.0264	-0.0029
		(0.1657)	(0.0653)	(0.1315)	(0.1719)	(0.0566)	(0.1116)
TAXRATE$_{i,t}$	+	0.0017	-0.0008	0.0003	0.0018	-0.0025	0.0103
		(0.0049)	(0.0017)	(0.0063)	(0.0095)	(0.0024)	(0.0095)
TAXRATE$_{i,t-1}$	+	0.0039	0.0012	-0.0013	0.0024	0.0007	0.0011
		(0.0029)	(0.0011)	(0.0020)	(0.0050)	(0.0014)	(0.0031)
MKT-TO-BOOK$_{i,t}$	-	0.0045	-0.0015	-0.0051**	-0.0067	-0.0009	-0.0128***
		(0.0066)	(0.0009)	(0.0025)	(0.0051)	(0.0010)	(0.0028)
MKT-TO-BOOK$_{i,t-1}$	-	0.0030	-0.0003	-0.0020**	-0.0017	-0.0004	0.0026**
		(0.0046)	(0.0006)	(0.0010)	(0.0042)	(0.0007)	(0.0011)
FIXASSETS$_{i,t}$	+	0.0405	0.1577**	0.0514	0.4363***	0.1986***	-0.0190
		(0.1167)	(0.0618)	(0.0609)	(0.1153)	(0.0651)	(0.0631)
FIXASSETS$_{i,t-1}$	+	0.0477	-0.0865*	-0.0347	-0.3317***	-0.1209**	0.0342
		(0.1111)	(0.0497)	(0.0527)	(0.1131)	(0.0566)	(0.0543)
SIZE$_{i,t}$	+	0.0216	0.0368***	0.0537***	0.0650***	0.0428***	0.0614***
		(0.0148)	(0.0102)	(0.0109)	(0.0207)	(0.0104)	(0.0125)
SIZE$_{i,t-1}$	+	-0.0191	-0.0374***	-0.0490***	-0.0584***	-0.0387***	-0.0551***
		(0.0142)	(0.0102)	(0.0105)	(0.0200)	(0.0100)	(0.0121)
Correlation1		-7.065***	-9.317***	-19.96***	-7.453***	-9.218***	-23.48***
Correlation2		1.491	-0.1503	1.366	-1.143	0.2154	-0.5716
Sargan Test (df)		266.6 (511)	440.8 (427)	649.1 (595)*	265.9 (511)	518.6 (476)	1081(784)**
Wald Test-1 (df)		904.6 (13)***	1468 (13)***	4750 (13)***	2981 (13)***	2474 (13)***	8163 (13)***
Wald Test-2 (df)		85.15 (16)***	24.14 (12)**	335.7 (30)***	369.6 (16)***	238.4 (12)***	1728 (30)***
R^2		0.7769	0.7861	0.6757	0.8037	0.8219	0.7367
Firms / Observations		359 / 2812	565 / 5468	2417 / 32540	359 / 2812	565 / 5468	2417 / 32540
Estimation Period		1985-2000	1989-2000	1971-2000	1985-2000	1989-2000	1971-2000

See Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

[110] In fact, after dividing the full sample into three classes for size classification, the Sargan Tests turned out to easily accept the validity of instruments for the UK models.

5.4.2.3. The Results of System-GMM Estimator Specification

In this section, we discuss our main results based on the model for which all relevant variables are shown in equation (5.6). Although the main focus will be the static long-run results in Table 5.14, the implications of short-run models in Tables 5.12 & 5.13 will be referred to where necessary.

The GMM estimates in Table 5.13 were obtained, following general-to-specific approach, after excluding the insignificant lagged independent variables from the estimation of general dynamic model in Table 5.12[111]. Focusing on the lagged independent variables in Table 5.13, one can see that almost all lagged-variables are significant in the UK. In France and Germany, size, market-to-book ratio and profitability are the significant lagged-variables. Together with highly-significant lagged dependent variable, a significant lagged variable would imply some transitional effects on debt-ratios. This finding necessitates the discussion of long-run relationships between leverage and firm-specific factors. In Tables 5.12 & 5.13, time dummies are not included. Instead, we use market-related factors that control for time effects more explicitly. The significant coefficients of these factors emphasise the importance of dynamic relationship between firm characteristics and changes in business life.

5.4.2.3.1. Lagged Leverage

In Tables 5.12 &5.13, the coefficient of lagged leverage is positive and significant at 1% level for all countries. Beside this, as it is between zero and unity, one can assert that the coefficient is stable and converging to its desired value. It is important to note that the adjustment speed is independent from the serial correlation problem. Hence, the inclusion of lagged dependent variable implying the existence of dynamic capital structure is validated with these results. Accordingly, one can argue that the firms adjust their leverage ratios in order to achieve their targeted capital structure[112]. In terms of the adjustment speed, French firms are the quickest ones in adjusting themselves to desired debt ratios in all cases. For instance, they have the highest adjustment coefficient of 0.5760 (θ =1-0.4240) based on market leverage in Table 5.12. This is consistent with the idea that time

[111] Before discussing the implication of results in particularisation, it should again be noted that there is no misspecification problem for all countries. As one expects, all Correlation-1 test statistics indicate the existence of significant and negative first-order serial correlation of residuals while all Correlation-2 statistics do not reject the null hypothesis of no second-order serial correlation. Finally, all Sargan Tests (except the over-rejection case in the UK) confirm the validity of instruments used in the models, as there is no correlation between the residuals and the instruments.

dimension constructs a very important variable explaining the evolution of firms' debt ratios in France (Kremp et al. [1999]). It seems the adjustment process is relatively very costly and slow in Germany, where the adjustment coefficient is always lowest. It can also be argued that the cost of not being on the targeted (equilibrium) debt ratio is insignificant for the German firms. Thus, it may not be very important for German firms to adjust quickly their debt ratios as they are in a bank-oriented economy, where capital markets seem to react relatively slowly to financial activities of corporations. The UK seems to be the middle case in this adjustment process with the medium adjustment coefficients. Overall, the results seem to reveal that the dynamic capital structure implied by our model is not rejected as firms tend to trade-off between transaction costs of being on-target and disequilibrium costs of being off-target.

Table 5.14 shows the static long-run relationship between leverage and firm-specific factors based on general (panel-a) and specific (panel-b) case (see equation [5.2]). The GMM estimates for the long-run model are obtained using the following general equation. The implications of these long-run relationships will be discussed in depth in the next sections. (**PcGive**'s calculations for the estimated coefficients of static long-run equation are based on the algorithm proposed by Bårdsen [1989]).

$$\begin{aligned}
Leverage^{*}_{it} &= \left(\frac{\beta_2+\beta_3}{1-\beta_1}\right) Profitability^{*}_{it} + \left(\frac{\beta_4+\beta_5}{1-\beta_1}\right) Tax\ Rate^{*}_{it} + \left(\frac{\beta_6+\beta_7}{1-\beta_1}\right) Market\ to\ Book\ ratio^{*}_{it} + \\
&\left(\frac{\beta_8+\beta_9}{1-\beta_1}\right) Fixed\ Assests^{*}_{it} + \left(\frac{\beta_{10}+\beta_{11}}{1-\beta_1}\right) Firm\ Size^{*}_{it} + \left(\frac{\beta_{12}+\beta_{13}}{1-\beta_1}\right) Earnings\ \ Volatility^{*}_{it} + \\
&\left(\frac{\beta_{14}+\beta_{15}}{1-\beta_1}\right) Dividend^{*}_{it} + \left(\frac{\beta_{16}+\beta_{17}}{1-\beta_1}\right) Market\ Equity\ Premium^{*}_{it} + \\
&\left(\frac{\beta_{18}+\beta_{19}}{1-\beta_1}\right) Term\ Structure^{*}_{it} + \left(\frac{\beta_{20}+\beta_{21}}{1-\beta_1}\right) Share\ Price\ Change^{*}_{it} \qquad (5.6)
\end{aligned}$$

[112] In their survey of 392 US firms, Graham and Harvey [2001] find that 44% of the firms in their sample have strict or somewhat strict target debt ratios and 64% of investment-grade firms have somewhat strict optimal capital structure implied by static trade-off theory.

Table 5.12: Dynamic capital structure using GMM-SYS Estimations (General).

Dependent Variable		BOOK-LEVERAGE$_{i,t}$			MARKET-LEVERAGE$_{i,t}$		
Independent Variables	Predicted Sign	FRANCE	GERMANY	UK	FRANCE	GERMANY	UK
LEVERAGE$_{i,t-1}$	+	0.7089***	0.7859***	0.7301***	0.4240***	0.7958***	0.6457***
		(0.0381)	(0.0369)	(0.0179)	(0.0329)	(0.0266)	(0.0162)
PROFIT$_{i,t}$	-/+	-0.6175***	-0.0788	-0.1398***	-0.7382***	-0.1396	-0.1491***
		(0.1232)	(0.0732)	(0.0542)	(0.1432)	(0.0888)	(0.053)
PROFIT$_{i,t-1}$	-/+	0.4358***	-0.0005	0.0951***	0.3063***	0.0076	0.0473*
		(0.1016)	(0.0255)	(0.0298)	(0.0853)	(0.0333)	(0.0243)
TAXRATE$_{i,t}$	+	-0.0019	-0.0006	-0.0105**	0.0004	-0.0016	0.0278**
		(0.005)	(0.0021)	(0.0053)	(0.0106)	(0.0025)	(0.0118)
TAXRATE$_{i,t-1}$	+	0.0017	0.0011	-0.0050***	0.0016	0.0005	0.0039
		(0.0028)	(0.0011)	(0.0017)	(0.0048)	(0.0015)	(0.0034)
MKT-TO-BOOK$_{i,t}$	-	0.0098	-0.0015**	0.0016	-0.0560***	-0.0015*	-0.0517***
		(0.0105)	(0.0007)	(0.0024)	(0.0118)	(0.0008)	(0.0065)
MKT-TO-BOOK$_{i,t-1}$	-	-0.0013	0.0004	-0.0034***	0.0133*	0.0003	0.0113***
		(0.0079)	(0.0006)	(0.0011)	(0.008)	(0.0007)	(0.0034)
FIXASSETS$_{i,t}$	+	0.0070	0.1193	0.0570	0.2425**	0.1858**	-0.3304***
		(0.1112)	(0.0811)	(0.0516)	(0.1237)	(0.0865)	(0.0798)
FIXASSETS$_{i,t-1}$	+	0.1067	-0.0571	-0.0310	-0.0556	-0.1142	0.2782***
		(0.1072)	(0.0691)	(0.0443)	(0.1195)	(0.0699)	(0.0669)
SIZE$_{i,t}$	+	0.0601***	0.0380***	0.0466***	0.1281***	0.0483***	0.0476***
		(0.0162)	(0.0107)	(0.0093)	(0.026)	(0.0127)	(0.0161)
SIZE$_{i,t-1}$	+	-0.0585***	-0.0375***	-0.0411***	-0.1186***	-0.0435***	-0.0407***
		(0.0159)	(0.0104)	(0.0090)	(0.0258)	(0.0122)	(0.0156)
EARNINGS VOL$_{i,t}$	-	-0.0001	0.0000	0.0001	-0.0011	0.0000	-0.0004
		(0.0003)	(0.0001)	(0.0002)	(0.0007)	(0.0001)	(0.0003)
EARNINGS VOL$_{i,t-1}$	-	-0.0001	0.0000	0.00005**	-0.0002	0.0000	0.0001
		(0.0003)	(0.0000)	(0.00002)	(0.0004)	(0.0000)	(0.0001)
DIVIDEND$_{i,t}$	-/+	-0.0004	0.0001	-0.0015*	0.0018	0.0005	-0.0040**
		(0.0005)	(0.0002)	(0.0009)	(0.0012)	(0.0003)	(0.0018)
DIVIDEND$_{i,t-1}$	-/+	0.0002	0.0000	-0.0005	0.0013*	0.0001	-0.0018***
		(0.0005)	(0.0001)	(0.0003)	(0.0007)	(0.0002)	(0.0006)
EQUITY PREMIUM	-	0.0002*	-0.0001	0.0000	0.0002	-0.0001	-0.0003***
		(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
TERM-STRUCTR	-	-0.0047***	-0.0012*	-0.0017***	-0.012***	-0.0022**	-0.0047***
		(0.0011)	(0.0007)	(0.0002)	(0.0016)	(0.0010)	(0.0004)
SHARE PRICE	-	-0.0125**	-0.0126**	-0.0119***	-0.0547***	-0.0560***	-0.0189***
		(0.0062)	(0.0062)	(0.0021)	(0.0082)	(0.0069)	(0.0035)
Constant		0.0313	0.0229	0.0073	0.1520**	-0.0005	0.1261***
		(0.0247)	(0.0231)	(0.008)	(0.0622)	(0.0282)	(0.0174)
Correlation1		-6.166***	-8.738***	-18.90***	-6.779***	-9.009***	-20.47***
Correlation2		1.014	0.09975	1.316	0.3003	1.359	3.266***
Sargan Test (df)		272.2 (575)	281.5 (263)	850 (679)***	256.7 (574)	322 (263)***	1159(679)**
Wald Test-1 (df)		1016 (18)***	1450 (18)***	4448 (18)***	948.4 (18)***	3013 (18)***	4673 (18)***
Wald Test-2 (df)		33.71 (15)***	30.14 (14)***	36.15 (15)***	39.74 (15)***	32.01 (14)***	74.75 (15)**
R^2		0.7896	0.7969	0.6753	0.7140	0.8240	0.6432
Firms / Observations		293 / 2280	506 / 4772	2194 / 29774	293 / 2280	506 / 4772	2194 / 29774
Estimation Period		1986-2000	1990-2000	1972-2000	1986-2000	1990-2000	1972-2000

See notes in Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 5.13: Dynamic capital structure using GMM-SYS Estimations (Specific).

Dependent Variable		BOOK-LEVERAGE$_{i,t}$			MARKET-LEVERAGE$_{i,t}$		
Independent Variables	Predicted Sign	FRANCE	GERMANY	UK	FRANCE	GERMANY	UK
LEVERAGE$_{i,t-1}$	+	0.7143***	0.7905***	0.7282***	0.4550***	0.7897***	0.6461***
		(0.0377)	(0.0369)	(0.0183)	(0.0302)	(0.0292)	(0.0161)
PROFIT$_{i,t}$	-/+	-0.4540***	-0.0985*	-0.1385***	-0.5521***	-0.1390**	-0.1584***
		(0.0774)	(0.0590)	(0.053)	(0.1971)	(0.067)	(0.0561)
PROFIT$_{i,t-1}$	-/+	0.3277***	-	0.0943***	0.2145*	-	0.0575**
		(0.0728)	-	(0.0293)	(0.1136)	-	(0.0277)
TAXRATE$_{i,t}$	+	-0.0005	0.0042	-0.0106**	0.0087	0.0017	0.0309**
		(0.0058)	(0.0043)	(0.005)	(0.0125)	(0.0053)	(0.0141)
TAXRATE$_{i,t-1}$	+	-	-	-0.0050***	-	-	-
		-	-	(0.0017)	-	-	-
MKT-TO-BOOK$_{i,t}$	-	0.0098**	-0.0012	0.0016	-0.0533***	-0.0009	-0.0508***
		(0.0042)	(0.0009)	(0.0023)	(0.0106)	(0.0008)	(0.0063)
MKT-TO-BOOK$_{i,t-1}$	-	-	-	-0.0034***	0.0148**	-	0.0110***
		-	-	(0.0011)	(0.0068)	-	(0.0030)
FIXASSETS$_{i,t}$	+	0.1290***	0.0968**	0.0378**	0.2524***	0.1278**	-0.3265***
		(0.0399)	(0.0484)	(0.0176)	(0.0571)	(0.0541)	(0.0806)
FIXASSETS$_{i,t-1}$	+	-	-	-	-	-	0.2696***
		-	-	-	-	-	(0.0672)
SIZE$_{i,t}$	+	0.0331**	0.0398***	0.0471***	0.0988***	0.0509***	0.0482***
		(0.0130)	(0.0122)	(0.009)	(0.0213)	(0.012)	(0.0161)
SIZE$_{i,t-1}$	+	-0.0305**	-0.0395***	-0.0418***	-0.0886***	-0.0462***	-0.0418***
		(0.0125)	(0.0120)	(0.0087)	(0.0214)	(0.0116)	(0.0155)
EARNINGS VOL$_{i,t}$	-	0.0002	-0.0001	0.0000	-0.0003	0.0000	-0.0004
		(0.0004)	(0.0001)	(0.0002)	(0.0008)	(0.0001)	(0.0004)
EARNINGS VOL$_{i,t-1}$	-	-	-	0.00004**	-	-	-
		-	-	(0.00002)	-	-	-
DIVIDEND$_{i,t}$	-/+	0.0008	0.0000	-0.0010	0.0016*	0.0003	-0.0041**
		(0.00063)	(0.0002)	(0.0009)	(0.001)	(0.0005)	(0.0019)
DIVIDEND$_{i,t-1}$	-/+	-	-	-	0.0011*	-	-0.0018***
		-	-	-	(0.0006)	-	(0.0006)
EQUITY PREMIUM	-	0.0002*	-0.0001	0.0000	0.0003**	0.0001	-0.0003***
		(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
TERM-STRUCTR	-	-0.0050***	-0.0008	-0.0018***	-0.0131***	-0.0013	-0.0048***
		(0.0010)	(0.0007)	(0.0002)	(0.0015)	(0.001)	(0.0004)
SHARE PRICE	-	-0.0073	-0.0120**	-0.0122***	-0.0523***	-0.0525**	-0.0181***
		(0.0065)	(0.0057)	(0.0021)	(0.0073)	(0.0065)	(0.0034)
Constant		0.0048	0.0084	0.0037	0.0942*	-0.0261	0.1344***
		(0.0244)	(0.0243)	(0.0090)	(0.0563)	(0.034)	(0.0182)
Correlation1		-6.654***	-8.992***	-18.80***	-7.011****	-9.178***	-21.12***
Correlation2		1.691	-0.4362	1.415	-0.9985	0.5795	3.352***
Sargan Test (df)		275.6 (583)	286.7 (271)	854 (679)***	278.1 (583)	342 (271)***	1159(679)**
Wald Test-1 (df)		902.5 (13)***	761.9 (12)***	3833 (16)***	1181 (15)***	1416 (12)***	4683 (16)
Wald Test-2 (df)		38.64 (15)***	32.90 (14)***	34.56 (15)***	43.06 (15)***	29.76 (14)***	76.64 (15)**
R^2		0.7870	0.7899	0.6753	0.7287	0.8180	0.6370
Firms / Observations		325 / 2604	529 / 5045	2197 / 29799	321 / 2573	529 / 5045	2342 / 31760
Estimation Period		1985-2000	1989-2000	1972-2000	1985-2000	1989-2000	1971-2000

See notes in Table 5.1 for variable definitions. Asymptotic standard errors robust to heteroscedasticity are in the parentheses. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

5.4.2.3.2. Profitability

In Table 5.14, there is a significantly negative association between profitability and leverage in all countries, which is consistent with the Pecking Order Theory (POT) (Myers [1984]; Myers and Majluf [1984])[113]. That is, firms rely on their retained earnings at first instance for their investment opportunities and then, on external funding if needed. The results, hence, do not confirm the positive prediction of Free Cash Flow Theory (Jensen [1986]), which argues that debt reduces agency costs of free cash and disciplines management[114]. It seems that the agency costs of using debt is not negligible and the bankruptcy probability due to higher debt ratios cannot be preferred to additional tax benefits of using more debt in these countries. Or, the agency cost of free cash flow is not considerable, which cannot outweigh the importance of information asymmetries implied by POT. A profitable UK firm may have high debt-ratios to convey a quality signal to the market, where information disclosure of corporations is much more important than in Continental Europe[115]. It is also possible that in order to shelter gross profit from corporate taxes, firms with high income might have motivations to borrow more. Consequently, it may be surprising to find a significantly negative correlation in the UK, where market for corporate control plays an important disciplinary role in management and managers do not have control over the information processed by creditors. This fact could also explain why there is no significantly positive relationship between profitability and leverage in Germany, where takeovers are very rare and managers are informationally advantageous.

Hovakimian et al. [2001] argue that firms with relatively high profitability are likely to have more valuable assets-in-place, thus higher target debt-ratios. However, our results contradict this argument as profitability has significantly negative influence upon leverage despite the significantly positive relationship between profitability and fixed-assets ratio (see Table 5.2). One may, thus, argue that there might be chronic problems in raising outside equity because there is information asymmetries between managers and

[113] The same association is also reported by Bennett and Donnelly [1993], De Jong and Veld [2001], Johnson [1998], Narayanan [1988], and Shyam-Sunder and Myers [1999]. Therefore, the present evidence is not in line with the findings of Blazenko [1987], Leland and Pyle [1977], Heinkel [1982], John [1987] and Ross [1977].

[114] As discussed by Myers [1998], a significantly negative relationship between profitability and leverage would also invalidate the static-tradeoff theory in this respect as it suggest a direct causation because higher profit would mean more taxable income to shield.

[115] In fact, the empirical evidence shows that security prices rise when firms announce leverage-increasing events (e.g., Masulis [1980]; Travlos [1987], and decline when firms announce leverage-decreasing events (e.g., Asquith and Mullins [1986]; Loughran and Ritter [1995].

shareholders as well as adverse selection problems. The highest negative contemporaneous coefficient of profitability in Table 5.14 is in France. This implies that French firms, whose managers are argued to have strategic advantage over the information processed by creditors, use a hierarchy of alternative financing due to severe information asymmetries as stated by POT. As another reason, the protection of both shareholders and creditors is weakest in France (La Porta et al., 2000b), which means French firms should rely on their profits most as external borrowing is difficult or very costly. Similarly, the significantly negative coefficient of profitability in Germany is in line with POT, which contrasts with the traditional idea that the type of banks' relationship with firms and the concentrated ownership mitigate asymmetric information problems[116].

The relationship between past profitability and leverage is significantly positive in France and in the UK (Table 5.13). Past profitability can be regarded as a proxy for higher future growth opportunities in the framework of intangible assets. Consequently, this positive correlation should not be expected as the value of intangible assets decrease considerably in case of financial distress (see, Smith and Watts [1992]; Shyam-Sunder and Myers [1999]). As another explanation, firms may have been in short of enough retained profits as they would have needed more financing for attractive projects with positive-NPVs, which were unexpectedly abundant within a relatively short period. In order not to miss these opportunities they might have borrowed externally despite their increasing retained earnings. Alternatively, with a background of higher profitability it may be much easier for the firms to raise external capital.

5.4.2.3.3. Effective Tax Rate

In Table 5.14, the estimated coefficient of tax rate is always insignificant in France and Germany. As the coefficients are insignificant, one would not conclude that debt financing-related costs (e.g., agency and bankruptcy costs) seem to be outweighed by the tax benefits of debt financing in these countries. The insignificance of tax rate in France is not surprising as one may not expect such an association due to the fact that French tax

[116] Edwards and Fischer [1994] mention about how German banks decide whether a firm is eligible for a loan: German banks always obtain the firm's accounts for the preceding three years to have information about the management characteristics and its prospects for profitability and liquidity. The conventional wisdom that 'close relationship between German banks and firms due to bank representation on supervisory boards increases firm profitability', however, takes limited support by the empirical study of Edwards and Fischer [1994]. On the other hand, Cable's [1985] study on the role of banks in increasing German firms' profitability shows that there are motivations for large firms' shareholders to monitor management closely, thus, improve profitability. This deduction might stem from the greater degree of concentration of shareholdings in German firms than in UK firms.

system is mainly designed to promote the retentions of profits by reducing corporate taxes constantly. On the other hand, the significantly positive correlation between tax rate and market-leverage in the UK lends support to the mainstream finance literature (Modigliani and Miller [1963]) proposing a capital structure with almost only debt due to tax advantages of debt financing[117].

Interestingly, we detect a significantly negative association between tax rate and book-leverage in the UK[118]. This negative effect could also be due to the argument of Fama and French [1998] stating that negative information in high leverage about profitability outweighs tax benefits of debts. Jordan et al. [1998] also find a very strongly significant negative association between debt ratios and tax rate across UK firms. Accordingly, we can also argue that higher corporate taxes reduce the net earnings after taxes or the amount of retained earnings. This fact may lead the debt capacity of the firms to fall. It seems probable that the average amount of tax paid during time *t* affects the average level of debt during time *t+1* simply as a result of the effect on retained earnings. Consequently, this may explain the negative relationship between tax rate and leverage in the long-run.

5.4.2.3.4. Market-to-Book Ratio

The results in Table 5.14 under book-leverage show that the association of leverage with market-to-book ratio (proxy for growth opportunities) is different across countries, which may imply that resolving agency problems and related costs might differ across different legal systems. On one hand, the coefficient is significantly positive in France. The positive association may be because of the low shareholder protection in France such that growing firms would not prefer equity but debt financing. In Germany and the UK, the association is negative and significant only for one case (Germany, panel-a). Furthermore, the significantly positive coefficient in France may imply that French firms do not suffer from these problems or their profitable growth opportunities are not financially constrained. Alternatively, as there are no severe debt-related agency costs

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[117] Haugen and Senbet [1986], Mohammed et al. [1998] and Zimmerman [1983] justify this positive correlation.

[118] Taub [1975] also reports a negative relationship between (statutory) tax rate and debt-equity ratio. He has two possible explanations for this finding. Total variation in the tax rate during the estimation period is not sufficient enough to affect firms' debt ratios, or, there are some unknown factors closely correlated with tax rate. Since we do not use statutory tax rate, our tax variable does not suffer from invariation during the period. Furthermore, Fischer et al. [1989] and Yang et al. [2001] find a negative relation between effective tax rate and optimal debt ratio range. Yang et al. [2001] argue that the use of interest rate swaps by firms results in this negative association as hedging may reduce firms' expected tax liability (tax incentive of hedging argument).

problems they might prefer debt to equity. The monitoring of large shareholders in the UK is not effective due to dispersed ownership. However, it is unlikely to see the same problem in France because of the family and government influence on French firms, which might bring about this positive correlation. If asymmetric information problems are substantial in high-growth firms, then, such firms would employ high debt ratios to signal their quality to the market[119]. That argument could be another explanation for the significantly positive market-to-book ratio coefficient in France.

However, the relationship turns out to be significantly negative under market-leverage in all countries[120]. The results support the idea that cost of financial distress is relatively high and agency cost of debt (underinvestment problem) is considerable. Actually, this negative association is expected in the UK, where shareholders protection is high and therefore equity should be preferred over debt as an external finance. The rationale behind this association is that the firms having relatively higher growth opportunities may experience more severe underinvestment problems and thus less debt is used to mitigate such problems (Myers [1977]). Instead of existing assets, more of the firms' value with high market-to-book ratio arises from future cash flow streams of present and future projects. The capital markets might perceive that less debt or more equity is issued in situations where the firms' equity is overvalued by managers, and that rising market-to-book ratios increase the cost of financial distress (expected liquidation costs)[121]. In this case, high market-to-book ratios may decrease firms' debt capacity. Alternatively, equity might be preferred by both managers and shareholders of firms with growth opportunities as their interest coincide (Jung et al. [1996]). In the absence of investment opportunities, debt would be useful to mitigate the agency costs of managerial discretion (Jensen [1986], Berger et al. [1997]). This would reduce debt-equity ratios as higher (lower) growth opportunities would warrant the use of more equity (debt). The negative association of growth opportunities with leverage in Germany is not an expected result since the universal German banking system is supposed to reduce the asymmetric information problems.

[119] See Gul [1999], and Myers and Majluf [1984] for a similar discussion.

[120] Our negative finding is in line with the results of Johnson [1997,1998] and Rajan and Zingales [1995].

[121] In their new capital structure theory of market timing, Baker and Wurgler [2002] also document that current capital structure, which is assumed to be the cumulative outcome of past attempts, is strongly correlated to past market values. The theory, hence, does not assume an optimal capital structure. The authors use the market-to-book ratio to measure the market timing opportunities realised by managers. They find that firms are low (high)-levered because they raise funds when their market valuations are high (low).

Table 5.14 indicates that the results in France are sensitive to the alternative leverage definition, as the coefficient has become significantly negative at 1% level under market-leverage. In Germany, alternative leverage definition did not change the results. Although the coefficients are insignificant in panel-b, they are always negative. This may imply that the agency costs of debt supposed to be mitigated by main banks are higher than natural costs of equity due to flexible disclosure standards[122]. The opportunity for managers to pursue their own objectives at the expense of shareholders is very limited in Germany since most German firms have a large shareholders with strong incentives to monitor the management (Edwards and Fischer [1994]). This in turn suggests that agency costs of debt financing are reduced with the structure of share ownership by the close monitoring of management in Germany. Consequently, the strongly negative coefficient of market-to-book ratio is unexpected in Germany, where firms can benefit from low costs of debt and high debt capacity because of their long-term relationship with creditors.

5.4.2.3.5. Fixed Assets Ratio

The association between leverage and fixed assets ratio is significantly positive irrespective of the leverage definitions in France and Germany; and under book-leverage in the UK. This positive correlation is not surprising since there is a consensus on the effect of fixed asset ratio to capital structure in this direction (Harris and Raviv [1991], Myers [1977,1984], Scott [1977]). There is a potential problem of asset substitution-risk shifting in firms with proportionately low tangible fixed assets. Hence, it is difficult for firms with relatively high tangible assets to shift to riskier projects as their debt is secured with these assets (Johnson [1997, 1998], Stulz and Johnson [1985]). Therefore, tangible assets mitigate the agency costs of debt financing thereby raising optimal debt level since they can be regarded as collateral for debt. Furthermore, tangible assets have also the potential to generate cash flows. Johnson [1997] uses fixed asset ratio as a proxy for project liquidation values. This is useful because the firms with relatively more intangible assets are given less reliance in supplying debt by creditors since the intangible assets tend to be less valued in case of firms' liquidation. The fact that the relation is always significant may imply that the agency problems in the corporations are considerable, which necessitates the collateral of physical assets for borrowing.

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[122] Hovakimian et al. [2001] find that firms prefer equity issuance or debt repurchase when the incumbent managers think that the current share price is high relative to book value, assuming better growth opportunities are realised. This result being consistent with tradeoff /adjustment models may also be a reason for negative relationship between market-to-book ratio and leverage.

According to Edwards and Fischer [1994], the importance of collateral for loans in Germany is caused partly by institutional factors; e.g., saving banks are generally subject to limits on the amounts of uncollateralised loans they make. However, they emphasise that the procedures used by German and British banks to evaluate loan applications seem to be similar. Notwithstanding, the importance of tangibility should be less in Germany if the conventional wisdom is right in arguing that close relationship between German banks and firms reduces agency costs of debt (Berger and Udell [1994]).

Finally, the observed inverse relationship between market-leverage and tangibility of assets in the UK in Table 5.14 is more likely to be spurious than real.

5.4.2.3.6. Size

Table 5.14 shows that the definition of leverage matters in France and Germany regarding the influence of size on leverage[123]. The effect of size on debt ratios under market-leverage is the same across countries as the coefficient is always significantly positive at 1%[124]. The effect of bankruptcy costs can be seen as one of main determinants of optimal capital structure as a market imperfection (Kraus and Litzenberger [1973]). Moreover, Warner [1977] and Ang et al. [1982] argue that market value of the firm is negatively associated with the ratio of direct bankruptcy costs to firm value, which proposes that large firms might not envisage considerable difficulties in external borrowing. Assuming that size is the inverse proxy for bankruptcy probability, these arguments may help explain the positive correlation between size and leverage due to considerable costs of expected financial distress. Bankruptcy code is not conductive to reorganising firms, i.e., firms entering bankruptcy are usually liquidated in Germany, and liquidation process is costly and lengthy. If this is the case, the strongly positive correlation between size and leverage should not be unexpected.

On the other hand, under book-leverage, there is an insignificant relationship between size and debt ratios in Germany[125]. One possible explanation to this is that the control problems of large German companies may be mitigated by the effective role of banks in firm management. Another reason could be that German banks are supposed to support the firms in bad conditions (see, Dyson [1986]). Besides, because of information

[123] The results are based on firm size measured by total sales. We also used total assets as an alternative to size measure but it did not change the quality of results.

[124] The same association is also reported by Bennett and Donnelly [1993], Friend and Lang [1988], Marsh [1982], Michaelas et al. [1999], Mohammed et al. [1998], Theis and Casey [1999] and Warner [1977].

asymmetries small firms do not prefer costly equity financing and thus choose debt financing. The costs of resolving asymmetric information problems as well as the bankruptcy and agency costs are higher in small firms whose stocks are relatively less traded. Hence, one may argue that large German firms prefer informationally sensitive equities in the presence of asymmetric information between managers and outside investors, which leads to low debt ratios[126].

5.4.2.3.7. Earnings Volatility

Contrary to our expectations the volatility in earnings does not play any significant role in the capital structure decisions of the firms in any of the sample countries in Table 5.14. In the case of UK, some evidence of a positive relationship appears in Tables 5.12 & 5.13, which is theoretically inconsistent.

5.4.2.3.8. Dividend Payout Ratio

The results in Table 5.14 show that the impact of dividend policy on capital structure decisions varies across countries. In Germany, these two policies seem to be independent from each other as the relevant coefficient is not significant. The observed relation should have been significantly positive due to German taxation system if the tax arguments were right. Regarding the concentrated corporate ownership in Germany, this result may not be surprising. It is because large shareholders may not need the management to be monitored by the capital markets by forcing them to pay dividends and to search for external finding.

In France, market-leverage and payout ratio are positively correlated at 10 % significance level. This may be due to net weight of tax effect as shareholders receives tax credit for dividend income despite the tax rate on capital gains and dividends are standard. In this case, higher payout ratio increases relative cost of equity, encourages the use of debt, and thus leads to higher debt ratios. Another reason for the positive relation can be due to signalling effects. If lower payout ratio means more growth opportunities, then it should also mean lower debt ratios due to agency costs of debt (see, Myers [1977]).

[125] Johnson [1997, 1998], Kester [1986], Kim and Sorensen [1986], and Titman and Wessels [1988] also find a negative size effect.

[126] Ferri and Jones [1979] argue that it is not as simple as it seems to suggest a monotonically positive relationship between leverage and size. According to Castanias [1983], one might not find a positive correlation between leverage and default probability. Although Castanias [1983] implies a positive relation between size and leverage, he emphasises the ambiguity of this association despite the assertion of Titman and Wessels [1988] suggesting a direct relationship as larger firms are less likely to suffer from the bankruptcy threat. Interestingly, Harris and Raviv [1990] find a positive relationship between leverage and default probability. Booth et al. [2001] report inconsistent size effects across developing countries. Consequently, the size effect should be interpreted under the light of these caveats and controversies.

On the other hand, the relationship between leverage and payout ratio is significantly negative in the UK. One possible explanation is that if higher payout ratios signal higher expected future income the cost of equity associated with information asymmetries may decrease. Then, in return issuing equity would be advantageous, which would reduce the debt-equity ratio. Furthermore, this negative relation can be explained in the agency framework: In the debt contracts bondholders may restrict the dividend-paying firms to have high debt ratios at the same time.

5.4.2.3.9. Control (Market-related) Variables

Equity Premium

The results indicate that the influence of equity premiums on capital structure decisions is market dependent. In France managers seem to prefer to issue debt at the time of higher equity premium as suggested by the positive and significant coefficient in Table 5.14. On the other hand, the market-leverage in the UK declines significantly in response to increases in equity premium. This implies that managers issue more equity when the equity premium is high. This is possible in a situation when the observed high equity premium is due to a bullish market and managers believe that even after offering the required discount on equity issued the amount raised is at least equivalent to the true value of the securities issued. Unlike in France and in the UK, firms in Germany do not seem to consider the market equity premium while deciding their capital structure. This may also be related to the our evidence that German firms do not adjust their capital structure as quick as their French and UK counter parts do.

Term Structure of Interest Rates

Consistent with our expectation the results reveal an inverse relationship between the term-structures of interest rates and market-leverage in all sample countries in Table 5.14. This confirms the argument that at the time of high long-term interest rate firms are reluctant to raise debt capital and hence raise equity capital to meet their financing need. This seems to hold in all sample countries irrespective of their institutional arrangements and traditions.

Change in Share Price

Consistent with our expectation the results for all sample countries in Table 5.14 reveal that the book-leverage and market-leverage declines after an increase in share value. The significant negative coefficient of six-month lag annual return indicates that managers issue equity after positive stock market performance. In a situation of information asymmetry, where managers are better informed than the market (as in Myers and Majluf

[1984]) and they work for the benefit of existing shareholders, issuing equity signals that the shares are overvalued and hence a discount should be offered to attract new investors to invest on equity capital. However, if the current share prices are high then the realised value of the shares (even after the discount) is likely to be at least equivalent the true value of the equity, a condition conducive to equity issue. Moreover, the significant effect of this variable on book-leverage confirms that a reduction in leverage is not only due to the relative increase in the market value of equity (the denominator in market-leverage) but also due to actual additions in the value of equity. Therefore, our results confirm the common belief that managers issue equity when share prices are high.

Table 5.14: Static long-run relationship using system-GMM.

Dependent Variable		BOOK-LEVERAGE$_{i,t}$			MARKET-LEVERAGE$_{i,t}$		
Independent Variables	Predicted Sign	FRANCE	GERMANY	UK	FRANCE	GERMANY	UK
a) General							
PROFIT$_{i,t}$	-/+	-0.6245***	-0.3705	-0.1657	-0.7498***	-0.6466**	-0.2873***
		(0.1564)	(0.2728)	(0.1079)	(0.1499)	(0.3214)	(0.1000)
TAXRATE$_{i,t}$	+	-0.0006	0.0025	-0.0575**	0.0034	-0.0055	0.0894**
		(0.0231)	(0.0132)	(0.0244)	(0.0242)	(0.0176)	(0.0422)
MKT-TO-BOOK$_{i,t}$	-	0.0293*	-0.0053**	-0.0067	-0.0741***	-0.0056**	-0.1141***
		(0.0158)	(0.0024)	(0.0067)	(0.0144)	(0.0026)	(0.0125)
FIXASSETS$_{i,t}$	+	0.3904***	0.2906***	0.0963***	0.3244***	0.3504***	-0.1475***
		(0.0783)	(0.1036)	(0.0336)	(0.0700)	(0.1320)	(0.0461)
SIZE$_{i,t}$	+	0.0056	0.0021	0.0203***	0.0165***	0.0235***	0.0196***
		(0.0043)	(0.0058)	(0.0024)	(0.0054)	(0.0070)	(0.0034)
EARNINGS VOL$_{i,t}$	-	-0.0005	-0.0001	0.0004	-0.0023	0.0001	-0.0010
		(0.0014)	(0.0002)	(0.0007)	(0.0014)	(0.0002)	(0.0011)
DIVIDEND$_{i,t}$	-/+	-0.0008	0.0004	-0.0074*	0.0053*	0.0030	-0.0165**
		(0.003)	(0.0011)	(0.0045)	(0.0029)	(0.0019)	(0.0069)
EQUITY PREMIUM	-	0.0007*	-0.0006	0.0000	0.0003	-0.0003	-0.0008***
		(0.0004)	(0.0004)	(0.0001)	(0.0003)	(0.0006)	(0.0002)
TERM-STRUCTR	-	-0.0161***	-0.0057*	-0.0064***	-0.0209***	-0.0110**	-0.0134***
		(0.0041)	(0.0033)	(0.0008)	(0.0028)	(0.0049)	(0.0013)
SHARE PRICE	-	-0.0431**	-0.0588**	-0.0442***	-0.0950***	-0.2743***	-0.0534***
		(0.0207)	(0.0296)	(0.008)	(0.0149)	(0.0437)	(0.0096)
b) Specific							
PROFIT$_{i,t}$	-/+	-0.4422***	-0.4700*	-0.1625	-0.6194***	-0.6612**	-0.2851***
		(0.1177)	(0.2874)	(0.1048)	(0.1763)	(0.3168)	(0.1003)
TAXRATE$_{i,t}$	+	-0.0017	0.0200	-0.0571**	0.0159	0.0081	0.0874**
		(0.0202)	(0.0211)	(0.0229)	(0.0229)	(0.0254)	(0.0400)
MKT-TO-BOOK$_{i,t}$	-	0.0343**	-0.0055	-0.0063	-0.0706***	-0.0043	-0.1123***
		(0.0153)	(0.0044)	(0.0066)	(0.0135)	(0.004)	(0.0123)
FIXASSETS$_{i,t}$	+	0.4514***	0.4618**	0.1390**	0.4631***	0.6078**	-0.1608***
		(0.1365)	(0.2258)	(0.0625)	(0.1012)	(0.2561)	(0.0474)
SIZE$_{i,t}$	+	0.0092*	0.0015	0.0196***	0.0187***	0.0221***	0.0181***
		(0.0047)	(0.005)	(0.0023)	(0.0052)	(0.0069)	(0.0036)
EARNINGS VOL$_{i,t}$	-	0.0007	-0.0003	0.0003	-0.0005	-0.0002	-0.0013
		(0.0014)	(0.0004)	(0.0007)	(0.0014)	(0.0005)	(0.0011)
DIVIDEND$_{i,t}$	-/+	0.0027	-0.0002	-0.0035	0.0050*	0.0013	-0.0168**
		(0.0022)	(0.0009)	(0.0035)	(0.0026)	(0.0022)	(0.0069)
EQUITY PREMIUM	-	0.0007*	-0.0004	0.0000	0.0005**	0.0004	-0.0008***
		(0.0004)	(0.0004)	(0.0001)	(0.0003)	(0.0005)	(0.0002)
TERM-STRUCTR	-	-0.0174***	-0.0037	-0.0065***	-0.0240***	-0.006	-0.0136***
		(0.0038)	(0.0034)	(0.0008)	(0.0028)	(0.0047)	(0.0013)
SHARE PRICE	-	-0.0257	-0.0573**	-0.0447***	-0.0959***	-0.2497***	-0.0511***
		(0.0221)	(0.0278)	(0.0079)	(0.0143)	(0.0047)	(0.0095)

These results are based on the model in Tables 5.12 (panel-a) and 5.13 (panel-b). See also notes in Tables 5.1, 5.12. and 5.13.

5.4.2.4. GMM Estimates of Static Models

In this section, we will examine the estimates of static models which do not incorporate any lagged variables (Table 5.15). Based on the same leverage definition, one can compare the results in Tables 5.14 and 5.15. In general, it seems that the results of static models confirm our main results in Table 5.14. In addition, it emerges that the corresponding coefficients of determination and Wald Test-1 statistics of the dynamic models are much higher than that of static models in every case (showing the success and explanatory power of dynamic models relative to static ones). More importantly, significant Correlation-2 test statistics in Germany and the UK show that there is misspecification in the static models under book-leverage. This was not the case in dynamic models in Tables 5.12 & 5.13. Consequently, these findings can be a verification of appropriateness of dynamic models in capital structure studies.

Table 5.15: Static capital structure using GMM-SYS Estimations.

Independent Variables	Predicted Sign	BOOK-LEVERAGE$_{i,t}$			MARKET-LEVERAGE$_{i,t}$		
		FRANCE	GERMANY	UK	FRANCE	GERMANY	UK
PROFIT$_{i,t}$	-/+	-0.1525**	-0.0305	-0.2340***	-0.4005***	-0.0533	-0.3821***
		(0.0655)	(0.0597)	(0.0555)	(0.1322)	0.0609	(0.0923)
TAXRATE$_{i,t}$	+	0.0042	-0.0049	-0.0278**	0.0056	-0.0202**	0.0525**
		(0.0086)	(0.0058)	(0.0137)	(0.0196)	0.0095	(0.0244)
MKT-TO-BOOK$_{i,t}$	-	-0.0038	-0.0046**	0.0017	-0.0641***	-0.0048**	-0.0738***
		(0.0075)	(0.0019)	(0.0024)	(0.0122)	0.0020	(0.0083)
FIXASSETS$_{i,t}$	+	0.3226***	0.2438***	0.1136***	0.3439***	0.2389***	-0.0063
		(0.1003)	(0.064)	(0.0308)	(0.1101)	0.0789	(0.0502)
SIZE$_{i,t}$	+	0.0130*	0.0068	0.0255***	0.0201**	0.0297***	0.0031
		(0.007)	(0.0077)	(0.0034)	(0.0093)	0.0070	(0.0059)
EARNINGS VOL$_{i,t}$	-	-0.0005	-0.0002	0.0010***	0.0000	-0.0002	0.0010**
		(0.0006)	(0.0002)	(0.0003)	(0.0009)	0.0002	(0.0004)
DIVIDEND$_{i,t}$	-/+	0.0009	-0.0001	-0.0045***	0.0011	-0.0009	-0.0028
		(0.0011)	(0.0003)	(0.0018)	(0.0017)	0.0012	(0.0034)
EQUITY PREMIUM	-	0.0002	0.0003**	0.0002***	0.0001	0.0007***	0.0000
		(0.0002)	(0.0001)	(0.0001)	(0.0002)	0.0002	(0.0001)
TERM-STRUCTR	-	-0.0095***	-0.0008	-0.0018***	-0.0191***	-0.0040**	-0.0026***
		(0.0016)	(0.0014)	(0.0003)	(0.0023)	0.0018	(0.0006)
SHARE PRICE	-	-0.0175	-0.0447***	-0.0375***	-0.0469***	-0.1396***	-0.1170***
		(0.0119)	(0.0131)	(0.0054)	(0.0122)	0.0190	(0.0122)
Constant		0.0310	0.0288	-0.0369	0.1781	-0.1196	0.4338***
		(0.1108)	(0.1044)	(0.0344)	(0.1634)	0.0918	(0.0606)
Correlation1		-3.807***	-4.121***	-9.681***	-4.642***	-5.733***	-10.90***
Correlation2		-0.9333	-2.452**	-4.725***	-1.243	1.179	0.7680
Sargan Test (df)		268.6 (416)	268.9 (234)*	642 (395)***	266.3 (416)	293 (234)***	924 (395)***
Wald Test-1 (df)		75.96 (10)***	46.98 (10)***	414.6 (10)	165.9 (10)***	124.3 (10)***	689.4 (10)**
Wald Test-2 (df)		79.63 (15)***	69.61 (14)***	34.31 (15)***	81.09 (15)***	54.40 (14)	83.51 (15)**
R^2		0.2222	0.1090	0.0741	0.3853	0.1397	0.1152
Firms / Observations		325 /2604	529 / 5045	2345 / 31786	325 /2604	529 / 5045	2345 / 31786
Estimation Period		1985-2000	1989-2000	1971-2000	1985-2000	1989-2000	1971-2000

See notes in Table 5.1 and Table 5.12.

5.4.2.5. GMM Estimates based on Size Classification

This section is designed to examine the size-specific behaviour of firms while borrowing externally. We will focus on the long-run implications of the models, which are obtained after following general-to-specific approach. Size classification is useful to reduce the heterogeneity bias and thus to improve the precision of results. It is known that GMM estimates are valid especially for large samples. However, the results based on reduced sample-size due to size classification are still robust as they are corrected for small sample bias using Windmeijer [2000] process. As a general note for specification tests, all Correlation and Sargan tests confirm that the models in all countries are correctly specified. It is important to note that the over-rejection of Sargan Tests in Tables 5.12 and 5.13 for the UK is not the case in Table 5.20. This could be a strong evidence as to why we should not be concerned about the invalidity of instruments in the UK based on the full sample.

Table 5.16 reveals all French firms in different size classes adjust their debt ratios with approximately the same degree of adjustment (between 0.3 and 0.32) under book-leverage while medium firms have the highest adjustment coefficient under market-leverage. Furthermore, profitability is again inversely related to leverage for medium and large firms in Table 5.17, which strongly confirms the POT. Interestingly, profitability has no significant impact on small firms' debt ratios, which should not be the case if information asymmetries are relevant especially for small firms. Moreover, size classification does not seem to change the relationship between fixed-assets ratio and leverage as it detects a strong positive association. Market-leverage is negatively correlated with market-to-book ratio for small and large firms; and book-leverage is positively correlated with market-to-book ratio for medium firms. These findings may imply that medium-sized firms prone to grow with profitable future growth opportunities, for which suboptimal investment policies are unlikely to occur, do not have external financing constraints. The invariance of leverage with tax rate and earnings volatility in Table 5.14 is still valid across size classes except the significantly negative coefficient of tax rate under market-leverage for large firms. This may stem from the fact that France tax system favours the retention of profits with lowering tax rates gradually. The results with respect to the dividend policy show that the positive relationship between leverage and payout ratio in Table 5.14 seems to be driven by small firms.

Among the market-related factors in Table 5.17, the effects of share price performance and equity premium on capital structure do not vary across size classes. However, only small firms appear to disregard the trend in term structure of interest rates while deciding their financing mix.

Table 5.16: Dynamic capital structure in France: Size classification.

		Dependent Variable					
Independent Variables	Predicted Sign	BOOK-LEVERAGE$_{i,t}$			MARKET-LEVERAGE$_{i,t}$		
		Small	Medium	Large	Small	Medium	Large
LEVERAGE$_{i,t-1}$	+	0.6830***	0.6826***	0.7029***	0.6972***	0.5783***	0.6246***
		(0.0549)	(0.0385)	(0.0754)	(0.0491)	(0.0448)	(0.0507)
PROFIT$_{i,t}$	-/+	-0.4700***	-0.3634***	-0.3808***	-0.0632	-0.4035***	-0.3608*
		(0.0955)	(0.0875)	(0.1197)	(0.0880)	(0.1111)	(0.2172)
PROFIT$_{i,t-1}$	-/+	0.3938***	0.1900***	0.2302**	-	-	-
		(0.0716)	(0.0674)	(0.0921)	-	-	-
TAXRATE$_{i,t}$	+	0.0121	0.0024	-0.0070	0.0237	0.0077	-0.0268**
		(0.0189)	(0.0081)	(0.0076)	(0.0183)	(0.0192)	(0.0114)
TAXRATE$_{i,t-1}$	+	-	-		-	-	-
		-	-		-	-	-
MKT-TO-BOOK$_{i,t}$	-	0.0045	0.0128**	0.0027	-0.0303***	-0.0256**	-0.1211***
		(0.0060)	(0.0055)	(0.0069)	(0.0096)	(0.0128)	(0.0289)
MKT-TO-BOOK$_{i,t-1}$	-	-	-		-	0.0193**	0.0840***
		-	-		-	(0.0082)	(0.0199)
FIXASSETS$_{i,t}$	+	0.2134**	0.1626**	0.0738	0.1294	0.2503***	0.1847*
		(0.0893)	(0.0727)	(0.0677)	(0.1160)	(0.0971)	(0.1109)
FIXASSETS$_{i,t-1}$	+	-	-		-	-	-
		-	-		-	-	-
EARNINGS VOL$_{i,t}$	-	-0.0005	0.0002	0.0025	0.0023	-0.0005	0.0043
		(0.0011)	(0.0004)	(0.0017)	(0.0016)	(0.0005)	(0.0031)
EARNINGS VOL$_{i,t-1}$	-	-	-		-0.0011**	-	-
		-	-		(0.0005)	-	-
DIVIDEND$_{i,t}$	-/+	0.0014*	-0.0003	0.0011	0.0012	-0.0028	0.0019
		(0.0007)	(0.0008)	(0.0014)	(0.0013)	(0.0019)	(0.0019)
DIVIDEND$_{i,t-1}$	-/+	0.0016***	-		0.0017***	0.0017***	-
		(0.0004)	-		(0.0006)	(0.0005)	-
EQUITY PREMIUM	-	0.0002	0.0002	0.0002	0.0013**	0.0004	0.0004**
		(0.0004)	(0.0002)	(0.0001)	(0.0005)	(0.0003)	(0.0002)
TERM-STRUCTR	-	-0.0051	-0.0067***	-0.0036***	-0.0058	-0.0126***	-0.0104***
		(0.0032)	(0.0015)	(0.0014)	(0.0050)	(0.0022)	(0.0023)
SHARE PRICE	-	-0.0032	-0.0089	-0.0088	-0.0560***	-0.0423***	-0.0543***
		(0.0184)	(0.0059)	(0.0060)	(0.0198)	(0.0119)	(0.0108)
Constant		0.0252	0.0634*	0.0851**	0.1124**	0.1568***	0.2299***
		(0.0257)	(0.0333)	(0.0377)	(0.0486)	(0.0478)	(0.0518)
Correlation1		-3.328***	-4.792***	-3.965***	-2.905***	-4.566***	-5.410***
Correlation2		1.481	1.813*	0.3061	-0.4812	-1.710*	0.9668
Sargan Test (df)		65.88 (494)	87.06 (510)	92.18 (510)	48.93 (503)	92.38 (510)	92.51 (510)
Wald Test-1 (df)		545.3 (12)***	517.5 (11)***	199.4 (11)***	904.2 (12)***	732.5 (12)***	807.2 (11)**
Wald Test-2 (df)		12.09 (14)	47.35 (14)***	24.45 (15)*	21.74 (14)*	66.50 (14)***	39.07 (15)**
R^2		0.7370	0.8120	0.7661	0.7509	0.7827	0.7682
Firms / Observations		91 / 394	116 / 899	115 / 1302	91 / 394	116 / 899	115 / 1302
Estimation Period		1985-2000	1985-2000	1985-2000	1985-2000	1985-2000	1985-2000

The firms were sorted according to their average total sales and divided into three sub-samples. See notes in Tables 5.1 and 5.12.

Table 5.17: Size classification in France: Long-run Relationship

Independent Variables	Predicted Sign	Dependent Variable BOOK-LEVERAGE$_{i,t}$ Small	Medium	Large	MARKET-LEVERAGE$_{i,t}$ Small	Medium	Large
PROFIT$_{i,t}$	-/+	-0.2405	-0.5464**	-0.5067*	-0.2088	-0.9570***	-0.9611*
		(0.1731)	(0.2190)	(0.2725)	(0.2966)	(0.2400)	(0.5448)
TAXRATE$_{i,t}$	+	0.0381	0.0076	-0.0235	0.0783	0.0183	-0.0714**
		(0.0628)	(0.0254)	(0.0271)	(0.0646)	(0.0457)	(0.0334)
MKT-TO-BOOK$_{i,t}$	-	0.0141	0.0404**	0.0090	-0.1002***	-0.0149	-0.0990**
		(0.0185)	(0.0187)	(0.0236)	(0.0322)	(0.0141)	(0.0433)
FIXASSETS$_{i,t}$	+	0.6734***	0.5123**	0.2483	0.4272	0.5936***	0.4920*
		(0.2370)	(0.2213)	(0.2304)	(0.3590)	(0.2107)	(0.2717)
EARNINGS VOL$_{i,t}$	-	-0.0016	0.0006	0.0085	0.0041	-0.0011	0.0114
		(0.0033)	(0.0013)	(0.0058)	(0.0064)	(0.0011)	(0.0081)
DIVIDEND$_{i,t}$	-/+	0.0095***	-0.0009	0.0036	0.0095*	-0.0027	0.0049
		(0.0029)	(0.0026)	(0.0049)	(0.0055)	(0.0047)	(0.0048)
EQUITY PREMIUM	-	0.0005	0.0005	0.0005	0.0042**	0.0009	0.0011*
		(0.0013)	(0.0005)	(0.0005)	(0.0019)	(0.0006)	(0.0006)
TERM-STRUCTR	-	-0.0162	-0.0211***	-0.0121**	-0.0193	-0.0299***	-0.0277***
		(0.0102)	(0.0046)	(0.0048)	(0.0159)	(0.0059)	(0.0063)
SHARE PRICE	-	-0.0102	-0.0281	-0.0297	-0.1849***	-0.1004***	-0.1447***
		(0.0578)	(0.0191)	(0.0207)	(0.0710)	(0.0281)	(0.0360)

See notes in Table 5.16.

Table 5.18 and Table 5.19 report the short-run and long-run implications of size classification in Germany, respectively. Considering the adjustment process in Table 5.18, it is more important for small firms to adjust their debt ratios relatively quickly than for the others. Furthermore, confirming POT, there is a negative correlation between profitability and leverage in Table 5.19 for medium and large firms. As it was the case in France, the same association is insignificant for only small firms. Parallel with the theory, the estimated coefficient of tax rate is significantly positive only for small firms. Interestingly, the same coefficient is insignificant but negative for large firms despite their average tax rate being higher than small firms' tax rates (see Table 5.A5). This is unexpected because the coefficient should be positive especially for large firms because of their substantial taxable income. On the other hand, the relationship between market-to-book ratio and leverage shows a non-uniform behaviour across size classes. The estimated market-to-book ratio coefficient is statistically zero for medium and large firms. The association, however, is significantly negative only for small firms whose average market-to-book ratio is highest among the size class. This finding may emphasise the existence of suboptimal investment decisions for such firms. The relationship between fixed-assets ratio and leverage is always positive and significant for all types of firms. This strongly positive effect implies the importance of asset structure in case of liquidation, and therefore, the significance of agency costs in Germany. The results with respect to equity premium and earnings volatility do not change across size classes as they have always insignificant estimated coefficients in each case. A notable finding is due to the strongly positive effect of payout ratio on market-leverage for small firms. This is an expected result, probably, due to the fact that corporate tax rate on dividends is less than that on retained earnings. The same association is insignificant for medium and large firms maybe because tax concerns are not considerable for such firms.

On the other hand, only large firms seem to consider the trend in the term structure of interest rates while deciding their financing decisions. Finally, the relationship between market-leverage and share price performance is always significantly negative but the association of book-leverage with share price performance appears to be the same only for medium firms.

Table 5.18: Dynamic capital structure in Germany: Size classification.

		Dependent Variable					
Independent Variables	Predicted Sign	BOOK-LEVERAGE$_{i,t}$			MARKET-LEVERAGE$_{i,t}$		
		Small	Medium	Large	Small	Medium	Large
LEVERAGE$_{i,t-1}$	+	0.6825***	0.6949***	0.7492***	0.6695***	0.7654***	0.7732***
		(0.0410)	(0.0539)	(0.0497)	(0.0471)	(0.0538)	(0.0328)
PROFIT$_{i,t}$	-/+	-0.0271	-0.2255***	-0.1705*	-0.0022	-0.2534***	-0.1679*
		(0.0472)	(0.0785)	(0.0907)	(0.0403)	(0.0950)	(0.1007)
PROFIT$_{i,t-1}$	-/+	-0.0513*	0.1037**	0.0871	-0.0591**	0.1477***	-
		(0.0278)	(0.0510)	(0.0654)	(0.0291)	(0.0402)	-
TAXRATE$_{i,t}$	+	0.0064*	-0.0020	-0.0083*	0.0128**	-0.0046	-0.0092
		(0.0035)	(0.0024)	(0.0050)	(0.0065)	(0.0032)	(0.0072)
TAXRATE$_{i,t-1}$	+	0.0037	-	-	-	-	-
		(0.0028)	-	-	-	-	-
MKT-TO-BOOK$_{i,t}$	-	-0.0022*	-0.0037	0.0010	-0.0019**	-0.0070	-0.0223
		(0.0008)	(0.0034)	(0.0051)	(0.0008)	(0.0050)	(0.0155)
MKT-TO-BOOK$_{i,t-1}$	-	-	-	-	-	-	0.0166*
		-	-	-	-	-	(0.0089)
FIXASSETS$_{i,t}$	+	0.1437**	0.4131***	0.4442***	0.2037**	0.4040***	0.3537**
		(0.0590)	(0.1192)	(0.1633)	(0.0824)	(0.1383)	(0.1641)
FIXASSETS$_{i,t-1}$	+	-	-0.3046***	-0.3454**	-0.1262*	-0.2739**	-0.2710*
		-	(0.0988)	(0.1449)	(0.0712)	(0.1091)	(0.1597)
EARNINGS VOL$_{i,t}$	-	0.0000	0.0000	0.0004	0.0000	0.0000	0.0010
		(0.0001)	(0.0000)	(0.0006)	(0.0001)	(0.0000)	(0.0013)
EARNINGS VOL$_{i,t-1}$	-	0.0002***	-0.0000***	-	-	-	-0.0004***
		(0.0000)	(0.0000)	-	-	-	(0.0002)
DIVIDEND$_{i,t}$	-/+	-0.0003	-0.0004	-0.0000	0.0003	0.0003	-0.0002
		(0.0004)	(0.0005)	(0.0001)	(0.0003)	(0.0003)	(0.0002)
DIVIDEND$_{i,t-1}$	-/+	-	-	-	0.0006***	-	-
		-	-	-	(0.0002)	-	-
EQUITY PREMIUM	-	-0.0001	-0.0000	-0.0001	-0.0001	0.0001	-0.0001
		(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0002)
TERM-STRUCTR	-	-0.0001	-0.0012	-0.0019**	-0.0021	-0.0021	-0.0033**
		(0.0020)	(0.0014)	(0.0009)	(0.0019)	(0.0019)	(0.0015)
SHARE PRICE	-	0.0043	-0.0144*	-0.0104	-0.0391***	-0.0480***	-0.0679***
		(0.0108)	(0.0081)	(0.0073)	(0.0096)	(0.0090)	(0.0123)
Constant		0.0313	0.0204	0.0307**	0.0943***	0.0566	0.0979***
		(0.0392)	(0.0266)	(0.0152)	(0.0360)	(0.0370)	(0.0303)
Correlation1		-5.876***	-4.902***	-5.550***	-5.786***	-4.348***	-6.683***
Correlation2		-1.171	1.158	1.554	-0.09281	0.4150	0.3003
Sargan Test (df)		138.2 (363)	146.2 (363)	151.5 (370)	140.6 (370)	161.6 (370)	155.8 (363)
Wald Test-1 (df)		797.5 (13)***	569.4 (13)***	865.2 (12)***	454.4 (13)***	1064 (12)***	2100 (13)***
Wald Test-2 (df)		27.16 (14)***	26.02 (14)***	33.21 (14)***	29.09 (14)***	19.46 (14)	22.55 (14)*
R^2		0.7617	0.7893	0.7992	0.7727	0.8229	0.82659
Firms / Observations		159 / 1485	166 / 1493	185 / 1932	167 / 1527	177 / 1576	181 / 1807
Estimation Period		1990-2000	1990-2000	1989-2000	1989-2000	1989-2000	1990-2000

The firms were sorted according to their average total sales and divided into three sub-samples. See notes in Tables 5.1 and 5.12.

Table 5.19: Size classification in Germany: Long-run Relationship

Independent Variables	Predicted Sign	Dependent Variable BOOK-LEVERAGE$_{i,t}$ Small	Medium	Large	MARKET-LEVERAGE$_{i,t}$ Small	Medium	Large
PROFIT$_{i,t}$	-/+	-0.2470	-0.3993**	-0.3324	-0.1854	-0.4504	-0.7404*
		(0.1705)	(0.1641)	(0.2269)	(0.1395)	(0.3109)	(0.4426)
TAXRATE$_{i,t}$	+	0.0317*	-0.0067	-0.0333	0.0387*	-0.0194	-0.0405
		(0.0172)	(0.0079)	(0.0203)	(0.0203)	(0.0140)	(0.0311)
MKT-TO-BOOK$_{i,t}$	-	-0.0070***	-0.0122	0.0042	-0.0058**	-0.0298	-0.0253
		(0.0027)	(0.0113)	(0.0204)	(0.0026)	(0.0230)	(0.0539)
FIXASSETS$_{i,t}$	+	0.4527***	0.3555***	0.3943***	0.2344**	0.5545***	0.3645**
		(0.1646)	(0.1081)	(0.0883)	(0.0969)	(0.1717)	(0.1495)
EARNINGS VOL$_{i,t}$	-	0.0004	-0.0000	0.0014	0.0001	0.0001	0.0026
		(0.0004)	(0.0001)	(0.0024)	(0.0002)	(0.0001)	(0.0057)
DIVIDEND$_{i,t}$	-/+	-0.0010	-0.0013	-0.0001	0.0030***	0.0011	-0.0009
		(0.0012)	(0.0017)	(0.0005)	(0.0010)	(0.0013)	(0.0011)
EQUITY PREMIUM	-	-0.0004	-0.0001	-0.0003	-0.0002	0.0005	-0.0006
		(0.0005)	(0.0005)	(0.0004)	(0.0005)	(0.0008)	(0.0008)
TERM-STRUCTR	-	-0.0004	-0.0038	-0.0076*	-0.0062	-0.0090	-0.0147**
		(0.0063)	(0.0045)	(0.0039)	(0.0056)	(0.0087)	(0.0067)
SHARE PRICE	-	0.0135	-0.0473*	-0.0413	-0.1184***	-0.2044***	-0.2992***
		(0.0342)	(0.0275)	(0.0258)	(0.0309)	(0.0516)	(0.0591)

See notes in Table 5.18.

Table 5.20 and Table 5.21 report the short-run and long-run implications of size classification in the UK, respectively. It seems more important for small firms to adjust their book-leverage as their adjustment coefficients are highest in Table 5.20. This may be the effort of such firms to avoid from inefficient liquidations, which is particular to small firms in the UK. However, adjusting the market-leverage appears to be especially relevant for large firms. Being consistent with the POT, profitability is negatively correlated with leverage in all cases and it is insignificant only for small firms in Table 5.21. This finding implies that asymmetric information problems are specific to medium and large firms in the UK. On the other hand, under book-leverage, the coefficient of tax rate variable is insignificant for medium firms and significantly negative small and large firms. This does not support the relevant theory. A partial support to the tax theory is due to the significantly positive (at 10%) relation between tax rate and market-leverage for large firms. Moreover, the estimated coefficient of market-to-book ratio variable under market-leverage is significantly negative at 1% for all firms. This confirms the idea that financial distress costs and agency-type problems are substantial in the UK. However, for medium firms the relationship turns out to be significantly positive at 5% under book-leverage. This may imply that financial distress costs and agency costs of debt are not considerable for medium firms or their profitable future investments are not financially constrained. The expected positive relation between leverage and asset tangibility is found only under book-leverage for medium and large. The estimated coefficient of earnings volatility is never significant across size classes and that of payout ratio is significant and negative only for small firms under book-leverage. The impact of equity premium on debt ratios is uniform across different size classes: Under book-leverage it is insignificant; under market-leverage it is significantly negative at 1% level. Moreover, the impact of term structure of interest rates on debt ratios is even more uniform as it is significant negative across size classes and leverage definitions. However, the significantly negative effect of share price performance on debt-equity ratio is only detected for medium and large firms as the same impact is insignificant for small firms.

Consequently, the results tend to be uniform across size classes especially for the profitability, earnings volatility and market-related variables. In some cases, it has been able to resolve some ambiguous relationships in Table 5.14. Overall, the figures based on size classification tend to verify our main findings in Table 5.14.

Table 5.20: Dynamic capital structure in the UK: Size classification.

		Dependent Variable					
Independent Variables	Predicted Sign	$BOOK\text{-}LEVERAGE_{i,t}$			$MARKET\text{-}LEVERAGE_{i,t}$		
		Small	Medium	Large	Small	Medium	Large
$LEVERAGE_{i,t-1}$	+	0.6822***	0.6846***	0.7742***	0.7024***	0.6672***	0.5538***
		(0.0378)	(0.0305)	(0.0250)	(0.0280)	(0.0242)	(0.0248)
$PROFIT_{i,t}$	-/+	-0.0134	-0.2795***	-0.3067***	-0.0103	-0.3295***	-0.0811
		(0.0325)	(0.0466)	(0.0649)	(0.0276)	(0.0848)	(0.0792)
$PROFIT_{i,t-1}$	-/+	-	0.1560***	0.2368***	-	0.2049***	-
		-	(0.0319)	(0.0423)	-	(0.0461)	-
$TAXRATE_{i,t}$	+	-0.0232**	0.0028	-0.0125*	0.0092	0.0139	0.0258*
		(0.0096)	(0.0052)	(0.0070)	(0.0116)	(0.0098)	(0.0152)
$TAXRATE_{i,t-1}$	+	0.0018	-	-0.0050*	-	-	-
		(0.0067)	-	(0.0030)	-	-	-
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-	0.0003	0.0079***	0.0067**	-0.0213***	-0.0588***	-0.0500***
		(0.0033)	(0.0038)	(0.0033)	(0.0041)	(0.0164)	(0.0113)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$	-	-0.0049	-	-0.0027*	0.0038**	0.0222***	-
		(0.0033)	-	(0.0016)	(0.0015)	(0.0065)	-
$FIXASSETS_{i,t}$	+	0.0236	0.0515***	0.0536**	-0.1167	-0.2330**	-0.5549***
		(0.0286)	(0.0243)	(0.0240)	(0.0817)	(0.1053)	(0.1362)
$FIXASSETS_{i,t-1}$	+	-	-	-	0.1044	0.1995**	0.5073***
		-	-	-	(0.0650)	(0.0897)	(0.1208)
$EARNINGS\ VOL_{i,t}$	-	0.0000	0.0002	0.0000	-0.0001	-0.0003	-0.0001
		(0.0002)	(0.0002)	(0.0001)	(0.0003)	(0.0003)	(0.0001)
$EARNINGS\ VOL_{i,t-1}$	-	-	-	0.0001***	-	0.0001*	-
		-	-	(0.0000)	-	(0.0000)	-
$DIVIDEND_{i,t}$	-/+	-0.0022*	0.0003	-0.0001	-0.0010	-0.0011	-0.0039
		(0.0013)	(0.0009)	(0.0008)	(0.0020)	(0.0018)	(0.0030)
$DIVIDEND_{i,t-1}$	-/+	-	-	-	-	-0.0013*	-
		-	-	-	-	(0.0007)	-
EQUITY PREMIUM	-	0.0000	0.0000	0.0000	-0.0003***	-0.0002***	-0.0003***
		(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
TERM-STRUCTR	-	-0.0042***	-0.0015***	-0.0014***	-0.0074***	-0.0050***	-0.0041***
		(0.0005)	(0.0003)	(0.0002)	(0.0007)	(0.0006)	(0.0005)
SHARE PRICE	-	-0.0041	-0.0113***	-0.0093***	-0.0038	-0.0117**	-0.0323***
		(0.0043)	(0.0029)	(0.0030)	(0.0047)	(0.0050)	(0.0050)
Constant		0.0657***	0.0571***	0.0409***	0.1285***	0.1836***	0.2422***
		(0.0185)	(0.0128)	(0.0120)	(0.0210)	(0.0233)	(0.0274)
Correlation1		-9.696***	-12.47***	-13.27***	-11.53***	-13.51***	-14.47***
Correlation2		1.054	-0.7185	0.1418	0.8957	0.9939	3.685
Sargan Test (df)		374.9 (394)	453.1 (398)	485.4 (398)	410.6 (396)	500.6 (398)	545.2 (398)
Wald Test-1 (df)		754.5 (12)***	1173 (11)***	1629 (14)***	1235 (12)***	2609 (15)***	1965 (11)***
Wald Test-2 (df)		31.61 (15)***	51.66 (15)***	38.96 (15)***	69.80 (15)***	121.6 (15)***	133.9 (15)**
R^2		0.6051	0.6596	0.7297	0.6418	0.6917	0.6617
Firms / Observations		768 / 7605	785 / 10860	766 / 12654	768 / 7605	737 / 10184	792 / 13321
Estimation Period		1971-20000	1971-20000	1972-2000	1971-20000	1972-2000	1971-2000

The firms were sorted according to their average total sales and divided into three sub-samples. See notes in Tables 5.1 and 5.12.

Table 5.21: Size classification in the UK: Long-run Relationship

Independent Variables	Predicted Sign	BOOK-LEVERAGE$_{i,t}$ Small	BOOK-LEVERAGE$_{i,t}$ Medium	BOOK-LEVERAGE$_{i,t}$ Large	MARKET-LEVERAGE$_{i,t}$ Small	MARKET-LEVERAGE$_{i,t}$ Medium	MARKET-LEVERAGE$_{i,t}$ Large
PROFIT$_{i,t}$	-/+	-0.0421	-0.3916***	-0.3092**	-0.0345	-0.3745**	-0.1818
		(0.1020)	(0.1098)	(0.1523)	(0.0922)	(0.1890)	(0.1759)
TAXRATE$_{i,t}$	+	-0.0672**	0.0089	-0.0778*	0.0310	0.0418	0.0578*
		(0.0312)	(0.0164)	(0.0407)	(0.0396)	(0.0291)	(0.0344)
MKT-TO-BOOK$_{i,t}$	-	-0.0143	0.0249**	0.0175	-0.0587***	-0.1099***	-0.1119***
		(0.0115)	(0.0118)	(0.0125)	(0.0126)	(0.0343)	(0.0220)
FIXASSETS$_{i,t}$	+	0.0744	0.1633**	0.2375**	-0.0414	-0.1006	-0.1068**
		(0.0896)	(0.0757)	(0.1035)	(0.0775)	(0.0647)	(0.0483)
EARNINGS VOL$_{i,t}$	-	-0.0001	0.0006	0.0004	-0.0002	-0.0006	-0.0002
		(0.0006)	(0.0005)	(0.0003)	(0.0010)	(0.0010)	(0.0003)
DIVIDEND$_{i,t}$	-/+	-0.0069*	0.0008	-0.0003	-0.0034	-0.0072	-0.0086
		(0.0041)	(0.0029)	(0.0036)	(0.0066)	(0.0072)	(0.0068)
EQUITY PREMIUM	-	0.0001	-0.0001	-0.0001	-0.0010***	-0.0007***	-0.0007***
		(0.0002)	(0.0001)	(0.0002)	(0.0004)	(0.0003)	(0.0002)
TERM-STRUCTR	-	-0.0132***	-0.0049***	-0.0061***	-0.0248***	-0.0149***	-0.0092***
		(0.0021)	(0.0011)	(0.0013)	(0.0035)	(0.0023)	(0.0013)
SHARE PRICE	-	-0.0128	-0.0359***	-0.0413***	-0.0127	-0.0353**	-0.0725***
		(0.0134)	(0.0094)	(0.0135)	(0.0156)	(0.0145)	(0.0114)

Dependent Variable. See notes in Table 5.20.

5.4.2.6. GMM Estimates based on Industry Classification

It is obvious that the firms in manufacturing and service sectors have some differences with respect to their asset structure and the degree of vulnerability to the changes in financial markets. Myers [1977] and Hovakimian et al. [2001] argue that firms' assets-in-place should be financed more by debt and growth opportunities more by equity, where the former is relevant to manufacturing firms. Descriptive statistics (see Table 5.A6) show that, in all countries, service companies reveal lower debt ratios, higher market-to-book and fixed-assets ratios, and higher variability in profitability than manufacturing firms do. Service companies may borrow more to signal their credibility and profitability to the market, as share prices of such firms seem relatively sensitive to the news in the market. Thus, one may investigate further systematic differences by dividing the full sample into two industry groups; manufacturing and service sectors. In the following three tables, we will discuss the long-run relationships between debt-ratio and firm-specific factors with respect to the industry classification in France, Germany and the UK.

Table 5.22 shows that manufacturing companies seem quicker than service companies in adjusting their debt ratios in France. The relationship between profitability and leverage is significantly negative only for manufacturing firms in Table 5.23. The tax rate variable and dividend payout ratio do not have any significant effects on leverage. The fact that there is a strongly negative relationship between market-to-book ratio and market-leverage for manufacturing firms contradicts the idea that there are difficulties in shifting to riskier projects for such firms due to their substantial tangible assets. However, one can see from the significantly negative correlation between market-to-book ratio and market-leverage, how easy it may be for service companies to shift to riskier projects as they have relatively great amounts of intangible assets. Thus, the results imply that cost of financial distress increases with market-to-book ratio not only for service companies but also for manufacturing firms in France. However, the relationship between market-to-book ratio and book-leverage turns out to be significantly positive for manufacturing firms.

Besides, as expected, the relationship between leverage and fixed-assets ratio is significantly positive for manufacturing firms due to their collateralisable tangible assets which increase debt capacity. This finding confirms Myers' [1977] hypothesis that capital intensity should support heavy debt financing. However, we detect the same significant relationship for service companies as well. In addition, size and leverage are not significantly correlated for service firms under market-leverage and for manufacturing firms under book-leverage. Considering the size variable as an inverse proxy for bankruptcy probability, these findings emphasise the influence of French insolvency code in which firms' reorganisation is favoured. The effect of earnings volatility on debt ratio is insignificant except for service firms under book-leverage, in which the relationship is significantly positive contradicting the theory. As for the results related to the term structure of interest rates and share price performance, one can see the uniform behaviour across size classes as the relationship is significantly negative at 1%. However, only manufacturing firms consider the effect of equity premium while deciding their capital structure as the estimated coefficient is significantly positive. Thus, the managers of such firms prefer to issue debt when equity premium is high.

Table 5.25 shows that the results related to tax rate, market-to-book ratio, dividend payout ratio and term structure of interest rates variables do not vary in terms of significance (all insignificant) across different industry classes in Germany. On the other hand, one salient feature is that service companies are quicker and seem advantageous to be on their target capital structure with their higher adjustment coefficient in Table 5.24. This may be due to the sensitivity of share prices of service companies to corporate information disclosure. Moreover, as profitability exerts a significantly negative impact on leverage, service and manufacturing companies behave according to the pecking order theory. It could be due to the weak reorganisation process but strong liquidation process in German insolvency code that there is a significantly positive size effect on leverage for both types of firms. On the other hand, the estimated coefficient of fixed-assets ratio is positively significant only for service firms. The possible reason could be that service firms with such expenses also employ tangible assets that are collateralisable against borrowing, which imply the existence of agency problems in such firms.

Earnings volatility and equity premium seem to be insignificant except for service firms under market-leverage where both coefficients are significantly positive. Finally, leverage and share price performance tend to be negatively correlated irrespective of industry classes.

The findings of industry classification for the UK in Table 5.26 reveal that, unlike in Germany, manufacturing firms have the higher adjustment coefficients than service firms have. As being common findings in Table 5.27, the variables "profitability, dividend payout ratio, term structure of interest rates, share price performance", are significantly and negatively correlated with leverage across two industry classes. Market-to-book ratio and equity premium have no significant impact on book-leverage but their impact on market-leverage is significantly negative across industries. The significantly negative effect of market-to-book ratio on leverage implies the importance of agency problems and financial distress costs in both types of firms.

The significant and negative tax rate coefficient for manufacturing firms under book-leverage is not in line with the theory. Moreover, the significantly negative coefficient of fixed-assets ratio for manufacturing companies under market-leverage is not predicted by the theory either. Yet, the theory is confirmed by the significant and positive fixed-assets ratio coefficient under book-leverage for manufacturing firms. On the other hand, firm size has direct influence upon debt ratios for firms in both sectors (always significant at 1%), which highlights the significance of expected bankruptcy costs in the UK having considerable premature liquidation cases. Finally, the expected significant and negative relation between leverage and earnings volatility is found only under market-leverage for manufacturing firms.

In conclusion, we find several important differences in financing patterns of manufacturing and service companies across countries. However, market-related factors, profitability, fixed-assets ratio and size variables tend to have similar effects on leverage across industries in these countries. One can say that the findings based on industry classification generally support our main results reported in Table 5.14.

Table 5.22: Dynamic capital structure in France: Industry classification.

Dependent Variable:		BOOK-LEVERAGE$_{i,t}$		MARKET-LEVERAGE$_{i,t}$	
Independent Variables	Predicted Sign	Manufacturing	Service	Manufacturing	Service
LEVERAGE$_{i,t-1}$	+	0.7208***	0.7502***	0.6530***	0.6937***
		(0.0435)	(0.0460)	(0.0301)	(0.0388)
PROFIT$_{i,t}$	-/+	-0.3912***	-0.5052***	-0.4939***	-0.3173*
		(0.0890)	(0.0736)	(0.1333)	(0.1739)
PROFIT$_{i,t-1}$	-/+	0.2442***	0.4504***	0.2623***	0.2597**
		(0.0655)	(0.0547)	(0.0999)	(0.1229)
TAXRATE$_{i,t}$	+	-0.0094	0.0038	-0.0080	0.0070
		(0.0064)	(0.0072)	(0.0099)	(0.0124)
TAXRATE$_{i,t-1}$	+	-	-	-	-
		-	-	-	-
MKT-TO-BOOK$_{i,t}$	-	0.0060	0.0152***	-0.0709***	-0.0309***
		(0.0040)	(0.0043)	(0.0190)	(0.0105)
MKT-TO-BOOK$_{i,t-1}$	-	-	-	0.0456***	0.0159**
		-	-	(0.0152)	(0.0065)
FIXASSETS$_{i,t}$	+	0.1542***	0.0817**	0.1351***	0.1075**
		(0.0407)	(0.0402)	(0.0500)	(0.0437)
FIXASSETS$_{i,t-1}$	+	-	-	-	-
		-	-	-	-
SIZE$_{i,t}$	+	0.0466***	0.0343*	0.1227***	0.0855***
		(0.0121)	(0.0186)	(0.0221)	(0.0219)
SIZE$_{i,t-1}$	+	-0.0457***	-0.0299*	-0.1160***	-0.0802***
		(0.0119)	(0.0179)	(0.0219)	(0.0208)
EARNINGS VOL$_{i,t}$	-	-0.0002	0.0022**	-0.0001	0.0008
		(0.0002)	(0.0009)	(0.0008)	(0.0014)
EARNINGS VOL$_{i,t-1}$	-	-	-	-	-
		-	-	-	-
DIVIDEND$_{i,t}$	-/+	0.0007	-0.0002	0.0010	-0.0010
		(0.0004)	(0.0018)	(0.0010)	(0.0026)
DIVIDEND$_{i,t-1}$	-/+	-	-	-	-
		-	-	-	-
EQUITY PREMIUM	-	0.0003***	0.0001	0.0004**	0.0003
		(0.0001)	(0.0002)	(0.0002)	(0.0002)
TERM-STRUCTR	-	-0.0048***	-0.0050***	-0.0112***	-0.0107***
		(0.0011)	(0.0014)	(0.0018)	(0.0021)
SHARE PRICE	-	-0.0157***	-0.0047	-0.0547***	-0.0461***
		(0.0047)	(0.0116)	(0.0086)	(0.0116)
Constant		0.0226	-0.0464	0.0434	0.0083
		(0.0254)	(0.0369)	(0.0374)	(0.0637)
Correlation1		-5.126***	-4.568***	-6.110***	-5.398***
Correlation2		0.7711	1.472	-0.02842	-1.510
Sargan Test (df)		186.1 (583)	96.87 (583)	201.1 (583)	102.6 (583)
Wald Test-1 (df)		801.1 (13)***	995.5 (13)***	1860 (14)***	1417 (14)***
R^2		0.7964	0.7675	0.8012	0.7816
Firms / Observations		209 / 1765	116 / 839	209 / 1765	116 / 839
Estimation Period		1985-2000	1985-2000	1985-2000	1985-2000

The industries were classified as manufacturing (sectors 1-8, 14) and service (sectors 9-13, 15). See Appendix for industry classification of sectors. See also notes in Tables 5.1 and 5.12.

Table 5.23: Industry classification in France: Long-run Relationship

Dependent Variable:		BOOK-LEVERAGE$_{i,t}$		MARKET- LEVERAGE$_{i,t}$	
Independent Variables	Predicted Sign	Manufacturing	Service	Manufacturing	Service
PROFIT$_{i,t}$	-/+	-0.5267***	-0.2192	-0.6673***	-0.1881
		(0.1650)	(0.1762)	(0.1886)	(0.2211)
TAXRATE$_{i,t}$	+	-0.0337	0.0152	-0.0231	0.0230
		(0.0231)	(0.0293)	(0.0285)	(0.0405)
MKT-TO-BOOK$_{i,t}$	-	0.0216	0.0609***	-0.0728***	-0.0489**
		(0.0153)	(0.0200)	(0.0241)	(0.0196)
FIXASSETS$_{i,t}$	+	0.5525***	0.3271**	0.3894***	0.3509**
		(0.1368)	(0.1362)	(0.1402)	(0.1439)
SIZE$_{i,t}$	+	0.0032	0.0177*	0.0193***	0.0175
		(0.0053)	(0.0091)	(0.0062)	(0.0109)
EARNINGS VOL$_{i,t}$	-	-0.0008	0.0086**	-0.0003	0.0026
		(0.0008)	(0.0035)	(0.0023)	(0.0047)
DIVIDEND$_{i,t}$	-/+	0.0025	-0.0010	0.0030	-0.0034
		(0.0016)	(0.0071)	(0.0029)	(0.0084)
EQUITY PREMIUM	-	0.0011**	0.0003	0.0012**	0.0011
		(0.0005)	(0.0008)	(0.0005)	(0.0008)
TERM-STRUCTR	-	-0.0171***	-0.0199***	-0.0324***	-0.0350***
		(0.0045)	(0.0069)	(0.0053)	(0.0074)
ΔSHARE PRICE	-	-0.0561***	-0.0189	-0.1576***	-0.1504***
		(0.0185)	(0.0455)	(0.0276)	(0.0408)

See notes in Table 5.22.

Table 5.24: Dynamic capital structure in Germany: Industry classification.

Dependent Variable:		$BOOK\text{-}LEVERAGE_{i,t}$		$MARKET\text{-}LEVERAGE_{i,t}$	
Independent Variables	Predicted Sign	Manufacturing	Service	Manufacturing	Service
$LEVERAGE_{i,t-1}$	+	0.8120***	0.6397***	0.8078***	0.7728***
		(0.0410)	(0.1057)	(0.0284)	(0.0778)
$PROFIT_{i,t}$	-/+	-0.1066*	-0.3087**	-0.1409**	-0.1317*
		(0.0577)	(0.1560)	(0.0685)	(0.0766)
$PROFIT_{i,t-1}$	-/+	-	-	-	-
		-	-	-	-
$TAXRATE_{i,t}$	+	0.0076	0.0038	0.0098	-0.0025
		(0.0056)	(0.0038)	(0.0076)	(0.0041)
$TAXRATE_{i,t-1}$	+	-	-	-	-
		-	-	-	-
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-	-0.0005	0.0006	-0.0005	0.0001
		(0.0010)	(0.0013)	(0.0010)	(0.0011)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$	-	-	-	-	-
		-	-	-	-
$FIXASSETS_{i,t}$	+	0.0723	0.1163**	0.0766	0.1505*
		(0.0569)	(0.0542)	(0.0498)	(0.0791)
$FIXASSETS_{i,t-1}$	+	-	-	-	-
		-	-	-	-
$SIZE_{i,t}$	+	0.0505***	0.0116*	0.0610***	0.0130**
		(0.0143)	(0.0067)	(0.0120)	(0.0055)
$SIZE_{i,t-1}$	+	-0.0504***	-	-0.0567***	-
		(0.0141)	-	(0.0116)	-
$EARNINGS\ VOL_{i,t}$	-	0.0000	0.0000	0.0000	0.0001
		(0.0000)	(0.0000)	(0.0000)	(0.0001)
$EARNINGS\ VOL_{i,t-1}$	-	-	-	-	-
		-	-	-	-
$DIVIDEND_{i,t}$	-/+	0.0002	-0.0011	0.0004	-0.0014
		(0.0003)	(0.0013)	(0.0004)	(0.0012)
$DIVIDEND_{i,t-1}$	-/+	-	-	-	-
		-	-	-	-
EQUITY PREMIUM	-	-0.0001	0.0002	-0.0001	0.0006**
		(0.0001)	(0.0002)	(0.0001)	(0.0003)
TERM-STRUCTR	-	-0.0003	-0.0004	-0.0004	-0.0013
		(0.0008)	(0.0019)	(0.0011)	(0.0023)
ΔSHARE PRICE	-	-0.0110*	-0.0156*	-0.0525***	-0.0575***
		(0.0064)	(0.0094)	(0.0073)	(0.0141)
Constant		0.0261	-0.0992	-0.0067	-0.1577***
		(0.0229)	(0.0701)	(0.0228)	(0.0736)
Correlation1		-7.992***	-4.008***	-9.023***	-3.446***
Correlation2		-1.039	1.904	0.04958	1.927
Sargan Test (df)		289.4 (271)	104.8 (271)	317.7 (271)	110.2 (271)
Wald Test-1 (df)		782.1 (12)***	412.8 (11)***	1778 (12)***	1149 (11)***
R^2		0.7858	0.7205	0.8137	0.8118
Firms / Observations		415 / 4041	114 / 1004	415 / 4041	114 / 1004
Estimation Period		1989-2000	1989-2000	1989-2000	1989-2000

The industries were classified as manufacturing (sectors 1-8, 14) and service (sectors 9-13, 15). See Appendix for industry classification of sectors. See also notes in Tables 5.1 and 5.12.

Table 5.25: Industry classification in Germany: Long-run Relationship

Dependent Variable:		BOOK-LEVERAGE$_{i,t}$		MARKET- LEVERAGE$_{i,t}$	
Independent Variables	Predicted Sign	Manufacturing	Service	Manufacturing	Service
PROFIT$_{i,t}$	-/+	-0.5671*	-0.8567***	-0.7331**	-0.5796
		(0.3261)	(0.2769)	(0.3533)	(0.4033)
TAXRATE$_{i,t}$	+	0.0404	0.0107	0.0508	-0.0108
		(0.0316)	(0.0098)	(0.0405)	(0.0193)
MKT-TO-BOOK$_{i,t}$	-	-0.0025	0.0017	-0.0025	0.0005
		(0.0054)	(0.0035)	(0.0054)	(0.0050)
FIXASSETS$_{i,t}$	+	0.3848	0.3227**	0.3984	0.6626*
		(0.2862)	(0.1535)	(0.2555)	(0.3540)
SIZE$_{i,t}$	+	0.0005	0.0323**	0.0227***	0.0573**
		(0.0054)	(0.0137)	(0.0064)	(0.0248)
EARNINGS VOL$_{i,t}$	-	0.0001	0.0000	0.0000	0.0004*
		(0.0001)	(0.0001)	(0.0001)	(0.0002)
DIVIDEND$_{i,t}$	-/+	0.0012	-0.0031	0.0019	-0.0060
		(0.0016)	(0.0034)	(0.0023)	(0.0060)
EQUITY PREMIUM	-	-0.0007	0.0006	-0.0003	0.0024***
		(0.0006)	(0.0005)	(0.0006)	(0.0009)
TERM-STRUCTR	-	-0.0015	-0.0012	-0.0022	-0.0059
		(0.0043)	(0.0053)	(0.0058)	(0.0101)
ΔSHARE PRICE	-	-0.0582*	-0.0432	-0.2732***	-0.2531***
		(0.0340)	(0.0269)	(0.0490)	(0.0644)

See notes in Table 5.24.

Table 5.26: Dynamic capital structure in the UK: Industry classification.

Dependent Variable:		BOOK-LEVERAGE$_{i,t}$		MARKET- LEVERAGE$_{i,t}$	
Independent Variables	Predicted Sign	Manufacturing	Service	Manufacturing	Service
LEVERAGE$_{i,t-1}$	+	0.6905***	0.7795***	0.6105***	0.7146***
		(0.0278)	(0.0276)	(0.0239)	(0.0235)
PROFIT$_{i,t}$	-/+	-0.2057***	-0.0986*	-0.3032***	-0.1064***
		(0.0385)	(0.0606)	(0.0829)	(0.0377)
PROFIT$_{i,t-1}$	-/+	0.1245***	0.0630**	0.1280***	0.0488***
		(0.0221)	(0.0299)	(0.0489)	(0.0157)
TAXRATE$_{i,t}$	+	-0.0099*	0.0025	0.0386	0.0207
		(0.0059)	(0.0054)	(0.0277)	(0.0134)
TAXRATE$_{i,t-1}$	+	-0.0048**	-	-	-
		(0.0020)	-	-	-
MKT-TO-BOOK$_{i,t}$	-	-0.0002	0.0052	-0.0418***	-0.0400***
		(0.0025)	(0.0041)	(0.0102)	(0.0055)
MKT-TO-BOOK$_{i,t-1}$	-	-0.0006	-0.0039*	0.0075**	0.0086***
		(0.0011)	(0.0020)	(0.0034)	(0.0027)
FIXASSETS$_{i,t}$	+	0.0470**	0.0129	-0.4370***	-0.0435
		(0.0242)	(0.0193)	(0.0981)	(0.0272)
FIXASSETS$_{i,t-1}$	+	-	-	0.3990***	-
		-	-	(0.0839)	-
SIZE$_{i,t}$	+	0.0098***	0.0549***	0.0424**	0.0565***
		(0.0019)	(0.0153)	(0.0201)	(0.0158)
SIZE$_{i,t-1}$	+	-	-0.0501***	-0.0330*	-0.0521***
		-	(0.0149)	(0.0194)	(0.0153)
EARNINGS VOL$_{i,t}$	-	-0.0002	-0.0001	-0.0010*	-0.0010
		(0.0002)	(0.0008)	(0.0006)	(0.0011)
EARNINGS VOL$_{i,t-1}$	-	-	-	-	-
		-	-	-	-
DIVIDEND$_{i,t}$	-/+	-0.0014	-0.0031***	-0.0066**	0.0001
		(0.0009)	(0.0012)	(0.0028)	(0.0014)
DIVIDEND$_{i,t-1}$	-/+	-0.0006*	-0.0008*	-0.0026***	-
		(0.0003)	(0.0004)	(0.0009)	-
EQUITY PREMIUM	-	0.0000	0.0001	-0.0004***	-0.0002***
		(0.0000)	(0.0000)	(0.0001)	(0.0001)
TERM-STRUCTR	-	-0.0015***	-0.0026***	-0.0047***	-0.0055***
		(0.0002)	(0.0003)	(0.0005)	(0.0006)
ΔSHARE PRICE	-	-0.0076***	-0.0157***	-0.0202***	-0.0102**
		(0.0021)	(0.0033)	(0.0044)	(0.0046)
Constant		-0.0346**	-0.0100	0.0880***	0.0910***
		(0.0171)	(0.0131)	(0.0271)	(0.0187)
Correlation1		-14.27***	-12.71***	-16.74***	-13.71***
Correlation2		0.2516	1.030	2.135	2.420
Sargan Test (df)		566.5 (455)	446.6 (396)	742.5 (455)	513.2 (396)
Wald Test-1 (df)		1673 (15)***	1395 (15)***	3436 (16)***	2279 (14)
R^2		0.6807	0.6515	0.6325	0.6515
Firms / Observations		1344 / 20368	998 / 11392	1344 / 20368	1001 / 11413
Estimation Period		1971-2000	1971-2000	1971-2000	1971-2000

The industries were classified as manufacturing (sectors 1-8, 14) and service (sectors 9-13, 15). See Appendix for industry classification of sectors. See also notes in Tables 5.1 and 5.12

Table 5.27: Industry classification in the UK: Long-run Relationship

Dependent Variable:		BOOK-LEVERAGE$_{i,t}$		MARKET- LEVERAGE$_{i,t}$	
Independent Variables	Predicted Sign	Manufacturing	Service	Manufacturing	Service
PROFIT$_{i,t}$	-/+	-0.2624***	-0.1613	-0.4498***	-0.2015**
		(0.0801)	0.1677	(0.1336)	(0.0921)
TAXRATE$_{i,t}$	+	-0.0474*	0.0112	0.0991	0.0727
		(0.0245)	0.0248	(0.0709)	(0.0478)
MKT-TO-BOOK$_{i,t}$	-	-0.0025	0.0058	-0.0881***	-0.1099***
		(0.0057)	0.0146	(0.0194)	(0.0148)
FIXASSETS$_{i,t}$	+	0.1519**	0.0583	-0.0974*	-0.1526
		(0.0756)	0.0876	(0.0561)	(0.0956)
SIZE$_{i,t}$	+	0.0316***	0.0217***	0.0239***	0.0156***
		(0.0057)	0.0054	(0.0045)	(0.0053)
EARNINGS VOL$_{i,t}$	-	-0.0006	-0.0006	-0.0026*	-0.0037
		(0.0006)	0.0035	(0.0016)	(0.0038)
DIVIDEND$_{i,t}$	-/+	-0.0065*	-0.0176**	-0.0237**	0.0002
		(0.0039)	0.0073	(0.0094)	(0.0050)
EQUITY PREMIUM	-	-0.0001	0.0003	-0.0011***	-0.0008**
		(0.0001)	0.0002	(0.0002)	(0.0003)
TERM-STRUCTR	-	-0.0050***	-0.0120***	-0.0120***	-0.0192***
		(0.0008)	0.0022	(0.0016)	(0.0027)
ΔSHARE PRICE	-	-0.0246***	-0.0711***	-0.0518***	-0.0358**
		(0.0071)	0.0160	(0.0114)	(0.0158)

See notes in Table 5.26.

5.5. ROBUSTNESS OF THE RESULTS

It is highly difficult to establish exogeneity in financial and accounting data of balance sheets. So causation between variables or analysing determination of variables is problematic because of the endogeneity problem. That is, it would be less probable that the observed relations of explanatory variables would misleadingly affect the dependent variable when we use *past* values of capital structure determinants. For instance, if there has been a change in market value of a firm in *this* year compared to last year, the source of this change should be obtained from the *last* year's financial decisions. Therefore, using the same period data for both leverage and capital structure determinants might give misleading results.

We have compared the regression results of models in levels and differences using OLS, Anderson-Hsiao and GMM procedures. In the end, it was shown that the most appropriate methodology for dynamic capital structure would be system-GMM specification that combines the differenced equation with the level equation. Our results based on GMM estimates are robust due to many reasons. For instance, potential endogeneity problem is eliminated by GMM methodology. Moreover, GMM does not need the conditions of 'no autocorrelation', 'no heteroscedasticity', and 'normality' to be fulfilled especially for the large samples (see, Hansen [1982]). Our panel data set is far from suffering the consequences of small samples with large number of observations for the UK, and asymptotic standard errors are robust to heteroscedasticity. Related to sample size of France and Germany, the two-step GMM results in PcGive use the estimated variance matrix incorporating the small-sample correction of Windmeijer [2000]. Similarly, in order not to be affected by 'survivorship bias', we included dead firms to our data set as well depending the availability of data for dead firms.

Furthermore, there are some advantages of employing panel data. It increases degrees of freedom, renders large number of observations, reduces the collinearity among the explanatory variables (as indicated by very significant Wald tests) and consequently leads to more efficient estimates.

There are also some points of secondary importance in our analysis. For example, useful descriptive statistics for each year are reported to examine the yearly change in firms characteristics or the stability of the results across sub-samples. In addition, substantial outliers have been deleted from the data set. Different leverage and size measures have been utilised and the results were shown to be generally insensitive to these alternative definitions.

One should also emphasise the potential biases in selecting companies for the sample size. Sample selection bias may be due to two main reasons (Heckman, [1979]). First, we may have a self-selection of individuals or investigated data units; second, data processor or researchers' decision may prevail in sample selection. There is neither bias nor specification error due to omitted variable and missing data as the sample data set incorporates no missing value for any capital structure determinant and the nature of selected variables depends on the purpose of research.

Another point is that size and industry classification generally support our main findings.

There is a caveat for German data as the Prudence Principle results in the undervaluation of assets and overvaluation of liabilities. Yet, it is known that elimination of accounting differences, mainly in the definitions of assets and debts, for international comparisons can only be partial (see Friderichs et al. [1999]). As discussed by Wald [1999], assuming that accounting and institutional differences affect all firms in a country with a constant multiplier, these differences should disappear. That is to say, since total assets appear in the denominator of both dependent and independent variables, the estimated coefficient should not change due to proportional scaling. Hence, such differences should not be important in by-country regressions. More importantly, our data source DATASTREAM INTERNATIONAL supplies some datatypes which are common to all companies. As almost all of our datatypes are such common items, the empirical results imply the maximum comparability across countries.

Focusing on the correlation matrix of variables in all countries (Table 5.2), the correlation coefficients give some insights about the possibility of multicollinearity. The correlation between non-debt tax shields and profitability is too high in all countries. This is not surprising because the operating profit is used before depreciation. As the data are based on the balance sheets of firms, there are expectedly some other high correlations (e.g., between NDTS and fixed assets ratio). It is inevitable to use financial variables in terms of ratios, which have some common denominators, for cross-sectional regressions to have more robust results but this also causes high correlations between capital structure variables. Consequently, one should be cautious while interpreting the regression results in the context of these interrelations.

5.6. CONCLUSION

This chapter has attempted to explain why there have been substantial variations in the debt ratios that firms employ in their capital structure. This capital structure study has aimed to contribute to the literature in several ways. First, in the empirical analysis three distinct economies, France, Germany and the United Kingdom, have been taken as bases to investigate whether different institutional factors across countries have different influence upon the financing decisions of firms. Second, apart from commonly used firm-specific factors we also included some market-related factors and controlled for dividend policy to see their interaction with debt-equity ratio. Third, large panel data set was utilised to study dynamic capital structure. We believe its necessity because it is apparent that factors influencing firms' capital structure change overtime and thus time-varying observed difference in firms' capital structure should also be investigated. Moreover, we use the GMM estimation methodology due to its superiority in overcoming common econometric problems, especially in controlling for the endogeneity problem by using efficient instrumental variables. Using panel data together with GMM procedure, one is also able to control for unobservable and fixed firm-specific effects, which might potentially influence firms' capital structure decisions.

The empirical evidence seems to reveal that financing decisions of firms are not independent from country-specific institutional factors as the association between leverage and a certain firm-specific characteristics varies across countries. Our results related to the dynamics in firms' borrowing decisions suggest that the firms are adjusting their debt ratios to achieve their targeted capital structure. With respect to the estimated coefficients of lagged market-leverage, this adjustment process in France seems quickest in terms of responding to the new circumstances due to relatively low transaction costs. Furthermore, there is a significantly negative association between profitability and leverage in all countries. However, the asymmetric information problems between managers and outside investors implied by the pecking order theory seem most severe in France. The association between market-leverage and tax rate is insignificant in France and Germany, which does not give credit to the theory. This invariance is expected especially for France due to French tax system's objective to promote the retentions of profits by reducing corporate tax rates. The influence of tax rate on market-leverage is, however, significantly positive in the UK. Furthermore, the association of book-leverage with market-to-book ratio is also different across countries, which may imply that resolving agency problems and related costs might differ across different legal systems. The relationship is significantly positive in France, insignificant in the UK and significantly negative in Germany. The insignificant market-to-book ratio coefficient in the UK is not expected since the dispersed equity ownership and thus ineffective monitoring of management tend to prevent the mitigation of severe agency problems. The low shareholder protection in France might necessitate the preference of using debt over equity and therefore causes a strongly positive estimate of market-to-book ratio coefficient. On the other hand, market-to-book ratio and market-leverage is negatively associated in all countries, which confirms the idea that less debt should be used to mitigate underinvestment problems in growing firms. The relationship between fixed-assets ratio and leverage is significantly positive in all sample countries, which is in line with the theory that collateral tangible assets are useful to prevent risk-shifting problems. Another apparent difference across countries is due to the impact of dividend policy: The association of market-leverage with payout ratio is insignificant in Germany, significantly positive in France and significantly negative in the UK. This might be the reflection of differences of taxation systems and corporate governance in these countries.

Furthermore, size is found to be a strongly positive determinant of debt financing in all countries under market-leverage. This finding emphasises the importance of expected bankruptcy costs in financial distress, as size can be an inverse proxy for bankruptcy probability. The irrelevance of size with book-leverage in Germany, on the other hand, might be attributed to the effective role of banks in controlling the management and in supporting firms in bad conditions. This invariance is in line with the conventional wisdom that close and long-term relationship between firms and banks reduces the cost of financial distress. However, strongly negative association of leverage with profitability and market-to-book ratio; significantly positive relationship between size and market-leverage, and significantly positive of fixed-assets ratio on debt-ratios in Germany reveal somewhat important evidence, also found by Edwards and Fischer [1994]. Our results imply that allegedly efficient and strong characteristics of German corporate governance system seems to fail in mitigating agency, financial distress and asymmetric information problems with concentrated share ownership, and banks' close control and monitoring of the management.

As for the market-related factors, the inverse relation between term-structure and leverage in all countries confirms that companies are reluctant to raise debt capital while the long term-rate of interest is high. Similarly, the negative impact of prior share price change on leverage in all countries suggests that firms issue equity after share price increase. It seems that the effect of equity premium in debt-equity ratios is country dependent: German firms do not seem to consider the market equity premium when deciding their financing mix; French (UK) firms tend to issue debt (equity) when equity premium is high.

Furthermore, our study finds some other country-specific differences in financing behaviour of firms based on size and industry classification. On one hand, size classification in France shows that asymmetric information problems persist for medium and large firms while there seem no significant agency-type (underinvestment) problems for medium firms under book-leverage. In addition, the importance of collateralisable assets for external borrowing is seen in all size classes of French firms. Information asymmetries are not considerable for small firms in Germany and the UK as profitability has no significant impact on leverage for small firms. However, there are some concerns about such problems for medium and large UK firms.

On the other hand, industry classification reveals that capital intensity supports relatively heavy debt financing against risk-shifting problems for manufacturing firms only in France and the UK as fixed-assets ratio does not exert any significant effect on leverage in Germany. The estimated coefficient of profitability is insignificant for service companies in France, which implies the absence of information asymmetries in these firms. However, the same association is significant for manufacturing companies in all countries. The significantly positive impact of size on leverage in Germany and the UK emphasises the fact that UK insolvency code causes too many premature liquidations, and German firms entering into bankruptcy process are generally liquidated. The same relationship in France tends to be insignificant for service companies implying the firm-friendly nature of French bankruptcy laws. The effect of equity premium tends to be considerable with different directions for manufacturing firms in France and service firms in Germany and for both sectors in the UK.

In conclusion, the implications in this chapter reject the irrelevance hypothesis of Modigliani and Miller theorem with some significant firm-characteristics determinants accounting for capital structure variations across firms. We have also found some evidence that the institutional factors appear to be effective in financing decisions of firms across countries. However, we still need further empirical and theoretical research on capital structure, especially, across countries as there remain to be some ambiguous points waiting for investigation in this puzzling issue of corporate finance.

5.7. APPENDIX

Table 5. A1: Panel Structure: *a)* Number of firms having '*n*' continuous observations during the period; *b)* number of observations in each year; *c)* number of firms in each industry class; and *d)* number of observations in each industry class.

a) Number of firms

n (years)	France	Germany	UK
3	60	55	216
4	53	31	218
5	34	18	194
6	13	20	130
7	23	12	103
8	17	13	66
9	14	12	52
10	11	20	51
11	2	28	86
12	48	34	92
13	15	186	85
14	4	136	82
15	3	-	87
16	3	-	66
17	6	-	74
18	53	-	66
19	-	-	61
20	-	-	50
21	-	-	31
22	-	-	27
23	-	-	24
24	-	-	16
25	-	-	25
26	-	-	21
27	-	-	44
28	-	-	42
29	-	-	161
30	-	-	30
31	-	-	38
32	-	-	179
Total	**359**	**565**	**2417**

b) Number of observations

Years	France	Germany	UK
1969	-	-	456
1970	-	-	478
1971	-	-	486
1972	-	-	845
1973	-	-	886
1974	-	-	913
1975	-	-	918
1976	-	-	923
1977	-	-	929
1978	-	-	942
1979	-	-	962
1980	-	-	974
1981	-	-	1002
1982	-	-	1043
1983	58	-	1109
1984	65	-	1191
1985	68	-	1249
1986	71	-	1290
1987	75	151	1304
1988	92	349	1320
1989	142	372	1311
1990	143	397	1288
1991	151	412	1247
1992	163	424	1208
1993	175	430	1217
1994	197	442	1267
1995	208	463	1315
1996	243	477	1396
1997	292	504	1478
1998	347	551	1479
1999	346	545	1351
2000	335	516	1180
Total	**3171**	**6033**	**34957**

c) Number of firms

Industry	France	German.	UK
1	23	49	164
2	10	43	30
3	19	56	200
4	31	36	162
5	48	57	261
6	16	31	28
7	41	89	308
8	22	15	89
9	25	21	194
10	1	0	55
11	20	22	148
12	31	23	252
13	46	31	318
14	17	59	142
15	9	33	66

d) No. of observations

Industry	France	German.	UK
1	253	532	2564
2	94	510	601
3	234	610	3587
4	269	410	2297
5	378	517	3221
6	153	359	475
7	397	1034	5341
8	186	170	1376
9	218	207	2394
10	4	0	566
11	146	241	2110
12	295	246	3876
13	353	179	3374
14	141	648	2638
15	50	370	537

Figure 5.A1: Plots of mean leverage values for France.

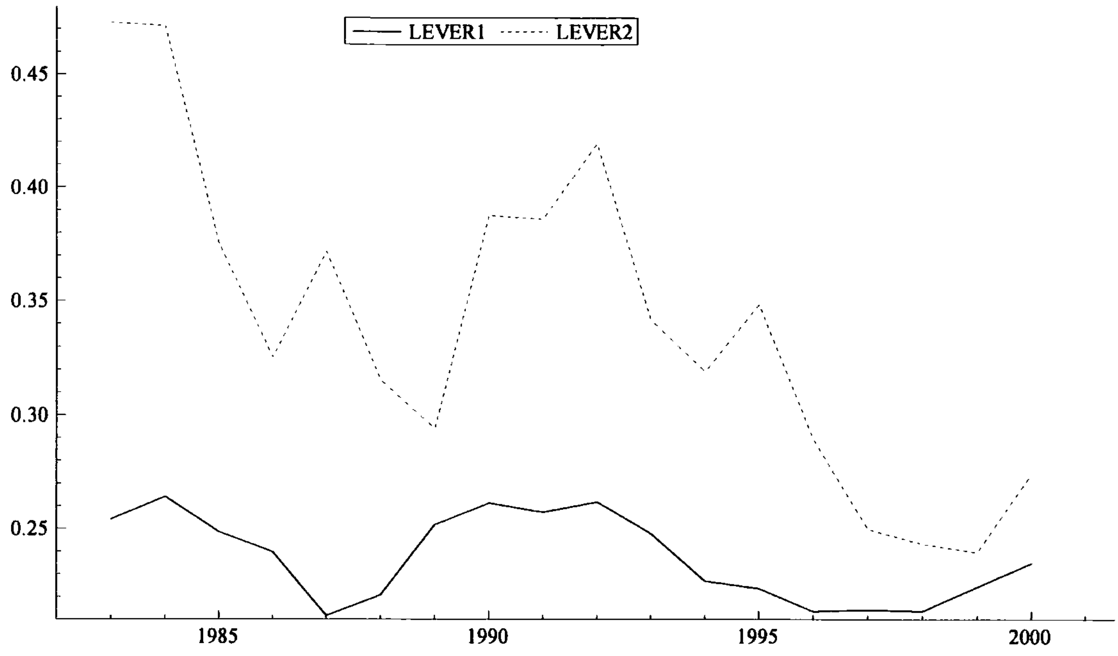

Figure 5.A2: Plots of mean leverage values for Germany.

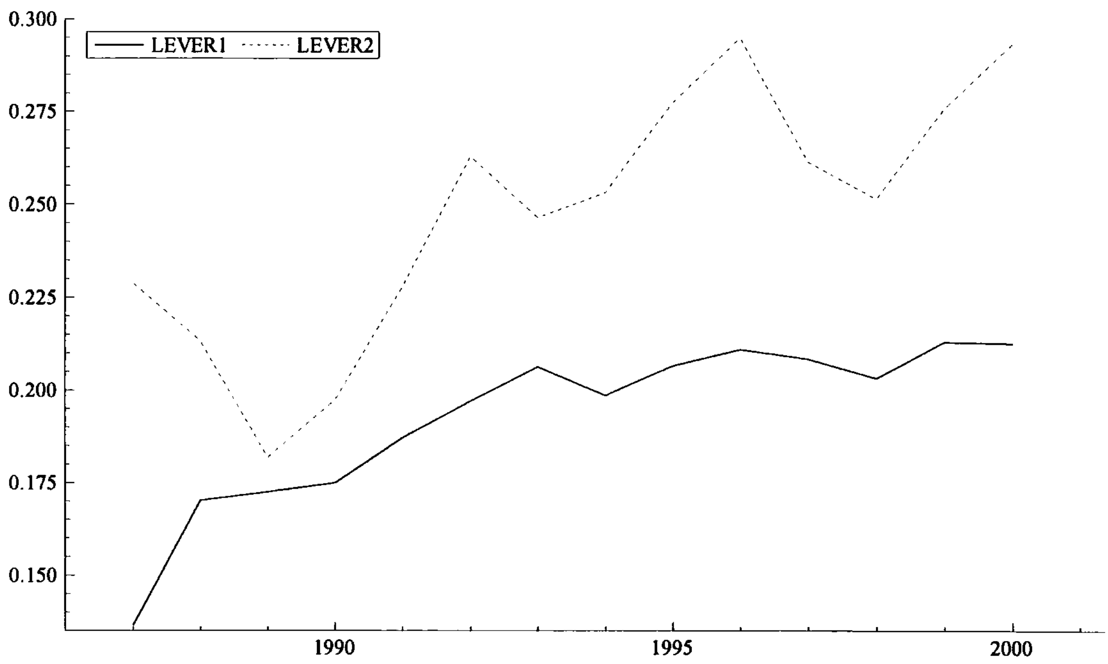

Figure 5.A3: Plots of mean leverage values for the UK.

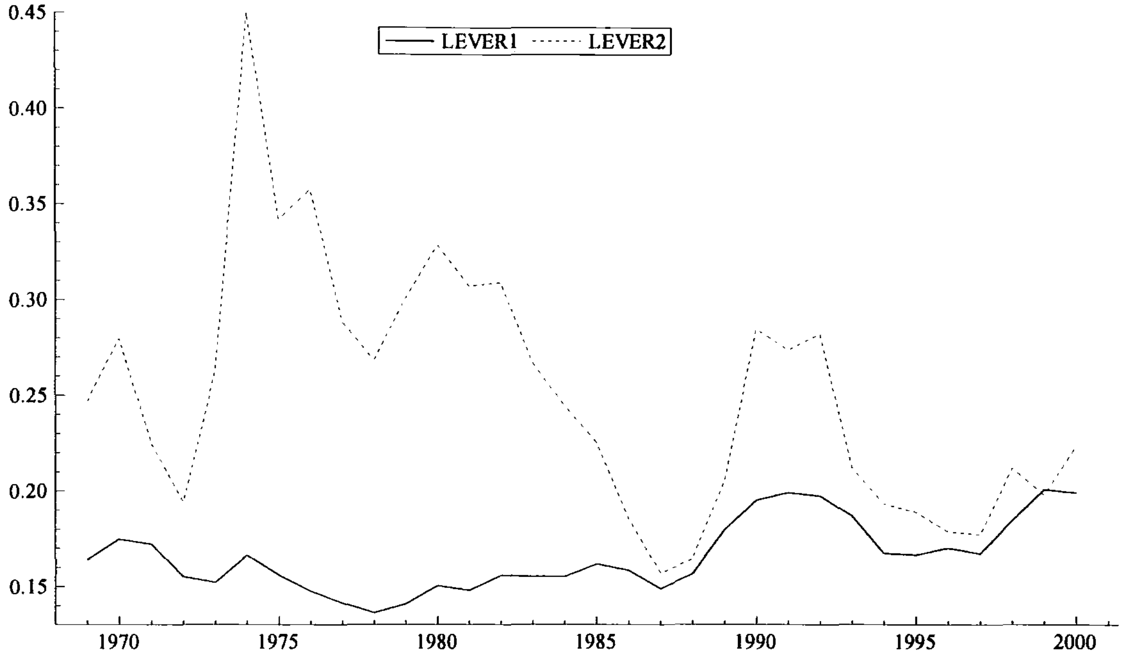

Table 5. A2: Descriptive Statistics for France in each Year.

1983	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2541	0.4728	0.1408	0.0512	0.4632	1.1466	0.2534	15.749	15.479
Standard Deviation	0.1156	0.2552	0.0763	0.0278	0.327	0.3306	0.1152	1.1441	1.153
Minimum	0.086	0.0893	0.0323	0.0152	-0.664	0.7918	0.0434	12.787	12.838
Maximum	0.6194	0.9258	0.523	0.1379	2.0451	2.5744	0.5712	18.756	18.828
1984	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.264	0.4711	0.1418	0.0502	0.4237	1.1843	0.2487	15.67	15.392
Standard Deviation	0.1196	0.2522	0.0836	0.028	0.5075	0.3908	0.1099	1.2168	1.2194
Minimum	0.0554	0.0866	0.0387	0.0147	-2.023	0.814	0.0402	12.721	12.39
Maximum	0.5977	0.9324	0.6057	0.1774	2.3899	3.1776	0.5096	18.909	18.825
1985	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2485	0.3753	0.1365	0.0469	0.3143	1.3183	0.2448	15.653	15.355
Standard Deviation	0.114	0.2135	0.0829	0.0256	0.6596	0.5309	0.1167	1.2139	1.2078
Minimum	0.0547	0.0419	-0.118	0.0069	-3.9682	0.7989	0.0286	12.855	12.637
Maximum	0.5965	0.8217	0.5277	0.1538	1.1686	4.0838	0.5983	18.88	18.808
1986	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2397	0.3251	0.1296	0.0568	0.3964	1.4412	0.2508	15.678	15.507
Standard Deviation	0.117	0.2001	0.0744	0.0527	0.3118	0.651	0.1265	1.2287	1.2793
Minimum	0.0372	0.0209	0.0024	0.0066	-0.722	0.7684	0.0306	12.992	12.81
Maximum	0.5827	0.8348	0.4414	0.3402	1.7247	5.6769	0.547	18.477	18.74
1987	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2117	0.3716	0.1367	0.0519	0.3731	1.2126	0.2402	15.733	15.589
Standard Deviation	0.1044	0.207	0.0748	0.0382	0.2204	0.4999	0.127	1.336	1.393
Minimum	0.0175	0.0139	-0.0214	0.0076	-0.4376	0.8014	0.0306	11.541	10.886
Maximum	0.4896	0.9103	0.4135	0.2417	1.0865	4.1922	0.5699	18.541	18.728

1988	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2208	0.3151	0.1368	0.0478	0.3597	1.416	0.2317	15.584	15.428
Standard Deviation	0.114	0.1945	0.0677	0.0369	0.1724	0.604	0.1317	1.4307	1.503
Minimum	0.0043	0.0016	0.0092	0.0089	-0.091	0.8397	0.0228	11.266	11.444
Maximum	0.563	0.7696	0.3691	0.2621	1.3551	4.5993	0.613	18.579	18.784
1989	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2516	0.2939	0.1333	0.0464	0.3061	1.5276	0.2318	15.003	14.9
Standard Deviation	0.1321	0.1645	0.0685	0.0334	0.2806	0.7298	0.1403	1.6816	1.6837
Minimum	0.0064	0.0024	0.0014	0.0049	-1.7055	0.7482	0.0202	10.005	9.946
Maximum	0.7483	0.7832	0.3747	0.2207	0.8405	6.8928	0.7989	18.631	18.858
1990	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2611	0.3875	0.1194	0.0463	0.3124	1.2477	0.237	15.091	15.036
Standard Deviation	0.1408	0.2079	0.0614	0.0351	0.6614	0.4513	0.1486	1.7122	1.7068
Minimum	0	0	-0.024	0.0024	-2.63	0.7137	0.0188	9.9416	9.9071
Maximum	0.6552	0.8995	0.3626	0.2286	6.5758	3.3998	0.7797	18.776	18.989
1991	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2571	0.3858	0.117	0.0478	0.3323	1.2539	0.2439	15.119	15.119
Standard Deviation	0.1422	0.2147	0.0699	0.0359	0.4465	0.5001	0.1507	1.745	1.7617
Minimum	0	0	-0.032	0.0038	-2.568	0.6946	0.0152	10.041	10.043
Maximum	0.6164	0.8664	0.4642	0.2421	2.8378	3.9573	0.7615	18.922	19.109
1992	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2616	0.4192	0.106	0.0476	0.2848	1.2055	0.2434	15.187	15.195
Standard Deviation	0.145	0.2483	0.0631	0.0342	0.2582	0.4325	0.1515	1.7758	1.7926
Minimum	0.0093	0.004	-0.057	0.0034	-0.845	0.4807	0.0069	9.6582	10.028
Maximum	0.6166	0.9575	0.3378	0.2622	1.5667	3.1922	0.7593	18.933	19.151
1993	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2478	0.3415	0.0983	0.0499	0.2916	1.415	0.2476	15.038	15.119
Standard Deviation	0.153	0.2328	0.07	0.0413	0.5318	0.7016	0.168	1.7833	1.7575
Minimum	0.0001	2E-05	-0.116	0.0046	-2.442	0.7316	0.0062	10.324	11.278
Maximum	0.6332	0.9637	0.3868	0.2965	5.5849	5.2089	0.8825	19	19.249
1994	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2269	0.3189	0.1114	0.0487	0.321	1.3713	0.24063	14.969	15.075
Standard Deviation	0.1523	0.2224	0.0731	0.0389	0.4925	0.6351	0.1689	1.7882	1.7732
Minimum	0	0	-0.071	0.0026	-1.614	0.6389	0.00531	10.422	11.162
Maximum	0.7437	0.9537	0.4452	0.271	5.2882	5.2384	0.96379	18.979	19.253
1995	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2237	0.3485	0.1142	0.0479	0.3232	1.3387	0.2367	15.008	15.073
Standard Deviation	0.1515	0.2488	0.0714	0.0359	0.528	0.7252	0.1646	1.8009	1.8
Minimum	0.0004	6E-05	-0.0868	0.0011	-1.98	0.5967	0.0049	10.427	11
Maximum	0.7615	0.9968	0.4575	0.2677	4.5472	6.9749	0.9855	20.526	20.067
1996	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2136	0.2895	0.1079	0.048	0.3242	1.5131	0.2361	14.76	14.821
Standard Deviation	0.1415	0.2331	0.0935	0.0323	0.4497	0.8309	0.1644	1.84	1.8375
Minimum	0	0	-0.7932	0.0003	-1.7464	0.5952	0.0036	8.677	9.9371
Maximum	0.8875	0.9753	0.5599	0.2056	5.0494	5.7161	0.9788	19.07	19.134
1997	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2143	0.2498	0.1204	0.0486	0.3095	1.6769	0.2249	14.44	14.487
Standard Deviation	0.151	0.2128	0.1257	0.0385	0.4612	1.0215	0.1635	2.0363	2.059
Minimum	0	0	-1.414	8E-05	-1.746	0.6766	0.0042	9.3434	9.2409
Maximum	0.9985	0.9662	0.7852	0.2875	6.4984	9.0462	0.9716	19.164	19.784
1998	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2137	0.2433	0.1121	0.0469	0.3062	1.8202	0.2145	14.229	14.286
Standard Deviation	0.1486	0.2131	0.1206	0.0352	0.3608	1.2877	0.1621	2.1688	2.1276
Minimum	0	0	-1.09	0.0002	-3.218	0.5516	0.0016	6.8712	9.3613
Maximum	0.8578	0.9541	0.5967	0.2447	2.44	13.155	0.964	19.132	19.798

1999	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2244	0.2396	0.105	0.0481	0.2697	2.1178	0.2144	14.371	14.456
Standard Deviation	0.1491	0.2037	0.1166	0.0427	0.4078	2.0662	0.1609	2.1693	2.1312
Minimum	0	0	-0.852	0.0021	-3.457	0.5603	0.0036	5.2407	9.2507
Maximum	0.8386	0.939	0.6563	0.5467	3.0245	20.602	0.9629	19.272	19.946
2000	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.2348	0.2743	0.1002	0.0484	0.2701	1.8826	0.2107	14.547	14.649
Standard Deviation	0.1542	0.218	0.1208	0.0434	0.396	1.6314	0.16	2.1501	2.1142
Minimum	0	0	-0.797	0.0021	-2.621	0.3968	0.0027	5.2407	9.2072
Maximum	0.8472	0.9145	0.9935	0.4337	3.4324	12.808	0.9623	20.227	20.502

Table 5. A3: Descriptive Statistics for Germany in each Year.

1987	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.1366	0.2288	0.1377	0.0564	0.5296	1.2599	0.3242	13.706	13.392
Standard Deviation	0.1215	0.2073	0.0898	0.0445	0.3914	0.3789	0.1681	1.772	1.7844
Minimum	0	0	-0.222	0	-2.98	0.6647	0.0341	9.6536	9.6708
Maximum	0.5023	0.7841	0.4347	0.2858	2.5633	2.628	0.8525	18.027	17.821
1988	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.1702	0.2133	0.1405	0.0703	0.5663	1.9045	0.3493	12.246	12.149
Standard Deviation	0.1753	0.2174	0.1221	0.0608	0.6587	4.2471	0.211	2.3313	1.9986
Minimum	0	0	-0.6098	0	-0.769	0.2955	0.0017	5.0057	6.8995
Maximum	0.7945	0.9885	0.7223	0.707	10.978	72.717	0.9947	18.101	17.892
1989	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.1725	0.1819	0.1349	0.064	0.6151	2.0968	0.3467	12.298	12.203
Standard Deviation	0.1693	0.1903	0.1103	0.0451	0.8679	3.9257	0.2054	2.3059	2.0057
Minimum	0	0	-0.731	0	-2.682	0.3067	0	5.8035	6.7186
Maximum	0.7732	0.97	0.5349	0.2331	10.978	68.04	0.9938	18.108	17.937
1990	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.175	0.1974	0.1357	0.0663	0.5493	2.1348	0.3491	12.358	12.265
Standard Deviation	0.1699	0.1997	0.1069	0.0449	0.767	4.3375	0.2031	2.2734	1.9926
Minimum	0	0	-0.622	0	-3	0.3479	0	5.4613	6.6219
Maximum	0.7856	0.9792	0.5625	0.3454	13.108	65.129	0.9909	18.204	17.945
1991	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.1872	0.228	0.1399	0.0696	0.4725	1.8234	0.3631	12.416	12.307
Standard Deviation	0.1698	0.2155	0.1158	0.0494	0.9829	2.6847	0.2054	2.2468	1.973
Minimum	0	0	-0.6222	0	-15	0.4744	0.0086	5.2223	6.7654
Maximum	0.9925	0.9773	0.6723	0.3743	6.9531	40.647	0.9904	18.25	18.001
1992	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.1971	0.2629	0.1275	0.0726	0.4621	1.6928	0.3671	12.411	12.337
Standard Deviation	0.1798	0.2445	0.1288	0.053	1.2422	2.3812	0.2016	2.2475	1.9657
Minimum	0	0	-0.901	0	-16.222	0.3208	0	5.3871	6.8838
Maximum	0.9911	0.9834	0.7428	0.4678	12.785	31.578	0.985	18.272	18.122
1993	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2064	0.2465	0.1161	0.073	0.2852	1.8508	0.3611	12.405	12.365
Standard Deviation	0.1883	0.2382	0.1203	0.0623	1.4671	2.6736	0.2024	2.2319	1.9698
Minimum	0	0	-0.339	0	-10.236	0.3608	0	5.5286	6.9758
Maximum	0.83564	0.9604	0.7291	0.6219	14.2	40.206	0.9929	18.263	18.188
1994	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.1987	0.2532	0.113	0.065	0.3653	1.747	0.3422	12.421	12.403
Standard Deviation	0.1871	0.2401	0.1188	0.0471	1.0655	2.6509	0.1978	2.2531	1.9443
Minimum	0	0	-0.4615	0	-8.8	0.3868	0	5.0423	7.1078
Maximum	0.9916	0.9681	0.7355	0.3094	15.5	43.136	0.9978	18.321	18.214
1995	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2067	0.2775	0.1063	0.0595	0.2613	1.8619	0.3341	12.38	12.396
Standard Deviation	0.1892	0.2519	0.1377	0.0438	1.1585	4.0229	0.1942	2.3379	1.9608
Minimum	0	0	-1.162	0	-15.58	0.4062	0	3.2106	7.0609
Maximum	0.9916	0.9789	0.7383	0.2876	5.7685	61.53	0.9984	18.299	18.175
1996	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2111	0.295	0.1048	0.057	0.3517	1.77	0.3344	12.378	12.444
Standard Deviation	0.1933	0.2682	0.1234	0.0428	1.5958	3.7619	0.1984	2.3809	1.9726
Minimum	0	0	-1.099	0	-16.47	0.3392	0	4.4804	7.0542
Maximum	0.8704	0.9735	0.744	0.3697	16.638	66.395	0.9804	18.338	18.829
1997	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.2086	0.2615	0.1162	0.0553	0.3502	1.8831	0.3192	12.349	12.404
Standard Deviation	0.1997	0.2532	0.1311	0.0413	0.6856	4.2163	0.1979	2.4262	1.989

Minimum	0	0	-0.41	0	-2.959	0.4326	0	1.2306	6.9384
Maximum	0.9904	0.9708	1.7416	0.3668	9.9538	88.476	0.9977	18.486	18.748
1998	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.2034	0.2516	0.1074	0.0527	0.3548	2.3431	0.3099	12.271	12.385
Standard Deviation	0.1988	0.2603	0.1909	0.0426	0.8283	5.0078	0.2082	2.4446	2.0047
Minimum	0	0	-2.92	0	-3.5734	0.4445	0	4.2792	6.9424
Maximum	0.883	0.9942	1.7174	0.4061	15.202	93.883	0.9985	19.216	19.211
1999	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.2132	0.276	0.0978	0.0507	0.3144	1.9977	0.3085	12.363	12.526
Standard Deviation	0.2061	0.2789	0.1366	0.0398	0.886	4.1348	0.21046	2.3919	2.0168
Minimum	0	0	-0.796	0	-12.377	0.4229	0	4.1625	7.1757
Maximum	0.9995	0.9878	1.3434	0.3096	8.6536	86.81	0.99716	19.355	19.486
2000	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.2127	0.2934	0.0987	0.0477	0.2725	2.0158	0.3077	12.384	12.516
Standard Deviation	0.2026	0.2883	0.1241	0.0373	0.8757	3.7037	0.2148	2.3738	2.0477
Minimum	0	0	-0.7074	0	-10.3	0.2536	0	4.2563	4.5704
Maximum	0.8444	0.9925	0.7245	0.2236	9.3808	41.805	0.9809	19.402	19.594

Table 5. A4: Descriptive Statistics for the UK in each Year.

1969	LEVER1	LEVER2	PROFIT	NDTS	ETR	MBR	FAR	SIZE1	SIZE2
Mean	0.164	0.2469	0.1386	0.0299	0.4328	1.2076	0.376	9.6633	9.5096
Standard Deviation	0.1169	0.2034	0.0572	0.019	0.1139	0.5997	0.1791	1.5296	1.5171
Minimum	0	0	-0.094	0.0012	-0.623	0.3582	0.0124	6.5539	6.3226
Maximum	0.6335	0.9464	0.3333	0.1679	1.3277	4.9602	0.9077	14.667	14.764
1970	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1749	0.2797	0.1368	0.0299	0.4178	1.1059	0.3711	9.7305	9.5549
Standard Deviation	0.1165	0.2055	0.0637	0.0197	0.2008	0.5157	0.1765	1.5304	1.5166
Minimum	0	0	-0.111	0	-2	0.3395	0.0163	6.2631	6.1792
Maximum	0.6385	0.9449	0.8129	0.1892	2.2215	4.7512	0.8975	14.739	14.798
1971	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1723	0.2247	0.1448	0.0309	0.3906	1.3752	0.3732	9.7611	9.5524
Standard Deviation	0.1121	0.1843	0.0621	0.0206	0.1909	0.747	0.1764	1.5141	1.5056
Minimum	0	0	-0.0088	0.0017	-1.1366	0.3724	0.0401	6.4892	6.2628
Maximum	0.6075	0.9039	0.5703	0.1786	3.6	7.8801	0.9002	14.705	14.825
1972	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.155	0.1942	0.149	0.0302	0.3815	1.3932	0.3658	8.9319	8.6787
Standard Deviation	0.1216	0.174	0.0682	0.0196	0.2416	0.745	0.1721	1.7095	1.7312
Minimum	0	0	-0.142	0	-5.4286	0.3667	0	3.7905	4.3659
Maximum	0.8199	0.8977	0.4919	0.1823	1.88	9.9818	0.9257	14.882	14.896
1973	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1521	0.2626	0.1585	0.0288	0.4163	1.0436	0.3528	9.0192	8.7746
Standard Deviation	0.1202	0.211	0.0667	0.0184	0.3401	0.4279	0.1705	1.7084	1.7148
Minimum	0	0	-0.071	0	-9	0.2609	0	3.6164	4.4067
Maximum	0.8475	0.9168	0.4142	0.1522	1.9091	6.5832	0.9652	15.042	15.07
1974	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1664	0.4496	0.1518	0.0285	0.5025	0.7481	0.345	9.022	8.7587
Standard Deviation	0.1212	0.2738	0.0656	0.0189	0.3298	0.1904	0.1684	1.7228	1.7056
Minimum	0	0	-0.0641	0	-4.394	0.2518	0	2.8198	4.4727
Maximum	0.7403	0.9889	0.4312	0.1872	5.8258	2.8465	0.9311	15.395	15.2
1975	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1559	0.3416	0.1436	0.0296	0.511	0.8966	0.345	8.9825	8.6586
Standard Deviation	0.1186	0.2481	0.0659	0.019	0.3553	0.2999	0.1715	1.716	1.7071
Minimum	0	0	-0.189	0	-4.235	0.2969	0	3.1903	4.1149
Maximum	0.7894	0.9788	0.4872	0.168	5.9891	4.1073	0.9733	15.186	15.112
1976	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1475	0.3574	0.144	0.029	0.5034	0.8468	0.3352	8.998	8.652
Standard Deviation	0.1178	0.2592	0.0621	0.0188	0.2377	0.2418	0.1668	1.7381	1.7183
Minimum	0	0	-0.075	0	-2.3846	0.3227	0	3.1335	4.6313
Maximum	0.7568	0.9867	0.3771	0.1677	3.1667	3.8594	0.9351	15.312	15.151
1977	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1413	0.2882	0.1496	0.029	0.4949	0.9782	0.3262	9.004	8.6316
Standard Deviation	0.111	0.2294	0.0635	0.0194	0.3345	0.3317	0.1663	1.737	1.7118
Minimum	0	0	-0.178	0	-6.5	0.2221	0	3.053	4.5215
Maximum	0.7266	0.9758	0.4425	0.1899	3.059	3.4212	0.9285	15.29	14.992
1978	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1362	0.2681	0.1478	0.0303	0.4977	0.9829	0.3321	9.0623	8.6962
Standard Deviation	0.1099	0.2186	0.0639	0.0205	0.2489	0.3474	0.1679	1.7225	1.7002
Minimum	0	0	-0.119	0	-6.5	0.2156	0	3.1382	4.3465
Maximum	0.8374	0.9884	0.4481	0.2148	1.0243	4.0916	0.9345	15.378	15.282
1979	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1409	0.3006	0.141	0.0309	0.4947	0.939	0.3303	9.0783	8.7532
Standard Deviation	0.1086	0.2336	0.0642	0.0205	0.6614	0.4015	0.1681	1.7446	1.6889

Minimum	0	0	-0.215	0	-16	0.2177	0	2.7056	4.4031
Maximum	0.8506	0.9904	0.4035	0.1983	9.9474	4.8252	0.9281	15.513	15.354
1980	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1505	0.3283	0.1241	0.0334	0.5145	0.9406	0.3447	9.0183	8.6923
Standard Deviation	0.1119	0.2495	0.0742	0.0225	0.6817	0.5115	0.1714	1.7743	1.6916
Minimum	0	0	-0.4732	0	-3.4063	0.2257	0	2.8343	4.3877
Maximum	0.9252	0.9925	0.3824	0.214	13.742	5.6504	0.9744	15.488	15.331
1981	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.148	0.3069	0.1036	0.035	0.46	0.9603	0.3538	8.8868	8.6109
Standard Deviation	0.1167	0.2467	0.0767	0.024	0.7824	0.5317	0.1753	1.8585	1.7372
Minimum	0	0	-0.664	0	-17.14	0.1822	0	1.3763	4.3207
Maximum	0.8859	0.9946	0.3746	0.2411	6.6667	7.1296	0.9921	15.581	15.498
1982	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1559	0.3087	0.1048	0.0354	0.4434	1.0884	0.3534	8.8381	8.5668
Standard Deviation	0.1214	0.2605	0.0743	0.0242	0.8185	0.9766	0.1782	1.8823	1.7518
Minimum	0	0	-0.1905	3E-05	-17.3	0.1318	0.0002	0.4072	4.2327
Maximum	0.6721	0.9963	0.4066	0.2767	11.607	22.828	0.9788	15.656	15.541
1983	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1552	0.267	0.1134	0.0364	0.4648	1.2221	0.3491	8.7832	8.5162
Standard Deviation	0.1221	0.2365	0.0838	0.0253	0.5461	0.8328	0.1797	1.8947	1.765
Minimum	0	0	-0.684	0	-2.993	0.1676	0	2.4241	4.282
Maximum	0.7029	0.9941	0.658	0.2397	10.93	7.4721	0.9448	15.851	15.512
1984	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1552	0.2443	0.1252	0.0363	0.4357	1.3824	0.341	8.7967	8.5196
Standard Deviation	0.1207	0.2216	0.082	0.0257	0.5594	1.0731	0.185	1.8751	1.7671
Minimum	0	0	-0.445	0	-14.41	0.2137	0	0.5386	4.3935
Maximum	0.6721	0.9895	0.658	0.2677	8.3333	14.206	0.9609	15.942	15.685
1985	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1618	0.2253	0.1294	0.0378	0.3916	1.4287	0.336	8.7957	8.5052
Standard Deviation	0.1284	0.2031	0.0932	0.0314	0.4143	0.9169	0.1852	1.8573	1.7683
Minimum	0	0	-0.852	0.0004	-9.3421	0.2137	0	1.6825	3.9408
Maximum	0.963	0.9686	0.5679	0.579	5.2667	10.062	0.9784	15.95	15.491
1986	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1584	0.1858	0.1359	0.0376	0.3538	1.642	0.333	8.855	8.5798
Standard Deviation	0.1316	0.1805	0.0984	0.0271	0.3254	1.112	0.1894	1.846	1.7553
Minimum	0	0	-1.098	0.0004	-8.429	0.2073	0.0011	0.7532	4.0208
Maximum	0.963	0.9524	0.657	0.3542	4.3667	16.347	0.9669	15.617	15.413
1987	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1488	0.1569	0.147	0.0368	0.3283	1.8173	0.3282	8.9347	8.6827
Standard Deviation	0.1276	0.1607	0.0959	0.0269	0.2765	1.4043	0.1938	1.8453	1.771
Minimum	0	0	-0.616	0	-7.066	0.2444	0.0005	0.1802	4.0395
Maximum	0.7209	0.8945	0.5888	0.3913	2.4359	22.115	0.9742	15.603	15.317
1988	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1567	0.1646	0.1533	0.0355	0.3301	1.6984	0.3337	9.0401	8.8191
Standard Deviation	0.127	0.1504	0.0994	0.0257	0.2611	1.4754	0.1969	1.8362	1.7612
Minimum	0	0	-0.6739	0.0005	-5.292	0.2671	0	0.3138	3.6312
Maximum	0.8309	0.8689	1.0108	0.3913	5.1739	40.024	0.981	15.513	15.391
1989	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1796	0.2052	0.1416	0.0347	0.3266	1.56	0.3437	9.134	8.9555
Standard Deviation	0.139	0.1749	0.1069	0.0236	0.3855	1.078	0.2045	1.8621	1.7882
Minimum	0	0	-1.125	0.0003	-6.027	0.2499	0	0.7166	3.6968
Maximum	0.8844	0.8655	0.6248	0.2044	10.5	13.895	0.9705	15.589	15.418
1990	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1952	0.2846	0.1302	0.0371	0.3218	1.2435	0.3571	9.1601	8.9943
Standard Deviation	0.1515	0.2288	0.1082	0.0274	0.6666	0.7033	0.2082	1.8349	1.8132

Minimum	0	0	-1.3217	0.0005	-6.027	0.2504	0.0007	2.6446	4.2435
Maximum	0.9682	0.9758	0.6184	0.35	17	9.3443	0.9685	15.637	15.323
1991	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1992	0.2737	0.1111	0.0405	0.2802	1.3477	0.3741	9.1522	9.0073
Standard Deviation	0.1545	0.2314	0.116	0.0366	0.7921	0.8484	0.2126	1.8883	1.8703
Minimum	0	0	-1.435	0.0002	-18.35	0.2532	0.0005	0.1174	2.7525
Maximum	0.9948	0.9751	0.5739	0.8237	13.769	11.181	0.951	15.574	15.313
1992	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1974	0.2821	0.1028	0.0403	0.2428	1.3962	0.38	9.1376	9.0246
Standard Deviation	0.1464	0.2443	0.117	0.0275	0.8347	1.0137	0.2198	1.892	1.8814
Minimum	0	0	-1.435	0	-18	0.2416	0	0.1174	2.7525
Maximum	0.915	0.9904	0.5779	0.2522	7.3582	15.112	0.9685	15.592	15.372
1993	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1871	0.2121	0.1088	0.0408	0.2563	1.713	0.3707	9.137	9.0262
Standard Deviation	0.1535	0.2087	0.1046	0.0304	0.4516	1.3004	0.2205	1.9338	1.8786
Minimum	0	0	-0.569	0	-5.1795	0.2497	0	1.013	3.3437
Maximum	0.9896	0.9988	0.5779	0.4473	5.6069	19.838	0.9897	15.648	15.454
1994	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1675	0.1933	0.1185	0.0384	0.2728	1.6927	0.3623	9.1565	9.0491
Standard Deviation	0.1398	0.1884	0.1088	0.0262	0.5119	1.341	0.2228	1.9233	1.8594
Minimum	0	0	-0.653	0	-10.58	0.2539	0	1.013	3.7964
Maximum	0.9256	0.9979	0.5481	0.2473	6.6128	20.792	0.9766	15.594	15.448
1995	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1666	0.189	0.1129	0.0384	0.2442	1.8969	0.3572	9.142	9.0437
Standard Deviation	0.1354	0.1842	0.1328	0.029	0.7223	2.1523	0.2279	1.9892	1.8885
Minimum	0	0	-0.8156	0	-18.5	0.2394	0	1.013	4.1811
Maximum	0.967	0.9964	0.7289	0.4423	5.6849	37.54	0.9859	15.636	15.532
1996	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1703	0.1789	0.1075	0.0382	0.2618	1.984	0.3534	9.0246	8.9573
Standard Deviation	0.1429	0.1747	0.1526	0.0289	0.3398	2.0992	0.2388	2.041	1.8944
Minimum	0	0	-1.398	0	-7.838	0.2006	0	1.0143	4.2103
Maximum	0.967	0.9991	0.7123	0.3177	6.2262	41.918	0.9779	15.778	15.541
1997	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1673	0.1773	0.1014	0.0374	0.2415	1.9839	0.3456	8.9389	8.9068
Standard Deviation	0.148	0.1768	0.254	0.0273	0.3802	2.1431	0.2448	2.1233	1.9297
Minimum	0	0	-6.8947	0	-5.667	0.2201	0	0.2679	1.5076
Maximum	0.967	0.9739	0.7298	0.2509	5.2182	45.982	0.9777	15.722	15.62
1998	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1847	0.2122	0.0917	0.039	0.2464	1.8961	0.3502	8.9406	8.9185
Standard Deviation	0.1618	0.2005	0.3036	0.0298	0.7544	2.068	0.248	2.1675	1.9463
Minimum	0	0	-6.8947	0	-15	0.2258	0	0.2621	1.5076
Maximum	0.9736	0.9717	1.0557	0.318	11.958	30.674	0.9826	15.398	15.608
1999	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.2008	0.1979	0.0973	0.0405	0.2798	2.816	0.3505	9.0281	9.0102
Standard Deviation	0.1741	0.2001	0.188	0.0292	0.8131	4.3578	0.2512	2.1537	1.9723
Minimum	0	0	-2.721	0	-2.871	0.2113	0	0.2621	3.136
Maximum	0.9917	0.9802	0.7737	0.2507	18.43	48.143	0.9908	15.613	15.683
2000	**LEVER1**	**LEVER2**	**PROFIT**	**NDTS**	**ETR**	**MBR**	**FAR**	**SIZE1**	**SIZE2**
Mean	0.1991	0.2236	0.0782	0.0387	0.2231	2.147	0.3296	9.0614	9.1736
Standard Deviation	0.1749	0.2187	0.1684	0.0301	0.4423	3.2681	0.2543	2.2344	2.0142
Minimum	0	0	-1.411	0	-5.8228	0.1955	0	0.6001	3.6681
Maximum	0.9917	0.9831	0.6856	0.27	5.1667	48.143	0.9815	16.224	16.674

Table 5.A5: Descriptive Statistics for Size classification.

	LEVER1	*LEVER2*	*PROFIT*	*NDTS*	*ETR*	*MBR*	*FAR*	*SIZE1*	*SIZE2*
France-small									
Mean	0.2147	0.2073	0.0918	0.051	0.268	2.0787	0.1991	12.172	12.48
Standard Dev.	0.1682	0.2	0.1591	0.0408	0.4632	1.5552	0.1942	1.0765	1.130
Minimum	0	0	-1.414	0.0002	-2.814	0.3968	0.0016	5.2407	9.207
Maximum	0.7483	0.8947	0.5137	0.3204	6.5758	12.808	0.8861	14.539	16.16
France-medium									
Mean	0.2334	0.2967	0.129	0.0493	0.3138	1.5671	0.2271	14.128	14.09
Standard Dev.	0.1515	0.2223	0.0771	0.0417	0.4411	1.1633	0.1555	0.6588	0.852
Minimum	0	0	-0.255	0.0024	-3.457	0.627	0.0148	11.208	10.88
Maximum	0.9985	0.9753	0.5925	0.5467	5.5849	13.096	0.9855	16.377	18.15
France-large									
Mean	0.2383	0.363	0.113	0.0465	0.3294	1.3689	0.2453	16.453	16.38
Standard Dev.	0.1275	0.2261	0.0708	0.0331	0.4202	0.8603	0.1351	1.1276	1.278
Minimum	0.0035	0.0008	-0.038	8E-05	-3.968	0.7182	0.0224	13.861	13.47
Maximum	0.695	0.9968	0.9935	0.3402	6.4984	20.602	0.7045	20.526	20.50
Germany-small									
Mean	0.2146	0.212	0.1002	0.0581	0.3971	2.8822	0.3513	9.9149	10.46
Standard Dev.	0.223	0.2414	0.1789	0.0604	1.041	6.1932	0.2604	1.6457	1.229
Minimum	0	0	-2.92	0	-15	0.2536	0	1.2306	6.621
Maximum	0.9925	0.9652	1.7416	0.707	15.5	93.883	0.9985	14.385	14.77
Germany-medium									
Mean	0.2136	0.2755	0.1244	0.0617	0.3647	1.6077	0.3242	12.307	12.11
Standard Dev.	0.1906	0.2607	0.1229	0.0428	1.1593	1.8239	0.1828	0.6117	0.748
Minimum	0	0	-0.796	0	-16.47	0.2955	0	4.6377	4.570
Maximum	0.9995	0.9942	1.3434	0.4061	16.638	38.542	0.9239	14.547	14.80
Germany-large									
Mean	0.1683	0.2662	0.1256	0.0623	0.4143	1.3601	0.331	14.623	14.32
Standard Dev.	0.144	0.2379	0.0785	0.0373	0.9177	0.978	0.1604	1.3603	1.419
Minimum	0	0	-0.5078	0	-16.222	0.4788	0	6.2712	6.319
Maximum	0.6874	0.9885	0.5927	0.3403	15.202	35.356	0.8658	19.402	19.59
UK-small									
Mean	0.15	0.1941	0.0825	0.0374	0.292	1.8291	0.3447	6.959	7.097
Standard Dev.	0.1605	0.2219	0.2175	0.0324	0.6916	2.583	0.2286	1.1769	1.021
Minimum	0	0	-6.8947	0	-18.5	0.1955	0	0.1174	1.508
Maximum	0.9896	0.9991	1.0557	0.8237	17.857	48.143	0.9908	11.119	11.85
UK-medium									
Mean	0.1592	0.2523	0.1358	0.0351	0.3636	1.3596	0.3427	8.5466	8.273
Standard Dev.	0.1302	0.2285	0.09	0.024	0.544	1.2358	0.1951	0.6961	0.827
Minimum	0	0	-1.125	0	-17.14	0.1318	0	2.446	3.696
Maximum	0.9459	0.9831	0.8129	0.296	18.43	40.175	0.9859	11.905	12.54
UK-large									
Mean	0.1849	0.2669	0.1391	0.0351	0.395	1.3845	0.3567	10.701	10.38
Standard Dev.	0.1239	0.2095	0.0664	0.0238	0.4278	1.0403	0.1948	1.3892	1.532
Minimum	0	0	-0.308	0	-17.3	0.2499	0	5.6094	5.438
Maximum	0.9948	0.9963	1.0108	0.3177	13.6	30.385	0.9921	16.224	16.67

Table 5.A6: Descriptive Statistics for Industry classification

	LEVER1	*LEVER2*	*PROFIT*	*NDTS*	*ETR*	*MBR*	*FAR*	*SIZE1*	*SIZE2*
France-Manuf									
Mean	0.2314	0.3338	0.1159	0.0488	0.3088	1.4669	0.2293	14.996	15.04
Standard Dev.	0.1398	0.2345	0.0925	0.0354	0.432	0.9885	0.1401	1.9617	1.9598
Minimum	0	0	-1.09	8E-05	-3.968	0.4807	0.0016	5.2407	9.2935
Maximum	0.9985	0.9753	0.9935	0.3402	6.4984	13.096	0.9855	20.227	19.948
France-Service									
Mean	0.2334	0.2647	0.1113	0.0474	0.3194	1.7811	0.2321	14.533	14.491
Standard Dev.	0.1537	0.2057	0.1051	0.042	0.44484	1.4098	0.1829	1.8233	1.7295
Minimum	0	0	-1.4142	0.0003	-3.4565	0.3968	0.0027	8.6773	9.2072
Maximum	0.74	0.9968	0.5925	0.5467	6.5758	20.602	0.8825	20.526	20.502
Germany-Manuf									
Mean	0.2001	0.2597	0.1213	0.0599	0.3853	1.8283	0.3167	12.359	12.35
Standard Dev.	0.1871	0.2474	0.1353	0.0476	1.0707	3.1787	0.1898	2.335	1.971
Minimum	0	0	-2.9204	0	-16.47	0.2536	0	3.2106	4.5704
Maximum	0.9925	0.9885	1.7416	0.707	16.638	93.883	0.9985	19.402	19.594
Germany Service									
Mean	0.1866	0.2218	0.1013	0.0642	0.4234	2.2827	0.407	12.533	12.591
Standard Dev.	0.1915	0.248	0.1149	0.0466	0.9016	5.3817	0.2384	2.3045	2.0564
Minimum	0	0	-0.707	0	-10.3	0.4788	0	1.2306	6.6219
Maximum	0.9995	0.9942	0.6185	0.4135	14.2	86.81	0.965	18.182	19.13
UK-Manuf									
Mean	0.1697	0.2606	0.1211	0.0351	0.3604	1.3846	0.3234	9.1078	8.9178
Standard Dev.	0.132	0.2234	0.1086	0.0229	0.5782	1.6022	0.1693	1.9173	1.8135
Minimum	0	0	-2.462	0	-18.5	0.1955	0	0.1174	3.6681
Maximum	0.9459	0.9991	1.0557	0.35	18.43	48.143	0.9921	16.224	16.21
UK-Service									
Mean	0.1636	0.2148	0.1286	0.0366	0.3555	1.6634	0.3927	8.9046	8.7164
Standard Dev.	0.1446	0.2143	0.1606	0.0313	0.4822	1.6723	0.2466	1.8546	1.815
Minimum	0	0	-6.895	0	-14.41	0.1318	0	0.3138	1.5076
Maximum	0.9948	0.9831	1.0108	0.8237	17	39.964	0.9859	14.577	16.674

6. CHAPTER 5: DETERMINANTS OF CORPORATE DEBT MATURITY STRUCTURE

6.1. INTRODUCTION

In empirical and theoretical corporate finance, the principal focus of firms' financing decisions has traditionally been on the choice between debt and equity[127]. Obviously, firms should also decide the maturity of the new debt when they choose debt-financing rather than equity-financing. As a consequence, not only the issue of 'the *amount* of firms' future cash flows to be paid out to debtholders instead of shareholders' but also that of 'the *timing* of future payments to debtholders' has been another financial concern since 1980s[128]. However, not much is known about the maturity structure of debt financing, relative to the research on capital structure decisions. Earlier, Merton [1974] and Stiglitz [1974] theoretically show the irrelevance of debt maturity structure in which neither short- nor long-term debt affect firm value, surely assuming perfect market conditions. Why firms use both commercial papers and bonds to finance their assets and investment opportunities seems to be partially understood under the existence of market imperfections. The debt maturity structure is important to firms, since a badly chosen maturity may cause an inefficient liquidation of even a positive-NPV project. However, it can also be used by firms as a signalling device in an imperfect market to provide information about their quality, credibility and future prospects. According to signalling models, under-(over-)valued firms issue short-(long-)term debt to signal their under-(over-)valuation. Indeed, Fama [1990] suggests that maturity structure of corporate debt reflects the incentive to provide information, monitoring and bonding relevant for contracts.

The general tendency in the literature favours short-term debt as it mitigates asymmetric information and agency problems, i.e., in most cases an optimal debt maturity structure is implied. The main debt maturity theories can be grouped as follows. One strand is interested in *tax arguments*: Brick and Ravid [1985] contend that when term structure of interest rates is upward sloping long-term debt is optimal since gain from leverage due to interest tax shield is accelerated (borrower's incentive) and recognition of interest income is delayed (lender's incentive). Brick and Ravid [1991] further demonstrate the optimality of long-term debt even if yield curve is flat or

[127] For an excellent survey of capital structure theories and the relevant empirical studies, see Harris and Raviv [1991].
[128] For another well-designed review study, see Ravid's [1996] survey paper on debt maturity.

downward sloping assuming interest rates are uncertain. Kim et al. [1995], and Stohs and Mauer [1996] find some supportive evidence for tax effect but Guedes and Opler [1996], and Barclay and Smith [1995] cannot. Another strand is based on *information asymmetries*: Flannery [1986] and Kale and Noe [1990] predict that high-quality firms prefer short-term debt to signal their type, which is empirically supported by Stohs and Mauer [1996]. Diamond [1991b, 1993] shows that even low-quality firms would prefer short-term debt due to liquidity risk and only medium-rated firms are predicted to issue long-term debt, which is empirically supported by Barclay and Smith, Guedes and Opler, and Stohs and Mauer. Third strand deals with *contracting costs* arguments: Myers [1977] argues that short-term debt mitigates underinvestment problem if it matures before growth options are exercised since there remains an opportunity for lenders and firms to re-contract. Similarly, Barnea et al. [1980] argue that short-term debt may diminish asset substitution problem since the value of short-term debt is less sensitive to changes in firms' asset value. This contracting costs hypothesis is empirically supported by Barclay and Smith, and Guedes and Opler but not by Stohs and Mauer. It is also predicted by asymmetric information arguments (Hart and Moore [1994]) and contracting costs hypothesis (Myers [1977]) that firms match the maturity of their assets and liabilities (*matching principle*). This immunisation hypothesis is heavily supported by empirical studies.

Early empirical debt maturity studies focus on different perspectives but not directly examine the determinants of debt maturity. Titman and Wessels [1988] find a negative correlation between size and short-term debt and argue that smaller firms cannot afford to high flotation costs of issuing long-term debt. Mitchell [1991] finds information variables significant; e.g., unquoted firms are more likely to issue shorter-term debt due to information asymmetries. Mitchell [1993] finds a negative (positive) correlation between maturity and leverage (firm quality). Later, several papers study explicitly the possible determinants of firms' debt maturity decisions. Kim et al. [1995] report a significantly positive correlation between debt maturity, and leverage and size. Barclay and Smith [1995] find that larger firms with lower market-to-book ratio have longer debt maturity. Guedes and Opler [1996] report that larger and better firms, and the ones with higher growth opportunities are most likely to issue short-term debt. Stohs and Mauer [1996], however, find only mixed support that there is an inverse relationship between debt maturity and market-to-book ratio. Ozkan [2000] also finds a supportive evidence for the maturity-matching hypothesis but not for the tax hypothesis. He further reports that maturity is negatively correlated to firm size and market-to-book ratio. Scherr and Hulburt [2001] examine debt maturity structure of only small firms. They find little evidence that tax status, growth options, and information asymmetries affect small firms' debt maturity choice. However, the hypotheses related to capital structure, default probability and asset maturity are found to be relevant to maturity decisions of such firms.

In this study, potential determinants of corporate debt maturity structure are examined in the framework of tax, contracting-costs, signalling, liquidity risk, and maturity-matching hypotheses. This paper aims to extend the existing literature in several ways. First, except Ozkan's [2000, 2002] UK data and Cai et al.'s [1999] Japanese data, all other studies report their evidence based on the US firms' data. It is obviously important to investigate the relationship between the firm-specific characteristics and debt maturity choices of firms across countries. By this way, one can understand whether country-specific factors have any impact on firms' debt maturity decisions, and consequently whether the association of a certain firm-specific factor with debt maturity differs across countries. In this international study, France, Germany and the UK are chosen, since they are supposed to represent satisfactorily different financial structures of their classes, which is explained in the previous chapters in detail. Demirgüç-Kunt and Maksimovic [1999] use aggregated data to examine the debt maturity determinants of firms in 30 countries. They provide some macroeconomic explanations to the variations in debt maturity structure across firms and report that financial and legal factors have impact on maturity decisions of firms. These findings support our view that debt maturity decisions should also be examined internationally. This international study, however, has some limitations. They use aggregated data not firm-level panel data, and do not control for some econometric problems to be explained below. Therefore, one could say that there is no rigorous empirical debt maturity study in an international context. In an attempt to fill this gap, this chapter explores cross-country differences with respect to debt maturity decisions of corporations. Necessity for such a work is already explained in Booth et al. [2001] who find substantial differences in firms' capital structure choices across countries and conclude that 'knowing the country of origin is usually at least as important as knowing the size of the independent variables'. Meric et al. [2001] examine the financial characteristics (liquidity, turnover, profitability, leverage) of French, German and UK manufacturing firms and report significant differences. Moreover, Claessens et al. [1999] argue that there is a mismatch between the maturity structure of assets and liabilities in civil law countries. They further contend that lower profitability-liquidity, higher leverage-overall risk, more unstable cash flows, and insufficient interest coverage prevail in civil law (France, Germany) countries than in code law (the UK) countries. They also find that firms in bank-based economies use more short-term debt than the ones in market-based countries. In addition, good shareholder protection and short-term debt usage is argued to be positively correlated.

Second, we use a dynamic debt maturity model, which assumes that firms have a long-run optimal debt maturity structure and this optimality cannot immediately be met through adjustment process as a result of any change in market conditions. It is apparent that factors influencing firms' debt maturity structure change overtime. Thus, it would also be necessary to explain time-varying observed difference in debt maturity structure of firms. Our research focuses on this gap hitherto greatly neglected by debt maturity studies, Ozkan [2000] being the only exception. We adopt an autoregressive-distributed lag model, by which we are able to examine the determinants of debt maturity structure, the speed of adjustment process to desired optimal debt maturity level, and to provide the *static* long-run relationship between maturity and firm-specific factors. This is the first empirical debt maturity study to shed light on these three issues.

Last, in the literature, except Ozkan [2000], no debt maturity study explicitly considers the endogeneity issue using GMM. It should be investigated as it is likely that random shocks affect both dependent variable and independent variables at the same time[129]. It is possible that observed relations between debt maturity and its proposed determinants indicate the effects of debt maturity on the latter rather than vice-versa. We control for this problem by using Generalised Method of Moments (GMM) procedure. GMM also overcomes the problems of heteroscedasticity, normality, simultaneity and measurement errors, which are common for studies using firm-level data based on balance sheets. In order to eliminate any bias arising from unobserved firm-specific effects, a common practice in the literature has been to use difference-GMM after the seminal study by Arellano and Bond [1991]. In this methodology, the regression equation is first-differenced and the right-hand-side regressors are instrumented so as to control for possible parameter inconsistency stemming from simultaneity bias. Since traditional difference-GMM estimator has the weak instruments problem (see Arellano and Bover [1995], and Blundell and Bond [1998]), we prefer recently developed GMM estimator of

[129] See Barclay et al. [2002] who state that the previous studies using OLS suffer from the problems related to multiple endogenous variables.

differences- and levels-equations system. This consistent and efficient system-GMM methodology has not been used before to analyse the relationship between firm and market characteristics, and corporate debt maturity policy.

Econometric results reveal that there are considerable differences in debt maturity patterns in France, Germany and the UK. It is found that French firms tend to adjust their maturity structure more quickly to attain their target level. In addition, debt maturity is found to be significantly and positively associated with leverage and insignificantly correlated to firm quality in all three countries. The results further reveal that the effects of size of the firm, market-to-book ratio, asset maturity, earnings volatility, tax rates and liquidity on debt maturity vary across these countries. In addition to these firm-specific factors, we find that the impact of market-specific factors on debt maturity decisions is also country-dependent. These factors (market equity premium, term structure of interest rates, share price performance, and interest rate volatility) are, not surprisingly, relevant especially in the UK, a market-oriented economy. Therefore, the findings indicate that the differences in institutional and financial arrangements, and the degree of monitoring agency problems may lead to different corporate debt maturity structure across countries.

The rest of the chapter is organised as follows. The next section describes the variables and the related debt maturity hypotheses. Section 3 discusses the construction and analysis of data. Methodology and the model are developed in section 4. Section 5 presents the empirical results. Last section concludes the paper with some future agenda.

6.2. CONSTRUCTION OF THE DETERMINANTS OF CORPORATE DEBT MATURITY STRUCTURE AND THE UNDERLYING THEORIES

6.2.1. Proxies for Dependent Variables

In general, long-term debt is used to finance capital investment while short-term debt is used to finance inventory and to meet short-term cash flow needs. Decomposition of debt is necessary as one set of explanatory variables might not explain the demand for both types of debt. However, there is no common definition of short- or long-term debt. Some define long-term debt payable after one year (e.g., Ozkan [2000], Scherr and Hulburt [2001]) and some others define payable after three (Barclay and Smith [1995]) or 5 years (Jaramillo and Schiantarelli [1996], Schiantarelli and Sembenelli [1997]). As a result, it is not unexpected to see that one of the most significant differences across empirical debt maturity papers is the choice of dependent variable. On the other hand, Morris [1992], Titman and Wessels [1988], Michaelas et al. [1999], and Demirgüç-Kunt and Maksimovic [1999] use short- or long-term debt to total assets as debt maturity measurement. However, leverage related costs of short and long-term debt might not be similar. Therefore, scaling short- or long-term debt by total assets rather than by total debt would not directly be examining debt maturity structure as this definition is not independent from firms' capital structure. Morris [1992], and Dennis et al. [2000] use 'duration'; Mitchell [1993] and Guedes and Opler [1996] use 'maturity of new issues'; and Stohs and Mauer [1996] use 'weighted average maturity of liabilities' as dependent variable. Scherr and Hulburt [2001] use two maturity specifications (long-term debt payable after one year to total debt; and weighted-average debt maturity) and report that sensitivity of the results to the definitions are minor.

We use the ratio of debt that matures within (after) one year to total debt as short-term (long-term) debt ratio.

6.2.2. Proxies for Explanatory Variables

The attributes below have been predetermined in terms of their explanatory coherence in testing the existing theories of debt maturity and appropriateness to compare our results with other empirical findings. Although it is not easy to find exact proxies for the arguments discussed in the previous section, we argue that the present proxies covered in this empirical analysis have sufficient explanatory power to be taken into account. While analysing the empirical results, one should emphasise the fact that the nature of empirical studies of optimal debt maturity structure differs in terms of time-period, firm characteristics, maturity definition, methodology and so forth.

6.2.2.1. Lagged Maturity

The inclusion of lagged dependent variable to the debt maturity model can have both short-term and long-term interlinks with other explanatory variables. It could be a benchmark to see whether firms have optimal debt maturity structure, and if any, the degree of divergence or convergence from (to) the target level may potentially be detected in the framework of adjustment costs. A recent study by Hovakimian et al. [2001] reveals that firms adjust their capital structure towards target debt ratios. Jalilvand and Harris [1984] use partial adjustment model to empirically test whether firms' financing and dividend decisions are modelled as two-phase process, target value formation and adjustment to these target. They find that, being consistent with market imperfections, firms partially adjust to their long-run financial targets. Mitchell [1993] uses lagged long-term debt ratio to control for the maturity structure of a firm's *outstanding* debt. Newberry and Novack [1999] consider cumulative effects of debt maturity prior to bond offering. Schiantarelli and Sembenelli [1997], Schiantarelli and Srivastava [1997] and Ozkan [2000] also include the lagged maturity as an explanatory variable.

In this study, if the lagged maturity coefficient is statistically significant, positive and below unity, then, one can conclude that firms tend not to change debt maturity structure overtime. If it is greater than one, it implies firms do not have a target maturity ratio. The tax, bankruptcy, and monitoring-related arguments predict a positive impact of lagged maturity but the signalling hypothesis implies no effect on debt maturity choice (see, Mitchell [1993]). We expect a positively significant relationship between current and past maturity structure in a dynamic framework.

6.2.2.2. Leverage

Signalling arguments imply that leverage has no effect on debt maturity decisions (see, Mitchell [1993]). However, considering leverage as a proxy for firms' ability to raise external funding, it may have a positive effect on debt maturity. Liquidation concerns due to high leverage may cause the long-term debt choice to hedge against liquidation risk. Morris [1992] hypothesises that firms with higher debt ratios tend to issue longer-term debt in order to delay their exposure to bankruptcy risk. Leland [1994] argues that the probability of bankruptcy is higher for shorter-term debt. Leland and Toft [1996] theoretically show that if firms choose higher leverage they also choose longer maturity.

On the other hand, as higher leverage implies higher default probability and higher monitoring costs, it may be negatively correlated especially with short-term debt. The tax and bankruptcy (trade-off) arguments implying optimal debt policies predict a negative effect of leverage on debt maturity. Furthermore, Dennis et al. [2000] contend that leverage and maturity should be negatively correlated as agency costs of underinvestment can be mitigated by reducing leverage as well as shortening maturity.

Mitchell [1993] uses debt-equity ratio as an explanatory variable to control for the firms' capital structure. Including leverage to the model could test the implications of term structure and interest rate volatility arguments which assume that capital structure decisions are held constant. One can also test the argument that little leverage implies immaterial bankruptcy probability and thus has no effect on debt maturity structure (Stohs and Mauer [1996]). We measure leverage as the ratio of book value of total debt to book value of total assets. Alternative definition is the ratio of book value of total debt to market value of equity plus book value of total debt.

6.2.2.3. Tax Rates and Interest Rates

Brick and Ravid [1985] argue that when term structure of interest rates is upward sloping long-term debt is optimal since tax gains from leverage are accelerated (reduction in expected tax liability and increase in firm value are implied), assuming expectations hypothesis holds[130]. This implies that debt maturity is positively related to the term structure, i.e., more long-term debt is issued when the slope of the term structure is positive. In their model, Brick and Ravid first set leverage and then maturity. However, they are criticised by Lewis [1990], who argues that taxes (assumed to be only market imperfections) have no effect on debt maturity decisions if optimal leverage and debt maturity are simultaneously determined. Brick and Ravid [1991] further show the optimality of long-term debt even if yield curve is flat or downward sloping assuming interest rates are uncertain. On the other hand, Kane et al. [1985] demonstrate that the trade-off between bankruptcy and flotation costs of raising debt, and per-period tax advantage of debt financing leads to an optimal debt maturity structure. They argue that optimal maturity is negatively associated with tax advantage of debt and the volatility of firm value, and positively correlated with flotation costs. It is because firms increase their debt maturity as the tax advantage of debt decreases to assure that the remaining tax benefit is not less than amortised flotation costs. Therefore, they imply a negative relationship between debt maturity and tax rate.

In a multi-period model with interest rate uncertainty, Kim et al. [1995] demonstrate that a long-term debt maturity strategy maximises investor *tax-timing option* value (repurchasing or reissuing the debt). The analysis, which is empirically supported, predicts that the firm lengthens debt maturity as interest rate volatility increases and as the slope of the term structure increases[131].

Scholes and Wolfson [1992] propose the *tax clientele* argument to predict the relationship between debt maturity and taxes. It is argued that not all firms can afford to issue (luxury) long-term debt although transaction costs stemming from rolling-over short-term debt become higher. The authors contend that corporations having high

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130 Expectations hypothesis implies that in early years the interest expense of long-term debt is higher than that of rolling short-term debt and the interest expense is less in later years if the yield curve is upward sloping. However, short-term debt becomes optimal if the curve is downward sloping. In addition, the slope of the term structure is measured by the difference between month-end yields on a 10-year and a 6-month government bond (see, e.g., Kim et al. [1995] and Stohs and Mauer [1996]).

131 Unlike the positive correlation prediction by tax-based theories, Guedes and Opler [1996], and Stohs and Mauer [1996] find a negative association between the slope of the yield curve and debt maturity. The reason is argued to be the attempt of firms to avoid term premium in long-term interest rates. Emery [2001]

marginal tax rates construct a natural clientele of cheap long-term debt (long-term debt yields higher tax shield). They, then, expect a positive relation between debt maturity and marginal tax rates as firms can use the ongoing tax advantages of long-term debt[132].

Dennis et al. [2000] and Guedes and Opler [1996] proxy marginal effective tax rate by taxes paid to assets. Scherr and Hulburt [2001] measure tax rate using dummy variables, which is not appropriate for dynamic models. We measure effective tax rate (ETR) as the ratio of total tax charge to total taxable income. We measure term structure of interest rates as the difference between the month-end yields on long-term (10 years or more) government bond and three-months treasury-bills, with a six-month lag, matched to the month of firms' fiscal year-end. Interest rate-volatility is the standard deviation of monthly government bond yield over the previous year, matched with the month of firms' fiscal year-end.

6.2.2.4. Market-to-book ratio

This ratio can be a proxy for expected future growth opportunities. Hovakimian et al. [2001] state that wealth transfer from equityholders to debtholders occurs when new equity is issued. This transfer is much larger for firms financed mainly with long-term debt and for financially distressed firms. Titman and Wessels [1988] argue that suboptimal investment problems (wealth appropriation from bondholders) are likely to occur for equity-controlled firms and such agency costs tend to be substantial for growing firms. Stulz [1990] argues that non-growth firms should use more long-term debt which effectively limits managerial discretion. Thus, long-term debt and expected future growth should be negatively correlated. On the other hand, Kanatas and Qi [2001] show that long-term debt is more likely to be chosen if such incentive problems (rejecting positive-NPV projects) are unimportant. As Myers [1977] and Barnea et al. [1980] contend that agency problems are mitigated if firms issue short-term debt, market-to-book ratio should be positively correlated to short-term debt. That is, the underinvestment problem is mitigated if growth firms use short-term debt which expires *before* exercising the growth options, thereby borrowers and lenders can recontract. Easterbrook [1984] contends that agency costs of monitoring are lower provided firms commit to periodic evaluations (through issuing short-term debt). Titman [1992] argues

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supports this inverse relationship in his model based on the interaction between the demand for firms' products, their requirement for assets, and the debt maturity choice.

[132] Harwood and Manzon [1998] show that firms with high marginal tax rates use more long-term debt than firms with low marginal tax rates. These findings are in line with the existence of tax clienteles for

that growth firms have both the greater likelihood of bankruptcy and optimistic future outlook, then they can benefit from borrowing short-term and swapping for a fixed-rate contract. Leland and Toft [1996] also favour the use of short-term debt to eliminate asset substitution problem in the presence of longer-term debt. In the end, there is a consensus in the literature that market-to-book ratio should be inversely correlated to debt maturity in the agency/contracting costs perspective.

However, liquidity risk arguments (see, e.g., Diamond [1991b], Froot et al. [1993], Opler and Titman [1994]) predict the contrary: Firms with long-term investment opportunities requiring ongoing managerial discretion may prefer to hedge themselves against liquidity risk by issuing long-term debt. By this way, firms can avoid the inefficient liquidation of their risky growth opportunities. Moreover, short-term debt may cause loss of the investment rents if it is refinanced in the credit markets with high interest rates. Thus, a positive correlation between growth opportunities and debt maturity is predicted. Furthermore, Hart and Moore [1995] emphasise the role of long-term debt in controlling management's ability to raise funding for future projects. It is argued that long-term debt may prevent self-interested managers from financing unprofitable investments, which may imply a direct variation of long-term debt with market-to-book ratio.

We measure market-to-book ratio as the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets[133].

6.2.2.5. Firm Size

In the literature, larger firms are argued to have lower asymmetric information and agency problems, higher collateralisable tangible assets relative future investment opportunities, and thus, easier access to long-term debt markets. There are several reasons why small firms are discouraged from issuing long-term public debt and forced to use short-term private (e.g., bank) debt. Small firms have higher failure rates than larger firms (Queen and Roll [1987]). The cost of issuing long-term debt is considerably higher for small firms (see, e.g., Smith [1977]) and such firms might not benefit from the scale economies. Titman and Wessels [1988], hence, argue that smaller firms may have higher short-term debt ratios. It is further argued that larger firms tend to use more long-term debt due to their remaining financial needs (Jalilvand and Harris [1984], Marsh [1982]). Agency problems (risk shifting, claim dilution) between shareholders and

financing with different debt maturities. Newberry and Novack [1999] also find a positive relation between tax rate and debt maturity.

[133] Due to data limitations we are unable to use alternative proxies such as, R&D plus advertising expenses to total assets ratio.

lenders may be particularly severe for small firms (Smith and Warner [1979]). Then, bondholders attempt to control the risk of lending to small firms by restricting the length of debt maturity. Large (small) firms, thus, are expected to have more long (short)-term debt in their capital structure (Barnea et al. [1980], Whited [1992]). Consequently, these arguments imply a positive relationship between firm size and debt maturity. We measure firm size as the natural logarithm of total sales or total assets.

6.2.2.6. Liquidity

One may expect that firms with greater liquid assets should more easily raise external funding. However, Myers and Rajan [1998] argue that great asset liquidity may reduce this capacity as excessive liquidity also reduces managers' ability to commit credibly to an investment action. Non-depreciating assets (e.g., land) are evinced to increase debt maturity. Their paradox is that non-depreciating but liquid assets (e.g., inventories) do not support long-term debt and 'maturity shortens even further with increases in intrinsic asset liquidity'. Ozkan [2001] argues that firms with higher liquidity ratios might support a relatively higher debt ratio due to greater ability to meet short-term obligations when they fall due. This implies a negative correlation between liquidity and maturity. On the other hand, by buying long-term bonds, lenders are also exposed to a risk that the firm's conditions may deteriorate or the management may shift to too risky projects before the bond is due. Morris [1992], thus, argues that lender may impose restrictions (e.g., minimum level of working capital or liquid balances) on the long-term borrowers to control such risks. He, then, hypothesises that firms with higher liquidity balances will be able to lengthen their debt maturity. We measure liquidity ratio as current assets divided by current liabilities. This ratio is also known as working capital ratio, which can give an indication of the ability of firms to pay their obligations[134].

6.2.2.7. Asset Maturity

The immunisation hypothesis implies that firms match their debt maturities to their asset maturities. This maturity matching principle has been widely accepted in debt maturity discussions as it seems useful to control the risk and costs of financial distress. Myers [1977] argues that the underinvestment problem as a result of the conflicts between

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[134] Another proxy for liquidity could be Altman's [1968] Z-score, defined below:

$Z=0.012*[WC/TA]+0.014*[RE/TA]+0.033*[EBIT/TA]+0.006*[MVE/TA]+0.999*[S/TA]$;

where WC is working capital; TA is total assets; RE is retained earnings; EBIT is earnings before interest and taxes; MVE is market value of equity; S is sales. $Z>2.99$ clearly non-bankrupt firm; $Z<1.81$ clearly bankrupt firm, and $1.81<Z<2.99$ zone of ignorance. See also Scherr and Hulburt [2001] who use Z-score as proxy for default risk. However, using this variable might cause multicollinearity among explanatory bondholders and equityholders can be mitigated by the matching principle. Firms schedule their debt repayments in accordance with the decline in future value of assets-in-place in this matching process[135]. Mitchell [1991] argues that a firm with short-term debt (interest-insensitive) insulates shareholders by issuing short-term debt since the assets and bonds then become insensitive to change in interest rates. In an imperfectly competitive Cournot duopoly product market, Kanatas and Qi [2001] argue that short (long)-term debt should be used for financing assets with short (long) economic lives. Emery [2001] argues that firms avoid the term premium by matching the maturity of their liabilities and assets. Hart and Moore [1994] confirm matching principle by showing that slower asset depreciation means longer debt maturity. Therefore, we expect a positive relationship between debt maturity and asset maturity[136]. Following Stohs and Mauer [1996], we measure asset maturity as net property, plant & equipment divided by depreciation expense.

6.2.2.8. Firm Quality

The studies on debt maturity under asymmetric information generally show the optimality of short-term debt financing as a vehicle of mitigating the adverse selection problem. The *signalling hypothesis* implies that firms with asymmetric information problems and high-quality projects choose to issue shorter-term debt (See Mitchell [1991]). Similarly, Covitz and Harrison [2000] empirically show that long-term debt sends a negative signal relative to short-term debt, which is intensified during economic downturns and by increase in maturity. Goswami et al. [1995b] demonstrate that when good firms show a sufficiently high positive correlation between cash flows relative to bad firms, good (bad) firms issue short (long)-term debt in a separating equilibrium. Announcement of short-term debt issuance is considered as relatively good news (see, e.g., Goswami et al. [1995b]). Datta et al. [2000] report that maturity of the firm's debt and its stock price are negatively correlated such that the longer the maturity the more negative the stock price response. Under asymmetric information, Flannery [1986], and Kale and Noe [1990] argue that long-term debt, which is more sensitive to firm value, can potentially be more mispriced than short-term debt. Hence, high (low) quality firms are more likely to issue less (more)

variables due to the relevance of its definition with the variables in our model. Hence, we did not include this variable to our model.

[135] Debt of maturity shorter than asset life may be more risky as sufficient cash flows might not be generated from the asset. Debt of maturity longer than asset life may also be risky as it is not certain that necessary cash flows will be obtained to service the debt after asset retirement (Morris [1976a]). This type of hedging policy allows us to know the cost of financing the asset over its life.

undervalued (overvalued) short (long) term debt[137]. Datta and Iskandar-Datta [2000] find a negative relation between long-run abnormal returns and the maturity of debt-IPOs, which is predicted by Flannery [1986], and Kale and Noe [1990]. This negative relationship is also consistent with the long-run implications by Barclay and Smith [1995], Guedes and Opler [1996], and Datta et al. [2000]. This result implies that high (low) quality firms issue short (long) term debt. As a result, we expect a negative relationship between firm quality and debt maturity.

Newberry and Novack [1999] use size and Z-score as proxy for firm quality. Following Barclay and Smith [1995] and Dennis et al. [2000], we measure firm quality determined by *abnormal* earnings, which is measured by the difference between the earnings per share in years [t+1] and [t] divided by share price in year [t]. Stohs and Mauer [1996] document that this measure is a robust proxy for unexpected component of the future change in earnings. Our alternative proxy (see, Ozkan [2000]) is the difference between the earnings in years [t+1] and [t] divided by the earnings in year [t].

6.2.2.9. Earnings Volatility

In their continuous-time model, Kane et al. [1985] show that optimal debt maturity is inversely related to the firm value volatility. Low variability in firm value causes firms to avoid rebalancing their capital structure frequently due to the concerns about expected bankruptcy costs. Thus, such firms are expected to issue long-term debt rather than short-term debt. Our proxy for the firm value variability is the earnings volatility, which is measured by absolute difference between annual % change in earnings before interest, taxes and depreciation (EBITD) and average of this change.

6.2.2.10. Control (Market-related) Variables

Share Price Performance

Signalling hypothesis argues that undervalued firms issue short-term debt, which is less sensitive to realisation of expected cash flows, to signal their undervaluation. The expectation is that these firms will have positive abnormal stock returns at the time of issue. Guedes and Opler [1996] state that past stock returns may be used as predictors of debt maturity as it is generally expected that issuing informationally disadvantaged securities (e.g., long-term debt) proceeds share price runup.

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[136] In their survey of 392 US firms, Graham and Harvey [2001] find that matching maturity between liabilities and assets is important in choosing the issuance of short or long-term debt.

[137] Flannery [1986] shows that low-quality firm cannot afford to rollover short-term debt due to positive transaction costs, thus choose long-term debt in separating-equilibrium; if transaction costs do not exist

We, thus, expect a positive correlation between debt maturity and share price performance, which is measured as the first difference of log of annual price, with a six-month lag, matched to the month of firms' fiscal year-end.

Equity Premium

Equity premium, which varies overtime, measures the cost of equity in relation to the return on risk-free investment. Higher equity premium causes higher cost of equity capital. If equity premium is high firms tend to prefer issuing debt rather than equity. Fama and French [1989] suggest that the premium of long-term share in total debt should have an impact on both equity and debt market. It is argued that expected excess bond returns are generally low when business conditions are good due to, e.g., the availability of profitable growth opportunities. Under such conditions, one may observe high equity returns. Baker and Wurgler [2000] examine the equity market-timing hypothesis, i.e., firms substitute between debt and equity depending on the cost of equity. They find that managers time the equity market as firms tend to issue equity instead of debt when the future cost of equity is relatively low. Similarly, Baker et al. [2001] focus on debt market-timing hypothesis, i.e., firms substitute between long- and short-term debt depending on the cost of long-term debt[138]. They document that, in an attempt to borrow at the lowest-cost maturity, managers substitute toward long-term debt when the cost of long-term debt is low relative to that of short-term debt. Their finding based on the aggregate time-series data is opposite to the tax theory of optimal debt maturity structure that predicts a positive relationship between term-premium and debt maturity. Baker et al. [2001] conclude that the success of managers to minimise the cost of capital depends on "whether the debt market is entirely efficient and integrated with the equity market". Fama and French [1989] also report that expected excess returns on stocks and corporate bonds move together. Consequently, we expect that equity risk premium may have different impact on short- and long-term debt. We use six-month lagged equity premium, which is measured by the difference between return on stock market and return on treasury-bills, matched to the month of firms' fiscal year-end.

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low-quality firms can mimic high-quality firms and pooling-equilibrium occurs in short-term debt. Kale and Noe [1990] demonstrate the same conclusion without the existence of transaction costs.

[138] Graham and Harvey's [2001] survey reveals that firms tend to issue short-term debt when the short-term interest rates are relatively low and while they wait for long-term rates to decline.

6.3. ANALYSIS OF THE DATA SET

6.3.1. Introduction

The procedure of data construction is the same as explained in the previous chapter, section 5.3.1. However, the database is different in terms of the number of firms and observations, and of variables. See the appendix at the end of this chapter for detailed information.

6.3.2. Descriptive Statistics

Table 6.1 shows that average long-term debt ratio (Long1) is highest in France (58.8%) and lowest in the UK (45.7%), while Germany is in between (53.3%). This may confirm the idea that there is a short-term relationship between lenders and borrowers in the UK. In addition, the standard deviation of long-term debt is highest in the UK and lowest in France. This finding would imply that UK firms change their debt maturity structure most frequently. As UK firms have highest volatility in earnings, these findings confirm the theory that more volatile earnings cause firms to rebalance their capital structure more frequently and thus lower the optimal debt maturity.

Further examination (see Table 6.A2 and figures in the appendix) of the long-term debt ratio in each year reveals the following conclusions. There is an apparent decline in the long-term debt ratios of French firms, from 72.6% in 1983 to 54.5% in 2000. The same trend can be seen for that of German firms as it is 67.5 % in 1987 and 48.8% in 2000. This decreasing trend may be due to the development of more advantageous and efficient commercial paper market, switching from long-term debt to equity as the stock market develops, and emergence of medium-term debt market[139]. This finding may also be relevant for the idea that short-term debt is more attractive than long-term debt when legal system is inefficient or costly (Demirgüç-Kunt and Maksimovic [1999], Hart and Moore [1995]). On the other hand, the average long-term debt ratios of UK firms have been unstable during 1969-1984. From 1984 onwards, this ratio has been rising at a decreasing rate. Thus, one could say that the long-term debt ratios of firms in these countries tend to converge to each other. It seems in the UK that the maturity composition of debt becomes shorter during the recessions and lengthens during expansions (due to its possible correlation with GDP growth). Moreover, the fact that

[139] Until recently public issue of commercial papers and longer-term bonds were discouraged through the requirements of the issue authorisation procedure and the securities transfer tax in Germany (Bundesbank, Monthly Report, March 1992).

long-term debt to total assets ratio has been decreasing in France may indicate that the stock market is heating up.

Table 6.1: Descriptive Statistics for France, Germany and the UK.

France	Mean	Median	Mode	Std.dev	Variance	Kurtosis	Skew.	Min.	Max.	Obsrv.
SHORT1	0.4324	0.4095	0	0.25765	0.0664	-0.5202	0.2931	0	1	3009
SHORT2	0.09496	0.0794	0	0.08035	0.0065	8.16469	1.7696	0	0.9999	3009
LONG1	0.58826	0.6067	1	0.26781	0.0717	-0.60174	-0.279	0	1	3160
LONG2	0.14267	0.1177	0	0.11916	0.0142	3.57668	1.4903	0	0.9488	3160
LEVERAGE1	0.23306	0.2207	0.049	0.1449	0.021	0.6268	0.652	8E-05	0.9985	3160
LEVERAGE2	0.31144	0.2745	0.052	0.22726	0.0516	-0.44132	0.6139	2E-05	0.9753	3160
ETR	0.31505	0.3544	0	0.45906	0.2107	62.3824	3.2036	-3.968	6.7836	3160
MTBR	1.56172	1.2202	13.16	1.10617	1.2236	33.8066	4.7671	0.3968	13.155	3160
SIZE1	14.8396	14.853	16.72	1.9347	3.7431	0.95938	-0.254	0	20.227	3160
SIZE2	14.8557	14.763	13.07	1.8989	3.6058	-0.22165	0.107	9.2072	20.502	3160
LIQUIDITY	1.49681	1.3383	0.853	0.77003	0.5929	67.6515	5.6043	0.0218	15.548	3160
ASSETMAT	5.87294	4.91	7.509	5.78183	33.43	74.0468	7.0934	0.026	92.949	3160
QUALITY1	0.01642	0.005	0	0.42453	0.1802	306.889	4.4427	-9.062	10.264	2806
QUALITY2	0.0815	0.0912	0	3.9808	15.847	143.395	0.2205	-66.18	66.221	2806
EARNVOL	0.7584	0.1994	0.0012	5.8530	34.2581	2058.76	42.274	0.0000	289.62	2889
CHSHP	0.0930	0.0775	0.0000	0.4092	0.1674	2.6921	0.0912	-2.353	2.3690	2866

Germany	Mean	Median	Mode	Std.dev	Variance	Kurtosis	Skew.	Min.	Max.	Obsrv.
SHORT1	0.46721	0.4295	1	0.31336	0.0982	-1.10016	0.2929	0	1	5882
SHORT2	0.09009	0.0408	0	0.12252	0.015	6.9606	2.2574	0	0.9977	6809
LONG1	0.53279	0.5705	0	0.31336	0.0982	-1.10016	-0.293	0	1	5882
LONG2	0.10748	0.0634	0	0.13261	0.0176	4.49199	1.9226	0	0.9955	6809
LEVERAGE1	0.19745	0.1501	0	0.19017	0.0362	0.42268	0.9818	0	0.9977	6809
LEVERAGE2	0.24561	0.1692	0	0.24728	0.0611	-0.15065	0.9108	0	0.9942	6239
ETR	0.39311	0.4533	0	1.0299	1.0607	110.206	-0.143	-16.47	16.638	6782
MTBR	2.01218	1.3113	1.285	4.24848	18.05	244.48	13.934	0.2536	93.883	6239
SIZE1	12.3354	12.379	11.08	2.30539	5.3148	0.64579	-0.25	1.2306	19.402	6563
SIZE2	12.2502	12.148	10.54	2.0225	4.0905	0.50858	0.2607	3.9219	19.594	6809
LIQUIDITY	4.14811	1.7159	6.553	23.3093	543.32	429.341	18.961	0.0012	654	6793
ASSETMAT	7.72738	5.2723	0	11.0058	121.13	76.9186	7.4382	0	174.33	6329
QUALITY1	0.00867	0.0001	0	0.25041	0.0627	152.844	4.1379	-5.277	4.7472	6277
QUALITY2	-0.0898	0	0	5.45219	29.726	123.734	-1.91	-96.79	80.542	6194
EARNVOL	3.2986	0.3718	0.1266	19.9380	397.523	535.953	19.638	0.0000	653.94	6153
CHSHP	0.0069	0.0000	0.0000	0.3452	0.1192	4.4917	0.3725	-2.227	2.7783	5429

UK	Mean	Median	Mode	Std.dev	Variance	Kurtosis	Skew.	Min.	Max.	Obsrv.
SHORT1	0.54292	0.5273	1	0.33876	0.1148	-1.36466	-0.029	0	1	32339
SHORT2	0.08442	0.0557	0	0.09542	0.0091	8.38427	2.2218	0	0.9903	35266
LONG1	0.45708	0.4727	0	0.33876	0.1148	-1.36466	0.0289	0	1	32339
LONG2	0.08262	0.0478	0	0.10237	0.0105	7.45464	2.1329	0	0.9896	35266
LEVERAGE1	0.16694	0.1508	0	0.13746	0.0189	2.79683	1.2228	0	0.9958	35266
LEVERAGE2	0.24313	0.1882	0	0.22112	0.0489	0.2251	0.9545	0	0.9991	34947
ETR	0.35962	0.3607	0	0.55282	0.3056	470.554	-3.92	-18.5	18.43	35248
MTBR	1.51927	1.1124	2.285	2.17534	4.7321	574.897	18.9	0.1318	97.176	34947
SIZE1	9.03169	8.858	8.261	1.8893	3.5695	0.65115	0.1945	0.0156	16.224	35111
SIZE2	8.8299	8.5697	11.45	1.81985	3.3119	0.33371	0.601	1.5076	16.674	35266
LIQUIDITY	1.69656	1.4527	2	1.57749	2.4885	355.372	14.42	0.0242	61.42	35266
ASSETMAT	13.5762	9.3443	0	17.8024	316.93	66.7523	6.7541	0	282.63	35157

QUALITY1	0.00628	0.0062	0	0.14052	0.0197	324.737	0.5481	-4.933	4.8651	34092
QUALITY2	0.08574	0.1133	0	3.17009	10.049	156.193	-1.409	-68.09	64.314	32796
EARNVOL	1.1169	0.2498	0.0258	8.0445	64.7135	2767.908	44.649	0.0000	660.76	32835
CHSHP	0.0544	0.0691	0.0000	0.4660	0.2172	3.5258	-0.355	-4.183	3.3032	32671

Short1 (Short2) is the ratio of debt that matures in less than one year to total debt (total assets). *Long1 (Long2)* is the ratio of debt that matures in more than one year to total debt (total assets). *Leverage1* is the ratio of book value of total debt to book value of total assets. *Leverage2* is the ratio of book value of total debt to market value of equity plus book value of total debt. Effective Tax Rate (*ETR*) is the ratio of total tax charge to total taxable income. Market-to-Book Ratio (*MTBR*) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. *Size1 (Size2)* is the natural logarithm of total sales (total assets). *Liquidity* is the ratio of current assets to current liabilities. *Asset-Maturity* is the ratio of net property, plant &equipment to depreciation expense. *Quality1* is the difference between EPS in years [t+1] and [t] divided by share price in [t]. *Quality2* is the difference between earnings in years [t+1] and [t] divided by earnings in [t]. *Earnings volatility* (EARNVOL) is the first-difference of earnings minus average of the first-differences. *Change in share price* (CHSHP), or share price performance, is the difference between share prices at times [t] and [t-1] to share price at time [t-1].

6.3.3. Correlation Matrix

Table 6.2 shows that maturity and leverage are significantly positively correlated in all cases, which contradicts the trade-off and signalling arguments. Firm quality (Quality1) is significantly negative only in the UK, which is predicted by the theory. The significantly positive association of maturity with firm size in France and in the UK, and with asset maturity and liquidity in all countries is predicted by the theory. Tax rate variable is significant and positive only in Germany; and market-to-book ratio variable is never significant, which are not predicted by the theories.

If leverage is strongly positively correlated to debt maturity and strongly negatively to market-to-book ratio, then, we should control for leverage to prevent the downward bias in estimated coefficient of market-to-book ratio. (see, Stohs and Mauer [1996]). By this way, a spurious inverse relation between market-to-book ratio and debt maturity may be avoided. The results in Table 6.2 show that this is the case for all countries and thus leverage variable should be included in the model.

Table 6.2: Correlation Matrix for France, Germany and the UK.

France	SHORT1	LONG1	SHORT2	LONG2	LEVER1	LEVER2	ETR	MTBR
SHORT1	1							
LONG1	-1*	1						
SHORT2	0.5100*	-0.5100*	1					
LONG2	-0.5449*	0.5449*	0.0622*	1				
LEVER1	-0.1566*	0.1566*	0.5982*	0.8369*	1			
LEVER2	-0.0926*	0.0926*	0.4705*	0.5563*	0.7051*	1		
ETR	0.0098	-0.0098	-0.0424**	-0.0739*	-0.0831*	-0.0659*	1	
MTBR	0.0237	-0.0237	-0.1683*	-0.1510*	-0.2138*	-0.4860*	0.0062	1
SIZE1	-0.0333	0.0333	0.0978*	0.0818*	0.1195*	0.3128*	0.0543*	-0.2402*
SIZE2	-0.0831*	0.0831*	0.0716*	0.1672*	0.1736*	0.3432*	0.0347	-0.2478*
LIQUIDITY	-0.1045*	0.1045*	-0.2799*	-0.0921*	-0.2279*	-0.2322*	-0.0008	0.0867*
ASSETMAT	-0.1465*	0.1465*	-0.0123	0.3910*	0.3070*	0.1873*	-0.0448**	-0.0959*
QUALITY1	-0.0256	0.0256	0.0108	0.0319	0.0315	0.0491**	-0.0097	-0.0060
QUALITY2	0.0253	-0.0253	0.0301	0.0037	0.0190	0.0070	-0.0245	0.0108

	SIZE1	SIZE2	LIQUIDITY	ASSETMAT	QUALITY1	QUALITY2
SIZE1	1					
SIZE2	0.9472*	1				
LIQUIDITY	-0.3266*	-0.2656*	1			
ASSETMAT	0.0618*	0.2056*	-0.0842*	1		
QUALITY1	0.0094	0.0139	-0.0254	0.0254	1	
QUALITY2	0.0123	0.0264	0.0126	0.0198	-0.1030*	1

Germany	SHORT1	LONG1	SHORT2	LONG2	LEVER1	LEVER2	ETR	MTBR
SHORT1	1							
LONG1	-1*	1						
SHORT2	0.4665*	-0.466*	1					
LONG2	-0.5150*	0.5150*	0.0695*	1				
LEVER1	-0.059*	0.0595*	0.7053*	0.7562*	1			
LEVER2	-0.0202	0.0202	0.5710	0.5315*	0.7525*	1		
ETR	-0.0416*	0.0416*	-0.0309**	-0.0020	-0.0210	-0.0371**	1	
MTBR	-0.0019	0.0019	-0.0442*	-0.0320*	-0.0520*	-0.2416*	0.0001	1
SIZE1	0.0704*	-0.0704*	-0.1012*	-0.2360	-0.2340*	0.0323**	0.0108	-0.2106*
SIZE2	-0.0008	0.0008	-0.1171*	-0.1480	-0.1820*	0.0548*	-0.0010	-0.2011*
LIQUID	-0.0938*	0.0938*	-0.1376*	-0.0300	-0.1120*	-0.1267*	-0.0090	0.0219
ASSETMAT	-0.1070*	0.1070*	0.0527*	0.2417*	0.2064*	0.0991*	-0.0180	0.0233
QUALITY1	0.0122	-0.0122	0.1171*	0.0281	0.0953*	0.0876*	-0.0550*	0.0072
QUALITY2	-0.0042	0.0042	-0.0332**	0.0020	-0.0200	-0.0430*	0.0352**	0.0283

	SIZE1	SIZE2	LIQUIDITY	ASSETMAT	QUALITY1	QUALITY2
SIZE1	1					
SIZE2	0.9189*	1				
LIQUID	-0.1440*	-0.1076*	1			
ASSETMAT	-0.2740*	-0.1014*	0.0821*	1		
QUALITY1	-0.0040	-0.0039	-0.0176	-0.0130	1	
QUALITY2	-0.0120	0.0044	-0.0123	0.0098	0.0175*	1

UK	SHORT1	LONG1	SHORT2	LONG2	LEVER1	LEVER2	ETR	MTBR
SHORT1	1							
LONG1	-1*	1						
SHORT2	0.4930*	-0.4930*	1					
LONG2	-0.6476*	0.6476*	-0.1004*	1				
LEVER1	-0.1455*	0.1455*	0.6409*	0.6985*	1			
LEVER2	-0.0243*	0.0243*	0.5057*	0.3803*	0.6590*	1		
ETR	-0.0033	0.0033	-0.0541*	-0.0372*	-0.0675*	-0.0022	1	
MTBR	-6E-05	6E-05	-0.0172*	-0.0110*	-0.0217*	-0.2744*	-0.0463*	1

UK	SHORT1	LONG1	SHORT2	LONG2	LEVER1	LEVER2	ETR	MTBR
SIZE1	-0.2781*	0.2781*	-0.1296*	0.2322*	0.0867*	0.0945*	0.0675*	-0.1119*
SIZE2	-0.3535*	0.3535*	-0.1597*	0.3347*	0.1446*	0.1065*	0.0471*	-0.0909*
LIQUIDITY	-0.0483*	0.0483*	-0.2457*	-0.0784*	-0.2376*	-0.1698*	0.0031	0.0418*
ASSETMAT	-0.1346*	0.1346*	-0.0350*	0.1690*	0.1059*	0.0882*	-0.0107	-0.0705*
QUALITY1	0.0149**	-0.0149**	0.0359*	0.0023	0.0290*	0.0043	-0.0218*	0.0084
QUALITY2	-0.0174*	0.0174*	-0.0202*	0.0083	-0.0081	-0.0242*	0.0002	0.0208*

	SIZE1	SIZE2	LIQUIDITY	ASSETMAT	QUALITY1	QUALITY2
SIZE1	1					
SIZE2	0.9357*	1				
LIQUIDITY	-0.1524*	-0.0790*	1			
ASSETMAT	-0.0720*	0.0442*	-0.1067*	1		
QUALITY1	-0.0228*	-0.0316*	-0.0149**	-0.0145**	1	
QUALITY2	0.0076	0.0135**	-0.0026	0.0173*	0.0267*	1

The statistics reported here are the **Pearson** correlation coefficients between the variables used in the analysis. (*) and (**) represent that the correlation coefficient is significant at 1 percent level and 5 percent level, respectively. See Table 6.1 for variable definitions.

6.4. EMPIRICAL ANALYSIS

6.4.1. THE MODEL

We use the same econometric model which is explained in the previous chapters (see, equation [5.1]). Our general dynamic model for the empirical study of corporate debt maturity structure is as follows (subscript-i stands for firm-*i*; β's are the unknown parameters to be estimated and ω_t is the disturbance term):

$$\begin{aligned} MATURITY_{it} = {} & \beta_1[MATURITY]_{it-1} \\ & + \beta_2[LEVERAGE]_{it} + \beta_3[LEVERAGE]_{it-1} \\ & + \beta_4[EFFECTIVE\ TAX\ RATE]_{it} + \beta_5[EFFECTIVE\ TAX\ RATE]_{it-1} \\ & + \beta_6[MARKET\text{-}TO\text{-}BOOK\ ]_{it} + \beta_7[MARKET\text{-}TO\text{-}BOOK\ ]_{it-1} \\ & + \beta_8[FIRM\text{-}\ SIZE]_{it} + \beta_9[FIRM\text{-}\ SIZE]_{it-1} \\ & + \beta_{10}[LIQUIDITY]_{it} + \beta_{11}[LIQUIDTY]_{it-1} \\ & + \beta_{12}[ASSET\ MATURITY]_{it} + \beta_{13}[ASSET\ MATURITY]_{it-1} \\ & + \beta_{14}[QUALITY]_{it} + \beta_{15}[QUALITY]_{it-1} + \omega_{it}. \end{aligned} \quad (6.1)^{140}$$

Furthermore, in order to investigate the existence of target debt maturity structure in the framework of adjustment costs, the following procedure will be used. Assume that desired target level, $MATURITY_{it}^{*}$, is determined by several explanatory variables, x_s.

[140] In the next section, for the sake of simplicity, we will estimate the model (6.1) with only the stated variables here in order to compare the methodologies. Later, the model will be extended by including more variables.

$$MATURITY_{it}^{*} = \sum_{k=1} \psi_k x_{kit} + \omega_{it} \quad (6.2)$$

where ω_{it} is disturbance term serially correlated with mean zero and possibly heteroscedastic, and ψ_k's are estimable unknown parameters which are common to each firms. The model assumes that firms adjust their current ratios, $MATURITY_{it}$, with the degree of adjustment coefficient "θ" to attain the desired maturity structure.[141]

$$MATURITY_{it} - MATURITY_{it-1} = \theta(MATURITY_{it}^{*} - MATURITY_{it-1}) \quad (6.3)$$

If θ =1, then, the actual change in maturity will equal to the desired change and firms will have a complete adjustment with zero transaction costs, being in equilibrium. If θ = 0, however, there will not be any change due to unaffordable high transaction costs and firms will set their current debt-ratios to the past level, $MATURITY_{it-1}$.

Substituting (6.2) into (6.3), we get the following equation:

$$MATURITY_{it} = (1-\theta)MATURITY_{it-1} + \sum_{k=1} \theta\psi_k x_{kit} + \theta\omega_t \quad (6.4)$$

This adjustment model assumes that θ lies between zero and unity due to the existence of transaction costs. If the cost of being in disequilibrium is higher (lower) than the cost of adjustment, θ, which is inversely proportional to transaction costs, tends to unity (zero).

What is more, as we want to compare the alternative methodologies, our model (6.1) will be estimated by OLS, Anderson-Hsiao Instrumental Variable technique, GMM-differences and GMM-level estimation procedures[142].

Harris and Raviv [1991] account for the industry classification by commenting that 'firms within an industry are more alike than those in different industries'. In addition, Ferri and Jones [1979] emphasise the statistical relationship between relative debt structure class and generic industry class. As it is expected that industry effects can also be important in determining maturity structure of the firms, we have included industry dummy variables to the analysis to control industry-specific effects[143].

[141] See Miguel and Pindado [2001], and Özkan [2001] who also use this model.
[142] In the literature, most studies use OLS, censored Tobit, maximum likelihood, random and fixed effects,. Dennis et al. [2000] also criticise the previous empirical studies of debt structure with respect to their methodologies; one point is that exogeneity assumptions cause biased estimates. Therefore they use a simultaneous model of debt contract terms.
[143] See the Appendix for industry classification and the number of firm in each industry.

Obviously, the existence of such effects can only be investigated through the models in levels, not in differences.

In addition, using yearly time dummies, Bevan and Danbolt [2001] show that there has been a change in the character of credit markets in the UK. Aarstol [2000] reports that inflation and debt maturity structure of US non-financial corporations is inversely related since short-term debt reduces uncertainty about the real value of loan repayments and the variability of relative price changes increases with inflation. Therefore, in order to control for the influence of time periods and for modelling time effects, time dummies will be utilised to test whether the corporate debt maturity decisions are related to time-varying elements, say, macroeconomic factors or aggregate business cycles.

6.4.2. EMPIRICAL RESULTS

6.4.2.1. Comparison of the Results of Alternative Estimation Procedures

In Table 6.3 to Table 6.5, we report estimation results of the dynamic capital structure for France, Germany and the UK. In these tables, Model 1 presents the OLS-type estimates in levels, where unobservable firm-specific fixed effect are not eliminated and all explanatory variables (including lagged dependent variable) are assumed to be strictly exogenous. Model 2 give Anderson-Hsiao (AH)-type estimates in first differences, which uses $\Delta MATURITY_{it-2}$ or $MATURITY_{it-2}$ as an instrument for $\Delta MATURITY_{it-1}$. Models 3 and 4 show the GMM estimates in levels and in differences, respectively, where all explanatory variables except the lagged dependent variable (LDV) are treated as exogenous. Thus, in both models only $MATURITY_{it-1}$ is instrumented, in which case GMM instruments used increase in each period through the panel, unlike in case of AH instruments. In Model 5, we report GMM estimates in levels, where all right-hand side variables are treated as endogenous. The number of observations and the estimation period differ across alternative procedures, which are given in the tables. But in general one cross-section unit (first year) is lost due to first-differences and another (year-2000) due to the definition of quality variable. Six different type of test statistics were reported, three of which (Wald Tests) test the joint significance of the estimated coefficients, time and industry dummies, and time dummies only, respectively; distributed as chi-square under the null hypothesis of 'no relationship'. Two tests (Correlation Tests) are performed for the first and second order autocorrelation of residuals; distributed as standard normal N(0,1) under the null hypothesis of 'no serial correlation'. The last statistics (Sargan Test) is to test the validity of the instrument set (overidentifying restrictions); distributed as chi-square under the null hypothesis of 'valid instruments'. Only the *two-step* GMM estimates will be reported as they are more efficient than one-step estimates and Sargan Test is consistent only in this specification. All estimation procedures were executed using **PcGive** (Doornik and Hendry [2001]).

Firstly, considering all countries, Correlation Tests reveal that in all cases the OLS and GMM-Level specifications violate the assumption of 'no serial correlation'. Apart from serial correlation in the error terms, OLS specification also suffers from endogeneity problem. The former is not surprising since LDV might be correlated with seemingly existent unobservable and time-invariant firm-specific effects. Furthermore, the estimated coefficient of LDV is relatively too high and significant in all OLS specifications ranging from 0.70 to 0.72. The same problem exists in the GMM estimates in levels and the upward bias is even higher in all cases (ranging from 0.82 to 0.84) as compared to the OLS coefficients. This upward bias, in spite of the industry dummies inclusion, can be attributed to the correlation between LDV and unobservable fixed effects. Moreover, the Sargan Test of GMM-Level (model-3) estimation results reveal that the instruments used are invalid in France and in the UK. This is because we assumed the strict exogeneity of all variables except LDV. However, it is likely that the explanatory variables constructed on the basis of balance sheet data of firms are endogenous. Therefore, due to the reasons stated above one can conclude that the OLS and GMM specifications in levels are not appropriate for a study of dynamic debt maturity structure model.

In what follows, in order to overcome the problem in levels-specification, first-differences of the variables were taken to control for fixed effects and the estimation results were reported in Models 2 and 4. Furthermore, the examination of standard deviation of the coefficients of model-2 in these tables (Table 6.3 to Table 6.5) exhibits that AH-type estimates using differenced instrument (AHD) generally result in larger variances than GMM estimates in differences (GMM-DIF). This is especially apparent with regard to the standard deviations of LDVs. The inference from this comparison can be regarded as a strong finding and is consistent with the findings of Arellano and Bond [1991] that AHD causes substantial efficiency loss. Furthermore, the AH instrumental variable technique does not use all available moment conditions, which is not the case for GMM methodology. In the end, as discussed earlier, although AH-type estimates do not suffer from serial correlation (even it does for France) and are consistent, they are far from being efficient. As for GMM estimates in differences (model-4), all Sargan Tests in these tables indicate that the instruments used are not valid. The reason for the rejection of instrument validity is apparent as we assumed that all the variables, except LDV by definition, are exogenous. We allowed the possibility that the past and current values of the regressors are uncorrelated with current shocks by this way but that turned out to be a wrong assumption[144]. In model-5, the Sargan Tests again reject the validity of instruments only for the UK but the Correlation Tests show the presence of serial correlation problem in all countries. This, in turn, implies that even if we relax the exogeneity of variables by using GMM-instruments as lags of all variables dated (t-2) and earlier, the test statistics show the presence of misspecification in GMM-Level estimation[145]. Therefore, if serial correlation exists and the coefficient of LDV is too high in GMM-Level, controlling for firm heterogeneity is necessary despite the absence of endogeneity problem. In this case, GMM-DIF is used to control for potential unobserved firm-specific effects as the serious upward bias on the LDV of model-5 suggests its presence.

The discussion above reveals that the specification of the OLS, AH, the GMM-Levels specification and GMM-Differences specification assuming strict exogeneity of the variables are not appropriate for our dynamic debt maturity structure model. In the next section, we will relax the assumption of exogeneity in GMM-Differences models thereby using some more instruments to determine the most appropriate estimation procedure.

[144] As discussed in Blundell and Bond [1998,1999], the pattern of signs on current and lagged regressors in the unrestricted models are consistent with the AR(1) specification as the signs are reverse in most cases.
[145] We did not, and will not in the next sections, use all available instruments in order to reduce finite sample biases due to having too much instruments relative to the cross-sectional sample size. This is discussed by Alonso-Borrego and Arellano [1999], Kiviet [1995]. As time dummies are added in all models and thus used as additional instruments. If level instruments dated (t-2) in GMM-DIF is rejected by Sargan, it shows the presence of measurement errors.

Table 6.3: Dynamic corporate debt maturity structure in France: Alternative Estimations.

		Dependent Variable: $MATURITY_{i,t}$				
Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-LEV	(3) GMM-LEV1	(4) GMM-DIF1	(5) GMM-LEV2
$MATURITY_{i,t-1}$	+	0.7041***	0.3589***	0.8218***	0.3937***	0.8425***
		(0.0249)	(0.0792)	(0.0335)	(0.0787)	(0.0260)
$LEVERAGE_{i,t}$	-/+	0.0053	-0.1062	-0.0151	-0.1234	0.0573
		(0.0943)	(0.1036)	(0.1067)	(0.1013)	(0.2556)
$LEVERAGE_{i,t-1}$		0.1071	0.2252***	0.1001	0.2562***	-0.0056
		(0.0899)	(0.0825)	(0.1036)	(0.0674)	(0.2298)
$TAXRATE_{i,t}$	-/+	-0.0018	0.0057	-0.0043	0.0041	-0.0264
		(0.0059)	(0.0061)	(0.0067)	(0.0069)	(0.0356)
$TAXRATE_{i,t-1}$		-0.0008	0.0034	0.0031	0.0072	0.0046
		(0.0068)	(0.0081)	(0.0072)	(0.0083)	(0.0090)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	-0.0077	-0.0020	-0.0073	-0.0072	-0.0242
		(0.0081)	(0.0112)	(0.0081)	(0.0110)	(0.0296)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		0.0182*	0.0159	0.0178*	0.0219	0.0360
		(0.0109)	(0.0206)	(0.0108)	(0.0193)	(0.0293)
$SIZE_{i,t}$	+	0.0686***	0.0813***	0.0914***	0.0797**	-0.0282
		(0.0180)	(0.0271)	(0.0264)	(0.0319)	(0.0394)
$SIZE_{i,t-1}$		-0.0665***	-0.0667***	-0.0894***	-0.0604***	0.0267
		(0.0177)	(0.0215)	(0.0256)	(0.0231)	(0.0387)
$LIQUIDITY_{i,t}$	-/+	0.1077**	0.1124**	0.1733***	0.1480***	0.0863*
		(0.0492)	(0.0515)	(0.0599)	(0.0571)	(0.0490)
$LIQUIDITY_{i,t-1}$		-0.0719*	-0.0218	-0.1374***	-0.0422	-0.0773*
		(0.0407)	(0.0293)	(0.0533)	(0.0328)	(0.0415)
$ASSETMAT_{i,t}$	+	0.0039**	0.0034	0.0048**	0.0047**	-0.0027
		(0.0017)	(0.0021)	(0.0021)	(0.0022)	(0.0047)
$ASSETMAT_{it-1}$		-0.0033**	-0.0037	-0.0042**	-0.0037	0.0031
		(0.0016)	(0.0030)	(0.0019)	(0.0033)	(0.0044)
$QUALITY_{i,t}$	-	0.0208***	0.0216***	0.0230***	0.0219***	-0.0084
		(0.0062)	(0.0073)	(0.0073)	(0.0075)	(0.0224)
$QUALITY_{i,t-1}$		-0.0076*	0.0041	-0.0110***	0.0013	-0.0103*
		(0.0039)	(0.0088)	(0.0042)	(0.0088)	(0.0054)
Correlation1		-4.062***	-7.677***	-4.068***	-5.382***	-4.666***
Correlation2		2.772***	2.266**	1.241	1.747*	0.9569
Sargan Test (df)		-	-	25.58 (14)**	22.45 (14)*	104.9 (112)
Wald Test-1 (df)		1301 (15)***	104.9 (15)**	1335 (15)***	91.75 (15)***	1791 (15)***
Wald Test-2 (df)		295.9 (30)***	-	32.12 (30)	-	26.90 (30)
Wald Test-3 (df)		9.475 (15)	13.14 (15)	5.547 (15)	12.39 (15)	10.35 (15)
R^2		0.5580	-	0.4790	-	0.5200
Firms / Observations		358 / 2448	299 / 2090	358 / 2448	299 / 2090	358 / 2448
Estimation Period		1984-1999	1985-1999	1984-1999	1985-1999	1984-1999

See notes in Table 6.1 for variable definitions. Model-1 is OLS estimation in levels. Model-2 is Anderson-Hsiao type estimation in differences, where $MATURITY_{it-2}$ is instrumented for $\Delta MATURITY_{it-1}$. Models 3 and 4 are GMM estimates in levels and first differences, respectively, where only $MATURITY_{t-1}$ is treated as endogenous. Model 5 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 3 and 5. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 6.4: Dynamic corporate debt maturity structure in Germany: Alternative Estimations.

		Dependent Variable:		MATURITY$_{i,t}$		
Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-DIF	(3) GMM-LEV1	(4) GMM-DIF1	(5) GMM-LEV2
MATURITY$_{i,t-1}$	+	0.6968***	0.3298***	0.8356***	0.4515***	0.8204***
		(0.0167)	(0.1303)	(0.0217)	(0.0604)	(0.0244)
LEVERAGE$_{i,t}$	-/+	-0.1734***	-0.2186***	-0.1920***	-0.2456***	0.1932
		(0.0583)	(0.0759)	(0.0593)	(0.0803)	(0.2014)
LEVERAGE$_{i,t-1}$		0.2400***	0.1724**	0.2647***	0.2134***	-0.0870
		(0.0593)	(0.0714)	(0.0612)	(0.0711)	(0.1801)
TAXRATE$_{i,t}$	-/+	0.0023	-0.0011	0.0002	-0.0003	0.0731*
		(0.0028)	(0.0034)	(0.0029)	(0.0035)	(0.0381)
TAXRATE$_{i,t-1}$		-0.0012	-0.0014	-0.0030	-0.0009	-0.0066*
		(0.0026)	(0.0036)	(0.0027)	(0.0036)	(0.0040)
MKT-TO-BOOK$_{i,t}$	-/+	0.0062**	0.0085	0.0085***	0.0067	0.0246**
		(0.0026)	(0.0080)	(0.0025)	(0.0092)	(0.0112)
MKT-TO-BOOK$_{i,t-1}$		-0.0094***	-0.0011	-0.0103***	-0.0027	-0.0160***
		(0.0012)	(0.0087)	(0.0012)	(0.0088)	(0.0060)
SIZE$_{i,t}$	+	-0.0052	0.0195	-0.0138	-0.0052	0.0056
		(0.0124)	(0.0151)	(0.0128)	(0.0152)	(0.0544)
SIZE$_{i,t-1}$		0.0057	0.0129	0.0158	0.0158	-0.0032
		(0.0125)	(0.0117)	(0.0131)	(0.0145)	(0.0539)
LIQUIDITY$_{i,t}$	-/+	0.0036***	0.0044***	0.0036***	0.0046***	0.0009
		(0.0007)	(0.0005)	(0.0007)	(0.0008)	(0.0008)
LIQUIDITY$_{i,t-1}$		-0.0014	0.0014	-0.0022**	0.0011	-0.0004
		(0.0009)	(0.0011)	(0.0010)	(0.0008)	(0.0007)
ASSETMAT$_{i,t}$	+	0.0015**	0.0019***	0.0014**	0.0024***	0.0010*
		(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
ASSETMAT$_{it-1}$		-0.0005	-0.0009	-0.0007	-0.0009	-0.0004
		(0.0005)	(0.0010)	(0.0006)	(0.0008)	(0.0005)
QUALITY$_{i,t}$	-	-0.0143	-0.0036	-0.0124	-0.0041	-0.0654
		(0.0101)	(0.0115)	(0.0101)	(0.0130)	(0.0575)
QUALITY$_{i,t-1}$		-0.0367**	-0.0191	-0.0404***	-0.0162	-0.0459
		(0.0151)	(0.0159)	(0.0150)	(0.0173)	(0.0320)
Correlation1		-4.879***	-4.673***	-5.777***	-10.16***	-5.860***
Correlation2		1.624	-0.599	-1.309	0.835	-1.105
Sargan Test (df)		-	-	7.454 (11)	18.11 (11)*	86.17 (88)
Wald Test-1 (df)		2084 (15)***	91.14 (15)***	1877 (15)***	146.5 (15)***	2237 (15)***
Wald Test-2 (df)		243 (26)***	-	64.38 (26)***	-	36.03 (26)*
Wald Test-3 (df)		39.61 (12)***	79.47 (11)	24.26 (12)**	29.78 (12)***	18.24 (12)
R^2		0.5289	-	0.3802	-	0.4087
Firms / Observations		508 / 3993	451 / 3286	508 / 3993	470 / 3485	508 / 3993
Estimation Period		1988-1999	1990-1999	1988-1999	1989-1999	1988-1999

See notes in Table 6.1 for variable definitions. Model-1 is OLS estimation in levels. Model-2 is Anderson-Hsiao type estimation in differences, where ΔMATURITY$_{it-2}$ is instrumented for ΔMATURITY$_{it-1}$. Models 3 and 4 are GMM estimates in levels and first differences, respectively, where only MATURITY$_{t-1}$ is treated as endogenous. Model 5 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 3 and 5. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 6.5: Dynamic corporate debt maturity structure in the UK: Alternative Estimations

		Dependent Variable:		$MATURITY_{i,t}$		
Independent Variables	Predicted Sign	(1) OLS-LEV	(2) AH-DIF	(3) GMM-LEV1	(4) GMM-DIF1	(5) GMM-LEV2
$MATURITY_{i,t-1}$	+	0.7191***	0.3261***	0.8134***	0.5268***	0.8232***
		(0.0069)	(0.0587)	(0.0085)	(0.0181)	(0.0080)
$LEVERAGE_{i,t}$	-/+	-0.0013	-0.0335	-0.0027	-0.0394	-0.1632
		(0.0336)	(0.0411)	(0.0371)	(0.0454)	(0.1475)
$LEVERAGE_{i,t-1}$		0.1424***	0.2130***	0.1119***	0.1914***	0.2234*
		(0.0321)	(0.0376)	(0.0366)	(0.0414)	(0.1189)
$TAXRATE_{i,t}$	-/+	0.0012	-0.0007	0.0015	0.0007	-0.0468
		(0.0023)	(0.0024)	(0.0025)	(0.0023)	(0.0304)
$TAXRATE_{i,t-1}$		-0.0031	-0.0048	-0.0040	-0.0040	0.0004
		(0.0035)	(0.0036)	(0.0041)	(0.0042)	(0.0056)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	-0.0002	-0.0002	-0.0006	-0.0008	0.0066
		(0.0013)	(0.0017)	(0.0014)	(0.0014)	(0.0051)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		0.0003	-0.0005	0.0005	-0.0002	-0.0023
		(0.0011)	(0.0017)	(0.0012)	(0.0016)	(0.0028)
$SIZE_{i,t}$	+	0.0489***	0.0423***	0.04464***	0.0407***	0.0116
		(0.0069)	(0.0105)	(0.0077)	(0.0103)	(0.0269)
$SIZE_{i,t-1}$		-0.0335***	-0.0055	-0.0344***	-0.0088	-0.0022
		(0.0069)	(0.0096)	(0.0076)	(0.0096)	(0.0262)
$LIQUIDITY_{i,t}$	-/+	0.0632***	0.0934***	0.0664***	0.0921***	0.0079
		(0.0143)	(0.0168)	(0.0169)	(0.0207)	(0.0120)
$LIQUIDITY_{i,t-1}$		-0.0459***	-0.0155	-0.0547***	-0.0301**	-0.0155
		(0.0120)	(0.0160)	(0.0151)	(0.0150)	(0.0096)
$ASSETMAT_{i,t}$	+	0.0013***	0.0013***	0.0013***	0.0014***	0.0004
		(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0006)
$ASSETMAT_{it-1}$		-0.0005***	0.0004	-0.0006***	0.0001	0.0000
		(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0005)
$QUALITY_{i,t}$	-	-0.0181**	-0.0252**	-0.0198**	-0.0338***	-0.1904**
		(0.0087)	(0.0100)	(0.0088)	(0.0105)	(0.0849)
$QUALITY_{i,t-1}$		0.0300**	0.0014	0.0314**	0.0035	0.0196
		(0.0118)	(0.0109)	(0.0131)	(0.0119)	(0.0221)
Correlation1		-9.900**	-10.09***	-12.01***	-24.39***	-12.36***
Correlation2		3.014***	1.011	-3.875***	2.347**	-3.626***
Sargan Test (df)		-	-	79.32 (29)***	78.69 (29)***	275 (232)**
Wald Test-1 (df)		23440 (15)***	231.5 (15)	22520 (15)***	1188 (15)***	24620 (15)***
Wald Test-2 (df)		276.1 (45)***	-	136.6 (30)***	-	202.9 (45)***
Wald Test-3 (df)		152.4 (30)	112.2 (29)***	79.32 (29)***	103.7 (30)***	146.9 (30)***
R^2		0.6086	-	0.6010	-	0.5748
Firms / Observations		2311 / 28029	1945 / 23318	2311 / 28029	2175 / 25718	2311 / 28029
Estimation Period		1970-1999	1972-1999	1970-1999	1971-1999	1970-1999

See notes in Table 6.1 for variable definitions. Model-1 is OLS estimation in levels. Model-2 is Anderson-Hsiao type estimation in differences, where $\Delta MATURITY_{it-2}$ is instrumented for $\Delta MATURITY_{it-1}$. Models 3 and 4 are GMM estimates in levels and first differences, respectively, where only $MATURITY_{t-1}$ is treated as endogenous. Model 5 is GMM estimates in levels, where all variables are treated as endogenous. Industry dummies are included in models 1, 3 and 5. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

6.4.2.2. The GMM-DIF and Within Groups (WG) Estimation Results

In Table 6.6, we report Within Groups, and GMM-DIF estimation results assuming the endogeneity of explanatory variables. Correlation Tests confirm the validity of the assumption of serially uncorrelated errors in levels as Correlation1 is significant but Correlation2 is insignificant in all cases (except the significant Correlation2 for the UK). Furthermore, two-step Sargan Tests accept the validity of lagged level instruments dated (t-2) and earlier for France and Germany, and the validity of instruments dated (t-3) and earlier for the UK.

Although the results in Table 6.6 do not suffer from serial correlation, endogeneity problem and instrument invalidity, recent econometric studies document that standard GMM-DIF estimator has the problem of weak instruments. As discussed by Blundell et al. [2000], the weak instruments problem can be seen by comparing GMM-DIF estimates with WG (deviation from individual means) in Table 6.6. The results in these tables are generally similar and the estimated coefficient of lagged maturity of GMM-DIF is not substantially higher than that of WG (it is even lower for France). It is known that in the presence of firm-specific effects that OLS-Levels specification appears to cause an upward bias in the estimate of LDV while WG appears to cause a downward bias in the same coefficient's estimate. Consequently, one can expect this coefficient to be biased *downwards* in case of weak instruments usage. Therefore, system GMM (GMM-SYS) estimation procedure, in the end, has been shown to be the most efficient and consistent methodology for our dynamic debt maturity structure model[146].

[146] Controlling for unobserved firm heterogeneity and endogeneity problem in dynamic debt maturity structure seem very important as some variables have turned out to be insignificant after using correct methodology (GMM-SYS) in the following sections.

Table 6.6: Dynamic corporate debt maturity structure: GMM-DIF vs. Within Groups Estimations.

		Dependent Variable:		MATURITY$_{i,t}$			
Independent Variables	Predicted Sign	FRANCE		GERMANY		UK	
		WITHIN	*GMM-DIF2*	*WITHIN*	*GMM-DIF2*	*WITHIN*	*GMM-DIF2*
MATURITY$_{i,t-1}$	+	0.3371***	0.3321***	0.3504***	0.4168***	0.5226***	0.5788***
		(0.0371)	(0.0579)	(0.0244)	(0.0467)	(0.0095)	(0.0232)
LEVERAGE$_{i,t}$	-/+	0.0243	-0.1539	-0.1360**	-0.1987*	0.0208	-0.0805
		(0.0914)	(0.1357)	(0.0610)	(0.1135)	(0.0379)	(0.0764)
LEVERAGE$_{i,t-1}$		0.1432**	0.2059**	0.2420***	0.2144***	0.1974***	0.2017***
		(0.0693)	(0.0802)	(0.0610)	(0.0675)	(0.0316)	(0.0340)
TAXRATE$_{i,t}$	-/+	-0.0033	-0.0032	0.0027	0.0060	0.0009	0.0170
		(0.0063)	(0.0082)	(0.0035)	(0.0043)	(0.0022)	(0.0246)
TAXRATE$_{i,t-1}$		-0.0026	-0.0016	-0.0001	0.0013	-0.0027	0.0052
		(0.0070)	(0.0082)	(0.0033)	(0.0035)	(0.0034)	(0.0136)
MKT-TO-BOOK$_{i,t}$	-/+	0.0024	0.0016	0.0111*	-0.0213	-0.0007	0.0034
		(0.0120)	(0.0211)	(0.0066)	(0.0199)	(0.0015)	(0.0050)
MKT-TO-BOOK$_{i,t-1}$		0.0103	0.0138	0.0015	0.0013	-0.0011	0.0002
		(0.0160)	(0.0217)	(0.0054)	(0.0078)	(0.0017)	(0.0022)
SIZE$_{i,t}$	+	0.0548***	0.0665**	0.0092	-0.0049	0.0522***	0.0118
		(0.0186)	(0.0329)	(0.0133)	(0.0278)	(0.0076)	(0.0215)
SIZE$_{i,t-1}$		-0.0464**	-0.0583***	0.0080	0.0093	-0.0266***	-0.0050
		(0.0180)	(0.0208)	(0.0123)	(0.0153)	(0.0074)	(0.0115)
LIQUIDITY$_{i,t}$	-/+	0.1181**	0.0733	0.0044*	0.0046***	0.0772***	0.0476***
		(0.0530)	(0.0465)	(0.0007)	(0.0015)	(0.0174)	(0.0179)
LIQUIDITY$_{i,t-1}$		-0.0162	-0.0306	0.0011	0.0003	-0.0317***	-0.0401***
		(0.0294)	(0.0259)	(0.0009)	(0.0009)	(0.0122)	(0.0104)
ASSETMAT$_{i,t}$	+	0.0045**	0.0020	0.0027***	0.0023**	0.0014***	0.0004
		(0.0018)	(0.0025)	(0.0007)	(0.0011)	(0.0002)	(0.0005)
ASSETMAT$_{it-1}$		-0.0022	-0.0022	-0.0011*	-0.0014**	-0.0001	-0.0003
		(0.0018)	(0.0021)	(0.0006)	(0.0007)	(0.0002)	(0.0003)
QUALITY$_{i,t}$	-	0.0147***	0.0164***	-0.0103	-0.0055	-0.0163*	-0.0614
		(0.0043)	(0.0061)	(0.0132)	(0.0193)	(0.0095)	(0.0515)
QUALITY$_{i,t-1}$		-0.0049	-0.0036	-0.0298**	-0.0258	0.0255**	-0.0052
		(0.0039)	(0.0057)	(0.0146)	(0.0182)	(0.0109)	(0.0312)
Correlation1		-3.080***	-5.367***	-2.569***	-8.294***	-4.061***	-19.10***
Correlation2		0.0649	1.605	-3.432***	0.6711	1.458	2.199**
Sargan Test (df)		-	232.3 (512)	-	311.6 (328)	-	404.6 (448)
Wald Test-1 (df)		188.8 (15)***	61.65 (15)***	300.9 (15)***	125.4 (15)***	4555 (15)***	760.6 (15)**
Wald Test-2 (df)		14.90 (15)	13 (15)	102.1 (12)***	32.93 (12)***	140.4 (30)***	106.8 (30)**
Firms / Observations		299 / 2389	299 / 2090	470 / 3955	470 / 3485	2175 / 27893	2175 / 25718
Estimation Period		1984-1999	1985-1999	1988-1999	1989-1999	1970-1999	1971-1999

See notes in Table 6.1 for variable definitions. Time dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

6.4.2.3. The Comparison of System-GMM and Difference-GMM Estimators

Standard GMM-DIF estimator is biased either when the lagged and current dependent variables are highly correlated or when heteroscedasticity is high across cross-sections. It causes downward bias as the coefficient of lagged dependent variable (LDV) increase or relative variance of fixed effects increases. This is very important with respect to our adjustment coefficient which has long-run implications (see equation (6.5)). It also eliminates valuable information by taking first-differences and uses weak instruments. The results in Table 6.7 show that GMM-SYS estimates, which are produced as a result of the shortcomings of GMM-DIF, are more reasonable than GMM-DIF estimates. This is particularly apparent in the estimated coefficient of lagged leverage, which is substantially higher in GMM-SYS case than in WG case. Hence, GMM-SYS estimator produces higher estimated coefficient of LDV than GMM-DIF does, which is higher than WG estimate and below than OLS estimate. Consequently, the reported results are consistent with the analysis of Blundell and Bond [1998] that in autoregressive models with persistent series, GMM-DIF can cause serious finite sample biases due to weak instruments and these biases can be greatly reduced by including level equations in the system estimator. In what follows, therefore, we report the results of system-GMM estimator specification.

It would be noteworthy to mention about the implications of test statistics in Table 6.7. Sargan Tests accept the validity of instruments used in all countries. The instruments used for France and Germany are "lagged-levels dated [t-2] and earlier for differenced equations, and lagged-differenced dated [t-1] for level equations". The instruments used for the UK are "lagged-levels dated [t-3] and earlier as instruments in the first-differenced equations combined with lagged first-differences dated [t-2] as instruments in levels". In addition, the correlation tests are robust in all countries. The reason why Correlation-2 rejects the null of no serial correlation for the UK is because the instruments are dated at [t-3]. We assume that our error has a MA(1) structure for the UK and therefore, in differences, there is correlation up to order 2 (See Bond and Meghir [1994]).

Table 6.7: Dynamic corporate debt maturity structure: GMM-SYS Estimations.

Independent Variables	Predicted Sign	FRANCE General	FRANCE Specific	GERMANY General	GERMANY Specific	UK General	UK Specific
		Dependent Variable: MATURITY$_{i,t}$					
MATURITY$_{i,t-1}$	+	0.3966***	0.3895***	0.4908***	0.4547***	0.6517***	0.6472***
		(0.0487)	(0.0507)	(0.0416)	(0.0360)	(0.0213)	(0.0220)
LEVERAGE$_{i,t}$	-/+	-0.0300	-0.0275	0.1253	0.0627	-0.1576	-0.1515
		(0.1189)	(0.1138)	(0.1213)	(0.0687)	(0.1012)	(0.1016)
LEVERAGE$_{i,t-1}$		0.1943*	0.1646*	0.0096	-	0.2697***	0.2676***
		(0.0998)	(0.0906)	(0.0975)	-	(0.0609)	(0.0605)
TAXRATE$_{i,t}$	-/+	-0.0143	-0.0333**	0.0123**	0.0214**	0.0308	0.0351
		(0.0124)	(0.0181)	(0.0062)	(0.0106)	(0.0248)	(0.0267)
TAXRATE$_{i,t-1}$		-0.0047	-	0.0025	-	0.0055	-
		(0.0081)	-	(0.0031)	-	(0.0086)	-
MKT-TO-BOOK$_{i,t}$	-/+	0.0029	0.0115	0.0079	0.0165*	0.0069*	0.0062
		(0.0171)	(0.0143)	(0.0199)	(0.0096)	(0.0039)	(0.0040)
MKT-TO-BOOK$_{i,t-1}$		0.0214	-	-0.0070	-	0.0006	-
		(0.0166)	-	(0.0135)	-	(0.0016)	-
SIZE$_{i,t}$	+	0.03456	0.0100	-0.0369	-0.0007	0.0071	0.0231***
		(0.0270)	(0.0081)	(0.0248)	(0.0082)	(0.0260)	(0.0039)
SIZE$_{i,t-1}$		-0.0301	-	0.0344	-	0.0103	-
		(0.0265)	-	(0.0250)	-	(0.0251)	-
LIQUIDITY$_{i,t}$	-/+	0.0450	0.0316	0.0020**	0.0026***	0.0220**	0.0195**
		(0.0374)	(0.0282)	(0.0008)	(0.0009)	(0.0093)	(0.0096)
LIQUIDITY$_{i,t-1}$		-0.0194	-	0.0002	-	-0.0257***	-0.0232***
		(0.0202)	-	(0.0004)	-	(0.0075)	(0.0077)
ASSETMAT$_{i,t}$	+	0.0013	0.0016	0.0011	0.0007	0.0003	0.0000
		(0.0022)	(0.0019)	(0.0007)	(0.0009)	(0.0006)	(0.0004)
ASSETMAT$_{it-1}$		-0.0000	-	-0.0003	-	0.0003	-
		(0.0016)	-	(0.0006)	-	(0.0004)	-
QUALITY$_{i.t}$	-	0.0166*	0.0198**	-0.0207	-0.0167	-0.0758*	-0.0463
		(0.0092)	(0.0088)	(0.0249)	(0.0315)	(0.0433)	(0.0544)
QUALITY$_{i.t-1}$		-0.0057	-	-0.0276	-	0.0043	-
		(0.0059)	-	(0.0190)	-	(0.0213)	-
Correlation1		-5.858***	-6.002***	-9.035***	-9.377***	-20.25***	-20.07***
Correlation2		1.878	1.880	0.7428	0.6228	2.441**	2.422**
Sargan Test (df)		237.4 (632)	240.6 (632)	330.2 (352)	340.9 (352)	607.9 (680)	624.2 (680)
Wald Test-1 (df)		155.6 (15)***	99.18 (9)***	378.7 (15)***	182.7 (8)***	3845 (15)***	1712 (10)
Wald Test-2 (df)		63.01 (30)***	56.96 (30)***	77.18 (26)***	115 (26)***	216.1 (45)***	216.4 (45)**
Wald Test-3 (df)		25.86 (15)**	21.94 (15)	22.53 (12)**	33.44 (12)***	146 (30)***	149.1 (30)**
R^2		0.4689	0.4560	0.4769	0.4390	0.5909	0.5872
Firms / Observations		299 / 2389	299 / 2389	470 / 3955	470 / 3955	2175 / 27893	2175 / 27893
Estimation Period		1985-1999	1985-1999	1989-1999	1989-1999	1971-1999	1971-1999

See notes in Table 6.1 for variable definitions. Time and industry dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1, 2 and 3 test the joint significance of estimated coefficients, of time and industry dummies, and of time dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. The coefficient of intercept term is not reported. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

6.4.2.4. The results of system-GMM estimator specification

In this section, we discuss our main results based on the model for which all relevant variables are shown in equation (6.5). Although the main focus will be the static long-run results in Table 6.9, the implications of short-run models in Table 6.8 will be referred to where appropriate.

The 'specific' GMM estimates in Table 6.8 were obtained, following general-to-specific approach, after excluding the insignificant lagged independent variables from the estimation of general dynamic model. Focusing on the lagged independent variables, one can see that past leverage variable is significant at 1 % in France and in the UK; past liquidity and past size are significant in the UK. Schiantarelli and Jaramillo [1996] also report a significantly positive relationship between lagged leverage and maturity, and argue that obtaining debt in the past implies obtaining long-term debt in the future. Together with highly significant lagged maturity coefficients in all cases, a significant lagged variable would imply some transitional effects on debt maturity structure. This necessitates the discussion of long-run relationships between maturity, and firm-specific and market-related factors:

Table 6.8: Dynamic corporate debt maturity structure: GMM-SYS Estimations.

		Dependent Variable: MATURITY$_{i,t}$					
Independent Variables	Predicted Sign	FRANCE		GERMANY		UK	
		General	*Specific*	*General*	*Specific*	*General*	*Specific*
MATURITY$_{i,t-1}$	+	0.4370***	0.4258***	0.4970***	0.4588***	0.6412***	0.6347***
		(0.0535)	(0.0488)	(0.0433)	(0.0381)	(0.0216)	(0.0223)
LEVERAGE$_{i,t}$	-/+	-0.0387	-0.1017	0.1187	0.0480	-0.1044	-0.0884
		(0.1162)	(0.0999)	(0.1516)	(0.0732)	(0.0887)	(0.0945)
LEVERAGE$_{i,t-1}$		0.1737*	0.2360***	0.0043	-	0.2380***	0.2370***
		(0.0897)	(0.0814)	(0.1218)	-	(0.0544)	(0.0573)
TAXRATE$_{i,t}$	-/+	-0.0212	-0.0181	0.0092	0.0186*	0.0020	0.0034
		(0.0155)	(0.0185)	(0.0057)	(0.0102)	(0.0185)	(0.0205)
TAXRATE$_{i,t-1}$		-0.0056	-	0.0014	-	-0.0014	-
		(0.0088)	-	(0.0031)	-	(0.0058)	-
MKT-TO-BOOK$_{i,t}$	-/+	0.0023	0.0071	0.0256	0.0094	0.0059*	0.0073**
		(0.0176)	(0.0127)	(0.0209)	(0.0107)	(0.0035)	(0.0036)
MKT-TO-BOOK$_{i,t-1}$		0.0102	-	-0.0233	-	0.0008	-
		(0.0186)	-	(0.0154)	-	(0.0017)	-
SIZE$_{i,t}$	+	0.0288	0.0044	-0.0161	0.0063	-0.0178	-0.0269
		(0.0231)	(0.0085)	(0.0275)	(0.0088)	(0.0205)	(0.0201)
SIZE$_{i,t-1}$		-0.0276	-	0.0142	-	0.0355*	0.0440**
		(0.0229)	-	(0.027)	-	(0.0199)	(0.0194)
LIQUIDITY$_{i,t}$	-/+	0.0417	0.0277	0.0030***	0.0028***	0.0326***	0.0278**
		(0.0322)	(0.0243)	(0.0009)	(0.0009)	(0.0111)	(0.0111)
LIQUIDITY$_{i,t-1}$		-0.0200	-	-0.0001	-	-0.0382***	-0.0301***
		(0.0166)	-	(0.0005)	-	(0.0099)	(0.0090)
ASSETMAT$_{i,t}$	+	0.0020	0.0013	0.0013*	0.0014	0.0007	0.0004
		(0.0019)	(0.0018)	(0.0008)	(0.0010)	(0.0006)	(0.0004)
ASSETMAT$_{it-1}$		-0.0002	-	-0.0005	-	0.0003	-
		(0.0015)	-	(0.0006)	-	(0.0004)	-
QUALITY$_{i,t}$	-	0.0191	0.0087	-0.0033	-0.0006	-0.0708*	-0.0613
		(0.0138)	(0.0093)	(0.0313)	(0.0299)	(0.0402)	(0.0462)
QUALITY$_{i,t-1}$		-0.0056	-	-0.0128	-	0.0023	-
		(0.0075)	-	(0.0257)	-	(0.0212)	-
EARNINGS VOL$_{i,t}$	-	0.0056**	0.0052*	-0.0005	0.0000	-0.0005	-0.0009
		(0.0027)	(0.0031)	(0.0006)	(0.0006)	(0.0007)	(0.0011)
EARNINGS VOL$_{i,t-1}$		0.0001	-	0.0001	-	-0.0005	-
		(0.0002)	-	(0.0003)	-	(0.0003)	-
EQUITY PREMIUM	-/+	0.0000	0.0000	-0.0003	-0.0001	0.0002***	0.0002***
		(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0001)	(0.0001)
TERM-STRUCTR	+	-0.0034	-0.0038	0.0027	0.0017	0.0016***	0.0021***
		(0.0027)	(0.0026)	(0.0022)	(0.0021)	(0.0006)	(0.0006)
SHARE PRICE	+	0.0103	0.0167	0.0253*	0.0150	0.0079*	0.0068
		(0.0129)	(0.0123)	(0.0151)	(0.0132)	(0.0050)	(0.0052)
INTEREST VOL	+	-0.0002	0.0053	0.0117	0.0191	-0.0102**	-0.0119**
		(0.0076)	(0.0073)	(0.0233)	(0.0218)	(0.0052)	(0.0053)
Constant		0.1945*	0.1442	0.2593***	0.1697	-0.0182	-0.0091
		(0.1094)	(0.1333)	(0.0724)	(0.1369)	(0.0260)	(0.0273)
Correlation1		-5.681***	-6.065***	-8.810***	-9.094***	-19.81***	-19.76***
Correlation2		1.0815	1.0909	0.5639	0.3629	2.662***	2.659***
Sargan Test (df)		210.2 (602)	248.9 (611)	261.3 (296)	283.2 (305)	731.2 (764)	645 (679)
Wald Test-1 (df)		160.5 (21)***	158.3 (14)***	289.2 (21)***	194.7 (13)***	3853 (21)***	3695 (16)***
Wald Test-2 (df)		23.45 (14)*	37.22 (15)***	45.12 (14)***	36.51 (14)***	51.26 (15)***	60.73 (15)**
R^2		0.4938	0.4749	0.4786	0.4493	0.5985	0.5906
Firms / Observations		249 / 2104	283 / 2317	449 / 3583	455 /3823	1981 / 25787	2106 / 27333
Estimation Period		1986-1999	1985-1999	1990-1999	1989-1999	1972-2000	1971-1999

See notes in Table 6.1 for variable definitions. Industry dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 6.9: Static long-run relationship between debt maturity and firm- and market-specific factors.

		a) Dependent Variable: $MATURITY_{i,t}$					
Independent Variables	Predicted Sign	**FRANCE**		**GERMANY**		**UK**	
		General	*Specific*	*General*	*Specific*	*General*	*Specific*
$LEVERAGE_{i,t}$	-/+	0.2398*	0.2340**	0.2444**	0.0900	0.3724***	0.4066***
		(0.1409)	(0.1135)	(0.0980)	(0.1356)	(0.1236)	(0.1242)
$TAXRATE_{i,t}$	-/+	-0.0476	-0.0316	0.0210	0.0344*	0.0018	0.0094
		(0.0370)	(0.0317)	(0.0145)	(0.0190)	(0.0628)	(0.0562)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	0.0223	0.0124	0.0044	0.0173	0.0188**	0.0199**
		(0.0171)	(0.0222)	(0.0157)	(0.0199)	(0.0095)	(0.0100)
$SIZE_{i,t}$	+	0.0021	0.0076	-0.0039	0.0117	0.0493***	0.0467***
		(0.0092)	(0.0148)	(0.0072)	(0.0163)	(0.0042)	(0.0044)
$LIQUIDITY_{i,t}$	-/+	0.0386	0.0483	0.0059***	0.0052***	-0.0156	-0.0063
		(0.0346)	(0.0418)	(0.0020)	(0.0016)	(0.0194)	(0.0181)
$ASSETMAT_{i,t}$	+	0.0031*	0.0023	0.0017	0.0026	0.0029***	0.0011
		(0.0019)	(0.0031)	(0.0015)	(0.0018)	(0.0009)	(0.0012)
$QUALITY_{i,t}$	-	0.0239	0.0151	-0.0320	-0.0011	-0.1909	-0.1678
		(0.0364)	(0.0162)	(0.1086)	(0.0552)	(0.1608)	(0.1266)
EARNINGS $VOL_{i,t}$	-	0.0101**	0.0091*	-0.0008	-0.0001	-0.0027	-0.0024
		(0.0047)	(0.0054)	(0.0014)	(0.0012)	(0.0021)	(0.003)
EQUITY PREMIUM	-/+	-0.0001	0.0000	-0.0005	-0.0002	0.0006***	0.0006***
		(0.0004)	(0.0004)	(0.0005)	(0.0004)	(0.0002)	(0.0002)
TERM-STRUCTR	+	-0.0061	-0.0067	0.0054	0.0032	0.0044***	0.0059***
		(0.0049)	(0.0047)	(0.0044)	(0.0040)	(0.0017)	(0.0017)
SHARE PRICE	+	0.0182	0.0291	0.0502*	0.0277	0.0219*	0.0186
		(0.0228)	(0.0214)	(0.0293)	(0.0239)	(0.0133)	(0.0140)
INTEREST VOL	+	-0.0003	0.0092	0.0233	0.0353	-0.0284**	-0.0326**
		(0.0135)	(0.0127)	(0.0465)	(0.0403)	(0.0144)	(0.0146)

These results are based on the models in Table 6.8. See notes in Table 6.8.

Table 6.9 shows the static long-run relationship between debt maturity and firm-specific factors based on specific and general dynamic specification (see equation [6.1]) with reference to Table 6.8. The GMM estimates for the long-run model are obtained using the following general equation. The implications of these long-run relationships will be discussed in depth in the next sections.

$$Maturity^{*}_{it} = \left(\frac{\beta_2+\beta_3}{1-\beta_1}\right)Leverage^{*}_{it} + \left(\frac{\beta_4+\beta_5}{1-\beta_1}\right)Tax\,Rate^{*}_{it} + \left(\frac{\beta_6+\beta_7}{1-\beta_1}\right)Market\ to\ Book^{*}_{it} +$$
$$\left(\frac{\beta_8+\beta_9}{1-\beta_1}\right)Firm\ Size^{*}_{it} + \left(\frac{\beta_{10}+\beta_{11}}{1-\beta_1}\right)Liquidity^{*}_{it} + \left(\frac{\beta_{12}+\beta_{13}}{1-\beta_1}\right)Asset\ Maturity^{*}_{it} +$$
$$\left(\frac{\beta_{14}+\beta_{15}}{1-\beta_1}\right)Firm\ Quality^{*}_{it} + \left(\frac{\beta_{16}+\beta_{17}}{1-\beta_1}\right)Earnings\ Volatility^{*}_{it} + \left(\frac{\beta_{18}+\beta_{19}}{1-\beta_1}\right)Market\ Equity\,\Pr emium^{*}_{it} +$$
$$\left(\frac{\beta_{20}+\beta_{21}}{1-\beta_1}\right)Term\ Structure^{*}_{it} + \left(\frac{\beta_{22}+\beta_{23}}{1-\beta_1}\right)Share\,\Pr ice\,Change^{*}_{it} + \left(\frac{\beta_{24}+\beta_{25}}{1-\beta_1}\right)Interest\ Rate\ Volatility^{*}_{it} \quad (6.5)$$

6.4.2.4.1. Lagged Maturity

Our model captures the dynamics in firms' debt maturity decisions as the lagged-maturity coefficient is significantly positive at 1% level and less than unity for all cases in Table 6.8. It implies the presence of costly and non-instantaneous adjustment process towards target maturity structure[147]. (Firms may not immediately change their maturity structure, which indicates the presence of adjustment costs). Thus, our proposed model for dynamic debt maturity structure is shown to be relevant with these results.

With respect to the adjustment speed (θ=1-[coefficient of lagged-maturity], see equation [6.4]), with the highest adjustment coefficients French firms are the quickest ones in adjusting themselves to desired debt maturity structure. This is consistent with the idea that time dimension constructs a very important variable explaining the evolution of firms' debt ratios in France (Kremp et al. [1999]). It seems the adjustment process is relatively very costly and slow in the UK, where the adjustment coefficient is lowest. It can also be argued that the cost of not being on the targeted (equilibrium) debt ratio is insignificant for UK firms. Thus, it may not be very important for UK firms to adjust quickly their maturity structure. Germany seems to be the middle case in this adjustment process. Overall, the results seem to reveal that the dynamic debt maturity structure implied by our model is not rejected as firms tend to trade-off between transaction costs of being on-target and disequilibrium costs of being off-target.

6.4.2.4.2. Leverage

The results in Table 6.9 reveal that the association of leverage with maturity is significantly positive in all countries[148]. This is in line with the idea that firms with higher

[147] Mitchell [1993], Schiantarelli and Srivastava [1997], Schiantarelli and Sembenelli [1997], Newberry and Novack [1999], and Ozkan [2000] also report significantly positive lagged maturity coefficient.

[148] Cai et al. [1999], Kim et al. [1995], Schiantarelli and Srivastava [1997] and Stohs and Mauer [1996] find the same association. However, Mitchell [1993], Dennis et al. [2000], and Barclay et al. [2002] find an

debt-ratios attempt to control bankruptcy risk and costs, and delay a crisis at maturity by lengthening debt maturity. (Boot and Frankfurter [1972], Morris [1976b], Morris [1992]). Higher leverage increases the liquidation probability, thus, issuing long-term debt becomes more advantageous. High leverage can be a proxy for lack of growth opportunities such that few growth options imply less severe agency problems between debtholders and shareholders; thus more debt with longer maturity. (Schiantarelli and Sembenelli [1997]).

Thus, the results are inconsistent with the monitoring hypothesis that higher leverage causes higher monitoring costs and shorter maturity accelerates the frequency of creditors audit. In addition, tax-bankruptcy (signalling) arguments implying negative (no) relationship between leverage and maturity are not confirmed.

6.4.2.4.3. Effective Tax Rate

The results concerning the relation between tax rate and maturity differ across countries. The estimated coefficient of effective tax rate in Table 6.9 is statistically insignificant in the UK[149]. This may be due to the fact that unlike in France and Germany reported accounting income is not affected by tax considerations in the UK where financial accounting and tax accounting are separated. We detect a significantly positive tax coefficient in Germany ('specific' case in Table 6.9). Newberry and Novack [1999], and Ozkan [2000] report the same type of association. This is not in line with the trade-off hypothesis that firms increase their debt maturity as tax benefits decline such that remaining benefits are not less than amortised flotation costs. This positive impact is consistent with tax clientele argument that firms with high marginal tax rates and with ability to use interest tax shields effectively tend to issue long-term debt in current and future periods[150]. This finding may be due to relatively high rates in German tax system creating potential tax shields. It may also imply that lenders are not concerned about the possibility that the relatively high required rate of return for long-term debt causes firms to shift to risky projects. This story is consistent with the idea that corporate governance system in Germany is designed to mitigate agency costs.

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inverse causation. Our reported results are based on book-leverage. The alternative measurement, market-leverage, did not change the quality of results.

[149] It is also argued by Lewis [1990], and reported by Guedes and Opler [1996], Dennis et al. [2000] and Ozkan [2002] that taxes have no impact on maturity policies.

[150] Gordon and Lee [2001] report that corporate tax rates have positive influence on both short-term and long-term debt but their effect is found to be 50% higher on the use of the former. This might be due to the flexibility of short-term debt in adjusting to annual changes in tax rates.

On the other hand, the same coefficient is insignificant in France. In fact, it is known that potential tax benefits are prone to diminish under French tax system due to declining tax rates. This in turn reduces the importance of tax considerations while deciding debt maturity structure.

6.4.2.4.4. Market-to-book ratio

It is revealed in Table 6.9 that market-to-book ratio and debt maturity are significantly positively correlated in the UK. In the literature[151], consistent with Myers' [1977] argument that shortening debt maturity mitigates underinvestment problems, mostly a significantly negative association between growth opportunities and maturity is reported. However, our results do not confirm contracting-cost hypothesis and the argument that firms with greater information asymmetries issue less long-term debt. Similarly, Stohs and Mauer [1996] find no evidence for the agency cost hypothesis as the estimated market-to-book ratio coefficient is either insignificant or significantly positive[152]. Consequently, our results for the UK confirm the liquidity risk argument that firms can avoid inefficient liquidation of their risky growth opportunities by issuing long-term debt. Another reason for this positive impact could be that high growth firms face substantial hold-up problems and thus choose long-term debt.

The non-negative and insignificant market-to-book ratio coefficient in Germany, according to Myers [1977], should imply the insignificance of suboptimal investment concerns. This may be due to Chan-Lau's [2001] argument that the advantages of a specific corporate governance system are not necessarily related to information asymmetries; apart from mitigating the shareholders-managers conflicts, bank-oriented systems may also curtail underinvestment problems. Furthermore, Bah and Dumontier [2001] document that R&D-intensive (growth) firms in Europe and the USA use significantly higher levels of short-term debt due to underinvestment risks. They do not

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[151] See, e.g., Barclay and Smith [1995], Datta and Iskandar-Datta [2000], Dennis et al. [2000], Guedes and Opler [1996], Özkan [2000]).

[152] Barclay and Smith [1995] find market-to-book ratio and maturity to be significantly inversely related by omitting leverage from the model and thus implicitly assuming the endogeneity of leverage. However, Stohs and Mauer [1996] assume leverage is exogenous and find a significantly positive relationship between maturity and leverage, and insignificant estimate of market-to-book ratio variable in the cross-section regression. Later Barclay et al. [2002] use 2SLS estimation including leverage and again report significantly negative association of maturity with leverage and market-to-book ratio. Dennis et al. [2000] show ignoring endogeneity substantially biases the results: Assuming endogeneity of leverage and contract terms, they find both leverage and market-to-book ratio are significantly negatively related to maturity, as in Barclay and Smith. If they ignore the endogeneity, leverage (market-to-book ratio) and maturity are reported to be significantly (insignificantly) positively (negatively) correlated. After excluding leverage from the model in our country-samples, the downward bias in the estimate of market-to-book ratio is confirmed for France and Germany but not for the UK.

find any differences among firms in UK, France, Germany in this respect but imply negative relationship between maturity and growth. However, our results show that the relationship between maturity and growth opportunities varies across countries.

Dennis et al. [2000] argue that reducing leverage is a substitute for pledging collateral to control agency problems, which increases debt maturity as agency problems are curtailed. We do not find supportive evidence for this idea as we obtain that maturity is positively associated with market-to-book ratio in the UK and positively associated with leverage in all countries.

6.4.2.4.5. Firm Size

The results in Table 6.9 show that firm size has no significant impact on firms' debt maturity decisions in France and in Germany[153]. This is an uncommon finding as there is no study in the literature reporting insignificant estimate of size coefficient. It should be emphasised that no study has examined the determinants of debt maturity structure of French and German firms. Thus, this insignificance may be due to the country-specific factors that should be focused on. For instance, this finding is in line with the conventional wisdom that indirect bankruptcy costs (implicit in firm size) are less in Germanic and Latinic economies than in Anglo-Saxon economies due to corporate ownership structure and long-run relationship between firms and external financiers in the former[154]. On the other hand, confirming the above argument we find that firm size and debt maturity are significantly and positively associated at 1% level in the UK. This is a very common finding in the literature[155]. This commonality may be due to the fact that mostly US firms are examined in empirical debt maturity studies and it is known that financial and institutional environments in the US and UK are similar. This finding confirms the arguments related to affordable transaction costs, easy access to capital markets, lower information asymmetries, reputational considerations, and weak incentive problems, which are all relevant for larger firms to be able to issue long-term debt.

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[153] The results are based on firm size measured by total sales. Alternative size measurement by total assets did not change the quality of results.

[154] In fact, the proportion of long-term credit to total credit in the corporate sector is 78%, 73%, 50% in Germany, France and the UK, respectively (Borio [1996]).

[155] See, e.g., Barclay and Smith [1995], Dennis et al. [2000], Özkan [2000], Stohs and Mauer [1996]. On the other hand, Guedes and Opler [1996], Scherr and Hulburt [2001] are two exceptions who find significantly negatively relationship between size and maturity. This may be due to the liquidity risk argument that higher bankruptcy probability (lower firm size) is associated with longer debt maturity.

6.4.2.4.6. Liquidity

The association between debt maturity and liquidity is insignificant in France and in the UK (Table 6.9). However, the same association is significantly positive at 1% level in Germany. Morris [1992] and Schiantarelli and Srivastava [1997] also find a direct effect of liquidity on maturity. It may be that German firms with longer maturity hold greater liquidity in case they will not be able to meet the fixed payments of long-term debt during economic recessions (shortage problem). It is also known that bankruptcy costs, probability of being liquidated once entered the lengthy insolvency procedure are relatively high in Germany. This would motivate German firms to be liquid if they decide to issue long-term debt since healthier balance sheet conditions could improve the access to long-term finance. This motivation may also come from the German banks who are capable of reducing the financial distress costs via close control and monitoring of management. Likewise, the insignificant liquidity coefficient in France may be due to the underlying philosophy of French bankruptcy laws, which is the rehabilitation of firms through reorganisation rather than liquidation. This will make French firms have relatively low incentives to be liquid while borrowing long-term.

Although insignificant, negative liquidity coefficient in the UK may imply that, due to liquidity risk of short-term debt, firms may be asked by short-term financiers (e.g., banks) to hold compensating liquid balances (Schiantarelli and Sembenelli [1997]). More plausibly, as liquidity is promoted in market-oriented economies UK firms may have better opportunities to avoid liquidity risk than their counterparts. With the same token, this also implies that German firms who might have liquidity problems do not necessarily get immediate help from the banks.

6.4.2.4.7. Asset Maturity

It is known as a stylised fact that firms match their debt maturities to asset maturities (the immunisation hypothesis). Except Dennis et al. [2000], all other empirical studies report a significantly positive relationship between asset maturity and debt maturity. We have been able to find the same association for the UK firms (Table 6.9, 'general' specification). This finding is in line with the idea that firms match the maturities of their liabilities and assets as a hedging policy, in part to control underinvestment and bankruptcy problems.

However, asset maturity has no significant impact on debt maturity decisions in Germany and the asset maturity coefficient is significantly positive only at 10 % in France. This finding confirms Claessens et al.'s [1999] argument that there is a mismatch between the maturity structure of assets and liabilities in civil law countries. The estimated coefficients of non-negative market-to-book ratio and insignificant asset maturity variables in Germany may imply the absence of underinvestment problems. Concentrated share-ownership and firms' close relationship with their financiers in Germany may be driving forces to mitigate such agency problems. Furthermore, Goswami [2000] shows that costs of adverse selection may induce some mismatching of debt maturity and asset maturity in the presence of significant transaction costs.

6.4.2.4.8. Firm Quality

Barclay and Smith [1995], Stohs and Mauer [1996] and Scherr and Hulburt [2001] find that firm quality and maturity are significantly and negatively correlated, which supports the signalling hypothesis that high-quality firms with expected superior future earnings issue short-term debt[156]. In this case, positive information effect outweighs the liquidity risk. However, like Dennis et al. [2000], we find little support for the signalling hypothesis in Germany and in the UK as the coefficients of quality variable are only insignificantly negative (Table 6.9). Further support to the signalling hypothesis is due to the negative relation between maturity and current quality variable in the UK, which is significant at 10% in the short-run model (Table 6.8). In addition, the association of debt maturity with firm quality is positive but insignificant in France. No theory predicts a positive relationship and only Schiantarelli and Sembenelli [1997] report a significantly positive effect of firm quality (but proxied by cash flow) on debt maturity. One possible explanation to this non-negative association can be Diamond's [1993] contention that short-term debt may cause inefficient liquidation and thus good firms may prefer a combination of short- and long-term debt due to liquidity risk. Another one may be due to Diamond [1991b] who proposes a *non-monotonic* relationship between debt maturity and firm quality such that only medium-rated firms issue long-term debt, and very low-rated and highly-rated firms choose short-term debt[157]. If these explanations are not satisfactory, then, country-specific factors may partially be responsible for such a

[156] However, Barclay and Smith argue that firm quality tends to be unstable overtime: signalling hypothesis is relevant especially for time-series analysis; thus, may not be well captured by cross-sectional analysis.

[157] The prediction of reverse-U shape relation between quality and maturity gets strong empirical support from Stohs and Mauer [1996]. To test this prediction, we used SQUARED-QUALITY variable, which takes the square of QUALITY variable. To retain the original sign, it is multiplied by (-1) if QUALITY<0. It is expected that maturity is positively correlated with QUALITY and negatively correlated with SQUARED-QUALITY such that maturity increases as firm quality deteriorate at a decreasing rate. The regression results show that for France the coefficients have expected signs but they are insignificant, for

relation. Ball et al. [2000] argue that asymmetric information is more likely to be resolved in code-law countries than in common-law countries due to firms' close relations with major stakeholders. The insignificant quality coefficients in Germany and France may partially be explained by this view.

6.4.2.4.9. Earnings Volatility

Our results in Table 6.9 show that earnings volatility has no significant influence upon debt maturity decisions for German and UK firms. The insignificant but negative estimated coefficients of earnings volatility in these countries give only limited support to the theory. Cai et al. [1999] also report insignificant and negative coefficients. Contrary to the theory's prediction and empirical findings of Dennis et al. [2000] and Ozkan [2002], debt maturity and earnings volatility are significantly and positively correlated in France. One possible explanation could be that firms with more volatile earnings prefer to issue long-term debt due to liquidation concerns. Consequently, the theory fails to explain the positive relationship in France. This may lead us to conclude that theories should also consider, e.g., the corporate governance systems of countries in order to produce more comprehensive propositions.

6.4.2.4.10. Control (Market-related) Variables

Equity Premium

The results in Table 6.9 show that the association of debt maturity with equity premium is country dependent. The relationship between debt maturity and market equity premium is insignificant in France and Germany. This finding implies that debt markets and equity markets do not seem to be integrated. On the other hand, there is a significantly positive correlation between equity premium and debt maturity. Thus, UK firms tend to issue long-term debt if equity premium is high. As discussed in Baker et al. [2001], this can be managers' attempt to minimise the cost of capital in an environment where debt and equity markets are integrated. This is parallel to the argument that returns on equity and debt markets move together (Fama and French [1989]).

Term Structure of Interest Rates

Table 6.9 results provide no support for the tax hypothesis of Brick and Ravid in France and Germany as the estimated coefficient of term-structure variable is insignificantly different from zero[158]. On the other hand, the coefficient estimate on term-structure

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Germany and the UK the coefficients are insignificant with unexpected signs. Since including SQUARED-QUALITY in the model did not change the results for other variables, we do not report them.

[158] Cai et al. [1999], Kim et al. [1995], and Stohs and Mauer [1996] also find an insignificant term-structure coefficient.

variable is positive and significant at 1 % in the UK. This lends strong support to the tax hypothesis that debt maturity is positively related to the slope of the term-structure[159]. It implies that UK firms issue more long-term debt when the slope of term-structure is positive in order to accelerate the tax benefits of debt. Hence, French and German firms do not seem to give importance to these tax considerations while deciding the debt maturity structure.

Share Price Performance

We find that the association of debt maturity with share price performance is not uniform across countries. In France, any change in stock prices does not seem to affect the debt maturity decisions. Guedes and Opler [1996] also report that past stock price runup and the maturity of new debt issues are not significantly correlated. However, the same relationship is positive and significant at 10% in Germany and in the UK under 'general' specification in (Table 6.9). This positive impact confirms the asymmetric information models (see Lucas and McDonald [1990]) that firms issue informationally disadvantaged securities (long-term debt) after the rise in their share prices.

Interest Rate Volatility

Table 6.9 findings reveal that debt maturity structure is not affected by interest rate volatility in France and Germany as the relevant coefficients are insignificant, which is consistent with the empirical finding of Guedes and Opler [1996]. This is not in line with the theory which predicts a significantly positive relation[160]. On the other hand, the association of debt maturity with interest rate volatility is significantly negative in the UK. Thus, UK firms tend to shorten their debt maturity if interest rates are volatile. This negative finding is inconsistent with the positive findings of Kim et al. [1995] and Dennis et al. [2000].

In general, it appears that the market-related factors have significant impact on debt maturity decisions in the UK but not in other sample countries.

6.4.2.5. GMM Estimates of Static Models

In this section, the results for a static debt maturity model are presented in Table 6.10 assuming that target debt maturity is instantaneously adjusted as a reaction to random

[159] The same association is found by Newberry and Novack [1999], and Dennis et al. [2000]. However, our finding for the UK is not in line with the findings of Barclay and Smith [1995], and Guedes and Opler [1996], who report significantly negative term-structure coefficients.

[160] The tax-timing option theory argues that an increase in interest rate volatility reduces the present value of the tax shields from short-term debt financing while the present value of the tax shields from long-term debt financing does not change, assuming a convex corporate tax function. In this case, issuing long-term debt would be advantageous.

changes in the business and firms' conditions. In other words, it is assumed that there is no lag in adjustment process toward an optimal debt maturity structure.

It is especially noteworthy to discuss the results of static models for the UK in Table 6.10, which are different from the results in Table 6.9 in some cases. As predicted by the signalling hypothesis, firm quality now exerts strongly negative influence on debt maturity as the coefficient is significant at 1%. The tax rate and liquidity variables have significantly positive coefficients, which were insignificant in Table 6.9. However, market-to-book ratio and share price performance coefficients have become insignificant, which were significant in Table 6.9. The results for the remaining variables are the same in both tables. The significant variables in static models for France are tax rate and share price performance, which were insignificant in Table 6.9. As for Germany, the findings of static debt maturity structure generally support the results of dynamic models.

Table 6.10: Static debt maturity structure using GMM-SYS estimations.

Independent Variables	Predicted Sign	Dependent Variable: MATURITY$_{i,t}$ FRANCE	GERMANY	UK
LEVERAGE$_{i,t}$	-/+	0.2184**	0.0514	0.2778***
		(0.1107)	(0.1006)	(0.0836)
TAXRATE$_{i,t}$	-/+	-0.0458**	0.0280*	-0.0386*
		(0.0222)	(0.0162)	(0.0215)
MKT-TO-BOOK$_{i,t}$	-/+	-0.0073	-0.0021	0.0085
		(0.0147)	(0.0127)	(0.0055)
SIZE$_{i,t}$	+	0.0142	0.0149	0.0776***
		(0.0118)	(0.0135)	(0.0067)
LIQUIDITY$_{i,t}$	-/+	0.0330	0.0033**	0.0356**
		(0.0345)	(0.0013)	(0.0174)
ASSETMAT$_{i,t}$	+	0.0012	0.0007	0.0012**
		(0.0024)	(0.0015)	(0.0006)
QUALITY$_{i,t}$	-	0.0108	-0.0165	-0.1817***
		(0.0075)	(0.0305)	(0.0681)
EARNINGS VOL$_{i,t}$	-	0.0000	0.0003	0.0001
		(0.0002)	(0.0006)	(0.0008)
EQUITY PREMIUM	-/+	-0.0003	-0.0007*	0.0007***
		(0.0004)	(0.0004)	(0.0002)
TERM-STRUCTR	+	-0.0023	-0.0012	0.0043***
		(0.004)	(0.0028)	(0.0009)
SHARE PRICE	+	0.0362*	0.0829***	0.0067
		(0.0214)	(0.0321)	(0.0134)
INTEREST VOL	+	0.0061	-0.0345	0.0148**
		(0.0075)	(0.0264)	(0.0074)
Constant		0.2264	0.3800*	-0.3671***
		(0.1862)	(0.1969)	(0.0861)
Correlation1		-5.292***	-7.627***	-17.16***
Correlation2		0.0501	0.8470	-6.614***
Sargan Test (df)		239.9 (340)	257.5 (267)	409.8 (451)
Wald Test-1 (df)		28.51 (12)***	21.43 (12)**	251.4 (12)***
Wald Test-2 (df)		61.54 (15)***	45.92 (14)***	115.3 (15)***
R^2		0.0783	0.0463	0.1310
Firms / Observations		283 / 2322	458 / 3894	2152 / 28113
Estimation Period		1985-1999	1989-1999	1971-1999

See notes in Table 6.8.

It emerges that the corresponding coefficients of determination (R^2) and Wald Test-1 (joint significance) statistics of the dynamic models in Table 6.8 are much higher than that of static models in every case in Table 6.10. It shows the success and explanatory power of dynamic models relative to static ones. In general, the findings in both tables do not contradict each other in a way that if a coefficient is significantly positive in one case; it is not significantly negative in other case. Consequently, these findings can be a verification of appropriateness of dynamic models using GMM in debt maturity structure studies.

6.4.2.6. GMM Estimates based on Size classification

This section investigates the size-specific behaviour of firms while deciding maturity of debt by focusing on the long-run implication of the models. Size classification is useful to reduce the heterogeneity bias and hence to improve the precision of results. It is known that GMM estimates are valid especially for large samples. However, the results based on reduced sample size due to size classification are still robust as they are corrected for small sample bias using Windmeijer [2000] procedure. As a general note for specification tests, all Correlation and Sargan tests strongly confirm that the models in all countries are correctly specified.

Size classification results reveal the presence of adjustment process toward target debt maturity irrespective of country and size specification. Jalilvand and Harris [1984] report that large firms tend to adjust faster to the target long-term debt level than do small firms. In our sample, this is confirmed only for Germany (Table 6.13, 'specific' case) as large firms have the highest adjustment coefficient. For the UK (Table 6.15), we detect the reverse case as large firms have the lowest and small firms have the highest adjustment coefficients. There is a non-monotonous order for the French sample (Table 6.11) such that small firms have the highest and medium firms have the lowest adjustment coefficients.

The size-classification results for France show that significantly positive relation between maturity and leverage in Table 6.9 seems to be driven by small firms. It implies that liquidation concerns are substantial especially for small firms in France. The coefficient estimate of tax variable is insignificant across size groups, which may be due to French tax system stressing the retention of earnings via reduced tax rates, which ends up with reduced tax shields. Similarly, the impact of firm quality on maturity seems to be insignificant across size classes, except in the short-run model for medium firms in which the coefficient of current quality variable is significantly positive. The results with respect to the long run effects of market-to-book ratio on maturity in 'general' case are interesting. The positive effects of growth opportunities for the full sample in Table 6.9 appear to be driven by again small firms. However, the association of maturity with market-to-book ratio is significantly negative for large firms, which implies the possibility of suboptimal investment policies due to agency costs. As a result, large French firms issue short-term debt to mitigate underinvestment problems. Furthermore, liquidity ratios exert significantly positive impact debt maturity across all size classes especially small firms. In Table 6.8 for the full sample, we reported the same direction but size classification seems to reduce heterogeneity bias as it yields significant estimated coefficients in Table 6.12. The stylised fact of maturity matching principle is confirmed only by medium-sized French firms with the significantly positive asset maturity coefficient. The relationship between earnings volatility and maturity is significantly positive for small and medium firms but insignificant for large firms. Another discernible pattern is that the association of maturity with share price performance is significant and positive only for large firms. Finally, the remaining market-related factors, i.e., interest rate volatility, term structure of interest rates and equity premium, have no significant influence on maturity decisions of any of the size classes.

We report the long-run regression results for size classification for Germany in Table 6.14. The results with respect to leverage, tax rate, asset maturity, earnings volatility and interest rate volatility variables do not change across size classes and they have all insignificant coefficients. However, the findings of short-run models in Table 6.13 show that maturity is significantly and positively associated with lagged-leverage and current asset maturity variable only for medium firms. On the other hand, as predicted by the theory, market-to-book ratio is significant and negative only for medium firms (under 'specific' case in Table 6.14). It seems that large German firms, with the insignificant coefficient of liquidity variable, dot not consider the liquidity risk as an important concern. On the other hand, it is the medium and especially small firms who hold greater liquidity against the possible shortage problems, which otherwise might cause them to be in an insolvency situation. As found in France, only medium-sized German firms tend to match the maturity of their assets and liabilities. Contrary to what theory expects, firm quality seems to directly affect debt maturity decisions of only medium firms. It is again only for medium firms in which debt maturity and equity premium are significantly and negatively correlated. As predicted by the theory, the relationship between term-structure and debt maturity is significantly positive for medium firms. Finally, similar to the case in France, only for large firms is there significant and positive relationship between debt maturity and share price performance.

In Table 6.16, long-run size classification results for the UK are reported. The association of maturity with leverage is insignificant only for medium firms and significantly positive for small and large firms confirming the results in Table 6.9. Surprisingly, term-structure and share price performance variables do not play any significant role in debt maturity decisions across different size classes. The coefficients of both variables were significantly positive for the full sample case in Table 6.9. It seems that liquidity risk argument related to growth opportunities is pertinent for medium UK firms as the coefficient estimate of the market-to-book ratio variable is significant and positive only in this category. The tax clientele argument receives some support from the significantly positive relationship between tax rate and maturity for large firms. It seems apparent that all size classes of UK firms match their debt maturities with asset maturities as the asset maturity coefficient is significantly positive in all cases. Furthermore, it is only for large firms where debt maturity is significantly and positively associated with tax rate and liquidity ratio. The same associations were not significant for the full sample case in Table 6.9. Another success of size classification is due to the significantly negative correlation between debt maturity and earnings volatility for large firms, which is predicted by the theory. In the full sample, the coefficient estimate of earnings volatility variable was insignificant. Consistent with the signalling theory, debt maturity and firm quality are significantly and negatively correlated only for small firms ('general' case in Table 6.16). Finally, confirming the findings in the full sample, the association of debt maturity is significantly positive with equity premium and significantly negative with interest rate volatility for large firms.

In brief, the reported results based on the different firm size categories in our sample countries show that the implications of estimations in full sample and that of in size classification are not uniform. Thus, we capture some notable results which are attributable to only specific size groups. For instance, only medium-sized firms in France and Germany seem to apply maturity-matching principle. On the other hand, it seems that the results of size classification especially in the UK generally support our findings in the full sample. Hence, size classification results do not tend to be inconsistent with the full sample results and they give useful insights into our analysis.

Table 6.11: Dynamic corporate debt maturity structure in France: Size Classification.

Independent Variables	Predicted Sign	Dependent Variable: $MATURITY_{i,t}$ General Small	General Medium	General Large	Specific Small	Specific Medium	Specific Large
$MATURITY_{i,t-1}$	+	0.2462**	0.4367***	0.4247***	0.2467**	0.4940***	0.4136***
		(0.1159)	(0.1139)	(0.0983)	(0.1151)	(0.1146)	(0.0851)
$LEVERAGE_{i,t}$	-/+	0.3922*	0.0007	0.1384	0.4938***	-0.0658	0.2802
		(0.2060)	(0.1950)	(0.2899)	(0.1732)	(0.1848)	(0.1899)
$LEVERAGE_{i,t-1}$		0.1752	0.0129	0.0327	-	-	-
		(0.1816)	(0.1674)	(0.2348)	-	-	-
$TAXRATE_{i,t}$	-/+	0.0041	-0.0015	-0.0007	-0.0001	0.0078	0.0002
		(0.0178)	(0.0312)	(0.0348)	(0.0172)	(0.037)	(0.0372)
$TAXRATE_{i,t-1}$		0.0170	-0.0086	0.0021	-	-	-
		(0.0279)	(0.0142)	(0.0119)	-	-	-
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	-0.0398	0.0217	-0.0172	-0.0326	0.0127	-0.0175
		(0.0384)	(0.0172)	(0.0323)	(0.0386)	(0.0121)	(0.0288)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		0.0824**	0.0013	-0.0303	0.0729*	-	-
		(0.0410)	(0.016)	(0.0335)	(0.0395)	-	-
$LIQUIDITY_{i,t}$	-/+	0.0462**	0.2173***	0.2003**	0.0463**	0.2079***	0.2264***
		(0.0206)	(0.0493)	(0.0875)	(0.0210)	(0.0509)	(0.0821)
$LIQUIDITY_{i,t-1}$		0.0223**	-0.1476***	-0.1333*	0.0217**	-0.1539***	-0.1218*
		(0.0096)	(0.0479)	(0.0703)	(0.0094)	(0.0460)	(0.0676)
$ASSETMAT_{i,t}$	+	0.0022	0.0076**	0.0042	0.0024	0.0076**	0.0021
		(0.0023)	(0.0037)	(0.0043)	(0.0022)	(0.0035)	(0.0022)
$ASSETMAT_{it-1}$		-0.0046*	-0.0001	-0.0020	-0.0043*	-	-
		(0.0026)	(0.0032)	(0.0026)	(0.0024)	-	-
$QUALITY_{i.t}$	-	-0.0019	0.0299	0.0224	-0.0122	0.0524*	0.0226
		(0.0280)	(0.0392)	(0.0366)	(0.0258)	(0.0307)	(0.0231)
$QUALITY_{i.t-1}$		0.0113	-0.0062	-0.0039	-	-	-
		(0.0282)	(0.0390)	(0.0178)	-	-	-
$EARNINGS\ VOL_{i,t}$	-	0.0043	0.0193**	0.0058	0.0054	0.0141*	0.0095
		(0.0042)	(0.0077)	(0.0071)	(0.0040)	(0.0082)	(0.0078)
$EARNINGS\ VOL_{i,t-1}$		0.0196**	0.0052*	0.0000	0.0189**	0.0040	-
		(0.0079)	(0.0031)	(0.0002)	(0.0076)	(0.0035)	-
EQUITY PREMIUM	-/+	0.0005	0.0000	-0.0003	0.0003	0.0000	-0.0005
		(0.0011)	(0.0004)	(0.0004)	(0.0010)	(0.0004)	(0.0004)
TERM-STRUCTR	+	0.0118	-0.005	0.0029	0.0111	-0.0054	0.0022
		(0.0085)	(0.0037)	(0.0038)	(0.0085)	(0.0042)	(0.0039)
ΔSHARE PRICE	+	0.0256	-0.0031	0.0283*	0.0238	0.0009	0.0329**
		(0.0354)	(0.0197)	(0.0168)	(0.0351)	(0.0212)	(0.0159)
INTEREST VOL	+	0.0238	-0.0026	-0.0013	0.0220	-0.0012	0.0043
		(0.0288)	(0.0110)	(0.0082)	(0.0280)	(0.0129)	(0.0081)
Constant		0.0256	-0.0648	0.1911*	0.0493	-0.0212	0.1074
		(0.0948)	(0.1156)	(0.1113)	(0.0957)	(0.1469)	(0.1183)
Correlation1		-2.861***	-3.791***	-4.211***	-2.873***	-3.811***	-4.697***
Correlation2		1.305	0.7235	0.9091	1.352	0.9774	1.180
Sargan Test (df)		398.4 (535)	60.87 (535)	85.14 (535)	401 (535)	73.05 (535)	95.12 (543)
Wald Test-1 (df)		90.77 (19)***	208.9 (19)***	77.51 (19)***	72.51 (16)***	114.5 (14)***	59.80 (13)**
Wald Test-2 (df)		54.62 (13)***	24.35 (14)**	34.23 (13)***	57.42 (13)***	14.79 (14)	29.49 (14)**
R^2		0.4319	0.5802	0.5485	0.4286	0.6115	0.5492
Firms / Observations		41 / 228	98 / 722	110 / 1155	41 / 228	98 / 722	112 / 1227
Estimation Period		1986-1999	1986-1999	1986-1999	1986-1999	1986-1999	1985-1999

The firms were sorted according to average total sales. See also notes in Table 6.8.

Table 6.12: Size classification for debt maturity in France: Static Long-run Relationship

Independent Variables	Predicted Sign	General			Specific		
		Small	*Medium*	*Large*	*Small*	*Medium*	*Large*
$LEVERAGE_{i,t}$	-/+	0.7527***	0.0243	0.2973	0.6554***	-0.1300	0.4779
		(0.2465)	(0.2459)	(0.2488)	(0.2277)	(0.3624)	(0.3199)
$TAXRATE_{i,t}$	-/+	0.0279	-0.0180	0.0025	-0.0001	0.0155	0.0003
		(0.0553)	(0.0674)	(0.0738)	(0.0229)	(0.0716)	(0.0635)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	0.0566**	0.0410	-0.0825**	0.0534**	0.0252	-0.0298
		(0.0246)	(0.0267)	(0.0395)	(0.0249)	(0.0240)	(0.0491)
$LIQUIDITY_{i,t}$	-/+	0.0910***	0.1236**	0.1165	0.0903***	0.1067*	0.1784**
		(0.0342)	(0.0543)	(0.0851)	(0.034)	(0.0599)	(0.0712)
$ASSETMAT_{i,t}$	+	-0.0032	0.0134***	0.0037	-0.0025	0.0150**	0.0035
		(0.0031)	(0.0038)	(0.0046)	(0.0030)	(0.0073)	(0.0038)
$QUALITY_{i,t}$	-	0.0125	0.0421	0.0321	-0.0162	0.1036	0.0385
		(0.0602)	(0.1000)	(0.0928)	(0.0345)	(0.0657)	(0.0398)
$EARNINGS\ VOL_{i,t}$	-	0.0317**	0.0436***	0.0101	0.0322**	0.0339*	0.0162
		(0.0125)	(0.0159)	(0.0125)	(0.0126)	(0.0193)	(0.0133)
EQUITY PREMIUM	-/+	0.0006	0.0000	-0.0006	0.0004	0.0001	-0.0008
		(0.0014)	(0.0007)	(0.0007)	(0.0014)	(0.0008)	(0.0006)
TERM-STRUCTR	+	0.0157	-0.0088	0.0051	0.0147	-0.0107	0.0037
		(0.0107)	(0.0065)	(0.0069)	(0.0107)	(0.0080)	(0.0067)
SHARE PRICE	+	0.0340	-0.0055	0.0493*	0.0316	0.0017	0.0561*
		(0.0468)	(0.0349)	(0.0296)	(0.0463)	(0.0419)	(0.0286)
INTEREST VOL	+	0.0315	-0.0047	-0.0022	0.0292	-0.0024	0.0074
		(0.0392)	(0.0199)	(0.0142)	(0.0379)	(0.0256)	(0.0138)

Table 6.13: Dynamic corporate debt maturity structure in Germany: Size Classification.

		Dependent Variable: $MATURITY_{i,t}$					
Independent Variables	Predicted Sign	**General**			**Specific**		
		Small	*Medium*	*Large*	*Small*	*Medium*	*Large*
$MATURITY_{i,t-1}$	+	0.4427***	0.4786***	0.4538***	0.4810***	0.4586***	0.4153***
		(0.0787)	(0.0730)	(0.0662)	(0.0622)	(0.0673)	(0.0605)
$LEVERAGE_{i,t}$	-/+	0.0241	-0.1992	-0.0466	0.0949	-0.2748	0.0939
		(0.1856)	(0.1955)	(0.2494)	(0.0906)	(0.1968)	(0.1338)
$LEVERAGE_{i,t-1}$		0.1031	0.2793*	0.1478	-	0.3026*	-
		(0.1362)	(0.1694)	(0.2029)	-	(0.1779)	-
$TAXRATE_{i,t}$	-/+	0.0057	0.0064	-0.0098	0.0000	0.0114	0.0068
		(0.0139)	(0.0088)	(0.0097)	(0.0150)	(0.0117)	(0.0188)
$TAXRATE_{i,t-1}$		0.0066	-0.0021	-0.0066	-	-	-
		(0.0080)	(0.0058)	(0.0053)	-	-	-
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	0.0129	-0.0674	0.0156	-0.0065	-0.0615*	0.0046
		(0.0236)	(0.0518)	(0.0184)	(0.0177)	(0.0337)	(0.0268)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		-0.0197	0.0328	-0.0141	-	-	-
		(0.0181)	(0.0389)	(0.0150)	-	-	-
$LIQUIDITY_{i,t}$	-/+	0.0022**	0.0170*	0.0066	0.0030***	0.0093	0.0132
		(0.0009)	(0.0088)	(0.0295)	(0.0007)	(0.0067)	(0.0181)
$LIQUIDITY_{i,t-1}$		0.0004	0.0012	-0.0033	-	-	-
		(0.0005)	(0.0071)	(0.0178)	-	-	-
$ASSETMAT_{i,t}$	+	0.0004	0.0041***	0.0008	-0.0001	0.0045***	0.0029
		(0.0007)	(0.0014)	(0.0032)	(0.0008)	(0.0014)	(0.0024)
$ASSETMAT_{it-1}$		-0.0002	-0.0023**	0.0013	-	-0.0024**	-
		(0.0008)	(0.0011)	(0.0024)	-	(0.0011)	-
$QUALITY_{i,t}$	-	0.0289	0.0367	0.0036	0.0026	0.0712*	-0.0281
		(0.0577)	(0.0430)	(0.0418)	(0.0318)	(0.0396)	(0.0317)
$QUALITY_{i,t-1}$		0.0158	-0.0220	-0.0006	-	-	-
		(0.0482)	(0.0267)	(0.0557)	-	-	-
$EARNINGS\ VOL_{i,t}$	-	-0.0006	-0.0004	-0.0044	-0.0004	-0.0006	-0.0025
		(0.0006)	(0.0006)	(0.0073)	(0.0004)	(0.0008)	(0.0046)
$EARNINGS\ VOL_{i,t-1}$		-0.0001	0.0002	-0.0001	-	-	-
		(0.0002)	(0.0003)	(0.0020)	-	-	-
EQUITY PREMIUM	-/+	0.0000	-0.0009*	0.0000	0.0002	-0.0011**	-0.0003
		(0.0007)	(0.0005)	(0.0004)	(0.0006)	(0.0005)	(0.0003)
TERM-STRUCTR	+	0.0029	0.0075	0.0041	0.0019	0.0055	0.0019
		(0.0064)	(0.0047)	(0.0033)	(0.0052)	(0.0048)	(0.0029)
SHARE PRICE	+	0.0346	0.0226	0.0378*	0.0361	0.0318	0.0329*
		(0.0327)	(0.0208)	(0.0199)	(0.0312)	(0.0206)	(0.0198)
INTEREST VOL	+	0.0328	0.0423	-0.0145	0.0664	0.0140	-0.0267
		(0.0614)	(0.0446)	(0.0316)	(0.0522)	(0.0401)	(0.0326)
Constant		0.3749	0.3113***	0.2499***	0.2883*	0.3969***	0.2685***
		(0.2460)	(0.0804)	(0.0636)	(0.1496)	(0.0924)	(0.0644)
Correlation1		-4.442***	-5.250***	-5.462***	-4.595***	-5.394***	-5.692***
Correlation2		0.3719	-0.0799	0.4559	0.3815	-0.0635	0.1742
Sargan Test (df)		84.45 (239)	132 (239)	145.6 (263)	97.90 (247)	139.3 (247)	158.8 (271)
Wald Test-1 (df)		195.8 (19)***	212.4 (19)***	121.1 (19)***	129.3 (12)***	112.8 (14)***	72.48 (12)**
Wald Test-2 (df)		39.71 (14)***	52.41 (14)***	32.42 (14)***	39.95 (14)***	36.26 (14)***	38.09 (14)**
R^2		0.4904	0.4985	0.4580	0.4996	0.4748	0.4317
Firms / Observations		115 / 895	159 / 1189	181 / 1535	118 / 931	160 / 1221	181 / 1666
Estimation Period		1990-1999	1990-1999	1990-1999	1990-1999	1989-1999	1989-1999

The firms were sorted according to average total sales. See also notes in Table 6.8.

Table 6.14: Size classification for debt maturity in Germany: Static Long-run Relationship

Independent Variables	Predicted Sign	General			Specific		
		Small	*Medium*	*Large*	*Small*	*Medium*	*Large*
$LEVERAGE_{i,t}$	-/+	0.2282	0.1535	0.1852	0.1828	0.0515	0.1605
		(0.1651)	(0.1229)	(0.1798)	(0.1756)	(0.1218)	(0.2276)
$TAXRATE_{i,t}$	-/+	0.0221	0.0083	-0.0301	0.0000	0.0211	0.0116
		(0.0299)	(0.0245)	(0.0231)	(0.0290)	(0.0218)	(0.0319)
MKT-TO-$BOOK_{i,t}$	-/+	-0.0122	-0.0665	0.0027	-0.0126	-0.1136*	0.0078
		(0.0229)	(0.0439)	(0.0417)	(0.0339)	(0.0616)	(0.0459)
$LIQUIDITY_{i,t}$	-/+	0.0047***	0.0350***	0.0061	0.0058***	0.0172	0.0225
		(0.0017)	(0.0122)	(0.0279)	(0.0014)	(0.0124)	(0.0312)
$ASSETMAT_{i,t}$	+	0.0005	0.0033	0.0039	-0.0002	0.0039	0.0050
		(0.0017)	(0.0027)	(0.0041)	(0.0015)	(0.0024)	(0.0041)
$QUALITY_{i,t}$	-	0.0801	0.0282	0.0055	0.0050	0.1316*	-0.0480
		(0.1732)	(0.1270)	(0.1700)	(0.0611)	(0.0788)	(0.0543)
EARNINGS $VOL_{i,t}$	-	-0.0013	-0.0003	-0.0082	-0.0009	-0.0011	-0.0043
		(0.0013)	(0.0013)	(0.0150)	(0.0007)	(0.0014)	(0.0079)
EQUITY PREMIUM	-/+	0.0000	-0.0015	0.0000	0.0004	-0.0020**	-0.0005
		(0.0013)	(0.0010)	(0.0007)	(0.0011)	(0.0009)	(0.0006)
TERM-STRUCTR	+	0.0052	0.0145*	0.0076	0.0037	0.0101	0.0033
		(0.0116)	(0.0086)	(0.0061)	(0.0101)	(0.0089)	(0.0051)
ΔSHARE PRICE	+	0.0621	0.0433	0.0692*	0.0695	0.0587	0.0563*
		(0.0594)	(0.0388)	(0.0365)	(0.0604)	(0.0365)	(0.0332)
INTEREST VOL	+	0.0589	0.0812	-0.0266	0.1280	0.0259	-0.0456
		(0.1098)	(0.0841)	(0.0578)	(0.1011)	(0.0740)	(0.0556)

Table 6.15: Dynamic corporate debt maturity structure in the UK: Size Classification.

		Dependent Variable: $MATURITY_{i,t}$					
Independent Variables	Predicted Sign	**General**			**Specific**		
		Small	*Medium*	*Large*	*Small*	*Medium*	*Large*
$MATURITY_{i,t-1}$	+	0.6634***	0.6235***	0.7406***	0.6600***	0.6274***	0.7385***
		(0.0373)	(0.0368)	(0.0356)	(0.0384)	(0.0361)	(0.0359)
$LEVERAGE_{i,t}$	-/+	0.0301	-0.0943	0.1000	0.0375	-0.1253	0.1680**
		(0.1166)	(0.1243)	(0.1394)	(0.1212)	(0.1229)	(0.0689)
$LEVERAGE_{i,t-1}$		0.1586**	0.1811**	0.0960	0.1549**	0.1879**	-
		(0.0669)	(0.0865)	(0.0941)	(0.068)	(0.0851)	-
$TAXRATE_{i,t}$	-/+	0.0131	-0.0073	0.0371**	0.0161	-0.0081	0.0381**
		(0.0156)	(0.0091)	(0.0188)	(0.0160)	(0.0096)	(0.0195)
$TAXRATE_{i,t-1}$		-0.0054	-0.0005	0.0072	-	-	-
		(0.0096)	(0.0049)	(0.0073)	-	-	-
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	0.0051	0.0164	-0.0028	0.0044	0.0206*	0.0019
		(0.0033)	(0.0115)	(0.0083)	(0.0033)	(0.0110)	(0.006)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		0.0000	0.0038	0.0089	-	-	-
		(0.0017)	(0.0067)	(0.0066)	-	-	-
$LIQUIDITY_{i,t}$	-/+	0.0158*	0.1289***	0.2449***	0.0121*	0.1265***	0.2481***
		(0.0082)	(0.0373)	(0.0371)	(0.0074)	(0.0374)	(0.0337)
$LIQUIDITY_{i,t-1}$		-0.0155**	-0.1192***	-0.2140***	-0.0104**	-0.1207***	-0.2196***
		(0.0063)	(0.0275)	(0.0295)	(0.0051)	(0.0271)	(0.0271)
$ASSETMAT_{i,t}$	+	0.0008**	0.0008	0.0025**	0.0006**	0.0009*	0.0026**
		(0.0004)	(0.0013)	(0.0010)	(0.0003)	(0.0006)	(0.0011)
$ASSETMAT_{it-1}$		0.0001	0.0003	-0.0015*	-	-	-0.0015*
		(0.0003)	(0.0010)	(0.0008)	-	-	(0.0008)
$QUALITY_{i,t}$	-	-0.1306**	-0.0971*	0.0137	-0.1223	-0.0789	0.0095
		(0.0670)	(0.0516)	(0.0580)	(0.0810)	(0.0611)	(0.0660)
$QUALITY_{i,t-1}$		-0.0351	-0.0080	0.0201	-	-	-
		(0.0343)	(0.0241)	(0.0327)	-	-	-
$EARNINGS\ VOL_{i,t}$	-	-0.0005	0.0003	-0.0004	-0.0005	0.0002	-0.0003
		(0.0006)	(0.0007)	(0.0003)	(0.0006)	(0.0009)	(0.0003)
$EARNINGS\ VOL_{i,t-1}$		0.0000	0.0003	-0.0010**	-	-	-0.0010**
		(0.0002)	(0.0004)	(0.0005)	-	-	(0.0005)
EQUITY PREMIUM	-/+	0.0001	0.0001	0.0003***	0.0001	0.0002	0.0003***
		(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)
TERM-STRUCTR	+	-0.0007	0.0017	0.0008	-0.0007	0.0016	0.0010
		(0.0014)	(0.0011)	(0.0008)	(0.0014)	(0.001)	(0.0008)
SHARE PRICE	+	0.0087	0.0024	-0.0039	0.0088	0.0002	-0.0025
		(0.0086)	(0.0071)	(0.0067)	(0.0087)	(0.0072)	(0.0073)
INTEREST VOL	+	-0.0150	-0.0073	-0.0137**	-0.0118	-0.0085	-0.0142**
		(0.0123)	(0.0088)	(0.0063)	(0.0123)	(0.0083)	(0.0064)
Constant		0.0925***	0.1133***	0.0371	0.0975***	0.1200***	0.0548*
		(0.0358)	(0.0363)	(0.0295)	(0.0353)	(0.0377)	(0.0305)
Correlation1		-10.29***	-11.17***	-13.63***	-10.52***	-11.34***	-13.62***
Correlation2		-0.1795	1.029	3.968***	-0.0800	1.034	3.958***
Sargan Test (df)		411 (454)	466.9 (455)	492.6 (439)**	420.7 (454)	454.7 (455)	494.1 (439)*
Wald Test-1 (df)		619.4 (19)***	732.2 (19)***	1337***	509.8 (14)***	614.9 (14)***	938.7 (15)**
Wald Test-2 (df)		31.74 (15)***	41 (15)***	30.99 (15)***	40.51 (15)***	36.02 (15)***	32.15 (15)**
R^2		0.5662	0.5731	0.6482	0.5541	0.5704	0.6487
Firms / Observations		558 / 4891	693 / 8938	732 / 11987	621 / 5318	729 / 9456	732 / 11988
Estimation Period		1972-1999	1972-1999	1972-1999	1971-1999	1971-1999	1972-1999

The firms were sorted according to average total sales. See also notes in Table 6.8.

Table 6.16: Size classification for debt maturity in the UK: Static Long-run Relationship

Independent Variables	Predicted Sign	General			Specific		
		Small	*Medium*	*Large*	*Small*	*Medium*	*Large*
$LEVERAGE_{i,t}$	-/+	0.5606***	0.2307	0.7555***	0.5658***	0.1681	0.6422***
		(0.1935)	(0.1646)	(0.2205)	(0.1966)	(0.1569)	(0.2465)
$TAXRATE_{i,t}$	-/+	0.0229	-0.0207	0.1708*	0.0475	-0.0217	0.1455*
		(0.0553)	(0.0295)	(0.0985)	(0.0469)	(0.0254)	(0.0757)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	0.0150	0.0537***	0.0238	0.0129	0.0554*	0.0073
		(0.0107)	(0.0242)	(0.0179)	(0.0098)	(0.0298)	(0.0229)
$LIQUIDITY_{i,t}$	-/+	0.0010	0.0258	0.1193**	0.0050	0.0154	0.1087**
		(0.0165)	(0.0416)	(0.0484)	(0.0160)	(0.0410)	(0.0466)
$ASSETMAT_{i,t}$	+	0.0028***	0.0031***	0.0041***	0.0018**	0.0025*	0.0041***
		(0.0008)	(0.0012)	(0.0015)	(0.0008)	(0.0015)	(0.0016)
$QUALITY_{i,t}$	-	-0.4923*	-0.2791	0.1303	-0.3597	-0.2116	0.0362
		(0.2974)	(0.1830)	(0.3336)	(0.2500)	(0.1637)	(0.2523)
EARNINGS $VOL_{i,t}$	-	-0.0015	0.0015	-0.0054***	-0.0016	0.0005	-0.0053***
		(0.0020)	(0.0024)	(0.0021)	(0.0019)	(0.0024)	(0.0020)
EQUITY PREMIUM	-/+	0.0002	0.0004	0.0013***	0.0002	0.0005	0.0013***
		(0.0005)	(0.0004)	(0.0004)	(0.0005)	(0.0003)	(0.0004)
TERM-STRUCTR	+	-0.0019	0.0044	0.0030	-0.0021	0.0042	0.0038
		(0.0042)	(0.0028)	(0.0031)	(0.0041)	(0.0027)	(0.0030)
SHARE PRICE	+	0.0258	0.0065	-0.0150	0.0260	0.0004	-0.0095
		(0.0256)	(0.0187)	(0.0261)	(0.0256)	(0.0194)	(0.0282)
INTEREST VOL	+	-0.0447	-0.0193	-0.0528**	-0.0348	-0.0228	-0.0542**
		(0.0364)	(0.0233)	(0.0254)	(0.0360)	(0.0222)	(0.0258)

6.4.2.7. GMM Estimates based on Industry classification

It is obvious that the firms in manufacturing and service sectors have some differences with respect to their asset structure and the degree of vulnerability to the changes in financial markets. Goswami et al. [1995] argue that industries in which the cash flows are serially independent should issue mainly short-term debt. Some firms may want to keep their debt levels around the industry debt level. It is known that short-term debt mitigates insider agency problems. However, Kanatas and Qi [2001] argue that as refinancing depends on the new information about the firms' performance supplied by managers, such information required by lenders may be manipulated. Furthermore, short-term debt usage could also be an opportunity for rival firms in the same industry to take advantage of refinancing needs of the firms by taking hostile actions. Emery [2001] argues that firms' debt maturity choice depends also on the type of their investments and operations. Guedes and Opler [1996] find that firms in industries with more volatile earnings (service sector, in our case) tend to issue less long-term debt. Furthermore, regulated industries have lower growth opportunities and less management discretion, and thus are expected to use less short-term debt.

Therefore, further systematic differences may be detected by dividing the full sample into two industry groups; manufacturing and service sectors. In this section, we will focus on the long-run relationships between debt maturity and firm-specific factors in terms of the industry classification in France, Germany and the UK (Table 6.19) [161]. Before that, the regression results for short-run models (Tables 6.17 and 6.18) indicate the existence of target debt maturity structure as the coefficient of lagged-maturity is statistically significant at 1% in all cases. With respect to the adjustment speed, German and UK companies in service sector reveal the higher speed of adjustment toward desired maturity level than the ones in manufacturing sector. However, it is the manufacturing firms which have higher adjustment coefficients than service firms in France.

In Table 6.19, the long-run results in France with respect to tax rate, firm-quality, size and equity premium variables do not vary according to industry classification and they are in line with the full sample results (all being insignificant). On the other hand, significantly positive association of debt maturity with leverage and earnings volatility variables for the full sample appears to be caused by manufacturing firms. Another pattern for manufacturing firms is that while the relationship between market-to-book ratio and maturity is significantly positive for manufacturing firms (Table 6.19, panel-b), it is insignificant for service firms. Thus, it is essential for French manufacturing firms to avoid inefficient liquidation of their promising growth prospects by issuing long-term debt. Moreover, the maturity matching principle is marginally confirmed only by manufacturing companies as the asset maturity coefficient is positive and significant at 10% (Table 6.19, panel-a). One important thing with the industry classification is that the insignificant coefficient of the liquidity variable for the full sample has turned out to be significant for service firms (Table 6.19, panel-b). There is a significantly negative relationship between term-structure and debt maturity for manufacturing firms (Table 6.19, panel-b). This is inconsistent with the theory and may be explained by the argument that the managers tend to avoid the term premium in long-term interest rate by timing the debt market. Another success of industry classification in France is the significantly positive association of debt maturity with share price performance and its significantly negative association with interest rate volatility for manufacturing firms. These two variables were insignificant in the full sample estimations.

[161] Correlation and Sargan tests in Tables 6.14 and 6.15 show that all models are correctly specified.

As for the industry classification findings for Germany in Table 6.19, the estimated long-run coefficients of market-to-book ratio, size, asset maturity, quality, earnings volatility, equity premium and interest rate volatility variables are all insignificant for both industries. However, the results with respect to these variables concerning the short-run models in Tables 6.17 and 6.18 reveal a slightly different picture. For instance, debt maturity is significantly and positively associated with current market-to-book ratio and with current asset maturity variables for manufacturing firms. Furthermore, debt maturity is significantly and positively associated with current asset maturity and with past earnings volatility variables for service firms. The significantly positive association of debt maturity with leverage and tax rate for the full sample in Table 6.9 is revealed to be caused by manufacturing firms in Table 6.19. These firms are also responsible for the significantly positive association of maturity with liquidity ratio in the full sample results. This may imply the concerns about the liquidity risk and liquidation of profitable growth opportunities for manufacturing firms. Although we could not find any significant relationship between debt maturity and term-structure, Table 6.19 results show that this association is significantly positive, as predicted by the tax theory, for service firms only. Finally, significantly positive relationship between debt maturity and share price performance for the full sample seems to be driven by service firms in Table 6.19.

The long-run equilibrium results for the UK in Table 6.19 suggest that debt maturity decisions are uniform for both industry classes for the following variables which have significantly positive coefficients confirming the full sample results: Leverage, size, asset maturity, equity premium and term structure. Furthermore, the long-run coefficients of tax rate, quality and earnings volatility are all insignificant for both industry classes. Among these three, only the coefficient of lagged earnings volatility variable is significant and negative for manufacturing firms, as predicted by the theory. On the other hand, there are some differences across industry classes with respect to several variables. Market-to-book ratio seems to have positive effect on the maturity of debt only for manufacturing firms. An interesting finding is due to the significantly negative relationship between debt maturity and liquidity ratio for service firms only. This finding is consistent with the theory of Myers and Rajan [1998]. It may also be due to the argument that high liquidity enables firms to issue more short-term debt. Lastly, share price performance and interest rate volatility appear to be relevant only for manufacturing firms while deciding their debt maturity as the estimated coefficients are significant positive and significantly negative, respectively.

In general, the findings in France and in the UK tend to show that industry categorisation supports the main findings in the full sample (Table 6.9) without significant variation across industry classes. However, in Germany, there seems to be a strong relationship between the debt maturity strategies and the characteristics of particularly manufacturing firms. Overall, the results based on industry classification are not inconsistent with the ones based on full sample estimations.

Table 6.17: Dynamic corporate debt maturity structure: Industry Classification (General).

		Dependent Variable:	$MATURITY_{i,t}$				
Independent Variables	Predicted Sign	FRANCE		GERMANY		UK	
		Manufact.	*Service*	*Manufact.*	*Service*	*Manufact.*	*Service*
$MATURITY_{i,t-1}$	+	0.4862***	0.5292***	0.5397***	0.5125***	0.6590***	0.6002***
		(0.0539)	(0.1256)	(0.0433)	(0.1084)	(0.0306)	(0.0417)
$LEVERAGE_{i,t}$	-/+	-0.1050	0.0770	0.0553	0.0669	-0.2996**	0.0502
		(0.1090)	(0.3566)	(0.1505)	(0.2589)	(0.1261)	(0.1419)
$LEVERAGE_{i,t-1}$		0.2455***	-0.0901	0.0815	0.0254	0.3903***	0.1359
		(0.0867)	(0.2791)	(0.1201)	(0.2692)	(0.0774)	(0.0878)
$TAXRATE_{i,t}$	-/+	-0.0191	-0.0234	0.0016	0.0127	-0.0108	0.0316
		(0.0206)	(0.0343)	(0.0063)	(0.0144)	(0.0184)	(0.0197)
$TAXRATE_{i,t-1}$		-0.0010	0.0014	0.0017	-0.0091	-0.0068	0.0087
		(0.0123)	(0.0151)	(0.0033)	(0.0114)	(0.0067)	(0.0065)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-/+	0.0096	-0.0111	0.0403*	0.0090	0.0077	0.0033
		(0.0253)	(0.0227)	(0.023)	(0.0176)	(0.0048)	(0.0047)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		0.0059	0.0001	-0.0307*	-0.0188	0.0002	0.0019
		(0.0294)	(0.027)	(0.0182)	(0.0154)	(0.0032)	(0.0024)
$SIZE_{i,t}$	+	0.0148	0.0625	-0.0239	0.0666	-0.0059	-0.0030
		(0.0269)	(0.0508)	(0.0263)	(0.0658)	(0.0246)	(0.0352)
$SIZE_{i,t-1}$		-0.0175	-0.0687	0.0229	-0.0701	0.0238	0.0217
		(0.0259)	(0.0512)	(0.026)	(0.0633)	(0.0238)	(0.0339)
$LIQUIDITY_{i,t}$	-/+	0.0278	0.1897**	0.0031***	0.0092	0.0242	0.0325**
		(0.0259)	(0.0753)	(0.001)	(0.0107)	(0.0189)	(0.0143)
$LIQUIDITY_{i,t-1}$		-0.0150	-0.1450**	-0.0005	-0.0024	-0.0312**	-0.0487***
		(0.0141)	(0.0711)	(0.0007)	(0.0071)	(0.0129)	(0.0173)
$ASSETMAT_{i,t}$	+	0.0038*	0.0035	0.0015**	0.0077*	0.0010	0.0010
		(0.002)	(0.0047)	(0.0008)	(0.0046)	(0.0009)	(0.0008)
$ASSETMAT_{it-1}$		-0.0020	0.0002	-0.0004	-0.0032	-0.0001	0.0004
		(0.0020)	(0.0027)	(0.0005)	(0.0034)	(0.0006)	(0.0006)
$QUALITY_{i,t}$	-	0.0211	0.1926	-0.0042	0.0266	-0.0377	-0.0501
		(0.0152)	(0.1298)	(0.029)	(0.0637)	(0.0460)	(0.0833)
$QUALITY_{i,t-1}$		-0.0045	0.1072	-0.0172	-0.0079	0.0058	0.0133
		(0.0076)	(0.1023)	(0.0224)	(0.0768)	(0.0248)	(0.0337)
$EARNINGS\ VOL_{i,t}$	-	0.0046	0.0000	-0.0004	-0.0002	-0.0006	-0.0020
		(0.0035)	(0.0034)	(0.0006)	(0.0009)	(0.0008)	(0.0025)
$EARNINGS\ VOL_{i,t-1}$		0.0048	0.0002	0.0000	0.0007*	-0.0006*	0.0008
		(0.0037)	(0.0002)	(0.0002)	(0.0004)	(0.0003)	(0.0006)
EQUITY PREMIUM	-/+	-0.0002	0.0003	-0.0002	-0.0003	0.0002*	0.00026*
		(0.0003)	(0.0005)	(0.0003)	(0.0006)	(0.0001)	(0.00013)
TERM-STRUCTR	+	-0.0053	-0.0008	0.0024	0.0094	0.0016**	0.0018*
		(0.0034)	(0.0051)	(0.0027)	(0.0066)	(0.0008)	(0.0011)
ΔSHARE PRICE	+	0.0259*	-0.0482	0.0188	0.0587*	0.0087	0.0152
		(0.0148)	(0.0303)	(0.016)	(0.0361)	(0.0057)	(0.0094)
INTEREST VOL	+	-0.0126*	0.0161	0.0137	0.0125	-0.0113*	-0.0137
		(0.0073)	(0.0159)	(0.0228)	(0.0619)	(0.0064)	(0.0090)
Correlation1		-5.919***	-2.751***	-7.835***	-4.594***	-15.05***	-11.61***
Correlation2		1.352	0.8306	0.7300	-0.0947	2.100**	1.263
Sargan Test (df)		147.5 (602)	52.63 (377)	265 (269)	63.14 (296)	594 (512)***	414.2 (397)
Wald Test-1 (df)		215.5 (21)***	157.7 (21)***	296.8 (21)***	160.3 (21)***	2748 (21)***	1563 (21)***
R^2		0.5158	0.5491	0.4818	0.4602	0.6024	0.5771
Firms / Observations		170 / 1443	79 / 661	361 / 2903	88 / 680	1174 / 16864	807 / 8923
Estimation Period		1986-1999	1986-1999	1990-1999	1990-1999	1972-1999	1972-1999

See notes in Table 6.1 for variable definitions and notes in Table 6.8 for test statistics. The industries were classified as manufacturing (sectors 1-8, 14) and service (sectors 9-13, 15). See Appendix for industry classification of sectors.

Table 6.18: Dynamic corporate debt maturity structure: Industry Classification (Specific).

Independent Variables	Predicted Sign	Dependent Variable:	MATURITY$_{i,t}$				
		FRANCE		GERMANY		UK	
		Manufact.	*Service*	*Manufact.*	*Service*	*Manufact.*	*Service*
MATURITY$_{i,t-1}$	+	0.4319***	0.4718***	0.4753***	0.4555***	0.6570***	0.6123***
		(0.0448)	(0.1116)	(0.0391)	(0.0796)	(0.0302)	(0.0442)
LEVERAGE$_{i,t}$	-/+	-0.2084**	0.0271	0.0361	0.2049	-0.2493**	0.1396*
		(0.1058)	(0.1067)	(0.0774)	(0.1670)	(0.1199)	(0.0825)
LEVERAGE$_{i,t-1}$		0.3466***	-	-	-	0.3614***	-
		(0.0915)	-	-	-	(0.0759)	-
TAXRATE$_{i,t}$	-/+	-0.0090	-0.0341	0.0241*	0.0093	-0.0025	0.0289
		(0.0183)	(0.0233)	(0.0139)	(0.0171)	(0.0187)	(0.0200)
TAXRATE$_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
MKT-TO-BOOK$_{i,t}$	-/+	0.0231*	-0.0019	0.0316*	0.0011	0.0062	0.0012
		(0.0135)	(0.0128)	(0.0183)	(0.0187)	(0.0039)	(0.0048)
MKT-TO-BOOK$_{i,t-1}$		-	-	-0.0184	-	-	-
		-	-	(0.0141)	-	-	-
SIZE$_{i,t}$	+	0.0029	0.0087	0.0079	0.0262	0.0276***	0.0162**
		(0.0092)	(0.0101)	(0.0083)	(0.0218)	(0.0049)	(0.0072)
SIZE$_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
LIQUIDITY$_{i,t}$	-/+	0.0210	0.2387***	0.0026***	0.0196	0.0236**	0.0249*
		(0.0248)	(0.0608)	(0.0009)	(0.0132)	(0.0179)	(0.014)
LIQUIDITY$_{i,t-1}$		-	-0.1488***	-	-	-0.0293	-0.0370**
		-	(0.0537)	-	-	(0.0133)	(0.0175)
ASSETMAT$_{i,t}$	+	0.0022	0.0030	0.0011	0.0055	-0.0006	0.0012***
		(0.0017)	(0.0029)	(0.0009)	(0.0044)	(0.0009)	(0.0004)
ASSETMAT$_{it-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
QUALITY$_{i,t}$	-	0.0104	0.0359	-0.0131	-0.0738	0.0448	-0.0512
		(0.0095)	(0.1002)	(0.0284)	(0.0570)	(0.0607)	(0.0882)
QUALITY$_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
EARNINGS VOL$_{i,t}$	-	0.0027	0.0050	-0.0001	-0.0007	-0.0008	-0.0020
		(0.0035)	(0.004)	(0.0005)	(0.0011)	(0.0009)	(0.0024)
EARNINGS VOL$_{i,t-1}$		-	-	-	0.0008**	-0.0006*	-
		-	-	-	(0.0004)	(0.0003)	-
EQUITY PREMIUM	-/+	0.0000	0.0006	-0.0001	0.0002	0.0001	0.00026**
		(0.0003)	(0.0005)	(0.0003)	(0.0006)	(0.0001)	(0.00013)
TERM-STRUCTR	+	-0.0066**	0.0002	0.0012	0.0133**	0.0014*	0.0021**
		(0.0033)	(0.0041)	(0.0026)	(0.0058)	(0.0008)	(0.0010)
ΔSHARE PRICE	+	0.0167	-0.0242	0.0054	0.0494	0.0090*	0.0104
		(0.0141)	(0.0265)	(0.0147)	(0.0353)	(0.0054)	(0.0085)
INTEREST VOL	+	-0.0061	0.0225	0.0206	0.0280	-0.0120*	-0.0128
		(0.0076)	(0.0153)	(0.0232)	(0.0705)	(0.0063)	(0.0087)
Correlation1		-6.098***	-3.017***	-8.035***	-4.771***	-15.12***	-11.50***
Correlation2		1.229	0.7101	0.6711	-0.2095	1.990*	1.333
Sargan Test (df)		172.3 (611)	84.32 (386)	287 (278)	76.57 (296)	580.8 (512)**	406.9 (397)
Wald Test-1 (df)		161.5 (14)***	110.8 (14)***	203.5 (14)***	76.69 (14)***	1402 (16)***	473.4 (14)**
R^2		0.4693	0.5236	0.4367	0.4061	0.5973	0.5700
Firms / Observations		187 / 1579	96 / 738	367 / 3096	88 / 700	1174 / 16876	880 / 9565
Estimation Period		1985-1999	1985-1999	1989-1999	1990-1999	1972-1999	1971-1999

See notes in Table 6.1 for variable definitions and notes in Table 6.8 for test statistics. The industries were classified as manufacturing (sectors 1-8, 14) and service (sectors 9-13, 15). See Appendix for industry classification of sectors.

Table 6.19: Long run relationship for debt maturity: Industry Classification.

a) **General**: Dependent Variable: MATURITY$_{i,t}$

Independent Variables	Predicted Sign	FRANCE *Manufact.*	FRANCE *Service*	GERMANY *Manufact.*	GERMANY *Service*	UK *Manufact.*	UK *Service*
LEVERAGE$_{i,t}$	-/+	0.2736	-0.0279	0.2972***	0.1893	0.2660	0.4654**
		(0.1825)	(0.3597)	(0.1076)	(0.2836)	(0.1784)	(0.1848)
TAXRATE$_{i,t}$	-/+	-0.0392	-0.0468	0.0071	0.0073	-0.0518	0.1008
		(0.0568)	(0.0980)	(0.0176)	(0.0395)	(0.0659)	(0.0636)
MKT-TO-BOOK$_{i,t}$	-/+	0.0301	-0.0232	0.0210	-0.0201	0.0232*	0.0130
		(0.0207)	(0.0397)	(0.0194)	(0.0145)	(0.0141)	(0.0126)
SIZE$_{i,t}$	+	-0.0052	-0.0133	-0.0024	-0.0074	0.0525***	0.0466***
		(0.0124)	(0.0275)	(0.0079)	(0.0204)	(0.0055)	(0.0070)
LIQUIDITY$_{i,t}$	-/+	0.0249	0.0950	0.0057**	0.0140	-0.0203	-0.0405**
		(0.0317)	(0.0656)	(0.0025)	(0.0242)	(0.0362)	(0.0177)
ASSETMAT$_{i,t}$	+	0.0034*	0.0079	0.0025	0.0091	0.0025*	0.0034***
		(0.0020)	(0.0058)	(0.0016)	(0.0068)	(0.0015)	(0.0007)
QUALITY$_{i,t}$	-	0.0324	0.6367	-0.0465	0.0384	-0.0935	-0.0922
		(0.0422)	(0.4791)	(0.1061)	(0.2710)	(0.1972)	(0.2673)
EARNINGS VOL$_{i,t}$	-	0.0182*	0.0004	-0.0008	0.0010	-0.0036	-0.0031
		(0.0111)	(0.0068)	(0.0015)	(0.0020)	(0.0029)	(0.0071)
EQUITY PREMIUM	-/+	-0.0003	0.0006	-0.0003	-0.0005	0.0005*	0.0007**
		(0.0006)	(0.0010)	(0.0006)	(0.0013)	(0.0003)	(0.0003)
TERM-STRUCTR	+	-0.0103	-0.0016	0.0051	0.0193	0.0046**	0.0045*
		(0.0068)	(0.0108)	(0.0058)	(0.0129)	(0.0023)	(0.0026)
ΔSHARE PRICE	+	0.0504*	-0.1024	0.0409	0.1204*	0.0256	0.0379
		(0.0279)	(0.0683)	(0.0345)	(0.0697)	(0.0168)	(0.0236)
INTEREST VOL	+	-0.0245*	0.0343	0.0299	0.0256	-0.0330*	-0.0342
		(0.0149)	(0.0358)	(0.0492)	(0.1283)	(0.0190)	(0.0227)

b) **Specific**: Dependent Variable: MATURITY$_{i,t}$

Independent Variables	Predicted Sign	FRANCE *Manufact.*	FRANCE *Service*	GERMANY *Manufact.*	GERMANY *Service*	UK *Manufact.*	UK *Service*
LEVERAGE$_{i,t}$	-/+	0.2431*	0.0512	0.0689	0.3764	0.3266*	0.3600*
		(0.1448)	(0.2022)	(0.1477)	(0.3036)	(0.1691)	(0.2120)
TAXRATE$_{i,t}$	-/+	-0.0158	-0.0646	0.0460*	0.0171	-0.0073	0.0745
		(0.0322)	(0.0438)	(0.0268)	(0.0312)	(0.0545)	(0.0527)
MKT-TO-BOOK$_{i,t}$	-/+	0.0406*	-0.0037	0.0250	0.0019	0.0180	0.0031
		(0.0241)	(0.0240)	(0.0192)	(0.0344)	(0.0114)	(0.0122)
SIZE$_{i,t}$	+	0.0051	0.0166	0.0151	0.0482	0.0805***	0.0418**
		(0.0162)	(0.0194)	(0.0158)	(0.0411)	(0.0129)	(0.0169)
LIQUIDITY$_{i,t}$	-/+	0.0370	0.1703***	0.0050***	0.0361	-0.0164	-0.0311*
		(0.0437)	(0.0427)	(0.0018)	(0.0244)	(0.034)	(0.0165)
ASSETMAT$_{i,t}$	+	0.0039	0.0056	0.0020	0.0101	-0.0017	0.0032***
		(0.0031)	(0.0049)	(0.0017)	(0.0079)	(0.0028)	(0.0010)
QUALITY$_{i,t}$	-	0.0183	0.0680	-0.0249	-0.1356	0.1306	-0.1320
		(0.0166)	(0.1915)	(0.0543)	(0.1028)	(0.1769)	(0.2291)
EARNINGS VOL$_{i,t}$	-	0.0048	0.0094	-0.0002	0.0003	-0.0042	-0.0052
		(0.0063)	(0.0081)	(0.0010)	(0.0023)	(0.0029)	(0.0060)
EQUITY PREMIUM	-/+	0.0001	0.0011	-0.0002	0.0003	0.0004	0.0007*
		(0.0005)	(0.0008)	(0.0005)	(0.0012)	(0.0003)	(0.0004)
TERM-STRUCTR	+	-0.0116*	0.0004	0.0022	0.0244**	0.0041*	0.0053**
		(0.0061)	(0.0078)	(0.0049)	(0.0105)	(0.0022)	(0.0027)
ΔSHARE PRICE	+	0.0294	-0.0457	0.0103	0.0907	0.0263*	0.0269
		(0.0248)	(0.052)	(0.0278)	(0.0641)	(0.0159)	(0.0218)
INTEREST VOL	+	-0.0107	0.0427	0.0393	0.0513	-0.0349*	-0.0331
		(0.0136)	(0.0305)	(0.0442)	(0.1299)	(0.0186)	(0.0229)

These results are based on the models in Table 6.17 (panel-a) and on Table 6.18 (panel-b). See notes in Tables 6.17 and 6.18.

6.5. CONCLUSION

The main focus of this chapter has been to investigate the variations in debt maturity decisions of firms across European countries. The empirical evidence based on the GMM results discovers that the degree and type of association of debt maturity with firms-specific factors are not separated from the corporations' financial and economic environment in which they are operating. The results in all countries with respect to the dynamics in firms' debt maturity decisions imply that there is an adjustment process towards target debt maturity structure. The significantly positive coefficient estimates of lagged-maturity variable suggest that this adjustment process is costly and the adjustment speed is highest in France in terms of responding to the new circumstances.

This study identifies several firm-specific and market-related factors responsible for the corporate debt maturity decisions. First, a significantly positive association between leverage and maturity is found in all countries, which may be due to liquidation concerns of firms. Second, the results with respect to the relation between tax rate and maturity differ across countries, which may be due to different taxation systems. We find that taxes have no significant impact on debt maturity decisions of UK firms. However, the tax clientele argument is confirmed in Germany with the significantly positive effect of tax rate on maturity. In addition, the negative but insignificant association of maturity with tax rates in France partially supports the trade-off hypothesis. Third, market-to-book ratio is found to be significantly and positively correlated with debt maturity in the UK, which confirms the liquidity risk arguments. This variable does not exert any significant effect on debt maturity in France and Germany. Thus, the contracting-cost hypothesis is rejected as it predicts negative relationship between debt maturity and market-to-book ratio. Instead, the liquidity risk hypothesis is confirmed, i.e., firms issue long-term debt to avoid inefficient liquidation of their risky growth opportunities. Our finding for Germany supports the idea that bank-based systems may curtail underinvestment problems. Fourth, firm size and debt maturity are insignificantly associated in France and Germany but significantly and positively associated in the UK. This may suggest that indirect bankruptcy costs, incentive problems and information asymmetries are less in Germanic and Latinic economies than in Anglo-Saxon economies due to corporate ownership structure and long-run relationship between firms and external financiers. Fifth, there is no significant relationship between liquidity and maturity in France and the UK while the same association is positive and significant at 1 % in Germany. It may be that French firms do not consider being liquid when they borrow long-term as French bankruptcy rules favour the saving of ailing firms. However, it is not the case for German firms since bankruptcy procedures in Germany emphasise the liquidation of insolvent firms. Sixth, the relationship between asset maturity and debt maturity is significantly positive in the UK, which supports the maturity-matching hypothesis that firms pursue a hedging policy to control agency and bankruptcy problems. However, it seems that German firms do not apply this matching principle and the situation is marginal in France. One explanation to the violation of this principle is that concentrated corporate ownership, long and close relationship between firms and investors in civil-law countries may curtail the problems which stipulates the application of maturity matching principle. Furthermore, we find little support for the signalling hypothesis in Germany and the UK that high-quality firms prefer short-term debt as the quality coefficients are negative but insignificant. In France, however, the quality coefficient is insignificantly positive. On the other hand, Diamond's hypothesis arguing that there is a non-monotonous relationship between maturity and quality is not supported in any of sample countries. As being the final firm-specific factor, earnings volatility has significantly positive impact on debt maturity only in France, which is not predicted by the theory. The same variable seems to be irrelevant to debt maturity decisions of German and UK firms.

The results show that debt markets and equity markets tend to be integrated only in the UK, which may not be surprising in a market-oriented economy. This inference is due to the highly significant coefficient of equity premium variable, which is insignificant in other countries. The second market-related factor is the term structure of interest rates, which is only significant again in a market-based country, the UK. The significantly positive coefficient of the term-structure support the tax-hypothesis that firms lengthen their debt maturity if the term-premium is high in order to accelerate the tax benefits of debt. Share price performance is the third market factor which can be used to test the signalling hypothesis that firms issue long-term debt (informationally disadvantaged security) after an increase in their share price. This hypothesis is marginally validated only in Germany and the UK as the relevant coefficient is positive and significant at 10 %. Finally, the estimation results with respect to the interest rate volatility do not confirm the theory. Its association with debt maturity is significantly negative in the UK and insignificant in other sample countries.

Moreover, this study examines the debt maturity behaviour of firms according to size and industry classification. In France, the liquidation concerns, liquidity risk and

signalling problems are especially relevant for small firms while underinvestment problems are specific to large firms. Only medium firms in France tend to apply the matching principle. In Germany, only large firms do not consider the liquidity risk whereas the same risk is substantial for small and large UK firms. However, liquidation concerns of investment projects seem quite considerable for medium UK firms. In the UK, only large firms behave according to tax clientele and earnings volatility arguments. Yet, the findings based on large UK firms invalidate interest rate volatility hypothesis.
With respect to the industry classification results, we find that maturity-matching hypothesis is confirmed only by manufacturing firms in France; but by both industries in the UK, and by neither in Germany. In all countries, especially manufacturing firms tend to avoid the liquidation of their growth opportunities. In Germany, only manufacturing firms set their debt maturity decisions according to the tax clientele argument. Market-related factors do not seem to be important for service firms but manufacturing firms in France. The situation is the reverse in Germany where market factors play more important role in debt maturity decisions for service firms. In the UK, however, these factors appear to be equally important for both industries.

In conclusion, capital structure, tax rates, quality and size of firms, growth opportunities, asset maturity and liquidity seem to play central role in determining the debt maturity structure of a firm. Apart from these firm-specific factors, this study obtains some market-specific factors that have substantial impact on debt maturity strategies of corporations especially in the UK. However, the nature and the dominance of the impact of these factors depend on the financial environment and tradition of the specific country as their effects vary across countries. Moreover, country specific factors do play significant roles on how quickly the firms can and need to adjust their maturity position to achieve the target maturity structure. Consequently, the debt maturity decision of a firm is not only the result of its own characteristics but also the result of environment and tradition in which it operates.

Future research may examine the interaction of debt maturity with source of financing (use of commercial paper, bank relationship, distinguishing between public and private debt), which could improve the results further.

6.6. APPENDIX

Table 6.A1: Panel Structure: *a)* Number of firms having '*n*' continuous observations during the period; *b)* number of observations in each year; *c)* number of firms in each industry class; and *d)* number of observations in each industry class.

a) Number of firms

n (years)	France	Germany	UK
3	60	22	207
4	54	26	218
5	33	35	196
6	13	26	128
7	22	9	98
8	17	9	67
9	14	8	56
10	12	8	52
11	1	13	87
12	47	24	91
13	16	38	82
14	5	364	89
15	3	-	85
16	3	-	65
17	5	-	73
18	53	-	68
19	-	-	64
20	-	-	50
21	-	-	34
22	-	-	21
23	-	-	26
24	-	-	20
25	-	-	26
26	-	-	23
27	-	-	44
28	-	-	44
29	-	-	165
30	-	-	27
31	-	-	39
32	-	-	178
Total	**358**	**582**	**2423**

b) Number of observations

Years	France	Germany	UK
1969	-	-	466
1970	-	-	479
1971	-	-	489
1972	-	-	866
1973	-	-	903
1974	-	-	930
1975	-	-	936
1976	-	-	940
1977	-	-	951
1978	-	-	962
1979	-	-	979
1980	-	-	1000
1981	-	-	1029
1982	-	-	1067
1983	59	-	1122
1984	64	-	1200
1985	67	-	1260
1986	70	-	1303
1987	75	401	1314
1988	92	418	1325
1989	142	437	1312
1990	142	446	1288
1991	151	454	1247
1992	163	456	1216
1993	175	465	1222
1994	197	473	1269
1995	207	500	1318
1996	242	535	1402
1997	291	557	1483
1998	345	572	1471
1999	344	563	1340
2000	334	532	1177
Total	**3160**	**6809**	**35266**

c) Number of firms

Industry	France	German.	UK
1	23	49	165
2	10	44	31
3	19	56	199
4	31	37	162
5	48	59	261
6	16	35	28
7	41	89	315
8	22	16	87
9	25	21	191
10	1	0	55
11	19	22	147
12	31	23	254
13	46	34	319
14	17	64	142
15	9	33	67

d) No. of observations

Industry	France	German.	UK
1	253	575	2580
2	94	565	611
3	235	689	3600
4	268	462	2323
5	375	593	3248
6	153	437	476
7	397	1120	5395
8	186	199	1367
9	217	238	2311
10	4	0	585
11	143	269	2161
12	296	275	3954
13	348	225	3417
14	141	760	2694
15	50	402	544

Table 6. A2: Mean values of Long-term Debt ratios.

	France		Germany		UK	
YEARS	**LONG1**	**LONG2**	**LONG1**	**LONG2**	**LONG1**	**LONG2**
1969	-	-	-	-	0.5151	0.0934
1970	-	-	-	-	0.5071	0.0956
1971	-	-	-	-	0.5382	0.0989
1972	-	-	-	-	0.4696	0.0806
1973	-	-	-	-	0.4457	0.0729
1974	-	-	-	-	0.3972	0.0718
1975	-	-	-	-	0.4302	0.0722
1976	-	-	-	-	0.459	0.0705
1977	-	-	-	-	0.4577	0.0676
1978	-	-	-	-	0.4695	0.0676
1979	-	-	-	-	0.4252	0.062
1980	-	-	-	-	0.4135	0.0631
1981	-	-	-	-	0.42	0.0629
1982	-	-	-	-	0.406	0.0644
1983	0.7256	0.1752	-	-	0.3989	0.0632
1984	0.693	0.1751	-	-	0.3906	0.0632
1985	0.6922	0.1644	-	-	0.395	0.0693
1986	0.6662	0.1587	-	-	0.4099	0.0705
1987	0.6472	0.1433	0.6752	0.1118	0.426	0.0681
1988	0.6261	0.1422	0.6137	0.1056	0.4265	0.0713
1989	0.62	0.1565	0.5805	0.1022	0.4298	0.0825
1990	0.6002	0.1553	0.5423	0.0974	0.44	0.089
1991	0.604	0.158	0.5293	0.0995	0.4456	0.0928
1992	0.5895	0.1574	0.5209	0.0995	0.4775	0.0994
1993	0.6029	0.1564	0.5455	0.1142	0.4879	0.0956
1994	0.5941	0.1445	0.539	0.1117	0.5039	0.0917
1995	0.5702	0.1357	0.4929	0.1105	0.4953	0.0936
1996	0.5607	0.1261	0.5108	0.1159	0.5097	0.0959
1997	0.5632	0.1275	0.4929	0.1081	0.5163	0.0957
1998	0.5705	0.1289	0.5056	0.1054	0.5164	0.1085
1999	0.5609	0.1369	0.4927	0.1108	0.5174	0.1175
2000	0.5453	0.1391	0.4878	0.1108	0.516	0.1172

Long1 is long-term debt to total debt; *Long2* is long-term debt to total assets

Figure 6.A1: Plots of Long-term debt ratios for France.

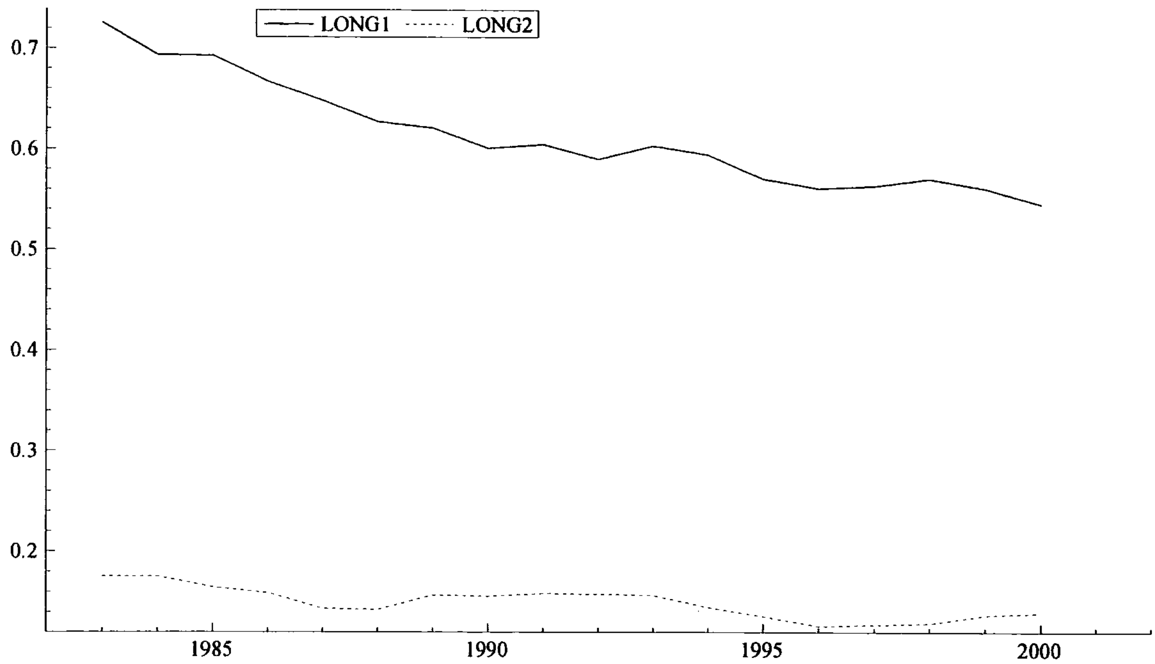


Figure 6.A2: Plots of Long-term debt ratios for Germany.

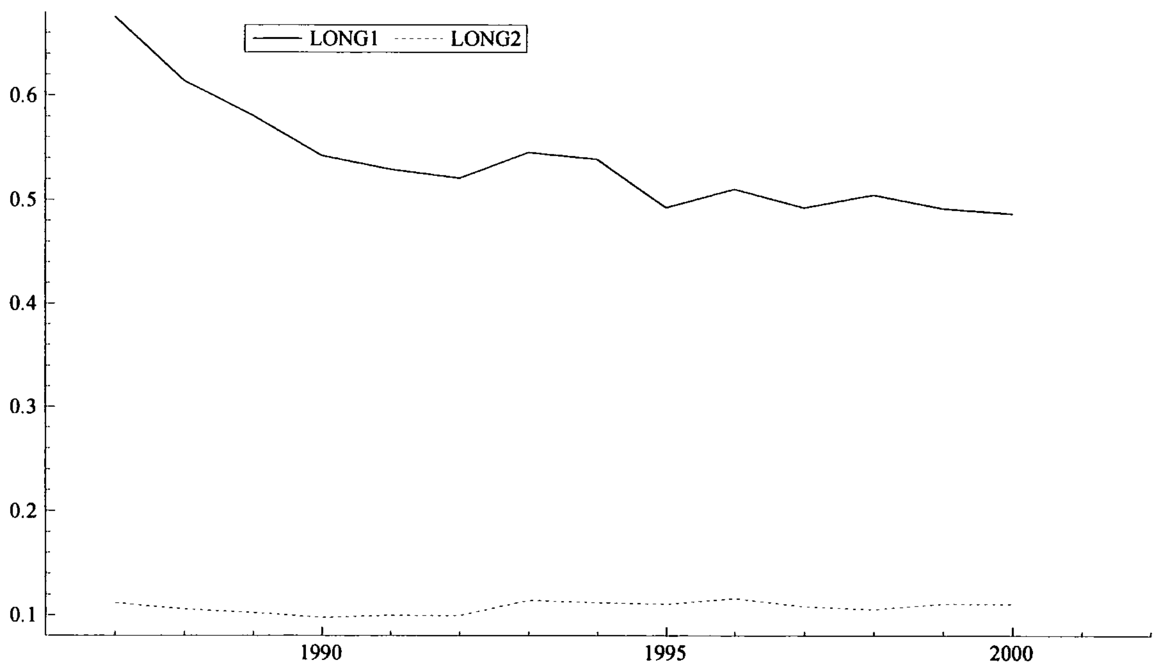
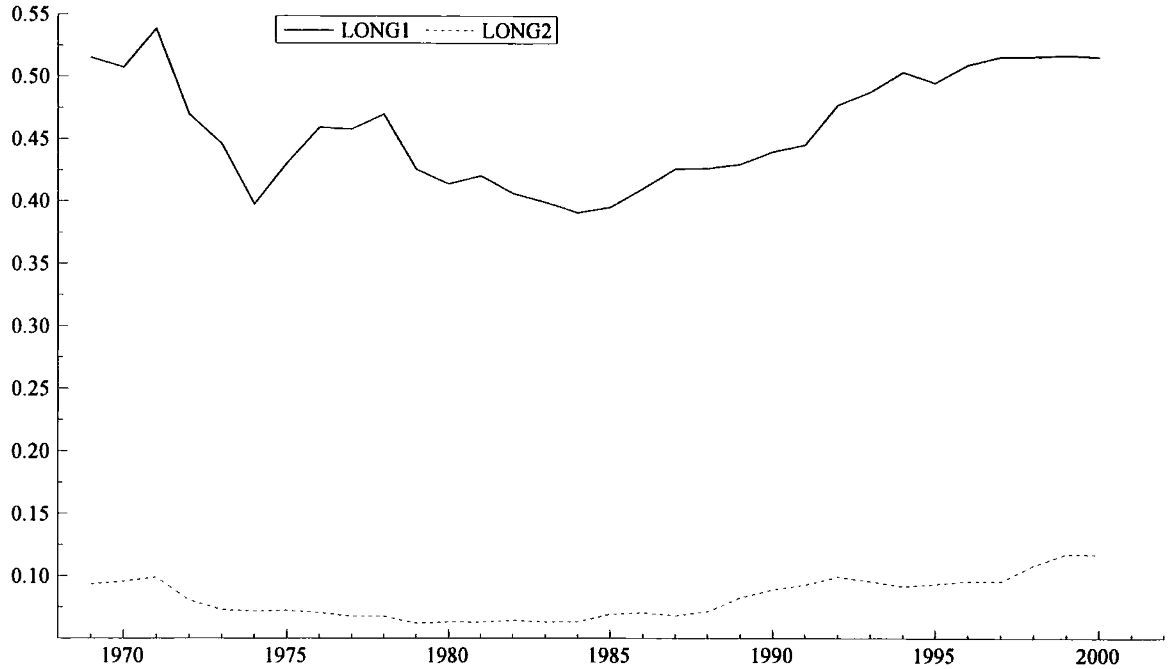


Figure 6.A3: Plots of Long-term debt ratios for the UK.



7. CHAPTER 6: DETERMINANTS OF CORPORATE DEBT OWNERSHIP STRUCTURE

7.1. INTRODUCTION

It is well known in capital structure debate that there are different costs and benefits of debt or equity financing. Recent research also sheds light on firms' cost-benefit analysis of obtaining external financing from different providers. It is known that privately placed debt is arguably the most important source of external financing for small firms due to their limited access to capital markets, transaction costs and information asymmetries. However, one should examine why firms use private debt financing even they have access to public debt markets or vice-versa, and why they use both types of debt financing. To examine the mix of public and private debt choice, large listed firms are appropriate as they have at least two options.

There are three main hypotheses which attempt to explain the variations in the mix of public and private debt. First strand focuses on *moral hazard* and *adverse selection* problems. Financial intermediation literature argues that (monitored) bank loans are different from other (arm's-length) public debt as banks have cost advantage in lending and have more information about the prospects of firms (Diamond [1984], Leland and Pyle [1977]). Fama [1985] argues that bank debt is like inside debt (financial slack in the context of Myers and Majluf [1984]), which may mitigate underinvestment problems due to information asymmetries. Hence, firms with potential agency conflicts are contended to benefit more from issuing private (e.g., bank) debt rather than non-monitored public debt. Second line of the literature is based on the *liquidation* and *renegotiation* arguments. Financial distress costs of public debt in renegotiations are generally higher than those of private debt, and public debt agreements are more difficult to renegotiate and emphasise more on the liquidation of distressed firms (Berlin and Loeys [1988], and Chemmanur and Fulghieri [1994a]). Thus, such firms are predicted to avoid issuing public debt. Finally, *transaction costs* hypothesis states that there are economies of scale in issuing substantial amount of public debt. It follows that only large firms are likely to benefit from the cost-advantageous public debt (Blackwell and Kidwell [1988], and Coase [1937]).

The relevance of such a topic can be confirmed with the following arguments. James [1987] finds that announcement of bank loan issuance causes positive abnormal stock returns. Among others, he shows that the evidence of firm-bank relationship increases firm value. He also finds issuing non-bank private debt or straight debt to repay bank debt has negative impact on firms' stock prices. Similarly, Datta et al. [2000] state that change in debt ownership structure can substantially affect shareholders' wealth as they report a significantly negative share price response to public debt IPO announcements. One important aspect of the mix of public and private debt is highlighted by James [1996]. He finds that this mix is relevant for distressed firms to be able to alter their capital structure through non-court restructurings. Cantillo and Wright [2000, p.155] state that 'understanding how firms choose their lenders may unveil the mechanism through which recessions and booms propagate and persist in the economy'. Moreover, Mayer [1988] indicates that banks are the largest sources of external financing for non-financial firms in Western Europe.

In this study, potential determinants of issuing bank debt are investigated in the framework of flotation costs, signalling, contracting costs, liquidation and renegotiation arguments. This paper attempts to extend the existing literature in several ways. First, except two Japanese data (Anderson and Makhija [1999], and Hoshi et al. [1993]) and one Spanish data (Saà-Requejo [1996]), all others report their evidence using US data. Undoubtedly, it is important to examine the association of private debt use with market-specific and firm-specific factors in an international context. By this way, one would discover whether country-specific factors have any influence on debt replacement decisions of corporations, and hence, whether the association of debt-type mix with a certain market- or firm-specific factor varies across countries. There is only one international paper: Esho et al. [2001] examine the mix between private and public debt within international debt markets for large Asian firms and find significant differences across countries. In an attempt to fill this gap, this chapter explores cross-country differences with respect to debt replacement decisions of corporations. In this study, France, Germany and the UK were chosen, since they are supposed to represent satisfactorily different financial structures of their classes, and no study has examined these countries. Rajan and Zingales [1995] argue that the difference between market-based and bank-based countries can be obtained in the debt ownership structure (mix of private and public debt), not in capital structure (mix of debt and equity)[162]. They suggest

[162] The distinctions between capital markets and banks are pronounced by a recent survey: 'Because they cut out a layer of intermediation, capital markets are generally cheaper than banks. Capital markets are short-termist, volatile, react continuously-instantaneously to changes in perception of future economy. Banks can employ skilled loan officers to judge differences credit risks. Their intermediation transforms

that the ratio of bank loans made by private sector to the GDP can be a better measure of the importance of banking sector in financing firms. For our sample countries in 1999, this ratio is 103.1 % in France, 146.9 % in Germany, and 129.1 % in the UK (World Bank, WDR Report 2000/01). Thus, one could argue that Germany is a bank-oriented country, at least in relative terms whereas UK is a market-oriented country with developed financial markets. Schmidt et al. [1999] find that there are strong signs of transformation in French financial system from bank- to market-based country as they detect a general decline in role of French banks[163]. However, they cannot find any trend toward disintermediation in Germany and the UK or orientation to capital markets in Germany. Mayer [1994] argues that dispersed corporate ownership in the UK is an obstacle to have a long-term relationship between firms and banks causing firms to rely on stock markets for external financing. Modigliani and Perotti [2000] state that a sign of strong shareholders protection (low voting premium) makes equity markets greater and reduces the dominance of bank lending. These arguments may be further motivations to examine the corporate debt ownership structure in these countries with dissimilar characteristics.

Second, we use a dynamic model, which assumes that firms have a long-run optimal debt ownership structure and this optimality cannot immediately be met through adjustment process as a result of any change in market conditions. It is obvious that factors affecting firms' debt composition structure change overtime. Hence, it would also be necessary to explain time-varying observed difference in debt ownership structure of firms. We adopt an autoregressive-distributed lag model, by which we are able to examine the determinants of bank debt use, the speed of adjustment process to desired optimal bank-debt ratio, and to provide the *static* long-run relationship between maturity and firm-specific factors. This is the first empirical debt ownership study to consider these three issues.

Last, to our knowledge, no debt-mix study explicitly examines the endogeneity issue by using Generalised Method of Moments (GMM). It should be investigated as it is likely that random shocks affect both dependent variable and independent variables at the same time. It may be the case that observed relations between debt-mix and its potential

short-term, highly liquid cash (deposits) into long-term, largely illiquid assets (loans)'. (Source: *The Economist*, Survey: Global Equity Markets, 5 May 2001).

[163] Bertero [1994], on the other hand, argues that the banking reforms in France have enabled new universal French banks to be at the heart of the French financial sector. She states that large proportion of firms' activities in the financial markets are still intermediated by banks.

determinants indicate the effects of debt mix on the latter rather than vice-versa. We control for this important problem by using GMM procedure. GMM also overcomes the problems of heteroscedasticity, normality, simultaneity and measurement errors, which are common for studies using firm-level data based on balance sheets.

Our evidence provides a few similarities in the debt-mix structure across countries: First, firm size and liquidity tend to inversely affect the use of bank debt in all countries, which may lend some support to flotation costs hypothesis. Second, asset collateral does not seem to play a significant role in any country. The regression results, however, indicate that there are substantial differences in firms' debt ownership structure in France, Germany and the UK. We find that French firms tend to adjust their debt-mix quicker than do their counterparts to attain their target level. In addition, our study detects a U-shaped relation between bank-debt use and growth opportunities in the UK, which implies the presence of bank information monopolies (holdup problems) only in the UK. It seems interest coverage ratio and profitability exert no significant impact on debt-mix decisions in Germany and the UK while the former directly and the latter indirectly affect the use of bank debt by French firms. Another country-dependent pattern is due to earnings volatility and stock return volatility variables, which do not affect debt replacement decisions of French and German firms but negatively affect bank-debt ratios of UK firms. Moreover, debt maturity and leverage inversely affect the use of bank debt in Germany and the UK while they have no significant impact in France. It is only in France where share price performance has an impact while term structure of interest rates does not have any impact on debt-mix decisions. Finally, the way firm quality and dividend payments affect debt ownership structure is similar in France and the UK whereas they have different implications in Germany. Consequently, the relationship-type of dependent and independent variables tends to be country-dependent, which can be attributed to the differences in corporate governance mechanisms and institutional features of the countries.

The remainder of the chapter is organised as follows. Section 2 describes the variables and the related debt-mix hypotheses. Section 3 discusses the construction and analysis of data. Methodology and the model are developed in section 4. Section 5 presents the empirical results. Last section summarises the chapter.

7.2. CONSTRUCTION OF THE DETERMINANTS OF CORPORATE DEBT OWNERSHIP STRUCTURE AND THE UNDERLYING THEORIES

7.2.1. Proxies for Dependent Variables[164]

We use bank-debt ratio, bank debt to total debt, as a measure of debt composition (debt ownership) structure. See Houston and James [1996], Hoshi et al. [1993], MacKie-Mason [1990], Easterwood-Kadapakkam [1991], among others, who use the same definition.

Bank debt details for France are not available in our main database (Datastream International). Instead, we use short-term debt as a proxy for bank debt. The following two studies may be supportive for our proxy: i) Bertero [1994] states that the decline in bank financing in France in early 1990s relative to 1970s is due to sharp reduction in short-term loans. ii) Carey et al. [1993] use short-term debt as a proxy for bank debt as the maturity distribution of their sample reveals that public debt has the highest proportion of long maturity, non-bank private debt has the medium to long maturity and bank debt has the short maturity.

Some bank debt data of French firms are available and hand-collected from Extel Cards Database. However, the data are incomplete relative to our main data set with respect to number of firms and time period (mainly covering the period 1996 to 2000 for about 200 firms). We construct another dependent variable using these data, bank debt to total debt. The third supportive point related to our proxy could be the significantly positive relationship between short-term debt ratio and bank-debt ratio in the correlation matrix (see Table 7.2).

In addition, this study also examines the maturity structure of bank debt. Thus, we construct several more dependent variables, i.e., short-term bank debt (payable within one year) to total debt; long-term bank debt (payable after one and five years) to total debt.

7.2.2. Proxies for Explanatory Variables

7.2.2.1. Target Debt Ownership Structure

Banking theory points out that there are some potential costs of bank financing (hold-up problems, monitoring costs, occurrence of inefficient liquidations) beside its potential benefits (low moral hazard and adverse selection costs, flexible renegotiations). Blackwell and Kidwell [1988] document that firms minimise issuance cost of debt by

[164] As discussed by Fama [1985] and reported by Johnson [1997], there are important differences between bank debt and non-bank private debt. Due to data unavailability, however, we are unable to construct alternative definitions for the dependent variable.

choosing the financing source providing the lowest transaction costs. Berlin and Loeys [1988] argue that firms can obtain an optimal debt ownership structure by trading-off the inefficiencies of harsh bond covenants of public debt and the agency costs of hiring a delegated monitor for bank debt.

Flotation costs of public debt are generally higher than those of private debt. Unlike in the UK, bond market is not well developed in Germany (see Rajan and Zingales [1995]). One may expect that German firms have more motivations to adjust their debt ownership structure than UK firms due to high transaction costs of public debt. Diamond [1993] and James [1996] emphasise that the mix of public and private debt may curtail recontracting flexibility of bank debt because of the incentives originated from the seniority structure of debt (bank debt is senior to public debt). Asquith et al. [1994] argue that debt ownership structure is very important in affecting the outcome of financial distress. As we examine the determinants of the *outstanding* debt ownership structure, we implicitly assume that corporations have target bank-debt ratio. Inclusion of lagged bank-debt ratio in the model could be a benchmark to decide whether firms have an optimal debt ownership structure, and if any, the degree of divergence or convergence from (to) the target level may potentially be detected in the framework of adjustment costs. We expect the coefficient estimate of lagged dependent variable to be statistically significant, positive and below unity to conclude that firms optimally determine their debt ownership structure.

7.2.2.2. Debt Maturity Structure

Corporations should choose their debt maturity and debt ownership structure when financing an investment project. Schuhmacher [1998] shows that the financing source depends on the maturity choice. If a firm finances short-term it prefers bank debt whereas public debt is chosen by firms financing long-term. Fama [1985] argues that short-term bank loans are renewal process and involves periodic evaluation of borrowing firms. Thus, issuing bank loan may imply the good quality of firms regarding their expected earnings. Kanatas and Qi [2001] theorise that firms' use of bank credit is inversely related to the intensity of incentive problems between managers and shareholders and directly related to the accuracy of bank monitoring. They further contend that bank debt is more suitable for financing assets with shorter economic lives. Hence, we expect that debt maturity and bank-debt ratio should be strongly negatively correlated. We use the ratio of debt that matures after one year to total debt as debt maturity measure. Esho et al. [2001] use this ratio as a proxy for firm reputation such that it will be inversely related to bank-debt ratio.

7.2.2.3. Capital Structure

It is also possible that firms' choices of debt financing source may depend on the amount of debt they employ in their capital structure. It is argued that bank monitoring generates a public good which reduces costs related to public debt (see, e.g., Fama [1985]). As a result, higher bank debt may imply higher leverage due to complementary effect of bank debt on public debt. Reorganisation of private debt is generally more flexible. Berlin and Loeys [1988] argue that private debt (especially bank debt) provides more emphasis on monitoring than public debt. Thus, as discussed by Easterwood and Kadapakkam [1991], firms with high leverage may prefer private debt financing in order to minimise the costs related to agency, bankruptcy and asymmetric information problems. Hoshi et al. [1993] argue that firms with low leverage will use public debt. The reason is that they have higher incentive to take optimal investment decisions as they risk their net worth while investing. Thus, bank-debt ratio and leverage are expected to be positively correlated[165]. (High levered and risky firms tend to borrow form banks).

On the other hand, the counter argument is that firms with higher debt ratios may restrict their bank borrowings in order to avoid frequent liquidations (Diamond [1993]). Banks' motivation to monitor (public good) on behalf of junior public debtholders may be lessened by high public debt to private debt ratio. Anderson and Makhija [1999] argue that leverage is endogenously determined such that higher leverage may mean lower potential agency costs, which supports higher public debt. Hooks and Opler [1993] find that bank borrowing is highest among firms employing relatively little debt in their capital structure. Hence, a negative relationship is suggested between these variables. One may expect the same association if leverage is considered as proxy for financial distress probability. In France, a comparable protection from bad debt losses in the event of bankruptcy exists only for the simple reservation of ownership for creditors with rights of lien. Consequently, the insolvency losses of French banks are considerably larger than those of their German competitors. Then, it is likely that French banks would be reluctant to lend firms with high debt ratios, thus the impact of leverage should not be positive in France.

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[165] Johnson [1998] regresses leverage on bank debt use and control variables and finds that optimal leverage increases with bank debt ratio. This is argued to be due to banks' ability, through monitoring and screening, to mitigate asymmetric information problems that lower optimal debt ratios.
Moreover, he attempts to explain the reasons why firms with bank debt have higher leverage: Firms with high market-to-book ratios have relatively more investment opportunities and hence experience potentially higher underinvestment problems lowering optimal debt ratio. He argues that banks are well-positioned to reduce such problems as they are more effective and efficient than other lenders for reducing asymmetric information.

We measure capital structure (leverage) as the ratio of book value of total debt to book value of total assets. Alternative definition is the ratio of book value of total debt to market value of equity plus book value of total debt. Finding a significant coefficient of leverage will not be in line with Myers and Majluf's [1984] Pecking Order theory which implies that current leverage has no impact on financing choices.

7.2.2.4. Agency Costs and Growth Opportunities

Outside public investors are generally weakly-informed about firms' growth options and are concerned about agency problems raised by Jensen and Meckling [1976] and Myers [1977]. Thus, they require high premium in such cases due to anticipated possible opportunistic behaviour of insiders. It is argued that negotiable bank debt financing is preferred to public debt in order to mitigate asset substitution and underinvestment problems (Berlin and Loeys [1988], Boyd and Prescott [1986], Diamond [1984]). As a proxy for growth opportunities, market-to-book ratio may have a mixed influence on the composition of public and private debt. Blackwell and Kidwell [1988], and Smith and Warner [1979] argue that less risky firms are more likely to issue public debt which contains less detailed restrictive covenants. Then, agency costs of private debt may be less than those of public debt. MacKie-Mason [1990b] argues that R&D-intensive firms should avoid borrowing from the public debt markets due to information asymmetries between managers and outside investors. Yosha [1995] contends that firms with potentially valuable future growth projects will not borrow from public debt markets due to high disclosure costs of revealing sensitive information[166]. Houston and James [1996] predict a positive correlation between market-to-book ratio and bank-debt ratio assuming the absence of bank information monopolies. These arguments imply that market-to-book ratio and bank-debt ratio should be positively associated.

However, Hoshi et al. [1993] show that firms with value-enhancing investment opportunities will tend to use public debt at lower rate as it will be costly for such firms to forego positive-NPV projects. They further argue that firms without attractive investment opportunities will only invest if they are monitored. Thus, they imply a negative relationship between bank-debt ratio and market-to-book ratio debt assuming managers give importance to shareholder value. Houston and James [1996] also argue that hold-up problems together with bank information monopolies may lead to a negative

[166] Carey et al. [1993], for example, note that US firms with takeover plans relied on private placement market to protect the confidentiality of their transactions in an attempt to prevent the competing offers. In our case, this should be relevant especially for the UK firms.

relationship between market-to-book ratio and the reliance on bank debt. The reason is that rents banks can extract from firms with profitable growth opportunities will be relatively high (see Diamond [1993] and Rajan [1992])[167]. Bank can hold up borrowing firms especially if firms do not have alternative financing sources.

On the other hand, in the literature a non-monotonic relationship between market-to-book ratio and bank debt use is implied. Hoshi et al. [1993] propose a reverse-U relation but fail to detect one for their sample of Japanese firms. Firms with valuable growth prospects may not issue bank debt if hold-up costs are higher than the benefits of monitoring. As discussed in Diamond [1991a], the relation turns out to be negative for low-growth firms assuming investment opportunities are profitable and carry low risk. However, this association may be positive for high-growth firms in some cases. For instance, issuing bank debt could prevent the disclosure of valuable information about high-growth firms (Yosha [1995]). Bank loans tend to have short-term maturity. According to Myers [1977], firms with high growth opportunities should use short-term debt to mitigate agency problems. Moreover, under uncertain macroeconomic conditions flexible bank debt may be more attractive for such firms in case of financial distress as they would not like their valuable projects to be liquidated (Berlin and Mester [1992]). These arguments imply that there might be a U-shaped relation rather than a reverse one: bank-debt ratio first decreases at the lowest market-to-book ratio range then increases at the highest market-to-book ratio range. *Low*-growth firms choose bank debt to curtail agency costs via monitoring, or to establish reputation (Diamond [1991a]); *high*-growth firms prefer the same source of financing in order to mitigate information asymmetries through close relations with banks; and *medium*-growth firms choose public debt as they need less monitoring for their projects which carry moderate risks. In order to test this argument we also include the squared-market-to-book ratio variable in the model[168].

We measure market-to-book ratio as the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. Johnson [1997] uses this ratio as a proxy for project quality: high market-to-book ratio may be caused by the capital markets' perception of the project as a high quality one. Following Barclays and Smith [1995] and Krishnaswami et al. [1999] we use depreciation ratio (depreciation

[167] In fact, Houston and James [1996] document that high-growth US firms relying on a single bank and having no public debt issue relatively low bank debt, which may indicate the presence of the hold-up problem by US banks. This finding highlights the importance of diversification of debt financing sources for such firms.

expense to total assets) as an alternative proxy for growth opportunities. As higher depreciation ratio implies higher tangible assets it can be an inverse proxy for growth options. Another alternative measure is the ratio of intangible assets to total assets.

7.2.2.5. Transaction Costs and Firm Size

Size of the firm can have several implications on the choice of public and private debt. Oliner and Rudebusch [1992] use firm size as a proxy for transaction costs. The costs of issuing long-term public debt are considerably higher for small firms. Coase [1937] also argues that deterrent transaction and contracting costs discourage small firms from raising external equity, thus, cause them to rely on their retained earnings. Small firms are more likely to be financially distressed than large firms (Queen and Roll [1987]) and they are likely to have higher information asymmetries. Hence, small firms are likely to borrow short-term debt through banks in order to avoid diseconomies of scale and financial distress costs. In fact, distinct features of banks are mostly benefited by small firms (Fama [1985]). Large firms are generally mature, less risky and have relatively low growth opportunities, thus, low potential agency problems. Moreover, large firms tend to have more constructed reputations and publicly available information which lead them to issue costly-efficient public debt (Diamond [1991a]). If bank loans typically involve small and medium firms due to flotation costs and contracting costs hypotheses, bank-debt ratio and firm size should be negatively correlated.

The evidence by Mayer and Alexander [1990] show that large firms in UK raise less bank loan than do other UK firms. This may be because of the fact that asymmetric information between insiders-outsiders is less for large firms. Moreover, size effect seems important in market-based countries where cost of financial distress is relatively high and firms have no strong supports from banking sector.

We measure firm size in three ways as the natural logarithm of i) total sales, ii) total assets, and iii) total assets minus book value of equity plus market value of equity.

7.2.2.6. Liquidity

The importance of firm liquidity as a determinant of choosing the lender has been by-passed by the empirical studies, except Saà-Requejo [1996]. As it is an important determinant of financing choices, firm liquidity should be controlled for. Saà-Requejo uses this variable to test whether past profitability (thus, the amount of retentions) affects firms' financing decisions.

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[168] The estimated coefficients of market-to-book ratio and squared-market-to-book ratio should be significantly negative and significantly positive, respectively, for the confirmation of a U-shaped relation.

With respect to the institutional framework, according to conventional wisdom, banks should provide cash internally to mitigate firms' liquidity problem in Germany. Then, one may expect that liquidity should be less important for German firms while choosing source of debt financing than for UK and French firms. We measure liquidity ratio as current assets divided by current liabilities.

7.2.2.7. Asymmetric Information and Firm Quality

The quality of firm can be a proxy for adverse selection problems and for firm reputation. Diamond [1991a] contends that highly-rated firms issue public debt after obtaining reputation through their established successful bank debt repayments; and medium- and low-quality firms use bank debt[169]. On *supply* side, the importance of firm quality is emphasised in Stiglitz and Weiss [1981] who argue that banks ration credits if they cannot distinguish between good and bad firms. Then, firms with high degree of information asymmetries and favourable information concerning their future earnings should issue private debt. On *demand* side, hidden-information view contends that firms will seek better-informed financier when the advantage of hidden information is substantial (MacKie-Mason [1990b]). If lenders of private debt are better informed than those of public debt (see, e.g., Yosha [1995]), then it might be cost-efficient for firms with potential information asymmetries to borrow from private sources. James [1987] argues that firms disclose the terms of private financing to signal their true value to the market. Oliner and Rudebusch [1996] contend that lenders would not be funding low-quality firms under tight monetary policy conditions.

We measure firm quality determined by *abnormal* earnings, which is measured by the difference between earnings per share in years [t+1] and [t] divided by share price in year [t] (see, e.g., Stohs and Mauer [1996]). If firms have favourable information about their future profitability, then they should have high future abnormal earnings. Thus we expect firm quality and bank-debt ratio to be positively correlated, according to the adverse selection hypothesis.

7.2.2.8. Dividend Policy

The potential impact of dividend policy on debt ownership structure is largely ignored by the empirical studies. Among those who do not, MacKie-Mason [1990b] argues that hidden-information problem may be exacerbated for non-dividend paying firms if paying dividends reveals hidden information. Then, one should expect non-dividend paying

[169] Diamond's reputation hypothesis is empirically supported by Datta et al. [1999] who find that the length of firm-bank relationship significantly reduces the at-issue yield spread, thus, the cost of external debt.

firms to avoid issuing public debt assuming dividends reveal information about firms' prospects. The expected relation between payout ratio and bank-debt ratio should, thus, be negative. Furthermore, Low et al. [2001] show that investors regard *small* firms' dividend decision as a function of bank monitoring. They find that market reaction to dividend omission by small firms with high levels of bank debt is much less negative than that to by the ones with little or no bank debt. We use the ratio of dividends to net earnings (payout ratio) as a proxy for dividend policy.

7.2.2.9. Firm Performance

This variable may be useful especially to test the hypotheses related to country-specific factors. Hoshi et al. [1993] contend that firms with good performance are likely to issue public debt assuming managers give importance to shareholder value. Since profitability (proxy for firm performance) is an important capital structure determinant, this effect should be controlled for. Jensen's [1986] free cash flow hypothesis predicts that profitability and leverage are positively correlated. If private debt mitigates agency costs of free cash flow, then, bank-debt ratio and profitability should not be significantly associated. Free cash flow problem should be inconsiderable in countries where share ownership is concentrated because shareholders will have high motivations to monitor managers. On the other hand, since UK firms have the chance to tap the developed bond market they should not have significant financial constraints caused by fluctuations in internal resources. This implies that profitability and bank-debt ratio should not be significantly correlated in the UK either. According to screening theory of banking closely held or family firms are less likely to borrow from intermediaries (see Cantillo and Wright [2000]). Thus, we expect profitability and bank-debt ratio to be negatively correlated especially in France. We measure profitability by the ratio of EBITD to total assets.

7.2.2.10. Asset Collateral

James [1996] emphasises that almost all bank debt of financially distressed firms is secured while public debt is rarely secured. Berger and Udell [1995] argue that bank specialise in lending to the firms with substantial asymmetric information problems. These can be reflected in the nature of loan contract terms such as interest rate charged and collateral required. As also explained by Hoshi et al. [1993], the expected relation between bank-debt ratio and fixed-assets ratio is negative if non-financial assets are valuable collateral to borrow from public debt markets with lower interest rates. With respect to the institutional factors, Edwards and Fischer [1994] state that collateral seems to be one of the requirements for majority of bank loans in Germany and the UK. Then, the expected relation may be positive in these countries. We use the ratio of net tangible assets to total assets as a proxy for asset collateral.

7.2.2.11. Financial Distress

Firms may be financially distressed if they cannot adjust themselves to adverse shocks. James [1996] use this ratio as a proxy for the severity of financial distress. Financially distressed firms may prefer private debt by paying higher interest rates due to its recontracting flexibility. Distress costs of public debt in renegotiations tend to be higher than those of private debt. Chemmanur and Fulghieri [1994a] theorise that firms with lower financial distress probability choose public debt over bank debt since the benefits of lower interest charges of public debt outweigh the benefits of flexible renegotiations in private debt. We thus expect a negative relationship between coverage ratio (proxy for financial distress) and bank-debt ratio. We measure this ratio as EBITD to total interest expense (see Johnson [1997], Anderson and Makhija [1999]).

7.2.2.12. Asymmetric Information and Earnings Volatility

In accounting literature (see e.g., Watts and Zimmerman [1986]) earnings are argued to follow random walk. If the volatility in earnings is high, then, it becomes even more difficult to forecast future earnings. MacKie-Mason [1990b] argues that managers are likely to have advantageous hidden information in such cases[170]. Then, issuing public debt will be costlier for them as public investors will stipulate high 'lemons' premia. Johnson [1997] uses this variable as a proxy for observable credit risk and probability of financial distress. Sy [1999] demonstrates theoretically that high credit risk firms' managers will issue private debt due to benefits from renegotiating tighter restrictions. On the other hand, low credit risk firms' managers will issue public debt due to benefits from increased flexibility rather than reduced restriction and monitoring. Thus, we expect earnings volatility (proxy for potential information asymmetries) and the reliance of bank debt to be positively correlated.

We measure earnings volatility as absolute annual percentage change in earnings minus average of this percentage change in the whole period.

[170] MacKie-Mason suggests modified pecking order in which firms prefer private debt over public debt if information asymmetries are substantial. If firms' public debt issues are undervalued by the market, then, they tend to choose bank debt which provides information benefits assuming banks as insiders (Hadlock and James [2002]). Similarly, Bolton and Freixas [2000] theorise that riskier firms choose bank debt, safer firms issue bond and the ones in between prefer both bond and equity.

7.2.2.13. Macroeconomic and Stock Market Factors

Stock Return Volatility

It is likely that under uncertain macroeconomic conditions firms will have difficulty in raising external funding from the capital markets (e.g., arm's-length debt). The uncertainty within an entity could exacerbate the bad conditions mainly due to highly potential agency costs. Hadlock and James [2002] state that firms with high stock return volatility tend to have substantial information asymmetries between outsider and insiders, which causes security undervaluation problem. This measure is used as a proxy for potential undervaluation, measured as standard deviation of daily stock returns measured in the year prior to announcement. They find that undervalued firms tend to use bank debt due to information benefits. Thus, one may expect a direct relationship between bank-debt ratio and stock return volatility which may quantify the risk due to the uncertainty of firms' economic environment (Demsetz and Lehn [1985]). We measure this variable by the standard deviation of weekly stock returns over the previous year, matched to the month of firms' fiscal year-end.

Change in Stock Price

MacKie-Mason [1990b] contends that rising share price of a company implies that investor are convinced about the improvement in the firm's prospects. In this case, firms will be more advantageous if they borrow from the public debt markets. Thus, a negative relation is expected between bank-debt ratio and change in share price. We measure this variable as the first difference of log of annual share price, with a six-month lag, matched to the month of firms' fiscal year-end.

Term Structure of Interest Rates

If most of the bank debt short-term debt, that may warrant the use of term-structure in the analysis. Kashyap et al. [1993] argue that tight monetary policies increase cost of bank capital, which in turn discourages firms from borrowing and investing. However, Oliner and Rudebusch [1996] contend that lenders would not be funding low-quality firms under such conditions, thus, causing those firms not to invest. French firms are family controlled with relatively low reliance on banks, UK firms rely on capital markets, German firms are argued to rely on bank-debt financing. Thus, as highlighted by Bolton and Freixas [2000], the effect of monetary policies on corporate sector may not be similar across countries. Mayer [1994] argues that the credit constraints have much more pronounced impact on real sector in the bank-based than the market-based countries. Our empirical analysis that incorporates term-structure in the model may shed light on these issues. This variable is measured as the difference between the month-end yields on long-term government bond and three-months treasury-bills, with a six-month lag, matched to the month of firms' fiscal year-end.

7.3. ANALYSIS OF THE DATA SET

7.3.1. Descriptive Statistics

In Table 7.1 we report descriptive statistics for the variables used in the analysis. The results show that, as one expects from a bank-oriented economy, Germany has the highest bank-debt (BANK) ratio (94.5 %). The short-term bank debt payable within 1 year to total debt (BANK-S) is 45.6 % while the long-term bank debt payable after five years (BANK-L5) is only 15.8 % of the total debt. This finding is not in line with the argument that there is a long-term relationship between firms and banks in Germany. The French firms, on average, have the lowest bank-debt ratio (43.1 %). This figure is close to what Belletante and Paranque [1998] find for the non-financial listed French firms (39.3%). On the other hand, the UK firms' average bank-debt ratio is in between these ranges (60.4 %). Comparing the ratios of long-term bank debt payable after one year to total debt (BANK-L1) in Germany and the UK, one can see the discernible difference between the ratios as it is 48.9 % for the former and 14.7 % for the latter. This may imply unimportance of the banks in the UK where the financing relationships between firms and banks are in short-horizons.

The details of these ratios in each year are reported in the appendix (see Table 7.A2 and the figures). In Germany, the bank-debt ratio seems stable during 1987-2000, which ranges between 90 % - 96 %. However, this ratio has been in the declining trend since 1996 and it takes its minimum value in 2000. The reduction in bank-debt ratio in Germany is associated with the reduction in both long-term bank debt ratios. In fact, while BANK-L1 is 63.4% in 1987 it drops to 43.3 % in 2000. Similarly, while BANK-L5 is 18.5 % in 1987 it goes down to 14.6 % in 2000. On the contrary, short-term bank debt ratio rises from 32 % in 1987 to 47 % in 2000. These figures may be related to the argument that decrease in bank debt may imply the development of financial markets.

In the UK, there is an apparent increase in the long-term bank-debt ratio, which goes up from 11.9 % in 1983 to 26.5 % in 2000. We observe the reverse trend in the short-term bank debt ratio during 1969-2000 as it is 45.4 % in 1969 and 33.3 % in 2000. The overall bank-debt ratio has two different patterns during 1969-2000. In the first half of the period (1969-1985), the ratio fluctuates between 42.8 % and 74.6 %. In the second half, the trend turns out to be decreasing in that bank-debt ratio falls from 72.4 % in 1986 to 59.8 % in 2000.

In France: Delbreil et al. [2000] posit that the fall in firms' reliance on banks in France reflects the financial constraints, high levels of real interest rates and changing behaviour of banks from sustained expansion to augmented discretion about lending. Bertero [1994] states that apparent decline in short-term bank borrowing and increase in internal financing is due to the financial and banking reforms in France. It is argued that there might be a link between contractions in bank lending and macroeconomic activity, which has some implications on future economic growth (see, e.g., Stanton [1998]). The results in Germany and the UK do not seem to confirm the idea that bank capital typically rises in expansions and declines in recessions. Instead, they imply that the changing pattern in bank-debt ratios of firms are not only determined by macroeconomic conditions but also by firm-specific factors.

Table 7.1: Descriptive Statistics for France, Germany and the UK.

France	Mean	Median	Mode	Std.dev	Variance	Kurtosis	Skew.	Min.	Max.	Obsrv.
BANK-Total	0.4079	0.3586	0	0.3327	0.1107	-1.1537	0.3732	0	1	1126
BANK-Proxy	0.4311	0.4080	0	0.2581	0.0666	-0.5334	0.2921	0	1	3243
MATURITY	0.5929	0.6099	1	0.2687	0.0722	-0.6238	-0.279	0	1	3424
LEVERAGE1	0.2344	0.2232	0	0.1464	0.0214	0.8319	0.6702	0	1	3444
LEVERAGE2	0.3118	0.2764	0	0.2272	0.0516	-0.4272	0.6089	0	0.9968	3183
MTBR	1.5584	1.2204	1.1480	1.1290	1.2746	52.344	5.5946	0.3968	20.602	3191
DEPREC	0.0478	0.0404	0	0.0374	0.0014	22.517	3.4656	0	0.5467	3428
INTANGIBLE	0.1076	0.0623	0	0.1254	0.0157	5.4573	1.9711	0	1	3419
SIZE1	14.811	14.801	16.723	1.926	3.708	-0.047	-0.088	5.241	20.526	3432
SIZE2	14.819	14.711	17.133	1.917	3.677	-0.233	0.131	9.207	20.502	3445
SIZE3	15.1801	15.0748	17.271	1.8322	3.3571	-0.1732	0.1877	9.1	20.782	3181
LIQUIDITY	1.4975	1.3384	4.1958	0.7870	0.6194	70.794	5.8866	0.0197	15.548	3444
QUALITY	-0.0023	0.0052	0	1.0402	1.0819	2209.64	-42.85	-53.09	10.263	3086
DIVIDEND	0.1236	0.2327	0	3.165	10.014	208.503	-8.478	-66.89	51.768	3318
PROFIT	0.1167	0.1112	0.3214	0.0974	0.0095	40.662	-2.228	-1.414	0.9935	3428
FIX-ASSET	0.2318	0.2040	0	0.1587	0.0252	2.0622	1.2256	0	0.9855	3444
COVERAGE	15.2405	5.6807	2.75	57.45	3300.13	108.83	5.26	-866.1	952.43	3286
EARN-VOL	0.7893	0.2002	18.686	5.7614	33.1938	2063.45	41.804	0	289.62	3069
RET-VOL	0.0528	0.0470	..	0.0264	0.0007	29.2011	3.5767	0.0047	0.4681	3180
SHARE-PF	0.0930	0.0775	0.0000	0.4092	0.1675	2.6730	0.0903	-2.353	2.3690	2891

Germany	Mean	Median	Mode	Std.dev	Variance	Kurtosis	Skew.	Min.	Max.	Obsrv.
BANK-Total	0.9451	1	1	0.1616	0.0261	13.2826	-3.561	0	1	5840
BANK-Short	0.4563	0.4109	1	0.3147	0.0990	-1.0850	0.3407	0	1	5840
BANK-Long>1	0.4888	0.5008	0	0.3177	0.1010	-1.2386	-0.085	0	1	5840
BANK-Long>5	0.1584	0.0760	0	0.2048	0.0420	2.3404	1.6359	0	1	5840
MATURITY	0.5323	0.5701	0	0.3134	0.0982	-1.1009	-0.291	0	1	5860
LEVERAGE1	0.1976	0.1503	0	0.1902	0.0362	0.4462	0.9840	0	1	6784
LEVERAGE2	0.2447	0.1687	0	0.2462	0.0606	-0.1443	0.9111	0	0.9885	6216
MTBR	1.9908	1.3093	1.2852	3.9352	15.4859	240.339	13.561	0.2536	92.288	6216
DEPREC	0.0582	0.0518	0	0.0512	0.0026	48.6720	4.1092	0	0.9674	6776

INTANGIBLE	0.0302	0.0053	0	0.0633	0.0040	17.1009	3.7090	0	0.7298	6776
SIZE1	12.3301	12.3761	11.076	2.3045	5.3109	0.6442	-0.249	1.2306	19.401	6542
SIZE2	12.2461	12.1465	10.355	2.0200	4.0805	0.5115	0.2612	3.9219	19.594	6788
SIZE3	12.728	12.574	10.794	1.8916	3.5782	0.3859	0.4466	7.4819	19.962	6216
LIQUIDITY	4.3360	1.7187	6.5531	27.4916	755.786	496.6131	20.587	0.0012	824.33	6768
QUALITY	0.0146	0.0001	0	1.3298	1.7683	1354.234	-5.953	-64.51	50.527	6236
DIVIDEND	0.3085	0	0	6.1017	37.231	303.996	0.669	-124.8	191.68	6754
PROFIT	0.1158	0.1166	0.1602	0.1342	0.0180	54.2701	-1.943	-2.920	1.7416	6757
FIX-ASSET	0.3255	0.2943	0	0.2097	0.0440	0.4145	0.7965	0	0.9985	6784
COVERAGE	34.689	6.2733	192	286.584	82131	324.205	11.393	-3778	8936	6600
EARN-VOL	3.2968	0.3735	0.1266	19.9204	396.823	536.8982	19.656	0	653.94	6164
RET-VOL	0.0437	0.0387	0	0.0297	0.0009	51.916	4.2333	0	0.6710	6147
SHARE-PF	0.0066	0	0	0.3447	0.1188	4.4888	0.3610	-2.227	2.7783	5412

UK	*Mean*	*Median*	*Mode*	*Std.dev*	*Variance*	*Kurtosis*	*Skew.*	*Min.*	*Max.*	*Obsrv.*
BANK-Total	0.6042	0.6969	1	0.3648	0.1331	-1.3071	-0.434	0	1	32028
BANK-Short	0.4557	0.4048	1	0.3582	0.1283	-1.3822	0.2369	0	1	32028
BANK-Long>1	0.1471	0	0	0.2637	0.0695	1.6883	1.7133	0	1	32526
MATURITY	0.4568	0.4720	0	0.3391	0.1150	-1.3666	0.0304	0	1	32548
LEVERAGE1	0.1761	0.1513	0	0.3993	0.1594	6278.19	69.817	0	38.903	35510
LEVERAGE2	0.2453	0.1926	0	0.2204	0.0486	0.2206	0.9382	0	0.9998	35189
MTBR	1.4924	1.1069	0.133	2.307	5.322	787.19	23.078	0.121	98.666	35065
DEPREC	0.0359	0.0302	0.0000	0.0339	0.0012	743.43	18.202	0	1.8629	35499
INTANGIBLE	0.0414	0	0	0.1376	0.0189	3952.66	39.113	0	14.972	35470
SIZE1	9.0190	8.8503	12.621	1.8994	3.6078	0.6745	0.1728	0.0156	16.224	35340
SIZE2	8.8185	8.5606	10.254	1.8285	3.3433	0.3560	0.5764	1.5018	16.674	35510
SIZE3	9.0430	8.7609	10.027	1.8677	3.4882	0.2376	0.6266	3.4780	16.783	35005
LIQUIDITY	1.7004	1.4503	1.3186	1.8484	3.4167	1344.77	26.569	0.0157	125.15	35489
QUALITY	0.0093	0.0060	0	0.3156	0.0996	10553.09	-50.93	-41.73	26.79	34311
DIVIDEND	0.3945	0.3595	0	3.19519	10.2093	359.710	2.0371	-94.25	98.6	35445
PROFIT	0.1212	0.1289	0.1667	0.1574	0.0248	505.55	-13.38	-6.894	5.2959	35499
FIX-ASSET	0.3476	0.3110	0.0000	0.2048	0.0419	0.3249	0.8104	0.0000	1.4209	35490
COVERAGE	48.134	7.4872	8	464.63	215879	2451.96	39.189	-9286	37227	33381
EARN-VOL	1.1264	0.2509	0.0258	8.0323	64.5173	2766	44.557	0	660.76	33060
RET-VOL	0.0511	0.0445	0	0.0299	0.0009	27.0310	3.1186	0	0.6813	34964
SHARE-PF	0.0538	0.069	0	0.4683	0.2193	3.5751	-0.370	-4.183	3.3032	32878

BANK-Total is the ratio of total bank debt to total debt. BANK-Short is bank debt payable within one year; BANK-Long>1 is bank debt payable after one year; BANK-Long>5 is bank debt payable after 5 years; all scaled by total debt. BANK-Proxy is the ratio of debt that matures in less than one year to total debt (only for France). MATURITY is the ratio of debt that matures in more than one year to total debt. *LEVERAGE1* is the ratio of book value of total debt to book value of total assets. *LEVERAGE2* is the ratio of book value of total debt to market value of equity plus book value of total debt. MARKET-TO-BOOK RATIO (MTBR) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets, matched to the month of firms' fiscal year-end. DEPRECIATION (DEPREC) is the ratio of depreciation expenses to total assets. INTANGIBLE is the ratio of intangible assets to total assets. *SIZE1 (SIZE2)* is the natural logarithm of total sales (total assets). *SIZE3* is the natural logarithm of total assets minus book value of equity plus market value of equity. *LIQUIDITY* is the ratio of current assets to current liabilities. QUALITY is the difference between earnings per share in years [t+1] and [t] divided by share price in [t], matched to the month of firms' fiscal year-end. DIVIDEND is the dividend payout ratio; dividends to net earnings. PROFITABILITY (PROFIT) is the ratio of EBITD to total assets. FIXED-ASSETS (FIX-ASSET) is the ratio of net tangible assets to total assets. COVERAGE is the ratio of EBITD to total interest expense. EARNINGS VOLATILITY (EARN-VOL) is absolute annual % change in earnings minus average of this change. RETURN VOLATILITY (RET-VOL) is the stock return volatility measured by the standard deviation of weekly stock returns over the previous year, matched to the month of firms' fiscal year-end. SHARE PERFORMANCE (SHARE-PF) is the first difference of log of annual share prices, with a six-month lag, matched to the month of firms' fiscal year-end. TERM is term structure of interest rates measured as the difference between the month-end yields on long-term (10 years or more) government bond and three-months treasury-bills, with a six-month lag, matched to the month of firms' fiscal year-end.

7.3.2. Correlation Matrix

Tables 7.2, 7.3 and 7.4 report the correlation matrix of the variables used in the analysis for France, Germany and the UK, respectively. These univariate results reveal that the associations of use of bank debt with the explanatory variables differ across countries. Hence, they give us motivation to conduct a multivariate analysis in the next section.

Table 7.2: Correlation Matrix for France.

	BANK	*PROXY*	*LONG*	*LEVER*	*MTBR*	*MTBR²*	*DEPRE*	*INTAN*	*SIZE*	*LIQUID*
PROXY	0.1081*									
LONG	-0.1081*	-1.0000*								
LEVER	-0.0492	-0.1415*	0.1415*							
MTBR	0.0640	0.0175	-0.0175	-0.1927*						
MTBR²	0.1000*	0.0040	-0.0040	-0.1173	0.8493*					
DEPREC	0.0040	-0.0668*	0.0668*	0.0356	-0.0318	-0.0152				
INTAN	-0.0540	-0.0423**	0.0423**	0.1038*	0.1537*	0.0638*	-0.0422**			
SIZE	-0.2604*	-0.0157	0.0157	0.0784*	-0.1903*	-0.0936*	-0.0960*	-0.0273		
LIQUID	0.1082*	-0.1932*	0.1932*	-0.2188*	0.0520*	0.0548*	-0.0766*	-0.1792*	-0.3212*	
QUALITY	0.0220	-0.0286	0.0286	0.0277	-0.0065	-0.0048	0.0179	-0.0189	0.0099	-0.0294
DIVID	-0.0250	0.0114	-0.0114	0.0166	0.0226	0.0072	0.0025	0.0115	0.0188	-0.0012
PROFIT	-0.0020	-0.0527**	0.0527**	-0.1019*	0.1982*	0.0732*	0.4154*	0.0055	-0.0185	-0.0100
FIXAST	-0.0250	-0.2140*	0.2140*	0.3083*	-0.1581*	-0.0700*	0.3269*	-0.2758*	0.1170*	-0.2037
COVER	-0.0460	-0.0206	0.0206	-0.2238*	0.1056*	0.0530**	0.0302	-0.0215	-0.0624*	-0.0683
EARNVO	-0.0660	-0.0265	0.0265	0.0020	-0.0205	-0.0071	-0.0157	0.0092	0.0020	0.0076
RETVOL	0.0341	-0.0050	0.0050	0.0964*	0.1005*	0.0900*	0.0809*	-0.0311	-0.2588*	0.0315
SHAREP	0.0110	-0.0218	0.0218	-0.1365*	0.3436*	0.2031*	-0.0521**	0.0691*	0.0685*	-0.0371
TERM	0.0323	0.0278	-0.0278	-0.1027*	0.1340*	0.0821*	0.0041	0.1351*	-0.1069*	0.0444**

	QUALITY	*DIVID*	*PROFIT*	*FIXAST*	*COVER*	*EARNV*	*RETVOL*	*SHARE*
DIVID	-0.0020							
PROFIT	-0.0794*	0.0601*						
FIXAST	0.0164	-0.0158	0.1156*					
COVER	-0.0177	0.0241	0.2845*	-0.0097				
EARNVO	0.0138	-0.0191	-0.0499**	-0.0323	-0.0105			
RETVOL	0.0336	-0.0155	-0.1687*	-0.0721*	-0.0533**	0.0487**		
SHAREP	-0.0168	0.0054	0.1666*	-0.0750*	0.0768*	-0.0096	-0.1062*	
TERM	0.0330	-0.0078	-0.0205	-0.0467**	0.0891*	-0.0255	0.0968*	0.0897*

The statistics reported here are the **Pearson** correlation coefficients between the variables used in the analysis. (*) and (**) represent that the correlation coefficient is significant at 1 percent level and 5 percent level, respectively. See Table 7.1 for variable definitions.

Table 7.3: Correlation Matrix for Germany.

	BANK	*BANK-S*	*BANK-L1*	*BANK-L5*	*LONG*	*LEVER*	*MTBR*	*MTBR²*	*DEPREC*	*INTAN*
BANK-S	0.2501*									
BANK-L1	0.2682*	-0.8656*								
BANK-L5	0.1372*	-0.5193*	0.5878*							
LONG	-0.1121*	-0.9711*	0.9082*	0.5420*						
LEVER	0.0034	-0.0355*	0.0370*	0.1356*	0.0441*					
MTBR	-0.0378*	0.0179	-0.0373*	0.0246	-0.0186	-0.0262				
MTBR²	-0.0381*	-0.0013	-0.0184	0.0211	0.0016	-0.0073	0.8596*			
DEPREC	0.0517*	-0.1189*	0.1451*	0.0664*	0.1262*	-0.0498*	-0.0615*	-0.0301**		
INTAN	-0.0404*	0.0250	-0.0458*	-0.0624*	-0.0306**	0.1012*	0.0224	0.0018	-0.0886*	
SIZE	-0.3324*	-0.0603*	-0.1119*	-0.0680*	0.0224	-0.1830	-0.2209*	-0.0825*	-0.0189	0.1257
LIQUID	-0.0522*	-0.0811*	0.0537*	0.0577*	0.0715*	-0.0947*	0.0462*	0.0056	-0.0223	-0.045
QUALITY	-0.0049	0.0196	-0.0220	-0.0502*	-0.0202	0.0327**	0.0025	0.0002	0.0208	0.0013
DIVID	-0.0047	-0.0119	0.0094	0.0024	0.0075	-0.0074	0.0418*	0.0196	0.0257	0.0146
PROFIT	0.0189	-0.0909*	0.1002*	0.0478*	0.1025*	-0.1455*	-0.0584*	-0.0768*	0.4599*	0.0246
FIXAST	0.0136	-0.3195*	0.3250*	0.3194*	0.3268*	0.2061*	-0.0767*	-0.0385*	0.3880*	-0.157
COVER	-0.0028	0.0176	-0.0190	-0.0197	-0.0193	-0.0529*	-0.0186	-0.0207	0.0378*	-0.0070
EARNVOL	0.0041	-0.0127	0.0147	-0.0063	0.0146	0.0505*	0.0100	0.0007	0.0097	-0.0083
RETVOL	-0.0462*	0.1181*	-0.1414*	-0.1176*	-0.1243*	0.0920*	0.0873*	0.0619*	-0.1421*	0.1268
SHAREPF	-0.0188	-0.0581*	0.0481*	0.0474*	0.0606*	-0.1192*	0.1421*	0.0670*	-0.0091	-0.0098
TERM	0.0448*	0.0256	-0.0024	-0.0006	-0.0141	-0.0159	-0.0289**	-0.0177	0.0965*	-0.089

	SIZE	LIQUID	QUALITY	DIVID	PROFIT	FIXAST	COVER	EARNVL	RETVOL	SHARE
LIQUID	-0.0977*									
QUALITY	0.0088	-0.0025								
DIVID	-0.0086	-0.0040	-0.0001							
PROFIT	0.0126	0.0049	-0.0616*	0.0413*						
FIXAST	-0.0082	-0.0931*	0.0145	0.0381*	0.1163*					
COVER	0.0284**	0.0027	-0.0025	0.0074	0.1251*	0.0234				
EARNVOL	-0.0547*	0.0092	0.0042	-0.0053	-0.0372*	-0.0202	0.0043			
RETVOL	-0.0489*	0.0229	-0.0053	-0.0141	-0.2205*	-0.1478*	-0.0264	0.0762*		
SHAREPF	0.0362*	0.0281**	-0.0626*	0.0134	0.1740*	0.0004	0.0165	0.0032	-0.0949*	
TERM	-0.0138	-0.0226	0.0002	-0.0186	0.0226	0.0596*	-0.0142	-0.0118	-0.1523*	-0.096

The statistics reported here are the **Pearson** correlation coefficients between the variables used in the analysis. (*) and (**) represent that the correlation coefficient is significant at 1 percent level and 5 percent level, respectively. See Table 7.1 for variable definitions.

Table 7.4: Correlation Matrix for the UK.

	BANK	*BANK-S*	*BANK-L*	*LONG*	*LEVER*	*MTBR*	*MTBR²*	*DEPREC*	*INTAN*
BANK									
BANK-S	0.7325*								
BANK-L	0.3871*	-0.3442*							
LONG	-0.5295*	-0.8612*	0.4362*						
LEVER	0.0145*	-0.0237*	0.0520*	0.0444*					
MTBR	-0.0431*	-0.0644*	0.0278*	0.0023	0.2376*				
$MTBR^2$	-0.0139**	-0.0073	-0.0093	-0.0056	0.1902*	0.8104*			
DEPREC	-0.0383*	-0.0537*	0.0199*	0.0157*	0.0834*	0.0637*	0.0184*		
INTAN	-0.0292*	-0.1060*	0.1032*	0.0750*	0.0090	0.0735*	0.0143**	-0.0718*	
SIZE	-0.1908*	-0.2862*	0.1245*	0.3522*	-0.0041	-0.1013*	-0.057*	-0.0644*	0.0422*
LIQUID	-0.0895*	-0.0594*	-0.043*	0.0457*	-0.1072*	0.0473*	0.0105	-0.1235*	-0.0663*
QUALITY	-0.0029	0.0074	-0.014**	-0.0110**	0.0344*	0.0109	0.0102	-0.0312*	-0.0039
DIVID	-0.0128**	-0.0175*	0.0060	0.0128**	-0.0061	-0.0066	-0.0039	0.0013	0.0021
PROFIT	-0.0156*	-0.0346*	0.0253*	0.0612*	-0.1639*	-0.2795*	-0.268*	0.1521*	-0.0759*
FIXAST	-0.1126*	-0.1897*	0.1016*	0.2444*	0.0263*	-0.0903*	-0.026*	0.2280*	-0.2227*
COVER	0.0122**	0.0322*	-0.027*	-0.0363*	-0.0283*	0.0105	-0.0058	0.0092	-0.0124**
EARNVOL	0.0199*	0.0245*	-0.0057	-0.0295*	0.0214*	0.0073	0.0044	0.0008	0.0298*
RETVOL	0.0144*	0.0386*	-0.032*	-0.0754*	0.1473*	0.1464*	0.0869*	0.0601*	0.1190*
SHAREPF	-0.0575*	-0.0534*	-0.0070	0.0577*	-0.0724*	0.1459*	0.0507*	-0.0506*	-0.0246*
TERM	-0.0842*	0.0041	-0.122*	0.0275*	-0.0073	-0.0361*	-0.0039	-0.0378*	0.0113**
EQPRM	0.0082	-0.0300*	0.0519*	0.0198*	-0.0026	0.0422*	0.0048	0.0271*	0.0021

	SIZE	*LIQUID*	*QUALITY*	*DIVID*	*PROFIT*	*FIXAST*	*COVER*	*EARNV*	*RETVOL*	*SHARE*
LIQUID	-0.0733*									
QUALITY	-0.0187*	-0.0062								
DIVID	0.0279*	-0.0062	-0.0031							
PROFIT	0.1514*	-0.0596*	-0.083*	0.0215*						
FIXAST	0.1463*	-0.2765*	-0.0067	0.0073	0.0585*					
COVER	-0.0066	-0.0098	-0.0017	0.0036	0.0862*	-0.0070				
EARNVOL	-0.0583*	-0.014**	0.0117**	-0.0190*	-0.0683*	-0.019*	-0.008			
RETVOL	-0.1806*	-0.0191*	0.0330*	-0.0128**	-0.2828*	-0.109*	-0.034*	0.079*		
SHAREPF	0.0200*	0.0509*	-0.0007	0.0022	0.1516*	-0.009	0.015*	-0.008	-0.112*	
TERM	-0.0028	0.0364*	0.0323*	-0.0009	0.0001	0.0140**	0.001	-0.008	0.065*	0.119*

The statistics reported here are the **Pearson** correlation coefficients between the variables used in the analysis. (*) and (**) represent that the correlation coefficient is significant at 1 percent level and 5 percent level, respectively. See Table 7.1 for variable definitions.

7.4. EMPIRICAL ANALYSIS

7.4.1. The Model

We follow the same econometric approach which is explained in the previous chapters. Our general dynamic model for the empirical study of corporate debt ownership structure is as follows (subscript-i stands for firm-*i*; β's are the unknown parameters to be estimated and ω_t is the disturbance term):

$$
\begin{aligned}
BANK\text{-}DEBT_{it} = {} & \beta_1[BANK\text{-}DEBT]_{it-1} \\
& + \beta_2[MATURITY]_{it} + \beta_3[MATURITY]_{it-1} \\
& + \beta_4[LEVERAGE]_{it} + \beta_5[LEVERAGE]_{it-1} \\
& + \beta_6[MARKET\text{-}TO\text{-}BOOK]_{it} + \beta_7[MARKET\text{-}TO\text{-}BOOK]_{it-1} \\
& + \beta_8[FIRM\text{-}SIZE]_{it} + \beta_9[FIRM\text{-}SIZE]_{it-1} \\
& + \beta_{10}[LIQUIDITY]_{it} + \beta_{11}[LIQUIDTY]_{it-1} \\
& + \beta_{12}[FIRM\text{-}QUALITY]_{it} + \beta_{13}[FIRM\text{-}QUALITY]_{it-1} \\
& + \beta_{14}[DIVIDEND\text{-}PAYOUT]_{it} + \beta_{15}[DIVIDEND\text{-}PAYOUT]_{it-1} \\
& + \beta_{16}[PROFITABILITY]_{it} + \beta_{17}[PROFITABILITY]_{it-1}. \\
& + \beta_{18}[FIXED\text{-}ASSETS]_{it} + \beta_{19}[FIXED\text{-}ASSETS]_{it-1}. \\
& + \beta_{20}[COVERAGE]_{it} + \beta_{21}[COVERAGE]_{it-1}. \\
& + \beta_{22}[EARNINGS\ VOLATILITY]_{it} + \beta_{23}[EARNINGS\ VOLATILITY]_{it-1} \\
& + \beta_{24}[RETURN\ VOLATILITY]_{it-1} \\
& + \beta_{25}[SHARE\ PERFORMANCE]_{it-1} + \beta_{26}[TERM]_{it-1} + \omega_{it}. \qquad (7.1)
\end{aligned}
$$

Model (7.1) will be estimated using difference-GMM (GMM-DIF) and system-GMM (GMM-SYS). Furthermore, we will also employ fixed-effects (within groups) estimator for comparative purposes. For the latter procedure, only a static version of the model will be considered, i.e., lagged dependent and lagged independent variables are to be removed from the model in order not to get biased estimations.

What is more, in order to search for the existence of target debt ownership structure in the framework of adjustment costs, the following procedure is to be followed using GMM estimators. Assume that desired target level, $BANK-DEBT_{it}^{*}$, is determined by several explanatory variables, x_s.

$$BANK-DEBT_{it}^{*} = \sum_{k=1} \psi_k x_{kit} + \omega_{it} \qquad (7.2)$$

where ω_{it} is disturbance term serially correlated with mean zero and possibly heteroscedastic, and ψ_k's are estimable unknown parameters which are common to each firms. The model assumes that firms adjust their current ratios, *BANK-DEBT*$_{it}$, with the degree of adjustment coefficient "θ" to attain the target debt ownership structure.

$$BANK-DEBT_{it} - BANK-DEBT_{it-1} = \theta(BANK-DEBT_{it}^{*} - BANK-DEBT_{it-1}) \qquad (7.3)$$

If $\theta = 1$, then, the actual change in bank-debt ratio will equal to the desired change and firms will have a complete adjustment with zero transaction costs, being in equilibrium. If $\theta = 0$, however, there will not be any change due to unaffordable high transaction costs and firms will set their current debt-ratios to the past level, *BANK-DEBT*$_{it-1}$.

Substituting (7.2) into (7.3), we get the following equation:

$$BANK-DEBT_{it} = (1-\theta)BANK-DEBT_{it-1} + \sum_{k=1}\theta\psi_k x_{kit} + \theta\omega_t \tag{7.4}$$

This adjustment model assumes that θ lies between zero and one because of the presence of transaction costs. If the cost of being in disequilibrium is higher (lower) than the cost of adjustment, θ, which is inversely proportional to transaction costs, tends to unity (zero).

7.4.2. EMPIRICAL RESULTS

In this section, we estimate our model using static (fixed-effects and static GMM-SYS) and dynamic (GMM-DIF and GMM-SYS) specifications. The Within Groups (WG) (fixed effects) results in tables 7.11 and 7.12 are reported assuming that there are unobservable firm-specific effects. In case of simultaneity and endogeneity problems additional to the firm heterogeneity problem, we produce GMM results in tables 7.5 to 7.8[171]. The number of dependent variables differs across countries: There are two in France; total-bank debt ratio and bank-debt ratio proxied by short-term debt ratio. In Germany, we have four different dependent variables; total bank-debt ratio, short-term bank-debt ratio, long-term bank-debt ratio (payable after one year) and long-term bank-debt ratio (payable after five years). In the UK we have three; total bank-debt ratio, short-term bank-debt ratio and long-term bank-debt ratio. In order to have more accurate country comparisons, we split UK data into two time periods: 1969-2000 and 1983-2000. Cross-country comparisons will be mainly based on the 'bank-debt ratio' dependent variable. In the next section, the implications of the results will be discussed in detail with respect to dynamic models using GMM estimator. The emphasis will be given to the static long-run equilibrium results of (7.1), which are obtained using equation (7.5) and reported at the end of the tables.

[171] The regression results in tables 7.5 to 7.8 are obtained using the following procedure: First, model (7.1) is estimated in its general format. Then, using 'general-to-specific' approach, the model is re-estimated after insignificant lagged independent variables in that estimation are removed from (7.1). The diagnostics (Correlation and Sargan tests) in the tables 7.5 to 7.8 show that the models are correctly specified.

$$Bank\ Debt^{*}_{it} = \left(\frac{\beta_2+\beta_3}{1-\beta_1}\right)Maturity^{*}_{it} + \left(\frac{\beta_4+\beta_5}{1-\beta_1}\right)Leverage^{*}_{it} + \left(\frac{\beta_6+\beta_7}{1-\beta_1}\right)Market\ to\ Book^{*}_{it} +$$
$$\left(\frac{\beta_8+\beta_9}{1-\beta_1}\right)Firm\ Size^{*}_{it} + \left(\frac{\beta_{10}+\beta_{11}}{1-\beta_1}\right)Liquidity^{*}_{it} + \left(\frac{\beta_{12}+\beta_{13}}{1-\beta_1}\right)Firm\ Quality^{*}_{it} +$$
$$\left(\frac{\beta_{14}+\beta_{15}}{1-\beta_1}\right)Dividend\ Payout^{*}_{it} + \left(\frac{\beta_{16}+\beta_{17}}{1-\beta_1}\right)Profitability^{*}_{it} + \left(\frac{\beta_{18}+\beta_{19}}{1-\beta_1}\right)Fixed\ Assets^{*}_{it} +$$
$$\left(\frac{\beta_{20}+\beta_{21}}{1-\beta_1}\right)Coverage^{*}_{it} + \left(\frac{\beta_{22}+\beta_{23}}{1-\beta_1}\right)Earnings\ Volatility^{*}_{it} + \left(\frac{\beta_{24}+\beta_{25}}{1-\beta_1}\right)Return\ Volatility^{*}_{it} +$$
$$\left(\frac{\beta_{26}+\beta_{27}}{1-\beta_1}\right)Share\ Price\ Change^{*}_{it} + \left(\frac{\beta_{28}+\beta_{29}}{1-\beta_1}\right)Term\ Structure^{*}_{it} \qquad (7.5)$$

7.4.2.1. Dynamic Debt Ownership Structure using GMM

7.4.2.1.1. Target Debt Ownership Structure

The GMM results in Tables 7.5a to 7.8a reveal that our model captures the dynamics in firms' debt ownership decisions. It is because the estimated coefficients of the lagged dependent variables (LDV) are significantly positive at 1% level and less than unity for all cases, except the 'bank-total' dependent variable using GMM-DIF for France[172]. It implies the presence of costly and non-instantaneous adjustment process towards desired debt ownership structure[173]. (Firms may not immediately change their debt composition, which indicates the presence of adjustment costs). Thus, our proposed model for dynamic debt ownership structure is shown to be relevant with these results. In fact, Hadlock and James [2002] document that firms trade-off the information benefits of bank debt against various contracting costs as to decide whether using bank debt is an optimal decision.

With respect to the adjustment speed (θ=1-[coefficient of LDV], see equation [7.4]), the GMM results show a pattern which is common to all countries: The adjustment process gets quicker for shorter-term bank debt. This is not surprising as it should be easier to alter the composition of any short-term debt due to its maturity structure.

The adjustment coefficients of total bank-debt ratio using GMM-SYS (tables 7.7a and 7.8a) indicate that French firms are the quickest ones in adjusting themselves to desired debt ownership structure. This is consistent with the idea that time dimension constructs a very important variable explaining the evolution of firms' debt ratios in France (Kremp et al. [1999]). It seems the adjustment process is relatively very costly and slow in Germany,

[172] As expected, GMM-DIF estimator produces lower LDV coefficients than GMM-SYS does (see Blundell and Bond [1998]).

where the adjustment coefficient of total bank-debt ratio is lowest. It can also be argued that the cost of not being on the targeted (equilibrium) debt ratio is insignificant for German firms. Hence, it may not be very important for German firms to adjust quickly their debt composition. UK seems to be the middle case in this adjustment process. Overall, the results tend to reveal that the dynamic debt ownership structure implied by our model is not rejected as firms attempt to trade-off between transaction costs of being on-target and disequilibrium costs of being off-target. The relevance of dynamism is also confirmed due to the considerable amount of lagged independent variables being significant in tables 7.5a to 7.7a.

7.4.2.1.2. Debt Maturity Structure

The relationship between debt maturity and bank-debt ratio (BDR) is negative but insignificant in France. In the UK (tables 7.6b and 7.8b) and Germany (Table 7.7b), the relationship is significantly negative as predicted by the arguments[174]. Thus, it seems French firms' debt maturity decisions are independent from debt ownership decisions unlike their German and UK counter parts which tend to borrow privately if the debt is of shorter-maturity.

7.4.2.1.3. Capital Structure[175]

The insignificant coefficient estimates of leverage indicate that capital structure of French firms does not affect their debt composition decisions. Although the long-run leverage multiplier is insignificant in Germany, the lagged leverage and BDR in the short-run model are significantly negatively associated (Table 7.7a). This may partially confirm Drukarcyk et al's. [1985] who posit that debt-ratio is one of the most important factors in Germany to get bank debt. In the UK, only the long-run multiplier is significantly negative for the 1969-2000 period (Table 7.8b). These negative findings support Diamond's idea that firms with high debt ratios may restrict their bank borrowing to prevent frequent liquidations[176]. They may also be related to the idea that higher leverage means lower agency costs and hence less usage of monitored debt. Considering leverage

[173] Cantillo and Wright [2000], and Hoshi et al. [1993] also report significantly positive estimated coefficients of LDV.

[174] Esho et al. [2001], and Houston and James [1996] report the same type or relation. Esho et al. argue that issuing long-term debt can imply firm reputation and serves a substitute for bank monitoring to mitigate agency problems.

[175] The results are based on book-leverage. Using market-leverage as an alternative definition does not change the quality of results.

[176] Dennis and Mihov [2003], Hadlock and James [2002], Houston and James [1996] and MacKie-Mason [1990b] also detect a negative relation. Thus, our results contradict the findings of Anderson and Makhija [1999], Hoshi et al. [1993], Johnson [1997] and Esho et al. [2001] who report a significantly positive leverage coefficient.

as financial distress proxy, these results are not surprising in terms of bankruptcy rules: German bankruptcy laws allow for liquidation rather than reorganisation, UK laws may cause too many premature liquidations and French laws protect the ailing firms[177]. Consequently, the argument that firms with high debt ratios borrow from banks in order to minimise agency, bankruptcy and asymmetric information costs is not confirmed.

7.4.2.1.4. Growth Opportunities[178]

Unlike in the UK, our experiments reveal that there is no a non-monotonous relation between market-to-book ratio (MTBR) and bank debt use in France and Germany[179]. The only discernible finding for the latter countries is the significantly positive coefficient on current MTBR in France (Table 7.5a)[180]. This implies that French firms with growth prospects tend to borrow from banks due to information asymmetries, high disclosure costs, low contracting costs, or the absence of bank information monopolies. It seems that costs related to information asymmetries, agency conflicts and monitoring, and holdup problems are not prevalent for German firms. This may be due to their corporate governance structure which is designed to mitigate agency and asymmetric information problems[181].

On the other hand, there are two cases in which we can argue that there is a U-shaped relation between bank debt ratio and MTBR in the UK: In Table 7.8b for the period 1983-2000, the coefficients on MTBR and $MTBR^2$ are significantly negative and positive, respectively at 10 %. An even stronger finding is in Table 7.8b for the period 1969-2000 using 'short-term bank debt ratio' as dependent variable, where the coefficients are significant at 1 % and have the predicted signs. Hence, one may state that

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177 As the theme of saving a ailing enterprise is emphasised by French laws relative to British and German, safeguarding of the jobs involved is the second most important goal, whereas satisfying creditors comes only in third place in France. Despite the bankruptcy reform in 1994, creditors' interests remain explicitly subordinated under French insolvency proceedings. This new law caused uncertainty as to future value guarantees in business failures, and hence tightened the selection criteria of firms for bank loans. It is known that insolvency losses of French banks are considerably larger than their German counter parts.

178 The results do not change substantially if we use depreciation ratio and intangible-assets ratio as alternative measures to market-to-book ratio.

179 In the UK, excluding $MTBR^2$ from the model does not change the quality of results of other variables. However, in some cases it makes the significant MTBR coefficient of non-linear model insignificant in the linear regression. Hence, we do not report the results of the regressions assuming linearity between bank-debt ratio and MTBR in the UK. In France and Germany, there is no evidence of non-linearity and including $MTBR^2$ in the regression reduces the power of the model. Thus, we only report results assuming linearity in these countries.

180 Anderson and Makhija [1999], Houston and James [1996] for firms with multiple bank relations, and Krishnaswami et al. [1999] also find a significantly positive MTBR coefficient.

181 Similarly, Easterwood and Kadapakkam [1991], Esho et al. [2001], Hadlock and James [2002] and Hoshi et al. [1993] cannot find a significant MTBR coefficient.

low-growth and high-growth firms borrow from banks due to different reasons while medium-growth firms borrow from public debt markets.

With respect to the GMM-DIF results in Table 7.6b, the coefficient on $MTBR^2$ is insignificant but has the predicted sign while that on MTBR is significantly negative[182]. As explained by Houston and James [2001], this strong negative impact implies that banks may focus their lending on fixed assets, working capital, etc. not on the firms with intangible growth opportunities (supply side). It may also be possible that firms with profitable growth opportunities restrict their bank borrowings due to potential holdup problems (demand side).

7.4.2.1.5. Firm Size[183]

The existing empirical studies have detected a kind of stylised fact that small firms borrow from banks as almost all papers report significantly negative coefficient on firm size. Similarly, our results for France and Germany (Table 7.7b), and the UK (7.6b) confirm this common finding with significantly negative size coefficient. Hence, the flotation costs hypothesis that small firms do not prefer public debt due to high flotation costs is confirmed with these findings. Furthermore, the argument that small firms are immature, riskier, and have relatively high growth options, thus, tend not to borrow from public debt market is also confirmed. Consequently, debt composition decisions of firms in these countries are similar with respect to firm size and do not reflect the different institutional features in this respect.

7.4.2.1.6. Liquidity

The results show that the reliance on bank debt is negatively associated with firms' liquidity in France (tables 7.7b and 7.5a), in Germany (Table 7.7b), and in the UK for the period 1969-2000 (tables 7.6b, 7.8b) and for the period 1983-2000 (Table 7.8a). Hence, it seems that liquid firms avoid borrowing from banks possibly due to holdup problems or monitoring costs, which are not specific to arm's-length public debt.

7.4.2.1.7. Firm Quality

The impact of firm quality on debt replacement decisions seems to differ across countries. In Germany, it has no significant effect on debt ownership structure. This does not confirm Drukarcyk et al. [1985] who show that quality of management is one of the most important factors in Germany to get bank debt. On the other hand, bank-debt ratio is

182 The studies which find a significantly negative MTBR coefficient are Houston and James [1996] for firms with single bank relation, Johnson [1997] and MacKie-Mason [1990b].

183 The results are based on Ln(Total Sales). Using Ln(Total Assets) as an alternative definition does not change the quality of results.

significantly positively associated with quality in France (Table 7.5a) and in the UK for the period 1969-2000 (Table 7.8). This positive association may be due to the argument that firms with future profitability and favourable information would prefer to borrow from better-informed lenders, such as banks, due to asymmetric information concerns. By this way, such firms would be able to signal their true value to the market.

With the same token, the insignificance of firm quality in shaping debt ownership structure of German firms may be because of the close relations between companies and banks, which should mitigate asymmetric information problems. This is in line with the finding of Krishnaswami et al. [1999] who conclude that adverse selection does not affect debt placement structure of firms with favourable information about future earnings but without considerable information asymmetries.

7.4.2.1.8. Dividend Policy

The association of bank-debt ratio with dividend payout ratio seems country-dependent with respect to GMM-DIF results. The correlation is significantly negative for France (Table 7.5) and the UK (Table 7.6), and significant positive for Germany (Table 7.5). As found by MacKie-Mason [1990b] and Saà-Requejo [1996], UK and French firms choose to use bank debt if they tend to decrease their payout ratios. This implies that firms in France and the UK avoid the adverse consequences of issuing public debt when they decide to cut dividend payments or not to pay at all. Hence, information content of paying dividends with respect to firms' growth prospects and future cash stream seems to be prevalent in these countries.

On the other hand, this argument fails to explain the positive impact of dividends in Germany. This non-negative finding can be explained by the conventional wisdom that close relations between firms and banks in Germany reduce asymmetric information problems. If banks are both financiers and shareholders, then they would possible force managers to pay dividends. Yet, it seems a puzzle why firms should pay dividends and then borrow from banks[184].

[184] Cobham and Serre [2000] argue that the relationship between corporations and banks in France is different from the ones in Germany and the UK. Representation of French banks on firms' board are less frequent than that of German banks. Thus, no flow of information or risk-sharing and control is involved in this relationship. Bank-firm relations in France are closer and longer-term than in the UK. Credit relationship and refinancing of bank debt (contractual and conditional) depends on the past behaviour of firms and their information supply to banks. French firms are not generally subjected to close monitoring

7.4.2.1.9. Firm Performance

The interaction between profitability and bank-debt ratio seems to be in line with the implications of institutional features. The association is significantly negative in France (Table 7.5) and insignificant in Germany and the UK. The irrelevance of profitability in Germany can be explained by the argument that monitored bank debt and concentrated share ownership mitigates agency cost of free cash flow[185]. What makes profitability ineffective in choosing the lender of UK firms may be developed public debt markets which can absorb the fluctuations of firms' internal sources. The inverse relationship between profitability and bank debt use in France can be explained by screening theory which contends that family controlled firms are less likely to borrow from banks[186].

7.4.2.1.10. Asset Collateral

Static long-run results show that asset collateral does not seem to be important in choosing debt provider in any of the sample countries[187]. However, we do detect some differences with respect to the estimates of short-run models. While the coefficient on lagged fixed-assets ratio is significantly negative in France (Table 7.5a) the same coefficient is significantly positive in the UK (tables 7.6a and 7.8a, for the 1969-2000 period). The negative finding in France may be due to the argument that firms with collateralisable non-financial assets choose to issue cost-efficient public debt. This implies that firms with lower incentive problems can be rewarded with lower interest rates. In addition, the current fixed-assets ratio coefficient is significantly positive in Germany (Table 7.7a) but it is significantly negative in the UK (tables 7.6a and 7.8a, for the 1969-2000 period). Drukarcyk et al. [1985] show that assets for collateral is one of the most important factors in Germany to get bank debt, which receives some support from the finding of significant fixed-assets ratio coefficient. The positive impact of

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by banks and managers retain relatively high control and independence. Rational risk management by banks and prudential behaviour by firms has been the essence.

[185] The panel study of Lehmann and Weigand [2000] for German corporations shows that having financial institutions as largest shareholders of listed firms improves profitability. This finding is consistent with the argument that banks are better and more efficient in monitoring to mitigate agency-type problems. However, as discussed by Franks and Mayer [2001], such close relationships may exacerbate the conflicts between banks and shareholders due to proxy votes held by banks. Becht [1999] argues that high voting power concentration through block holdings leads to liquidity costs but this cost can be alleviated by the role of banks in Germany.

[186] Cantillo and Wright [2000] find that, contrary to screening theory, closely held/family firms are more likely to borrow from intermediaries. This means banks' informational advantage over public debtholders can be attributed to the banks' power as (ex-post) reorganisers rather than (ex-ante) screeners.

[187] Cantillo and Wright [2000], Easterwood and Kadapakkam [1991], Hoshi et al. [1993] and Houston and James [1996] cannot find asset collateral to be significant in debt ownership structure decisions. One explanation maybe that non-financial assets do not serve as valuable collateral.

lagged collateral in the UK and current collateral in Germany could be due to banks' requirements for asset collateral while lending (Edwards and Fisher [1994])[188].

7.4.2.1.11. Financial Distress

The results reveal that the relationship between coverage ratio and bank-debt ratio is not uniform across countries. It seems that high or low coverage ratio does not affect firms' debt ownership decisions in the UK and Germany. On the other hand, bank debt use is strongly positively associated with coverage ratio in France (Table 7.5). It means French firms with low probability of being distressed are more likely to issue bank debt. Obviously, this is contrary to what the theory predicts and hence might be peculiar to France[189].

7.4.2.1.12. Earnings Volatility

The GMM-DIF results show that the association of bank debt use with earnings volatility is country-dependent. While earnings volatility has no significant impact on debt ownership decisions in Germany and France, it has significantly negative effect in the UK. Our finding that UK firms with high volatile earnings are likely to issue public debt is not predicted by the theory and inconsistent with the findings of Johnson [1997] and Saà-Requejo [1996]. One explanation to this negative finding is that since public debt markets are developed, UK firms with high volatile earnings may not prefer to borrow from banks as they have less restrictions to the public debt access than their counter parts in France and Germany.

7.4.2.1.13. Macroeconomic and Stock Market Factors

Stock Return Volatility

The GMM-SYS results show that the association of bank-debt ratio with stock return volatility varies across countries in a similar pattern with earnings volatility. As also found by Anderson and Makhija [1999] for Japanese firms, and Easterwood and Kadapakkam [1991] for US firms, the relationship is insignificant in France and Germany. However, contradicting the theory and the findings of Hadlock and James [2002], the correlation between bank debt use and stock return volatility turns out to be negative and significant at 1 % in the UK. Thus, it is interesting to note that UK firms with less volatile stock prices are more likely to issue bank debt despite the asymmetric

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[188] Esho et al. [2001], Hadlock and James [2002], and Johnson [1997] also find direct impact of collateral on bank debt choice.

[189] Leverage could also serve as a financial distress proxy. Thus, we re-estimated the model after excluding leverage but the quality of the results remained to be the same.

information problems. It also means that UK firms with greater potential for undervaluation tend to avoid issuing bank debt.

Change in Stock Price

The association of bank-debt ratio with stock price change (share performance) seems to be insignificant in Germany and the UK. However, the results indicate that French firms are less likely to issue bank debt if their share prices have gone up as the relevant coefficient is significantly negative (tables 7.5 and 7.7). Hadlock and James [2002] and MacKie-Mason [1990b] find the same association for US firms. An increase in share price may refer to firms' quality and convince the public debtholders about their future prospects. In this case, it would be more advantageous for French firms not to borrow from banks.

Term Structure of Interest Rates

The results exhibit that the association of bank debt use with term structure of interest rates is country-dependent. In France, the trend in yield curve does not seem to affect managers' decisions about choosing the lenders. In Germany, term structure of interest rates has significantly positive coefficient (Table 7.7a) while the same coefficient is strongly negative in the UK (tables 7.6 and 7.8). Hence, one can conclude that when long-term interest rates are relatively higher UK firms are reluctant to raise bank debt while German firms tend to issue bank debt. It seems that the impact of monetary policies in relation to cost of bank capital on corporate sector may differ across countries.

Table 7.5: a) Corporate debt ownership structure in France and Germany: difference-GMM ('specific' approach)

Independent Variables	Predicted Sign	FRANCE		GERMANY			
		BANK-TOTAL	*BANK-PROXY*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*	*BANK-LONG>5*
$BANK_{i,t-1}$	+	-0.0683	0.3141***	0.6699***	0.3656***	0.3937***	0.5325**
		(0.2306)	(0.0669)	(0.0991)	(0.0507)	(0.0540)	(0.0688)
$MATURITY_{i,t}$	-	-0.0165	-	-0.0354*	-	-	-
		(0.2156)	-	(0.0215)	-	-	-
$MATURITY_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$LEVERAGE_{i,t}$	+/-	0.2518	-0.2729**	-0.0394	0.3555***	-0.3421***	-0.0030
		(0.9134)	(0.1392)	(0.0508)	(0.1305)	(0.1228)	(0.0694)
$LEVERAGE_{i,t-1}$		-	-0.1765**	-	-0.2250***	0.1922***	-
		-	(0.0729)	-	(0.0686)	(0.0727)	-
$MKT\text{-}TO\text{-}BOOK_{i,t}$	+/-	0.0564*	0.0032	0.0033	-0.0034	0.0166	0.0011
		(0.0342)	(0.0244)	(0.0077)	(0.0170)	(0.0178)	(0.0117)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$SIZE_{i,t}$	-	-0.0621	0.0390	-0.0153	0.0015	-0.0154	0.0121
		(0.2521)	(0.0461)	(0.0175)	(0.0312)	(0.0302)	(0.0108)
$SIZE_{i,t-1}$		-	0.0153**	-	-	-	-
		-	(0.0078)	-	-	-	-
$LIQUIDITY_{i,t}$	+/-	0.0783	-0.2347***	0.0003	-0.0026***	0.0045**	0.0018
		(0.1136)	(0.0471)	(0.0005)	(0.0011)	(0.0023)	(0.0019)
$LIQUIDITY_{i,t-1}$		-0.0040**	0.1027***	-	-	-	-
		(0.0020)	(0.0233)	-	-	-	-
$QUALITY_{i,t}$	+	0.0188	-0.0189***	0.0017	-0.0206**	0.0195**	-0.0104*
		(0.0510)	(0.0045)	(0.0021)	(0.0104)	(0.0092)	(0.0079)
$QUALITY_{i,t-1}$		0.0523*	-	-	-	-	-
		(0.0311)	-	-	-	-	-
$DIVIDEND_{i,t}$	-	-0.0151***	0.0006*	0.0030**	-0.0014	0.0021	-0.0002
		(0.0059)	(0.0036)	(0.0015)	(0.0025)	(0.0030)	(0.0021)
$DIVIDEND_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$PROFITABILITY_{i,t}$	+/-	-0.4558**	-0.3739	-0.0234	0.0207	-0.0439	-0.0144
		(0.1769)	(0.2667)	(0.0230)	(0.0909)	(0.0884)	(0.0575)
$PROFITABILITY_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$FIXED\ ASSETS_{i,t}$	+/-	-0.9879	-0.4671	0.0215	-0.3272*	0.2864*	0.0962
		(1.7400)	(0.4639)	(0.0466)	(0.1710)	(0.1650)	(0.0943)
$FIXED\ ASSETS_{i,t-1}$		-0.2043*	0.6565***	-	0.1849**	-0.1798**	-0.0731*
		(0.1242)	(0.1693)	-	(0.0745)	(0.0771)	(0.0445)
$COVERAGE_{i,t}$	-	0.0018**	-0.0001	0.0000	0.0001*	-0.0001	0.0000
		(0.0008)	(0.0003)	(0.0000)	(0.00006)	(0.0000)	(0.0000)
$COVERAGE_{i,t-1}$		0.0010**	-	-	-	-	-
		(0.0004)	-	-	-	-	-
$EARNINGS\ VOL_{i,t}$	+	0.0305	0.0078	-0.0004	0.0011*	-0.0011**	-0.0009
		(0.0360)	(0.0052)	(0.0004)	(0.0006)	(0.0005)	(0.0007)
$EARNINGS\ VOL_{i,t-1}$		-	-	-	0.0007**	-0.0007*	-
		-	-	-	(0.0003)	(0.0004)	-
RETURN VOL	+	-0.3107	-0.4789*	0.0257	-0.0937	0.0600	0.1008
		(1.3870)	(0.2911)	(0.0550)	(0.2670)	(0.2609)	(0.1318)
SHARE PERFORM	-	-0.0682***	-0.0045	0.0004	-0.0019	-0.0010	0.0020
		(0.0265)	(0.0133)	(0.0044)	(0.0147)	(0.0151)	(0.0064)

TERM	+/-	-0.0192	0.0010	0.0003	0.0006	0.0001	-0.0008
		(0.0205)	(0.0027)	(0.0005)	(0.0025)	(0.0025)	(0.0013)
Constant		0.0078	-0.0015	-0.0001	0.0040*	-0.0018	-0.0003
		(0.0374)	(0.0043)	(0.0006)	(0.0021)	(0.0020)	(0.0009)
Correlation1		-0.4947	-4.498***	-4.376***	-7.765***	-7.655***	-6.537***
Correlation2		-0.8832	0.9034	-0.5638	0.1668	0.1302	0.1311
Sargan Test (df)		19.53 (72)	161.3 (154)	105.5 (132)	231 (209)	235 (209)	110.5 (121
Wald Test-1 (df)		36.12 (19)***	81.62 (18)***	94.96 (15)***	99.03 (17)***	113.7 (17)***	84.9 (14)**
Firms / Observations		191 / 325	274 / 1784	453 / 3424	447 / 3278	447 / 3278	453 / 3418
Estimation Period		1993-1999	1985-1999	1989-1999	1990-1999	1990-1999	1989-1999

b) Static long-run results

Independent Variables	Predicted Sign	FRANCE		GERMANY			
		BANK-TOTAL	*BANK-PROXY*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*	*BANK-LONG>5*
$MATURITY_{i,t}$	-	-0.0154	-	-0.1072	-	-	-
		(0.1999)	-	(0.0715)	-	-	-
$LEVERAGE_{i,t}$	+/-	0.2357	-0.6552**	-0.1195	0.2057	-0.2472	-0.0063
		(0.8546)	(0.3342)	(0.1535)	(0.1999)	(0.2137)	(0.1486)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	+/-	0.0528	0.0047	0.0100	-0.0053	0.0274	0.0024
		(0.0721)	(0.0357)	(0.0223)	(0.0268)	(0.0292)	(0.0251)
$SIZE_{i,t}$	-	-0.0581	0.0791	-0.0463	0.0023	-0.0255	0.0258
		(0.2382)	(0.0637)	(0.0540)	(0.0492)	(0.0495)	(0.0241)
$LIQUIDITY_{i,t}$	+/-	0.0695	-0.1925***	0.0009	-0.0042***	0.0074**	0.0039
		(0.1324)	(0.0669)	(0.0014)	(0.0016)	(0.0037)	(0.0040)
$QUALITY_{i,t}$	+	0.0666	-0.0276***	0.0052	-0.0324**	0.0321**	-0.0222
		(0.0630)	(0.0078)	(0.0064)	(0.0165)	(0.0153)	(0.0168)
$DIVIDEND_{i,t}$	-	-0.0142***	0.0009	0.0090*	-0.0023	0.0035	-0.0005
		(0.0055)	(0.0062)	(0.0053)	(0.0040)	(0.0049)	(0.0044)
$PROFITABILITY_{i,t}$	+/-	-0.4267**	-0.5451	-0.0708	0.0326	-0.0723	-0.0308
		(0.1656)	(0.3929)	(0.0727)	(0.1431)	(0.1459)	(0.1236)
$FIXED\ ASSETS_{i,t}$	+/-	-1.1160	0.2760	0.0651	-0.2243	0.1758	0.0494
		(1.3560)	(0.6711)	(0.1437)	(0.2889)	(0.2963)	(0.2028)
$COVERAGE_{i,t}$	-	0.0026***	-0.0001	0.0001	0.0001*	-0.0001	-0.0001
		(0.0009)	(0.0004)	(0.0001)	(0.00006)	(0.0001)	(0.0001)
$EARNINGS\ VOL_{i,t}$	+	0.0285	0.0113	-0.0011	0.0027**	-0.0031**	-0.0019
		(0.0337)	(0.0078)	(0.0012)	(0.0013)	(0.0014)	(0.0016)
RETURN VOL	+	-0.2909	-0.6982	0.0780	-0.1477	0.0990	0.2156
		(1.3126)	(0.4950)	(0.1720)	(0.4215)	(0.4305)	(0.2849)
SHARE PERFORM	-	-0.0639***	-0.0065	0.0012	-0.0030	-0.0016	0.0043
		(0.0248)	(0.0196)	(0.0133)	(0.0231)	(0.0249)	(0.0137)
TERM	+/-	-0.0180	0.0014	0.0010	0.0009	0.0001	-0.0017
		(0.0210)	(0.0040)	(0.0016)	(0.0040)	(0.0042)	(0.0029)

See notes in Table 7.1 for variable definitions. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Test-1 tests the joint significance of estimated coefficients; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 7.6: a) Corporate debt ownership structure in the UK: difference-GMM ('specific' approac

Independent Variables	Predicted Sign	Dependent Variables: 1969-2000			Dependent Variables: 1983-2000		
		BANK-TOTAL	*BANK-SHORT*	*BANK-LONG>1*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*
$BANK_{i,t-1}$	+	0.6139***	0.4623***	0.7445***	0.4241***	0.4906***	0.5573***
		(0.0469)	(0.0345)	(0.0426)	(0.0431)	(0.0370)	(0.0343)
$MATURITY_{i,t}$	-	-0.6953***	-	-	-0.3497***	-	-
		(0.1033)	-	-	(0.0770)	-	-
$MATURITY_{i,t-1}$		0.3738***	-	-	0.0891*	-	-
		(0.0893)	-	-	(0.0516)	-	-
$LEVERAGE_{i,t}$	+/-	0.0433	-0.0103	0.0349	0.1211	0.0790	-0.0092
		(0.0982)	(0.0445)	(0.0684)	(0.1048)	(0.0648)	(0.0501)
$LEVERAGE_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-	-0.0243**	-0.0367***	-0.0122*	-0.0217**	-0.0212*	-0.0131
		(0.0117)	(0.0118)	(0.0074)	(0.0108)	(0.0120)	(0.0108)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$MKT\text{-}TO\text{-}BOOK^2_{i,t}$	+	0.0000	0.0002	0.0001	0.0002	0.0001	0.0001
		(0.0002)	(0.0002)	(0.0002)	(0.0004)	(0.0001)	(0.0001)
$MKT\text{-}TO\text{-}BOOK^2_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$SIZE_{i,t}$	-	0.0569*	0.0571*	0.0517**	-0.0542**	-0.0775***	-0.0013
		(0.0347)	(0.0345)	(0.0218)	(0.0239)	(0.0232)	(0.0179)
$SIZE_{i,t-1}$		-0.1036***	-0.1259***	-0.0683***	-	-	-
		(0.0339)	(0.0326)	(0.0211)	-	-	-
$LIQUIDITY_{i,t}$	+/-	-0.0636**	-0.1630***	-0.0295*	-0.0018	-0.0336	0.0072
		(0.0345)	(0.0417)	(0.0174)	(0.0186)	(0.0287)	(0.0193)
$LIQUIDITY_{i,t-1}$		-	-	-0.0504**	-	-	-
		-	-	(0.0226)	-	-	-
$QUALITY_{i,t}$	+	0.0682	-0.0018	0.0465*	0.0083	-0.0194	0.0347
		(0.0555)	(0.0339)	(0.0283)	(0.0193)	(0.0415)	(0.0264)
$QUALITY_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$DIVIDEND_{i,t}$	-	-0.0035	0.0023	-0.0007	0.0020	0.0075	0.0002
		(0.0030)	(0.0049)	(0.0012)	(0.0036)	(0.0059)	(0.0026)
$DIVIDEND_{i,t-1}$		-0.0069*	-	-	-	-	-
		(0.0042)	-	-	-	-	-
$PROFITABILITY_{i,t}$	+/-	0.0609	-0.1040	0.0745	-0.1272	-0.0876	-0.0312
		(0.1464)	(0.1341)	(0.0869)	(0.1100)	(0.1360)	(0.1093)
$PROFITABILITY_{i,t-1}$		-	-	-	-	-	-0.1555*
		-	-	-	-	-	(0.0900)
$FIXED\ ASSETS_{i,t}$	+/-	-0.4855***	-0.5037***	0.0998	0.0286	0.0003	0.1735
		(0.1582)	(0.1215)	(0.0617)	(0.1281)	(0.1247)	(0.1545)
$FIXED\ ASSETS_{i,t-1}$		0.3437**	-	-	-	-	-0.3163**
		(0.1141)	-	-	-	-	(0.1398)
$COVERAGE_{i,t}$	-	-0.0001	0.0000	0.0000	0.0000	0.00005**	0.0000
		(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.00002)	(0.0000)
$COVERAGE_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$EARNINGS\ VOL_{i,t}$	+	-0.0013*	0.0003	0.0003	-0.0015	0.0058**	-0.0013
		(0.0007)	(0.0011)	(0.0011)	(0.0035)	(0.0028)	(0.0029)
$EARNINGS\ VOL_{i,t-1}$		-	-	-	-	-	0.0030*
		-	-	-	-	-	(0.0017)

RETURN VOL	+	0.0562	-0.0889	0.1190	-0.3260	-0.3889	0.1184
		(0.2229)	(0.1996)	(0.1509)	(0.2525)	(0.3084)	(0.2505)
SHARE PERFORM	-	-0.0069	-0.0411***	0.0062	0.0001	0.0119	-0.0040
		(0.0109)	(0.0105)	(0.0047)	(0.0128)	(0.0187)	(0.0131)
TERM	+/-	-0.0010	-0.0016**	-0.0008*	-0.0031**	-0.0030**	-0.0012
		(0.0010)	(0.0008)	(0.0005)	(0.0012)	(0.0013)	(0.0010)
Constant		0.0045***	-0.0011	0.0032***	-0.0004	0.0001	0.0008
		(0.0010)	(0.0010)	(0.0006)	(0.0020)	(0.0018)	(0.0014)
Correlation1		-11.9***	-14.23***	-14.58***	-11.41**	-13.52***	-13.68***
Correlation2		2.855***	1.143	3.286***	2.183**	2.281**	2.078**
Sargan Test (df)		271 (260)	242 (236)	209 (207)	246.2 (253)	240.6 (228)	239.9 (225)
Wald Test-1 (df)		1361 (20)***	432.7 (16)***	554.7 (17)***	273.7 (17)***	262.9 (15)***	302.1 (18)**
Firms / Observations		2080 / 24449	2080 / 24464	2093 / 25025	2028 / 14478	2028 / 14478	1920 / 14400
Estimation Period		1971-1999	1971-1999	1971-1999	1985-1999	1985-1999	1985-1999

b) Static long-run results

Independent Variables	Predicted Sign	Dependent Variables: 1969-2000			Dependent Variables: 1983-2000		
		BANK-TOTAL	*BANK-SHORT*	*BANK-LONG>1*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*
$MATURITY_{i,t}$	-	-0.8328***	-	-	-0.4525***	-	-
		(0.1293)	-	-	(0.0917)	-	-
$LEVERAGE_{i,t}$	+/-	0.1121	-0.0192	0.1366	0.2103	0.1550	-0.0207
		(0.2532)	(0.0824)	(0.2634)	(0.1810)	(0.1290)	(0.1134)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-	-0.0630**	-0.0683***	-0.0477	-0.0377**	-0.0416*	-0.0296
		(0.0324)	(0.0223)	(0.0302)	(0.0192)	(0.0231)	(0.0247)
$MKT\text{-}TO\text{-}BOOK^2_{i,t}$	+	0.0001	0.0004	0.0003	0.0003	0.0001	0.0003
		(0.0005)	(0.0003)	(0.0007)	(0.0007)	(0.0002)	(0.0003)
$SIZE_{i,t}$	-	-0.1211***	-0.1280***	-0.0647	-0.0942**	-0.1521***	-0.0030
		(0.0480)	(0.0305)	(0.0470)	(0.0420)	(0.0446)	(0.0405)
$LIQUIDITY_{i,t}$	+/-	-0.1647**	-0.3031***	-0.3127***	-0.0032	-0.0660	0.0163
		(0.0882)	(0.0735)	(0.1133)	(0.0324)	(0.0553)	(0.0434)
$QUALITY_{i,t}$	+	0.1767	-0.0033	0.1818	0.0144	-0.0380	0.0784
		(0.1459)	(0.0631)	(0.1218)	(0.0336)	(0.0816)	(0.0605)
$DIVIDEND_{i,t}$	-	-0.0268*	0.0042	-0.0028	0.0034	0.0147	0.0004
		(0.0157)	(0.0091)	(0.0049)	(0.0062)	(0.0115)	(0.0058)
$PROFITABILITY_{i,t}$	+/-	0.1578	-0.1935	0.2914	-0.2209	-0.1719	-0.4218*
		(0.3748)	(0.2511)	(0.3319)	(0.1922)	(0.269)	(0.2489)
$FIXED\ ASSETS_{i,t}$	+/-	-0.3673	-0.9368***	0.3906	0.0496	0.0006	-0.3225*
		(0.3291)	(0.2222)	(0.2444)	(0.2227)	(0.2449)	(0.1925)
$COVERAGE_{i,t}$	-	-0.0002	-0.0001	0.0000	0.0000	0.00001**	0.0000
		(0.0002)	(0.0002)	(0.0001)	(0.0000)	(0.00005)	(0.0000)
$EARNINGS\ VOL_{i,t}$	+	-0.0033*	0.0005	0.0011	-0.0025	0.0114**	0.0037
		(0.0019)	(0.0021)	(0.0043)	(0.0060)	(0.0057)	(0.0087)
RETURN VOL	+	0.1457	-0.1654	0.4657	-0.5660	-0.7635	0.2674
		(0.5735)	(0.3736)	(0.5896)	(0.4536)	(0.6227)	(0.5662)
SHARE PERFORM	-	-0.0180	-0.0764***	0.0241	0.0001	0.0235	-0.0090
		(0.0283)	(0.0211)	(0.0180)	(0.0222)	(0.0367)	(0.0295)
TERM	+/-	-0.0025	-0.0031**	-0.0032*	-0.0054**	-0.0060**	-0.0028
		(0.0025)	(0.0015)	(0.0019)	(0.0022)	(0.0025)	(0.0022)

See notes in Table 7.1 for variable definitions. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Test-1 tests the joint significance of estimated coefficients; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 7.7: a) Corporate debt ownership structure in France and Germany: system-GMM ('specific' approach)

Independent Variables	Predicted Sign	FRANCE		GERMANY			
		BANK-TOTAL	BANK-PROXY	BANK-TOTAL	BANK-SHORT	BANK-LONG>1	BANK-LONG>5
$BANK_{i,t-1}$	+	0.3599***	0.4488***	0.7929***	0.4382***	0.4605***	0.5896**
		(0.1494)	(0.0499)	(0.0733)	(0.0383)	(0.0394)	(0.0461)
$MATURITY_{i,t}$	-	-0.1171	-	-0.0523**	-	-	-
		(0.1510)	-	(0.0218)	-	-	-
$MATURITY_{i,t-1}$		-	-	0.0147*	-	-	-
		-	-	(0.0082)	-	-	-
$LEVERAGE_{i,t}$	+/-	0.0531	-0.2851***	0.0159	0.0268	-0.0487	0.0336
		(0.3261)	(0.1099)	(0.0421)	(0.0747)	(0.0689)	(0.0449)
$LEVERAGE_{i,t-1}$		-	-	-0.0322*	-	-	-
		-	-	(0.0196)	-	-	-
$MKT\text{-}TO\text{-}BOOK_{i,t}$	+/-	0.0308	0.0016	-0.0003	-0.0040	0.0030	-0.0062
		(0.0246)	(0.0119)	(0.0023)	(0.0125)	(0.0125)	(0.0065)
$MKT\text{-}TO\text{-}BOOK_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$SIZE_{i,t}$	-	-0.0291	-0.0040	-0.0030	0.0014	-0.0080	-0.0026
		(0.0297)	(0.0094)	(0.0020)	(0.0083)	(0.0078)	(0.0042)
$SIZE_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$LIQUIDITY_{i,t}$	+/-	0.0804**	-0.1513***	0.0001	-0.0023***	0.0026**	0.0007
		(0.0325)	(0.0445)	(0.0001)	(0.0009)	(0.0011)	(0.0007)
$LIQUIDITY_{i,t-1}$		-	0.0897***	-	-	-	-
		-	(0.0300)	-	-	-	-
$QUALITY_{i,t}$	+	0.0169	-0.0251***	0.0025	-0.0109	0.0105*	0.0055
		(0.0494)	(0.0070)	(0.0017)	(0.0117)	(0.0063)	(0.0051)
$QUALITY_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$DIVIDEND_{i,t}$	-	0.0058	0.0000	0.0006	0.0016*	0.0002	-0.0003
		(0.0111)	(0.0029)	(0.0007)	(0.0009)	(0.0018)	(0.0016)
$DIVIDEND_{i,t-1}$		-	-	-	0.0013**	-	-
		-	-	-	(0.0006)	-	-
$PROFITABILITY_{i,t}$	+/-	-0.1811	-0.2176*	0.0030	-0.0541	0.0384	0.0152
		(0.2619)	(0.1237)	(0.0105)	(0.0865)	(0.0818)	(0.0578)
$PROFITABILITY_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$FIXED\ ASSETS_{i,t}$	+/-	0.3144	-0.8211***	0.0291*	-0.2340**	0.2343***	0.0988**
		(0.2382)	(0.2801)	(0.0166)	(0.1004)	(0.0916)	(0.0500)
$FIXED\ ASSETS_{i,t-1}$		-	0.7056***	-	-	-	-
		-	(0.2674)	-	-	-	-
$COVERAGE_{i,t}$	-	-0.0002	0.0001	0.0000	0.0001**	-0.0001**	0.0000
		(0.0003)	(0.0004)	(0.0000)	(0.00005)	(0.00005)	(0.0000)
$COVERAGE_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$EARNINGS\ VOL_{i,t}$	+	-0.0185	-0.0035***	-0.0001	0.0010	-0.0012**	0.0002
		(0.0120)	(0.0013)	(0.0003)	(0.0009)	(0.0006)	(0.0005)
$EARNINGS\ VOL_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
RETURN VOL	+	-0.6505	-0.3844	0.0174	0.2276	-0.2170	-0.1603
		(0.9750)	(0.2650)	(0.0359)	(0.2250)	(0.2167)	(0.1166)
SHARE PERFORM	-	-0.0542*	-0.0289***	0.0013	-0.0153	0.0100*	0.0145**
		(0.0311)	(0.0110)	(0.0026)	(0.0116)	(0.0060)	(0.0071)

TERM	+/-	-0.0156	-0.0005	0.0007*	0.0005	0.0003	-0.0006
		(0.0188)	(0.0025)	(0.0004)	(0.0021)	(0.0021)	(0.0012)
Constant		0.5416	0.5623***	0.2437***	0.3209**	0.2575*	0.0522
		(0.5072)	(0.1805)	(0.0899)	(0.1359)	(0.1359)	(0.0645)
Correlation1		-2.342**	-5.247***	-4.756***	-9.046***	-8.937***	-6.91***
Correlation2		-0.7803	1.475	-0.3532	0.4638	0.4238	0.1504
Sargan Test (df)		60.59 (243)	233 (318)	187.8 (275)	246.5 (252)	245.3 (252)	236.1 (252
Wald Test-1 (df)		87.95 (15)***	260.8 (16)***	380.9 (17)***	220.2 (14)***	239.8 (14)***	255 (14)**
Wald Test-2 (df)		19.31 (14)	25.9 (15)***	15.31 (14)	36.67 (14)***	33.26 (14)***	23.8 (14)**
R^2		0.4388	0.5247	0.7631	0.4634	0.4843	0.6185
Firms / Observations		196 / 527	274 / 2061	453 / 3877	453 / 3877	453 / 3877	453 / 3877
Estimation Period		1993-1999	1985-1999	1989-1999	1989-1999	1989-1999	1989-1999

b) Static long-run results

Independent Variables	Predicted Sign	FRANCE		GERMANY			
		BANK-TOTAL	*BANK-PROXY*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*	*BANK-LONG>5*
$MATURITY_{i,t}$	-	-0.1830	-	-0.1818**	-	-	-
		(0.2206)	-	(0.0712)	-	-	-
$LEVERAGE_{i,t}$	+/-	0.0829	-0.5172***	-0.0788	0.0477	-0.0903	0.0820
		(0.5095)	(0.1982)	(0.0581)	(0.1331)	(0.1276)	(0.1085)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	+/-	0.0481	0.0029	-0.0014	-0.0071	0.0056	-0.0151
		(0.0355)	(0.0216)	(0.0112)	(0.0222)	(0.0231)	(0.0157)
$SIZE_{i,t}$	-	-0.0455*	-0.0072	-0.0145**	0.0025	-0.0148***	-0.0064
		(0.0273)	(0.0169)	(0.0074)	(0.0148)	(0.0058)	(0.0102)
$LIQUIDITY_{i,t}$	+/-	0.1256**	-0.1118***	0.0006	-0.0041***	0.0048**	0.0016
		(0.0603)	(0.0368)	(0.0006)	(0.0016)	(0.0019)	(0.0017)
$QUALITY_{i,t}$	+	0.0264	-0.0455***	0.0123	-0.0193	0.0195*	0.0133
		(0.0765)	(0.0133)	(0.0092)	(0.0208)	(0.0118)	(0.0124)
$DIVIDEND_{i,t}$	-	0.0091	0.0000	0.0031	0.0052**	0.0004	-0.0008
		(0.0180)	(0.0053)	(0.0034)	(0.0023)	(0.0033)	(0.0038)
$PROFITABILITY_{i,t}$	+/-	-0.2829	-0.3948*	0.0144	-0.0962	0.0711	0.0369
		(0.4499)	(0.2156)	(0.0499)	(0.1534)	(0.1511)	(0.1401)
$FIXED\ ASSETS_{i,t}$	+/-	0.4912	-0.2095**	0.1405	-0.4165**	0.4342**	0.2406**
		(0.3479)	(0.1043)	(0.1018)	(0.1804)	(0.1723)	(0.1227)
$COVERAGE_{i,t}$	-	-0.0004	0.0002	0.0000	0.0002**	-0.0002**	-0.0001*
		(0.0004)	(0.0007)	(0.0000)	(0.0001)	(0.0001)	(0.00006
$EARNINGS\ VOL_{i,t}$	+	-0.0289	-0.0063**	-0.0006	0.0018	-0.0022**	0.0004
		(0.0194)	(0.0026)	(0.0012)	(0.0017)	(0.0011)	(0.0012)
RETURN VOL	+	-1.0163	-0.6974	0.0842	0.4050	-0.4022	-0.3907
		(1.4931)	(0.4784)	(0.1826)	(0.3962)	(0.3966)	(0.2838)
SHARE PERFORM	-	-0.0847*	-0.0524***	0.0064	-0.0273	0.0186*	0.0354**
		(0.0471)	(0.0202)	(0.0130)	(0.0207)	(0.0113)	(0.0174)
TERM	+/-	-0.0244	-0.0010	0.0032	0.0009	0.0006	-0.0013
		(0.0282)	(0.0045)	(0.0027)	(0.0038)	(0.0038)	(0.0029)

See notes in Table 7.1 for variable definitions. Industry dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 7.8: a) Corporate debt ownership structure in the UK: system-GMM ('specific' approach)

Independent Variables	Predicted Sign	Dependent Variables: 1969-2000			Dependent Variables: 1983-2000		
		BANK-TOTAL	*BANK-SHORT*	*BANK-LONG>1*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*
$BANK_{i,t-1}$	+	0.7618***	0.6583***	0.7780***	0.6690***	0.6354***	0.6825***
		(0.0241)	(0.0273)	(0.0359)	(0.0281)	(0.0295)	(0.0275)
$MATURITY_{i,t}$	-	-0.6555***	-	-	-0.3270***	-	-
		(0.0523)	-	-	(0.0600)	-	-
$MATURITY_{i,t-1}$		0.4812***	-	-	0.2137***	-	-
		(0.0487)	-	-	(0.0483)	-	-
$LEVERAGE_{i,t}$	+/-	-0.0541	0.0100	-0.0953	-0.0085	0.0251	-0.0241*
		(0.0357)	(0.0249)	(0.0682)	(0.0238)	(0.036)	(0.0146)
$LEVERAGE_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
MKT-TO-BOOK $_{i,t}$	-	-0.0178*	-0.0383***	0.0001	-0.0165*	-0.0135	-0.0071
		(0.0112)	(0.0084)	(0.0061)	(0.0092)	(0.0091)	(0.0067)
MKT-TO-BOOK$_{i,t-1}$		0.0192**	-	-	-	-	-
		(0.0089)	-	-	-	-	-
MKT-TO-BOOK$^2_{i,t}$	+	0.0003	0.0005***	-0.0002	0.0002	0.0002	0.0001
		(0.0002)	(0.0001)	(0.0004)	(0.0002)	(0.0001)	(0.0001)
MKT-TO-BOOK$^2_{i,t-1}$		-0.0004**	-	-	-	-	-
		(0.0002)	-	-	-	-	-
$SIZE_{i,t}$	-	-0.0023	0.0245**	0.0271***	-0.0014	-0.0236***	0.0168***
		(0.0050)	(0.0298)	(0.0100)	(0.0070)	(0.0083)	(0.0065)
$SIZE_{i,t-1}$		-	-0.0566*	-	-	-	-
		-	(0.0343)	-	-	-	-
$LIQUIDITY_{i,t}$	+/-	-0.0502***	-0.1456***	-0.0169	-0.0106	-0.0366**	0.0052
		(0.0169)	(0.0266)	(0.0160)	(0.0156)	(0.0186)	(0.0128)
$LIQUIDITY_{i,t-1}$		-	0.1175***	-0.0511***	-	0.0328*	-
		-	(0.0230)	(0.0189)	-	(0.0192)	-
$QUALITY_{i,t}$	+	0.0931**	0.0049	0.0727**	0.0126	-0.0027	0.0454
		(0.0475)	(0.0262)	(0.0370)	(0.0229)	(0.0248)	(0.0399)
$QUALITY_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$DIVIDEND_{i,t}$	-	-0.0012	0.0009	0.0005	0.0005	0.0058	0.0006
		(0.0029)	(0.0032)	(0.0019)	(0.0026)	(0.0042)	(0.0018)
$DIVIDEND_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
$PROFITABILITY_{i,t}$	+/-	-0.0720	0.0915	0.0594**	-0.0661	-0.0686	-0.0237
		(0.0530)	(0.0919)	(0.0303)	(0.0705)	(0.0882)	(0.0501)
$PROFITABILITY_{i,t-1}$		-	-	-0.2026**	-	-	-
		-	-	(0.0875)	-	-	-
FIXED $ASSETS_{i,t}$	+/-	-0.2420*	-0.4703***	0.0474	-0.0145	0.0097	0.2434*
		(0.1317)	(0.1602)	(0.0703)	(0.0612)	(0.067)	(0.1496)
FIXED $ASSETS_{i,t-1}$		0.2143*	0.3708**	-	-	-	-0.2457*
		(0.1259)	(0.1506)	-	-	-	(0.1342)
$COVERAGE_{i,t}$	-	-0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
		(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$COVERAGE_{i,t-1}$		-	-	-	-	-	-
		-	-	-	-	-	-
EARNINGS $VOL_{i,t}$	+	-0.0005	0.0007	0.0007	-0.0018	0.0024	-0.0023
		(0.0005)	(0.0010)	(0.0013)	(0.0024)	(0.0027)	(0.0024)
EARNINGS $VOL_{i,t-1}$		-	-	-	-	-	0.0044**
		-	-	-	-	-	(0.0020)

RETURN VOL	+	-0.2575	-0.2527	-0.0009	-0.6249***	-0.6260**	0.2060
		(0.2085)	(0.2135)	(0.1319)	(0.2006)	(0.2543)	(0.2065)
SHARE PERFORM	-	0.0059	-0.0268***	0.0144***	-0.0044	0.0216	-0.0037
		(0.0087)	(0.0095)	(0.0052)	(0.0131)	(0.0143)	(0.0129)
TERM	+/-	-0.0034***	-0.0010	-0.0013**	-0.0032***	-0.0032***	-0.0016*
		(0.0008)	(0.0008)	(0.0005)	(0.0010)	(0.0011)	(0.0009)
Constant		0.3533***	0.5541***	-0.1129	0.3486***	0.4219***	-0.1129
		(0.0704)	(0.0785)	(0.1106)	(0.0962)	(0.1215)	(0.0909)
Correlation1		-16.83***	-12.71***	-15.29***	-16.55***	-16.22***	-15.43***
Correlation2		4.516***	3.46***	2.996***	3.609***	3.067***	2.771***
Sargan Test (df)		525.8 (484)	508 (486)	252.6 (226)	418.4 (393)	375.4 (353)	376.2 (352)
Wald Test-1 (df)		3782 (20)***	1262 (18)***	1252 (17)***	819.5 (17)***	714.4 (16)***	775.8 (17)**
Wald Test-2 (df)		51.39 (15)***	92.6 (15)***	12.07 (15)	72.6 (15)***	82.65 (15)***	18.75 (15)
R^2		0.6181	0.5494	0.4638	0.5599	0.5140	0.4649
Firms / Observations		2082 / 26520	2082 / 26520	2095 / 27132	2028 / 16506	2028 / 16506	1920 / 16320
Estimation Period		1971-1999	1971-1999	1971-1999	1985-1999	1985-1999	1985-1999

b) Static long-run results

Independent Variables	Predicted Sign	Dependent Variables: 1969-2000			Dependent Variables: 1983-2000		
		BANK-TOTAL	*BANK-SHORT*	*BANK-LONG>1*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*
$MATURITY_{i,t}$	-	-0.7319***	-	-	-0.3424***	-	-
		(0.1175)	-	-	(0.1037)	-	-
$LEVERAGE_{i,t}$	+/-	-0.2270*	0.0292	-0.4292	-0.0257	0.0689	-0.0760
		(0.1379)	(0.0729)	(0.3112)	(0.0723)	(0.0995)	(0.0756)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-	0.0056	-0.1120***	0.0007	-0.0497*	-0.0371	-0.0224
		(0.0281)	(0.0239)	(0.0274)	(0.0273)	(0.0245)	(0.0213)
$MKT\text{-}TO\text{-}BOOK^2_{i,t}$	+	-0.0003	0.0016***	-0.0009	0.0007*	0.0005	0.0004
		(0.0005)	(0.0004)	(0.0016)	(0.0004)	(0.0004)	(0.0003)
$SIZE_{i,t}$	-	-0.0096	-0.0938***	0.1219***	-0.0043	-0.0646***	0.0529***
		(0.0212)	(0.0153)	(0.0389)	(0.0211)	(0.0216)	(0.0199)
$LIQUIDITY_{i,t}$	+/-	-0.2108***	-0.0820*	-0.3062**	-0.0319	-0.0103	0.0163
		(0.0693)	(0.0444)	(0.1206)	(0.0469)	(0.0520)	(0.0403)
$QUALITY_{i,t}$	+	0.3909*	0.0143	0.3276*	0.0382	-0.0075	0.1431
		(0.2333)	(0.0766)	(0.2000)	(0.0693)	(0.0679)	(0.1256)
$DIVIDEND_{i,t}$	-	-0.0049	0.0027	0.0022	0.0014	0.0158	0.0018
		(0.0122)	(0.0094)	(0.0086)	(0.0078)	(0.0118)	(0.0056)
$PROFITABILITY_{i,t}$	+/-	-0.3024	0.2677	-0.6450**	-0.1998	-0.1882	-0.0748
		(0.2287)	(0.2667)	(0.3146)	(0.2152)	(0.2444)	(0.1583)
$FIXED\ ASSETS_{i,t}$	+/-	-0.1163	-0.2912**	0.2136	-0.0439	0.0266	-0.0073
		(0.2132)	(0.1431)	(0.3228)	(0.1848)	(0.1840)	(0.1738)
$COVERAGE_{i,t}$	-	-0.0003	-0.0001	-0.0001	0.0000	0.0000	0.0000
		(0.0002)	(0.0001)	(0.0002)	(0.0000)	(0.0000)	(0.0000)
$EARNINGS\ VOL_{i,t}$	+	-0.0023	0.0021	0.0031	-0.0056	0.0067	0.0066
		(0.0022)	(0.0030)	(0.0058)	(0.0073)	(0.0075)	(0.0088)
RETURN VOL	+	-1.0811	-0.7396	-0.0041	-1.8881***	-1.7170**	0.6489
		(0.8879)	(0.6366)	(0.5943)	(0.6400)	(0.7228)	(0.6513)
SHARE PERFORM	-	0.0249	-0.0785***	0.0648***	-0.0133	0.0591	-0.0117
		(0.0367)	(0.0288)	(0.0237)	(0.0396)	(0.0388)	(0.0406)
TERM	+/-	-0.0142***	-0.0030	-0.0059**	-0.0096***	-0.0087***	-0.0050*
		(0.0034)	(0.0023)	(0.0026)	(0.0031)	(0.0030)	(0.0029)

See notes in Table 7.1 for variable definitions. Industry dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

7.4.2.2. Maturity Structure of Bank Debt

This section examines whether using short-term or long-term bank debt ratio as dependent variables instead of total bank-debt ratio changes the estimation results[190]. In France, the main concern is to see whether 'bank-total' and 'bank-proxy' have different implications. With respect to long-run results, GMM-SYS estimator (Table 7.7a) performs better than GMM-DIF estimator (Table 7.5a) as it produces more significant variables. In many cases, these two dependent variables do not have the same relationships between the explanatory variables. The main reason for the inconsistency could be that they have significantly different sample sizes. The second reason maybe the weak proxy case.

In Germany, the long-run results (tables 7.5b and 7.7.b) show that the choice of dependent variable does matter. The models using the dependent variables 'bank-short' and 'bank-long>1' have much stronger explanatory power of debt ownership structure of corporations in Germany. However, the signs of the estimated coefficients under these two dependent variables are reverse to each other. For instance, while the coefficients on liquidity, fixed-assets ratio and quality variables are significantly negative under 'bank-short', they are significantly positive under 'bank-long>1'. Furthermore, while the coefficients on coverage and earnings volatility variables are significantly positive under 'bank-short', they are significantly negative under 'bank-long>1'. The positive quality coefficient and negative earnings volatility coefficient are predicted by the theory. Another notable finding is that the coefficient on share performance is significantly positive under 'bank-long>1' and "bank-long>5', which is not predicted by the theory. As predicted by the theory, the coefficient on coverage is significantly negative under 'bank-long>1' and 'bank-long>5' (Table 7.7b).

Static long-run findings in tables 7.6b and 7.8b for the UK reveal that the results are less sensitive to the choice of dependent variable as compared to the results in France and Germany. The irrelevance of dependent variables choice is especially noticeable in Table 7.8b (period 1983-2000). The expected negative relation between bank-debt ratio and share price change can be seen under 'bank-short' for the period 1969-2000. In addition, the theory's prediction of positive correlation between bank-debt ratio and earnings volatility is found in Table 7.6b for the period 1983-2000. Finally, term structure of interest rates, leverage, coverage, liquidity, payout ratio and firm size are the variables which tend to have similar implications across different dependent variables.

7.4.2.3. Static Debt Ownership Structure

In this section, the findings for a static debt ownership structure model are presented in tables 7.9 and 7.11 (for France and Germany) and tables 7.10 and 7.12 (for the UK) assuming that target debt ownership structure is instantaneously adjusted as a reaction to random changes in the macroeconomic environment and conditions of corporation. In other words, we stipulate that there is no lag in adjustment process toward an optimal debt ownership structure.

7.4.2.3.1. GMM Estimates

Static GMM-SYS results will be compared with the long-run GMM-SYS results in tables 7.7b and 7.8b. In France, the coefficients on maturity and coverage in Table 7.9 under 'bank-total' are significantly negative and thus are consistent with the theory. These coefficients were insignificant in the dynamic model. Another difference is due to liquidity and share price performance variables, for which the estimated coefficients in the static models are now insignificant. For the remaining variables, static and dynamic models have similar results. With respect to the dependent variable 'bank-proxy', dynamic specification performs better than static one, as the significant coefficients on liquidity fixed-assets ratio and earnings volatility become insignificant for the latter case.

In Germany, static and dynamic estimates have similar results under the dependent variable 'bank-total' except the coefficient on fixed-assets ratio which is significant in the static models. Under 'bank-short', however, the results for some variables are sensitive to whether the model is dynamic or not. The significant coefficients on liquidity and payout ratio turn out to be insignificant if static model is used. On the other hand, insignificant coefficients on stock return volatility and share price performance become significant and consistent with what the theories predict in static models. Under 'bank-long>1', the dynamic model performs better than the static model as all the significant variables in the static model are also significant in the dynamic model except the stock return volatility variable. Under 'bank-long>5', the static model seems to perform better with liquidity and stock return volatility variables becoming significant but coverage ratio variable becoming insignificant.

In the UK, it is apparent that the number of significant variables in the static model is more than that of in the dynamic model. We detect an interesting finding in the static models under the dependent variables 'bank-total' and 'bank-long>1 for the period 1969-

[190] In this case, one should remove maturity variable from the model.

2000: There is an inverse-U relation between growth opportunities and bank-debt ratio while previously found U-relation under 'bank-short' remains to be the case. In the static model for the period 1983-2000, the coefficient on leverage is significantly positive under 'bank-total' and 'bank-long>1'. More importantly, the theory's prediction of the positive relationship between stock return volatility and bank debt use is confirmed under 'bank-total (1969-2000)' and 'bank-long>1 (1983-2000)'. Another finding consistent with the theory is the significantly positive coefficient on earnings volatility under 'bank-long> (1969-2000). However, the same coefficient has the unpredicted sign for the 1983-2000 period. With respect to the share price performance variable in the static models, the results are sensitive to the dependent variable choice and time period.

In general, the findings based on static and dynamic models in France and Germany tend not to conflict each other and the implications seem to be similar. However, one should be cautious about the results for the UK as there are substantial differences between the implications of static and dynamic models especially in terms of the number of the significant variables. Overall, it seems that dynamic models have more explanatory power than do static models as R^2 and Wald Statistics of joint significance of variables are higher in dynamic models than in static models.

7.4.2.3.2. Fixed-effects Estimates (WG)

The most appropriate way to compare GMM and WG estimates using the dependent variable 'bank-total' is to examine static GMM-SYS and fixed-effects results[191]. The GMM results for France in Table 7.9 are different from WG results in Table 7.11. The significantly negative association of 'bank-total' with payout ratio and share price performance using WG estimator is predicted by the theory while the significantly positive coefficient on coverage ratio is unpredicted. In Germany, the results are similar except the WG estimate of significantly negative quality coefficient, which is not consistent with the theory. In the UK, the results of both estimation procedures with respect to the variables 'maturity, firm size, profitability, fixed-assets ratio, coverage ratio, and term structure of interest rates' are the same. In each case, however, WG estimator produces more significant variables than does GMM estimator. These findings can highlight the importance of controlling for endogeneity as the results are sensitive to econometric specification.

Table 7.9: Static corporate debt ownership structure in France and Germany: system-GMM

Independent Variables	Predicted Sign	FRANCE		GERMANY			
		BANK-TOTAL	*BANK-PROXY*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*	*BANK-LONG>5*
$MATURITY_{i,t}$	-	-0.3365**	-	-0.0479***	-	-	-
		(0.1427)	-	(0.0169)	-	-	-
$LEVERAGE_{i,t}$	+/-	0.0084	-0.3832***	-0.0142	0.0292	-0.0311	0.0500
		(0.2836)	(0.1322)	(0.0266)	(0.1019)	(0.0910)	(0.0600)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	+/-	0.0204	-0.0049	-0.0022	-0.0104	0.0026	-0.0075
		(0.0275)	(0.0149)	(0.0028)	(0.0160)	(0.0149)	(0.0112)
$SIZE_{i,t}$	-	-0.0905***	-0.0104	-0.0076**	0.0024	-0.0162	-0.0043
		(0.035)	(0.0165)	(0.0037)	(0.0125)	(0.0116)	(0.0064)
$LIQUIDITY_{i,t}$	+/-	0.0270	-0.0616	0.0002	-0.0025	0.0028	0.0023***
		(0.0417)	(0.0553)	(0.0003)	(0.0018)	(0.0016)	(0.0009)
$QUALITY_{i,t}$	+	-0.0546	-0.0197**	0.0030	0.0072	-0.0025	-0.0020
		(0.1575)	(0.0082)	(0.0028)	(0.0072)	(0.0093)	(0.0032)
$DIVIDEND_{i,t}$	-	0.0072	0.0016	0.0006	0.0007	0.0005	0.0001
		(0.0158)	(0.0030)	(0.0011)	(0.0018)	(0.0023)	(0.0022)
$PROFITABILITY_{i,t}$	+/-	0.0942	-0.4230**	-0.0092	-0.0976	0.0801	0.0129
		(0.3369)	(0.1662)	(0.0206)	(0.1196)	(0.1152)	(0.0719)
$FIXED\ ASSETS_{i,t}$	+/-	0.1756	-0.0793	0.0536**	-0.3239**	0.3700***	0.2740***
		(0.2998)	(0.1494)	(0.0267)	(0.1340)	(0.1362)	(0.1074)
$COVERAGE_{i,t}$	-	-0.0006**	0.0002	0.0000	0.0002*	-0.0001	-0.0001
		(0.0003)	(0.0005)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
$EARNINGS\ VOL_{i,t}$	+	-0.0119	-0.0005	-0.0001	0.0011	-0.0012	-0.0007
		(0.0147)	(0.0003)	(0.0003)	(0.0012)	(0.0012)	(0.0006)
RETURN VOL	+	-0.6652	-0.2452	-0.0291	0.5246**	-0.5131**	-0.3706**
		(0.6914)	(0.3654)	(0.0564)	(0.2467)	(0.2497)	(0.1621)
SHARE PERFORM	-	-0.0268	-0.0192*	-0.0004	-0.0255**	0.0251**	0.0211***
		(0.0318)	(0.0113)	(0.0033)	(0.0113)	(0.0111)	(0.0069)
TERM	+/-	0.0007	0.0011	-0.0002	0.0034	-0.0026	-0.0021
		(0.0142)	(0.0037)	(0.0007)	(0.0026)	(0.0027)	(0.0018)
Constant		1.7971***	0.9137***	1.0452***	0.5287***	0.5332***	0.0875
		(0.6677)	(0.2921)	(0.0460)	(0.1866)	(0.1714)	(0.1007)
Correlation1		-2.413**	-4.693***	-2.325**	-7.805***	-7.668***	-5.719***
Correlation2		-0.0110	0.1481	-1.781*	-3.13***	-3.241***	-2.347**
Sargan Test (df)		76.24 (230)	234.1 (275)	201.9 (252)	213.8 (229)	228 (229)	230.3 (229
Wald Test-1 (df)		52.51 (14)***	34.36 (13)***	16.76 (14)	41.58 (13)***	40.59 (13)***	47 (13)***
Wald Test-2 (df)		51.45 (14)***	38.45 (15)***	1043 (14)***	41.02 (14)***	56.02 (14)***	33 (14)***
R^2		0.0760	0.1270	0.1329	0.1166	0.1502	0.1692
Firms / Observations		200 / 682	275 / 2118	457 / 3955	457 / 3955	457 / 3955	457 / 3955
Estimation Period		1993-1999	1985-1999	1989-1999	1989-1999	1989-1999	1989-1999

See notes in Table 7.1 for variable definitions. Industry dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

[191] The interested reader may also compare the results based on the other dependent variables.

Table 7.10: Static corporate debt ownership structure in the UK: system-GMM

Independent Variables	Predicted Sign	Dependent Variables: 1969-2000			Dependent Variables: 1983-2000		
		BANK-TOTAL	*BANK-SHORT*	*BANK-LONG>1*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*
$MATURITY_{i,t}$	-	-0.7173***	-	-	-0.3004***	-	-
		(0.0460)	-	-	(0.0492)	-	-
$LEVERAGE_{i,t}$	+/-	0.1055	-0.0331	0.1524	0.0856*	-0.0042	0.0699**
		(0.0672)	(0.0390)	(0.1375)	(0.0449)	(0.0387)	(0.0284)
$MKT\text{-}TO\text{-}BOOK_{i,t}$	-	0.0243**	-0.0611***	0.0632***	-0.0366***	-0.0346***	-0.0068***
		(0.0117)	(0.0126)	(0.0126)	(0.0128)	(0.0121)	(0.0023)
$MKT\text{-}TO\text{-}BOOK^2_{i,t}$	+	-0.0003**	0.0009***	-0.0009***	0.0005**	0.0005**	0.0000
		(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0001)
$SIZE_{i,t}$	-	0.0171*	-0.0832***	0.0528***	-0.0105	-0.0688***	0.0413***
		(0.0092)	(0.0087)	(0.0083)	(0.0113)	(0.0118)	(0.0085)
$LIQUIDITY_{i,t}$	+/-	-0.1265***	-0.0743***	-0.1038***	-0.0253	-0.0396*	-0.0048
		(0.0283)	(0.0262)	(0.0275)	(0.0169)	(0.0231)	(0.0147)
$QUALITY_{i,t}$	+	0.1167	0.0188	0.1118	0.0281	0.0094	0.0500
		(0.0760)	(0.0245)	(0.0866)	(0.0480)	(0.0262)	(0.0358)
$DIVIDEND_{i,t}$	-	0.0046	-0.0028	0.0023	0.0017	0.0032	0.0004
		(0.0040)	(0.0038)	(0.0025)	(0.0028)	(0.0035)	(0.0020)
$PROFITABILITY_{i,t}$	+/-	0.0021	0.2270*	-0.1940	0.0977	-0.0307	0.0576
		(0.1282)	(0.1219)	(0.1590)	(0.0948)	(0.1271)	(0.0667)
$FIXED\ ASSETS_{i,t}$	+/-	-0.0441	-0.2338***	-0.0783	0.0977	-0.1019	0.1328*
		(0.0832)	(0.0831)	(0.0931)	(0.0945)	(0.0915)	(0.0704)
$COVERAGE_{i,t}$	-	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$EARNINGS\ VOL_{i,t}$	+	-0.0002	-0.0026	0.0066*	-0.0095***	-0.0044	-0.0055**
		(0.0018)	(0.0029)	(0.0039)	(0.0037)	(0.0035)	(0.0025)
RETURN VOL	+	0.4779**	0.2897	0.0347	0.0216	-0.3582	0.3556*
		(0.2498)	(0.2580)	(0.2101)	(0.2968)	(0.2854)	(0.2194)
SHARE PERFORM	-	0.0374***	-0.0074	0.0240***	0.0134	0.0534***	-0.0229**
		(0.0108)	(0.0115)	(0.0094)	(0.0146)	(0.0156)	(0.0093)
TERM	+/-	-0.0063***	-0.0026***	-0.0057***	-0.0042***	-0.0053***	0.0004
		(0.0011)	(0.0010)	(0.0010)	(0.0013)	(0.0013)	(0.0011)
Constant		0.8235***	1.4240***	-0.3127***	0.8700***	1.2744***	-0.3469***
		(0.1225)	(0.1135)	(0.1051)	(0.1476)	(0.1590)	(0.1111)
Correlation1		-6.528***	-16.7***	-5.073***	-7.638***	-14.06***	-11.33***
Correlation2		-5.903***	-7.461***	-5.371***	-5.755***	-6.089***	-6.895***
Sargan Test (df)		442.2 (433)	442.4 (434)	320.1 (294)	349.8 (354)	324.5 (314)	329.4 (314)
Wald Test-1 (df)		685.6 (15)***	154.3 (14)***	248.2 (14)***	105.1 (15)***	83.7(14)***	111.6 (14)**
Wald Test-2 (df)		133.6 (15)***	328.6 (15)***	22.7 (15)*	242.5 (15)***	308.3 (15)***	37.61 (15)**
R^2		0.1869	0.1258	0.1892	0.1000	0.0932	0.0941
Firms / Observations		2126 / 27310	2126 / 27310	2131 / 27761	2101 / 17957	2101 / 17957	2106 / 18408
Estimation Period		1971-1999	1971-1999	1971-1999	1984-1999	1984-1999	1984-1999

See notes in Table 7.1 for variable definitions. Industry dummies are included in all models. Correlation 1 and 2 are first and second order autocorrelation of residuals, respectively; which are asymptotically distributed as N(0,1) under the null of no serial correlation. Sargan Test is test of the overidentifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. Wald Tests 1 and 2 test the joint significance of estimated coefficients, and of industry dummies, respectively; asymptotically distributed as χ^2(df) under the null of no relationship. (*), (**) and (***) indicates that coefficients are significant or the relevant null is rejected at 10, 5 and 1 percent level, respectively.

Table 7.11: Corporate debt ownership structure in France and Germany: Fixed-effects estimation

		FRANCE		GERMANY			
		Dependent Variables		Dependent Variables			
Independent Variables	Predicted Sign	*BANK-TOTAL*	*BANK-PROXY*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*	*BANK-LONG>5*
MATURITY	-	-0.0546	-	-0.0525***	-	-	-
		(0.0744)	-	(0.0145)	-	-	-
LEVERAGE	+/-	-0.0838	-0.3603***	-0.0260	-0.0534	0.0251	0.0757*
		(0.2118)	(0.1048)	(0.0349)	(0.0574)	(0.0572)	(0.0402)
MKT-TO-BOOK	+/-	0.0147	-0.0173*	0.0036	-0.0007	0.0042	-0.0011
		(0.0183)	(0.0096)	(0.0061)	(0.0104)	(0.0116)	(0.0062)
SIZE	-	-0.0612	-0.0113	-0.0135*	0.0020	-0.0153	-0.0057
		(0.0496)	(0.0132)	(0.0071)	(0.0116)	(0.0107)	(0.0086)
LIQUIDITY	+/-	0.0045	-0.2247***	-0.0002	-0.0044***	0.0040***	0.0018
		(0.0282)	(0.0274)	(0.0002)	(0.0013)	(0.0011)	(0.0015)
QUALITY	+	0.0073	-0.0142***	-0.0008**	0.0043***	-0.0048***	-0.0103**
		(0.0507)	(0.0048)	(0.0003)	(0.0011)	(0.0009)	(0.0023)
DIVIDEND	-	-0.0027**	0.0005	0.0001	0.0000	0.0001	-0.0004
		(0.0013)	(0.0017)	(0.0003)	(0.0005)	(0.0006)	(0.0003)
PROFITABILITY	+/-	0.1881	-0.1436	-0.0113	-0.0407	0.0270	0.0273
		(0.2169)	(0.1221)	(0.0146)	(0.0463)	(0.0443)	(0.0343)
FIXED ASSETS	+/-	-0.3034	-0.4087***	0.0654**	-0.3473***	0.3928***	0.1536**
		(0.2940)	(0.1167)	(0.0258)	(0.0708)	(0.0703)	(0.0616)
COVERAGE	-	0.0004***	0.0001	0.0000	0.0001	-0.0001	0.00004*
		(0.0001)	(0.0002)	(0.0000)	(0.0000)	(0.0000)	(0.00002
EARNINGS VOL	+	-0.0081	0.0000	0.0000	-0.0003	0.0003	0.0000
		(0.0065)	(0.0002)	(0.0001)	(0.0004)	(0.0004)	(0.0001)
RETURN VOL	+	-0.5642	-0.3648*	-0.0797	0.2363	-0.2989	-0.3460*
		(0.6369)	(0.2201)	(0.0927)	(0.2634)	(0.2669)	(0.1806)
SHARE PERFORM	-	-0.0615**	-0.0129	-0.0019	-0.0342***	0.0305***	0.0178***
		(0.0255)	(0.0096)	(0.0046)	(0.0115)	(0.0113)	(0.0069)
TERM	+/-	-0.0049	0.0021	-0.0009	0.0020	-0.0027	-0.0016
		(0.0159)	(0.0028)	(0.0010)	(0.0029)	(0.0028)	(0.0020)
Wald Test (df)		27.91 (14)**	118.2 (13)***	19 (14)	82.73 (13)***	114.2 (13)***	55 (13)***
R^2		0.0600	0.1736	0.0300	0.0315	0.0346	0.0318
Firms / Observations		200 / 682	275 / 2118	457 / 3955	457 / 3955	457 / 3955	457 / 3955
Estimation Period		1992-1999	1984-1999	1988-1999	1988-1999	1988-1999	1988-1999

See notes in Table 7.1 for variable definitions.
Wald statistics tests the joint significance of estimated coefficient; asymptotically distributed as χ^2(df) under the null of no relationship.

Table 7.12: Corporate debt ownership structure in the UK: Fixed-effects estimations

		1969-2000			1983-2000		
Independent Variables	Predicted Sign	Dependent Variables			Dependent Variables		
		BANK-TOTAL	*BANK-SHORT*	*BANK-LONG>1*	*BANK-TOTAL*	*BANK-SHORT*	*BANK-LONG>1*
MATURITY	-	-0.5441***	-	-	-0.3459***	-	-
		(0.0136)	-	-	(0.0161)	-	-
LEVERAGE	+/-	0.1061***	-0.0753***	0.0929***	0.1131***	-0.0449**	0.1137***
		(0.0359)	(0.0232)	(0.0240)	(0.0389)	(0.0221)	(0.0267)
MKT-TO-BOOK	-	-0.0079*	-0.0213***	0.0146***	-0.0251***	-0.0158***	-0.0078***
		(0.0043)	(0.0045)	(0.0040)	(0.0044)	(0.0040)	(0.0030)
MKT-TO-BOOK^2	+	0.0000	0.0003***	-0.0003**	0.0003***	0.0002**	0.0001**
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)
SIZE	-	0.0431***	-0.0775***	0.0795***	-0.0002	-0.0830***	0.0533***
		(0.0063)	(0.0064)	(0.0056)	(0.0071)	(0.0076)	(0.0066)
LIQUIDITY	+/-	-0.0197***	-0.1012***	0.0245***	-0.0175***	-0.0789***	0.0340***
		(0.0060)	(0.0172)	(0.0049)	(0.0061)	(0.0174)	(0.0076)
QUALITY	+	-0.0071*	-0.0025	-0.0047**	-0.0065	0.0000	-0.0058*
		(0.0039)	(0.0029)	(0.0022)	(0.0044)	(0.0025)	(0.0034)
DIVIDEND	-	-0.0004	-0.0007	0.0001	-0.0012**	-0.0012**	-0.0001
		(0.0005)	(0.0004)	(0.0004)	(0.0006)	(0.0005)	(0.0005)
PROFITABILITY	+/-	-0.0567	-0.0751**	-0.0549*	0.0407	-0.0414	0.0554**
		(0.0399)	(0.0375)	(0.0285)	(0.0415)	(0.0384)	(0.0284)
FIXED ASSETS	+/-	0.0867**	-0.2898***	0.1719***	0.1022**	-0.2310***	0.2099***
		(0.0396)	(0.0437)	(0.0325)	(0.0423)	(0.0475)	(0.0380)
COVERAGE	-	0.0000	0.00003***	0.00002**	0.0000	0.00002***	0.00001**
		(0.0000)	(0.00001)	(0.00001)	(0.0000)	(0.000004)	(0.000005
EARNINGS VOL	+	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0003)	(0.0002)
RETURN VOL	+	-0.1689*	0.1878*	-0.2689***	-0.0183	0.2939**	-0.2130**
		(0.0986)	(0.1045)	(0.0788)	(0.1085)	(0.1171)	(0.0884)
SHARE PERFORM	-	0.0046	-0.0171***	0.0088***	0.0005	-0.0076	0.0017
		(0.0039)	(0.0042)	(0.0030)	(0.0050)	(0.0051)	(0.0040)
TERM	+/-	-0.0075***	-0.0024***	-0.0071***	-0.0030***	-0.0058***	0.0012
		(0.0008)	(0.0009)	(0.0006)	(0.0010)	(0.0010)	(0.0009)
Wald Test (df)		2210 (15)***	329.7 (14)***	450.9 (14)***	624.7 (15)***	236.3 (14)***	153.6 (14)**
R^2		0.2561	0.0792	0.0764	0.1208	0.0704	0.0359
Firms / Observations		2126 / 27310	2126 / 27310	2131 / 27761	2101 / 17957	2101 / 17957	2106 / 18408

See notes in Table 7.1 for variable definitions.
Wald statistics tests the joint significance of estimated coefficient; asymptotically distributed as χ^2(df) under the null of no relationship.

7.5. CONCLUSION

The objective of this chapter has been to examine the variations in corporations' debt ownership decisions across European countries. The empirical evidence with respect to the GMM results reveals that the degree and type of association of debt ownership structure with market-specific and firms-specific factors are not independent from firms' financial and economic environment in which they are operating. The findings in all countries with respect to the dynamics in firms' debt composition decisions indicate that there is an adjustment process towards the desired debt ownership structure. The significantly positive coefficient estimates on lagged dependent variables suggest that this adjustment process is costly and the adjustment speed is highest in France in terms of responding to the new circumstances.

This study identifies several market-related and firm-related factors responsible for the use of bank debt in the framework of country specific differences. First, maturity of debt and leverage ratio inversely affect the use of bank debt in Germany and the UK while they have no significant impact in France. These results seem to imply the liquidation concerns of firms in Germany and the UK, where bankruptcy rules emphasise this option unlike the firm-friendly French bankruptcy laws. Second, our study detects a U-shaped relation between bank-debt use and market-to-book ratio in the UK such that only low-growth and high-growth firms tend to borrow from banks. Hence, it seems that bank information monopolies (holdup problems) are present in the UK. In other countries, a non-monotonous relation of that type does not exist. In France, there is some evidence that French firms with investment opportunities tend to borrow from banks possibly because of information asymmetries or high disclosure costs. In Germany, such problems and costs do not seem to be substantial, which may be attributed to German corporate governance system. Third, smaller firms tend to borrow from banks in all countries. This confirms the common finding in the literature and the related arguments that small firms are riskier, immature and benefit more from monitored debt. Fourth, as a common finding, liquidity exerts negative influence on bank-debt use in all countries. Fifth, firm quality and bank-debt use are positively correlated in France and the UK while this association is insignificant in Germany. Hence, the concerns about obtaining a better-informed lender to mitigate adverse selection problems are not of importance for German firms possibly due to close and long run relations between firms and banks. Sixth, French and UK firms tend to use bank debt when they cut their dividend payout ratios, which is consistent with the hidden-information hypothesis that non-dividend paying firms avoid issuing public debt as paying dividends signals firms' future prospects. However, German firms resort to banks when they pay less dividends, which may again be due to their different corporate governance mechanism. Seventh, firms' profitability does not affect their debt ownership decisions in Germany and the UK while profitable firms tend to avoid borrowing from banks in France. Although there are some temporary effects of asset collateral, we could not detect any significant impact in the long-run for our sample countries. Furthermore, interest coverage ratio has no significant effect on debt ownership structure of UK and German firms while it directly affects the amount of bank debt used by French firms. Another country-dependent pattern is due to the earnings volatility variable, which does not affect debt replacement decisions of French and German firms but it inversely affects bank-debt ratio of UK firms.

This study also finds some factors with respect to the macroeconomic and stock market indicators that are related to corporate debt ownership structure. First, stock return volatility seems to reduce the amount of bank debt use by UK firms while not affecting bank-debt ratio of French and German firms, which is inconsistent with the theory. Second, only share price performance of French firms seems to be effective in debtholders selection as more use of bank debt follows share price runup. Regarding the implications of term structure of interest rates, relatively high (low) long-term interest rates cause German (British) managers to borrow from bank. However, the slope of yield curve does not seem to affect French managers' decisions in this respect.

In conclusion, the firm-specific and market-specific factors reveal that the debt ownership decisions of listed corporations is not only the result of their own characteristics but also the outcome of environment and tradition in which they operate.

It is argued that the development in banking and stock market may be complementary as each supplies and demands better information. Hence the econometrics results for the UK and Germany related to agency costs and asymmetric information should be similar, according to this argument. However, our study shows that this does not seem to be the case.

One limitation of our study in this chapter is due to the absence of detailed data about firm's debt composition, e.g., non-bank private debt, public debt. One could also extend the number of countries to enrich the analysis using some corporate governance factors. This is left to the future research.

7.6. APPENDIX

Table 7.A1: Panel Data Structure: *a)* Number of firms having '*n*' continuous observations during the period; *b)* number of observations in each year; *c)* number of firms in each industry class; and *d)* number of observations in each industry class.

a) Number of firms			
n (years)	France	Germany	UK
3	59	21	211
4	50	31	218
5	32	31	199
6	10	26	131
7	17	9	103
8	17	8	63
9	17	7	52
10	13	8	51
11	3	12	89
12	11	26	90
13	8	52	83
14	13	350	88
15	29	-	89
16	4	-	66
17	8	-	76
18	68	-	66
19	-	-	67
20	-	-	49
21	-	-	34
22	-	-	23
23	-	-	25
24	-	-	20
25	-	-	24
26	-	-	21
27	-	-	45
28	-	-	41
29	-	-	169
30	-	-	29
31	-	-	36
32	-	-	183
Total	**359**	**581**	**2441**

b) Number of observations			
Years	France	Germany	UK
1969	-	-	466
1970	-	-	481
1971	-	-	489
1972	-	-	870
1973	-	-	908
1974	-	-	933
1975	-	-	938
1976	-	-	943
1977	-	-	952
1978	-	-	964
1979	-	-	980
1980	-	-	1002
1981	-	-	1031
1982	-	-	1071
1983	75	-	1130
1984	83	-	1210
1985	87	-	1267
1986	120	-	1310
1987	132	399	1318
1988	139	417	1330
1989	148	438	1322
1990	151	447	1300
1991	162	454	1262
1992	177	456	1222
1993	188	465	1225
1994	204	473	1277
1995	211	499	1329
1996	245	535	1417
1997	293	557	1502
1998	347	572	1497
1999	346	564	1365
2000	337	512	1199
Total	**3445**	**6788**	**35510**

c) Number of firms			
Industry	France	German.	UK
1	23	49	165
2	10	44	31
3	19	56	201
4	31	37	164
5	48	59	263
6	16	35	28
7	41	89	316
8	22	16	88
9	25	21	197
10	1	0	56
11	20	22	148
12	31	23	254
13	46	33	321
14	17	64	142
15	9	33	67

d) No. of observations			
Industry	France	German.	UK
1	283	574	2589
2	107	567	611
3	242	688	3617
4	302	462	2350
5	406	588	3262
6	161	436	477
7	441	1117	5414
8	199	198	1376
9	232	237	2431
10	4	0	591
11	160	270	2169
12	319	274	3952
13	376	221	3428
14	152	757	2701
15	61	399	542

Table 7. A2: Mean values of Bank-Debt ratios.

	FRANCE		GERMANY				UK		
YEAR	BANK	SHORT	BANK	BANK-S	BANK-L1	BANK-L5	BANK	BANK-S	BANK-L
1969	-	-	-	-	-	-	0.4542	0.4542	0
1970	-	-	-	-	-	-	0.4598	0.4598	0
1971	-	-	-	-	-	-	0.4277	0.4277	0
1972	-	-	-	-	-	-	0.5013	0.5013	0
1973	-	-	-	-	-	-	0.5246	0.5246	0
1974	-	-	-	-	-	-	0.5775	0.5775	0
1975	-	-	-	-	-	-	0.5416	0.5416	0
1976	-	-	-	-	-	-	0.5062	0.5062	0
1977	-	-	-	-	-	-	0.5100	0.5100	0
1978	-	-	-	-	-	-	0.4945	0.4945	0
1979	-	-	-	-	-	-	0.5207	0.5206	0.0001
1980	-	-	-	-	-	-	0.5303	0.5260	0.0043
1981	-	-	-	-	-	-	0.5110	0.5071	0.0039
1982	-	-	-	-	-	-	0.5205	0.5127	0.0078
1983	-	0.2744	-	-	-	-	0.6515	0.5326	0.1189
1984	-	0.3070	-	-	-	-	0.7330	0.5627	0.1703
1985	-	0.3078	-	-	-	-	0.7458	0.5533	0.1925
1986	-	0.3338	-	-	-	-	0.7241	0.5303	0.1938
1987	-	0.3528	0.9548	0.3206	0.6342	0.1849	0.6855	0.4944	0.1911
1988	-	0.3739	0.9476	0.3858	0.5618	0.1901	0.6623	0.4731	0.1892
1989	-	0.3800	0.9419	0.4186	0.5233	0.1685	0.6687	0.4666	0.2021
1990	-	0.3998	0.9472	0.4533	0.4939	0.1628	0.6810	0.4596	0.2214
1991	-	0.3960	0.9520	0.4638	0.4882	0.1626	0.6739	0.4504	0.2235
1992	-	0.4105	0.9490	0.4713	0.4776	0.1593	0.6440	0.4153	0.2287
1993	-	0.3971	0.9500	0.4410	0.5090	0.1550	0.6263	0.3870	0.2393
1994	-	0.4059	0.9542	0.4570	0.4972	0.1604	0.5978	0.3649	0.2329
1995	0.4254	0.4298	0.9506	0.4949	0.4557	0.1422	0.6190	0.3677	0.2513
1996	0.3940	0.4393	0.9619	0.4837	0.4782	0.1511	0.6083	0.3451	0.2632
1997	0.4051	0.4368	0.9466	0.4992	0.4474	0.1498	0.5980	0.3309	0.2671
1998	0.3975	0.4295	0.9456	0.4841	0.4615	0.1517	0.6039	0.3393	0.2646
1999	0.4259	0.4391	0.9322	0.4856	0.4466	0.1485	0.6088	0.3354	0.2734
2000	0.4132	0.4547	0.9013	0.4680	0.4333	0.1464	0.5983	0.3334	0.2649

See Table 7.1 for definitions.

Figure 7.A1: Plots of bank-debt ratios for France.

Figure 7.A2: Plots of bank-debt ratios for Germany.

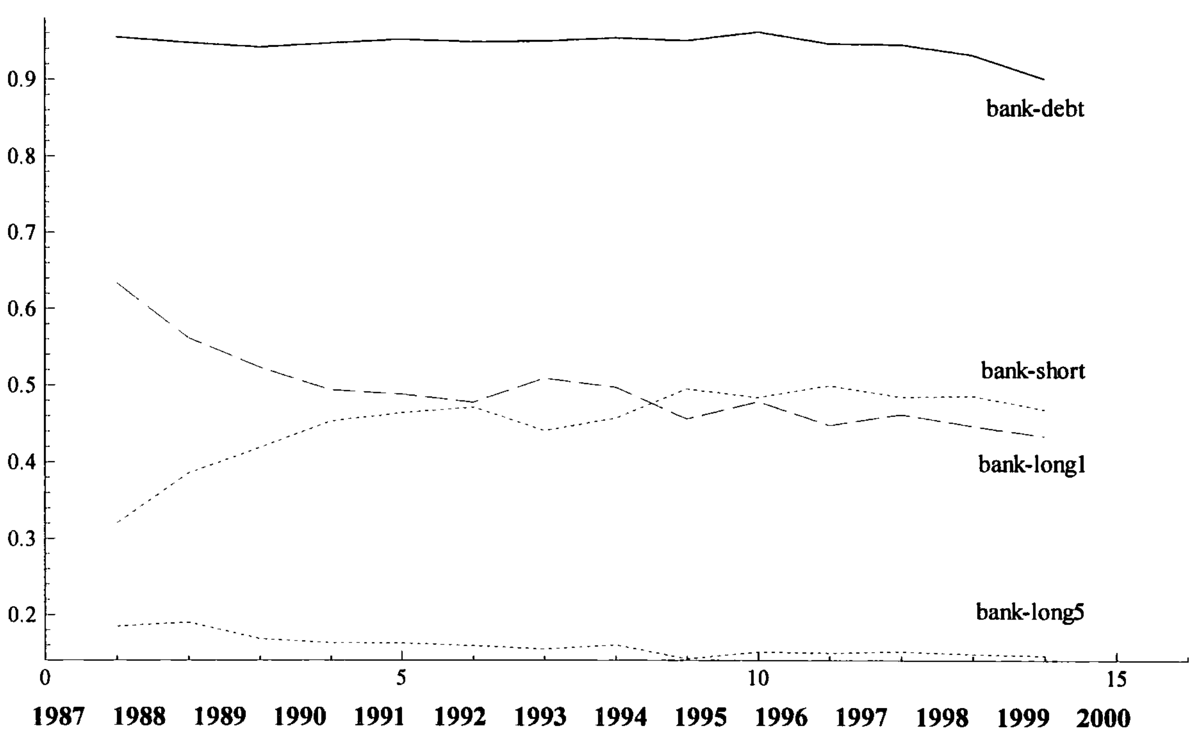
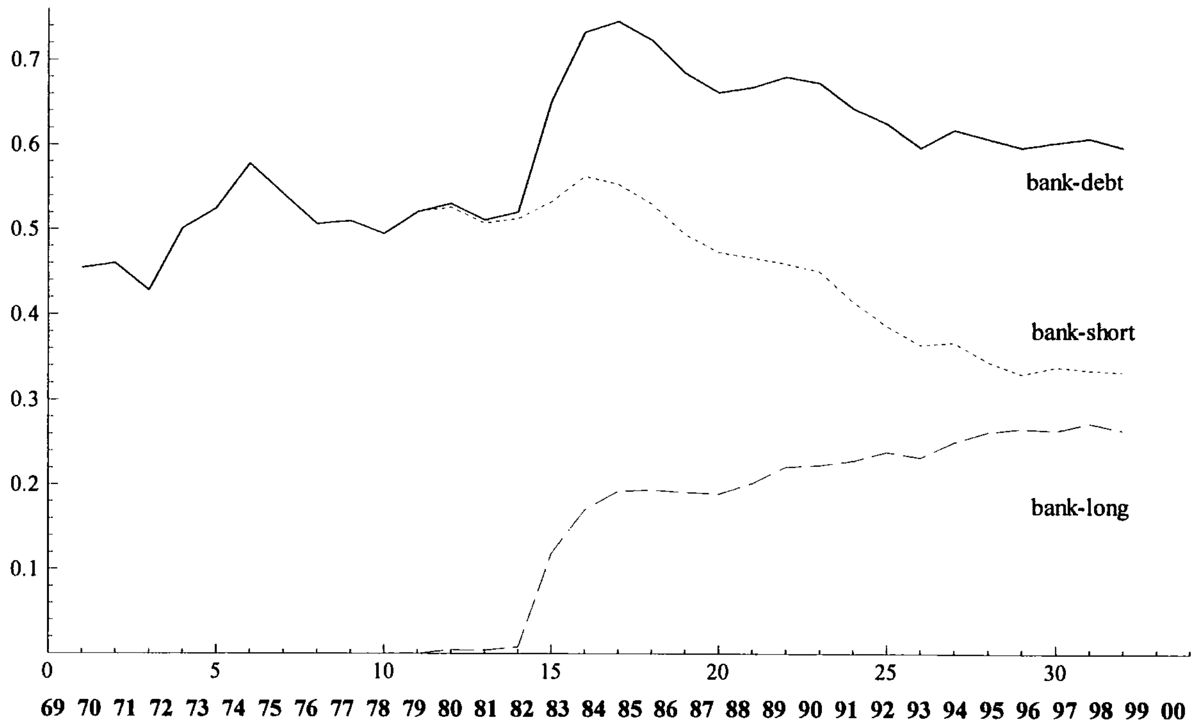


Figure 7.A3: Plots of bank-debt ratios for the UK.



"The fairest thing we can experience is the mysterious. It is the fundamental emotion that lies at the cradle of true art and true science. He who knows it not, who can no longer feel amazement, is as good as dead, a snuffed out candle. "

Albert Einstein, 1879-1955

8. SUMMARY AND CONCLUSIONS

Since the celebrated paper of Modigliani and Miller [1958], capital structure puzzle has remained to be unresolved and Myers' eighteen-year old question "How do firms choose their capital structures" is still unanswered. Subsequent to this theory, finance academics have relaxed the unrealistic assumptions of the M-M theory and considered the presence of market imperfections, and then developed new theories. According to the tradeoff theory, capital structure has an impact on firm value. An optimal capital structure is attained by trading off the benefits of debt financing (tax deductibility of interest payments) with its costs (agency, bankruptcy and transaction costs). Pecking Order theory, on the other hand, argues that there is a financial hierarchy in which firms first use internal cash to finance their investment, then debt and lastly equity financing.

Apart from capital structure puzzle, corporate finance has also questioned other unclear topics of financing decisions of firms. For instance, some papers attempted to explain why firms have different debt maturities. The literature advises the use of short-term debt as it is contended to reduce moral hazard and adverse selection problems and to signal firms' high quality to the market. The proponents of long-term debt use, however, argue that it can decrease firm's tax liabilities and hence increases firm value; and minimises security undervaluation problem. Other studies shed light on the association between capital structure and the source of debt. The models propose strong relationships between source of financing, and debt restructurings of financially distressed firms in line with mitigating information asymmetries and avoiding premature liquidations. The implications of these models are as follows. First, small firms prefer bank debt since they are more flexible in renegotiations; and their usage avoids disclosure costs of investment opportunities. Second, high-credit risk firms issue private debt to benefit from low interest rates. Furthermore, firms with more intangible assets prefer private debt to avoid liquidation. Large firms issue public debt to benefit from economies of scale du to flotation costs. Firm-specific characteristics may stipulate the combination of public and private debt against financial distress and thus lead to optimal debt-mix policy. Last, small firms first use bank debt to get a reputation by regular repayments and then issue public debt for lower interest burdens.

On the other hand, bargaining-based theories of capital structure work on the strategic advantage of debt to shareholders. They have several implications: The anticipation of potential future negotiations is likely to influence the optimal capital structure choice. Firms' opportunistic behaviour may put an upper limit on debt capacity. Finally, strategic debt use has also benefits aside from tax advantages, such as deterring new entrant in the market; forcing concessions from debtholders and changing the seniority of claims on firms.

The objective of this thesis is to test the conflicting implications of the theories of corporate capital structure, debt maturity structure and debt ownership structure. In doing so, we have contributed to the literature by providing empirical evidence from European countries. At the end of the comparative discussion of country-specific institutional factors in Chapter 2, it seems we have come to the point to assert that, apart from firm-specific factors, corporate policies are also influenced by domestic institutional environments in which firms operate. The review in Chapter 2 reveals that France, Germany and the United Kingdom have specific financial and economic structures markedly differing from each other. For instance, French bankruptcy procedures mostly emphasise to safeguard the failing firm. In the UK, the direct bankruptcy costs tend to be lower and the design of insolvency procedures might cause premature liquidations. In Germany, it is difficult to rehabilitate the failing firm due to strong protection of collateral. Furthermore, due to the two-tiered corporate governance system in Germany, labour management representation is strongest in this country. In the shareholder-based British corporate governance system, potential agency costs are higher than in Germany and France where there is a stakeholder approach. Although market for corporate control is important in the UK, there is a lack of long-term and close relationship between firms and their creditors. To highlight another difference, ownership concentration is much higher in Germany than in the UK where there are large institutional investors. On the other hand, the family and state control over the firms is highest in France.

This thesis also provides some contributions to the literature in terms of the econometric methodologies used, which is discussed in Chapter 3: The coefficient estimates on Fixed-effects models are imprecise as such models cause substantial loss in variability and also the variables lacking any change overtime cannot be precisely estimated. The OLS procedure is relatively weak in panel data estimations due to heterogeneity problem and estimated parameters are assumed to be stable over the period. Fixed-effects and GLS estimators are consistent only if the model contains neither lagged dependent variables nor endogenous independent variables, and the number of observations tend to infinity with fixed time period. Consequently, considering the problems of measurement errors, simultaneity bias and endogeneity, it appears that GMM estimation technique can be regarded as the most appropriate methodology of our interest for the dynamic panel data models. The common practice in dynamic panel data models' estimations is to use GMM-DIF estimator in which the first-differences are taken to eliminate the time-invariant unobservable individual effects. Recent developments indicate that using system GMM approach that combines the differenced equation with the level equation will result in more efficient estimates than does GMM-DIF. It is because GMM-SYS estimator overcomes the problem of weak instruments while under GMM-DIF estimator the information of the instruments decreases as the series become more persistent. GMM-SYS approach controls for the presence of unobservable firm-specific effects and the endogeneity of explanatory variables without eliminating valuable information. In our empirical analysis we test the validity of these econometric arguments and confirm the problems associated with alternative estimation procedures explained in Chapter 3.

In the empirical analysis, we attempted to provide some important contributions to the literature, which are largely ignored by the existing studies: First, three distinct economies, France, Germany and the United Kingdom, have been chosen to investigate whether different institutional factors across countries have different influence upon the financing decisions of firms. The findings in three empirical chapters reveal that financing decisions of corporations are not independent from country-specific institutional factors as the association of the financing mix with firm-specific and market-specific factors varies across countries. Second, large panel data set was utilised to study dynamic financing policies of firms. We believe its necessity because it is obvious that factors influencing firms' financing mix change overtime and thus time-varying observed difference in firms' financing structure should also be investigated. Moreover, we use the GMM estimation methodology due to its superiority in overcoming common econometric problems, especially in controlling for the endogeneity problem by using efficient instrumental variables. Using panel data together with GMM procedure, one is also able to control for unobservable and fixed firm-specific effects, which might potentially influence corporate financing decisions. Another important finding of this research is related to the presence of optimal financing policies in a dynamic framework, as proposed by the static-tradeoff theory. Our results suggest that firms appear to adjust their financing mix to achieve their optimal level. With respect to the estimated coefficients of lagged dependent variable, this adjustment process in France seems quickest in terms of responding to the new circumstances. This is consistent with the idea that time dimension constructs a very important variable explaining the evolution of firms' financing ratios in France (Kremp et al. [1999]). It may be possible that transaction (adjustment) costs are relatively low in France or disequilibrium costs of being off-target are substantial.

In Chapter 4, as the first empirical study, we attempt to explain why there have been substantial variations in debt-equity ratios of listed corporations across European countries. Apart from commonly used firm-specific factors in the literature, this capital structure study considers some market-related factors and controls for dividend policy to see their interaction with debt-equity ratio. The main findings and related implications of this chapter are as follows: There is a significantly negative association between profitability and leverage in all countries. However, adverse selection problems between managers and outside investors (pecking order theory) seem most severe in France as the highest profitability coefficient pertains to this country. This may also be due to the lowest shareholder protection in France. The relationship between market-leverage and tax rate is insignificant in France and Germany, which is inconsistent with the theory. The results are not surprising for France due to French tax system's emphasis to promote the retentions of profits with lower corporate tax rates. Market-leverage and tax rate are significantly positively correlated in the UK, which may be due to firms' attempt to benefit from tax advantage of debt.

Resolving agency problems and related costs tend to vary across different legal systems as the association of book-leverage with market-to-book ratio (proxy for growth opportunities) is different across countries: The correlation is significantly positive in France, insignificant in the UK and significantly negative in Germany. The finding in the UK is not expected since the dispersed corporate ownership and ineffective monitoring of management are argued to cause severe agency problems in British firms. The low shareholder protection in France might force firms to use debt over equity and therefore causes a strongly positive estimate of market-to-book ratio coefficient.

The relationship between fixed-assets ratio and leverage is significantly positive in all sample countries, which is in line with the theory that collateral tangible assets are useful to prevent risk-shifting problems. This finding indicates the presence of motivations for shareholders to shift to riskier projects at the expense of bondholders due to their limited liability as explained by Jensen and Meckling [1976] and Myers [1977].

Controlling for dividend policy also reveals some differences across countries: The association of market-leverage with payout ratio is insignificant in Germany, significantly positive in France and significantly negative in the UK. It is likely that the differences of taxation systems and corporate governance in these countries account for this variation.

Moreover, firm size, inverse proxy for bankruptcy probability, seems to be a strongly positive determinant of debt financing in all countries under market-leverage. This finding highlights the importance of expected bankruptcy costs in financial distress. The irrelevance of firm size with book-leverage in Germany could be due to the effective role of banks in controlling the incumbent management and in supporting firms in bad conditions. Close and long-term relationship between firms and banks in Germany may also alleviate the cost of financial distress. However, strongly negative association of leverage with profitability and market-to-book ratio; significantly positive relationship between size and market-leverage, and significantly positive of fixed-assets ratio on debt-ratios in Germany imply something important. Also found by Edwards and Fischer [1994], our results imply that allegedly efficient and strong characteristics of German corporate governance system seems to fail in mitigating agency, financial distress and asymmetric information problems with concentrated share ownership, and banks' close control and monitoring of the management.

This chapter also provides empirical evidence with respect to the market-related factors. The inverse relation between term structure of interest rates and leverage in all countries confirms that firms are reluctant to issue debt while the long term-rate of interest is high. Beside this, the negative impact of share price performance on leverage in all countries suggests that firms issue equity after share price increase. It emerges that the impact of equity premium on leverage is country dependent: German firms do not seem to consider the market equity premium when deciding their financing mix; French firms tend to issue debt when equity premium is high. UK firms tend to issue equity when equity premium is high. This can be good evidence as to how differently managers in these countries react to the changes in the capital markets.

The primary objective of Chapter 5 is to investigate the variations in debt maturity decisions of firms across European countries. This chapter detects several firm-specific and market-related factors responsible for corporate debt maturity decisions. First, a significantly positive relationship between leverage and maturity is found in all countries. This strong finding may stem from liquidation concerns of firms such that firms with profitable growth opportunities would avoid borrowing short-term debt.

As in capital structure decisions, different taxation systems appear to be effective in debt maturity decisions. We find that taxes have no significant impact on debt maturity decisions of UK firms. However, the tax clientele hypothesis is confirmed in Germany with the significantly positive effect of tax rate on debt maturity, i.e., firms with high marginal tax rates construct a natural clientele of cheap long-term debt which yields higher tax shield. In addition, the negative but insignificant tax rate coefficient in France partially supports the trade-off hypothesis that firms increase their debt maturity as the tax advantage of debt decreases.

Firm growth proxied by market-to-book ratio is found to be significantly positively correlated with debt maturity in the UK, as predicted by liquidity risk hypothesis. Hence, UK firms with long-term investment opportunities requiring ongoing managerial discretion prefer to hedge themselves against liquidity risk by issuing long-term debt. This variable does not exert any significant effect on debt maturity in France and Germany. Thus, the contracting-cost hypothesis is rejected as it predicts negative relationship between debt maturity and market-to-book ratio due to agency conflicts. The finding in Germany supports the idea that bank-based systems may curtail underinvestment problems.

Firm size and debt maturity have different interactions across countries. The relationship is insignificant in France and Germany but significantly positively in the UK. This may imply that indirect bankruptcy costs, incentive problems and information asymmetries are less in Germanic and Latinic economies than in Anglo-Saxon economies due to corporate ownership structure and long-run relationship between firms and external financiers.

As being another country-dependent relation, there is no significant relation between liquidity and debt maturity in France and the UK while the same association is significantly positive in Germany. It may be that French firms do not take positions to be liquid when they borrow long-term as French bankruptcy rules favour the saving of ailing firms. However, it is not the case for German firms since bankruptcy procedures in Germany favour the liquidation of insolvent firms.

What is more, the relationship between asset maturity and debt maturity is significantly positive in the UK. It confirms the maturity-matching hypothesis that firms pursue a hedging policy to control agency and bankruptcy problems, i.e., maturity of liabilities and assets are matched. However, it seems that German firms do not apply this matching principle and the situation is marginal in France. One explanation to the violation of this principle is that concentrated corporate ownership, long and close relationship between firms and investors in civil-law countries may mitigate the problems which necessitates the application of maturity matching principle.

Furthermore, we find little support for the signalling hypothesis in Germany and the UK that high-quality firms prefer short-term debt as the coefficients on firm-quality variable are insignificantly negative. In France, firm-quality has direct but insignificant impact on debt maturity. On the other hand, Diamond's hypothesis arguing that there is a non-linear relationship between maturity and quality is not supported in any of sample countries.

Volatility in earnings has significantly positive impact on debt maturity only in France. This is not predicted by the theory which argues that low variability in firm value causes firms to avoid rebalancing their capital structure frequently due to the concerns about expected bankruptcy costs. The same factor seems to be irrelevant to debt maturity decisions of German and UK firms.

Apart from firm-specific variables, this chapter also provides the relevance of market-specific factors to corporate debt maturity policies. The results indicate that debt markets and equity markets tend to be integrated only in the UK, which one can expect from a market-oriented economy. This inference is due to the highly significant coefficient of equity premium variable, which is insignificant in other countries. The second market-related factor is the term structure of interest rates, which is only significant again in the UK. The significantly positive coefficient on term-structure confirms Brick and Ravid's tax-hypothesis that firms lengthen their debt maturity if the term-premium is high in order to accelerate the tax benefits of debt. Share price performance is another market-based variable which can be used to test the signalling hypothesis that firms issue long-term debt after an increase in their share price. Because it is assumed that long-term debt is an informationally disadvantaged (likely to be mispriced) security. This hypothesis is marginally validated only in Germany and the UK. Lastly, the findings in terms of the interest rate volatility do not confirm the theory which contends that firm lengthens debt maturity as interest rate volatility increases. Its association with debt maturity is significantly negative in the UK and insignificant in France and Germany.

In brief, capital structure, corporate effective tax rate, firm quality, firm size, growth opportunities, asset maturity and liquidity seem to play significant role in shaping corporate debt maturity decisions. Apart from these firm-specific factors, we obtain in this chapter some market-specific factors that have substantial impact on debt maturity strategies of corporations especially in the UK. However, the nature and the dominance of the influence of these factors depend on the financial environment and tradition of the specific country as their effects vary across countries.

The objective of Chapter 6 is to examine the variations in corporations' debt ownership decisions across European countries. This chapter identifies several market-specific and firm-related factors responsible for the use of bank debt in the framework of country specific differences. First, debt maturity and leverage ratio negatively affect the bank debt use in Germany and the UK while they are irrelevant in French firms debt-mix decisions. These findings may refer to the liquidation concerns of Germany and British firms as bankruptcy rules in these countries favour the liquidation option. Hence Diamond's [1993] hypothesis that firms with higher debt ratios may restrict their bank borrowings in order to avoid frequent liquidations is supported. On the other hand, firm-friendly French bankruptcy laws are likely to be responsible for the irrelevance of these variables.

Our study finds a U-shaped relation between bank-debt use and market-to-book ratio in the UK such that only low-growth and high-growth firms tend to borrow from banks. Hence, it seems that bank information monopolies (holdup problems) explained by Rajan [1992], among others, are present in the UK. In other countries, such a non-linear relation does not seem to be prevalent. There is some evidence that French firms with investment opportunities tend to borrow from banks possibly because of information asymmetries or high disclosure costs. However, in Germany, such problems and costs do not seem to be substantial, which may again be attributed to the nature of German corporate governance system.

As a common finding for all countries, smaller firms tend to borrow from banks. This confirms the literature and the related arguments that small firms are riskier, immature and benefit more from monitored debt. Another common finding is related to the liquidity variable which affects the use of bank debt inversely for all companies.

Moreover, firm quality and bank-debt use are positively correlated in France and the UK while this association is insignificant in Germany. Consequently, the concerns about obtaining a better-informed lender to reduce adverse selection problems could be relevant for French and British firms. This is not the case for German firms possibly due to close and long run relations between firms and banks.

We find that French and British firms seem to issue bank debt when they cut their dividend payout ratios. This is consistent with MacKie-Mason' [1990b] hidden-information hypothesis that non-dividend paying firms avoid issuing public debt as paying dividends signals firms' future prospects. However, managers of German firms prefer to use bank debt when they pay less dividends, which may again be because of their different corporate governance mechanism.

It seems firm profitability does not affect their debt- replacement decisions in Germany and the UK while profitable French firms tend to avoid borrowing from banks.

Although there are some temporary effects of asset collateral, we could not detect any significant impact in the long-run for our sample countries. Thus our results contrast with Edwards and Fischer' s [1994] statement that collateral seems to be one of the requirements for majority of bank loans in Germany and the UK.

Besides, interest coverage ratio has no significant impact on debt composition of UK and German firms while it has positive effect on the use of bank debt by French firms. Another country-oriented pattern comes from the earnings volatility variable. Volatility in earnings does not affect debt-mix decisions of French and German firms but it has a negative impact for British firms.

In this chapter we also obtain some influence of macroeconomic and stock market indicators associated with corporate debt ownership structure. For instance, stock return volatility seems to decrease relatively the amount of bank debt used by British firms while it does not affect the debt-mix decisions of French and German firms. Moreover, only share price performance of French firms seems to be relevant in choosing different debt sources since share price runup tends to increase the use of bank debt in France. Finally, the results based on the term structure of interest rates differ across countries: It appears that relatively high long-term interest rates cause German managers to borrow from bank. Contrarily, relatively low long-term interest rates cause British managers to use bank debt. On the other hand, French managers do not seem to look at the shape of the yield curve while deciding their debt ownership structure.

In this chapter we provide indirectly a test for the following idea: It is argued mainly by World Bank researchers that the development in banking and stock market may be complementary as each supplies and demands better information. However, our results for the UK and Germany related to agency costs and information asymmetries show that this does not seem to be the case.

The discussion above shows that our empirical evidence has some implications related to corporate governance systems of these countries. But can we conclude which corporate governance system is better? Hardly can one give an exact answer as there seems no absolute advantage overall of a specific corporate governance mechanism. In fact, if one is to emphasise the benefits of long-term and close relations between firms and their financiers in Continental Europe, the costs associated with the conflict of interest between large and minority shareholders should also be mentioned. Likewise, if one is to refer to the shareholder-manager conflicts typical to Anglo-American countries, the existence of active markets for corporate control due to atomised corporate ownership structure in these countries should also be given credit. Each system has its own comparative advantage, as Colin Mayer [1998,1999] states. This study favours neither of these governance mechanisms but suggests a mixture of both by discarding negative characteristics of each type. Surely, this is something to be initiated and performed by policy makers.

With respect to the future research, this thesis suggests the following possible areas: First, it is apparent that finance theories are designed according to market-based economies. Hence, especially the impact of corporate governance systems differing across countries on firms' financing decisions can theoretically be examined. Second, to our knowledge, there exist no empirical tests of bargaining-based theories of capital structure. This gap may well be filled in as it is also important to look into the relationship between strategic use of debt and financing mix. Third, it seems we still need further empirical and theoretical research on capital structure, especially, across countries as there remain to be some ambiguous points waiting for investigation in this puzzling issue of corporate finance. Future research may also examine the interaction of debt maturity with source of financing using rich data (use of commercial paper, bank relationship, distinguishing between public debt, private debt and non-bank private debt). In conclusion, this thesis basically shows that the research in corporate finance is far from being complete.

9. APPENDIX

9.1. VARIABLE DEFINITIONS
([ ] shows Datastream code for the item)

- LEVERAGE1: [1301] / [392].
- LEVERAGE2: [1301] / {[1301]+[MV]}.
- PROFITABILITY: {[137]+[136]} / [392]; or {[993+136]} / [392].
- NON-DEBT TAX SHIELDS: [136] / [392].
- EFFECTIVE TAX RATE: [761]=[203] / [154].
- MARKET-TO-BOOK RATIO: {[MV]-[307]+[392]} / [392]
- FIXED ASSETS RATIO: [339] / [392] or [2005] / [392].
- SIZE: LOG{[104])} or LOG{[392]}.
- MATURITY-SHORT: [309] / [1301].
- MATURITY-LONG: [321] / [1301].
- MATURITY-SHORT2: [309] / [392].
- MATURITY-LONG2: [321] / [392].
- ASSET MATURITY: [339] / [136].
- DIVIDEND PAYOUT RATIO: [POUT].
- COVERAGE RATIO: {[136]+[137]} / [153]
- FIRM QUALITY: $\{[211]_{t+1}-[211]_t\} / [P]_t$
- LIQUIDITY-1: [376] / [389].
- LIQUIDITY-2: Z-Score =
  0.012{[376]-[389]} / [392]+0.014[196] / [392]+0.033[1300] / [392]+
  0.006[MV] / [392]+0.999[104] / [392].

- BANK-DEBT RATIO-TOTAL: {[275]+[387]} / [1301]:UK, France
  [2029] / [1301]:Germany
- BANK-DEBT RATIO-SHORT: [387] / [1301]: UK, France
  [2065/ [1301] : Germany
- BANK-DEBT RATIO-LONG: [275] / [1301]: UK, France
  [2066] / [1301]: Germany

9.2. THE DETAILED COMPONENTS OF DATASTREAM ITEMS:

MARKET VALUE (MV): Market value on Datastream is the share price multiplied by the number of ordinary shares in issue. The amount in issue is updated whenever new tranches of stock are issued or after a capital change. For companies with more than one class of equity capital, the market value is expressed according to the individual issue.

SHARE PRICE (P): The 'current' prices taken at the close of market for each day. These prices are adjusted for subsequent capital actions, and this adjusted figure then becomes the default price offered.

SHARE PRICE (UP): This is the closing price which has not been historically adjusted for bonus and rights issues. This figure therefore represents actual or 'raw' prices as recorded on the day.
PAYOUT RATIO [POUT]: It is the ratio of dividends per share divided by the net earnings per share (adjusted) for the last financial period.

TOTAL SALES (104):

It is the amount of sales of goods and services to third parties, relating to the normal activities of the company. This amount usually does not include VAT or any other taxes relating directly to turnover, and will be net of trade discounts. For brewing and tobacco companies, values are gross of duties.

General: Total Sales = [Domestic sales + Exports + Overseas sales]–[Inter company sales + Associate company sales + VAT (gross) + Other duties and taxes].
[104] =(101+102+103)-(108+109+123+125)

For United Kingdom: Total Sales = [Sales-continuing operations + Sales-acquisitions + Sales-discounted operations]– [Sales-associate cost etc].
[104] =(1070+1071+1072)-(1073).

COST OF SALES (129):

All costs directly allocated to production for those companies which follow the 'Cost of sales' method of disclosure. Many companies in Europe still follow the total cost method and as such a cost of goods sold is not available. Datastream does not estimate the cost of goods sold but provides a breakdown of costs in accordance with format 1 and format 2.

DEPRECIATION (136):

It represents provisions for amounts written off-AWO and depreciation of fixed assets and assets leased in. For industrials in Germany the figure includes AWO intangibles.

OPERATING PROFITS -ADJUSTED (137):

This is net profit derived from normal activities of the company after depreciation and operating provisions. [137] = [993] +[981].

TOTAL INTEREST CHARGES (153): This shows interest on bank, convertible and other loans, bonds and debentures, leasing finance and hire purchase minus interest capitalised. The figure also includes dividends/interest payments of redeemable preference shares described as participative loans.

PRE-TAX PROFIT (154):

In general, this is pre-tax profit as disclosed by the company; no adjustments are made to exclude items of an exceptional/extraordinary nature. Repositioning of items may be necessary for certain countries and companies:

- Pre-tax profit is stated before deducting/adding minority interest.
- Pre-tax profit is stated after transfer to untaxed reserves (also called tax-exempt reserves, tax regulated provisions and special reserves).

For France; pre-tax profit is stated before the normal write off of goodwill. For Germany; pre-tax profit is stated after deducting taxes other than income taxes.
For United Kingdom: Pre-tax Profit = [Operating profit + Total special items + Total non-operating income] – [Total interest charges + Other financial expenses] – [Associates' pre-tax profits].

RETENTIONS (196):

These are profits after tax, minority interest, dividends, post-tax extraordinary items, directors bonuses and allocations to untaxed reserves. (Retained earnings).

TOTAL TAX CHARGE (203):

In general, this is the company's published total charge for taxation.
For United Kingdom: Total Tax Charge = [Total domestic tax + Total overseas tax + Associates total tax]-[Prior year tax].
[203] = (166+169+170)-(199)
[166] = (160+161+164+173)-(162)
= [Corporation tax + Tax equalisation + Irrecoverable advance corporation tax + Franked income tax] –[Double–tax relief].
[169] = 167+168 = [Overseas tax] + [Overseas tax equalisation].
[170] = 171+204 = [Associates domestic tax] + [Associates overseas tax].

For German companies, taxes other than income taxes are excluded and shown as operating expenses.

EARNED FOR ORDINARY (210):

Net profit after tax, minority interests and preference dividends. This is the adjusted earnings using the adjusted pre-tax profit and taxation charge, i.e., excluding pre-tax extraordinary items, non-operating provisions and transfers to tax-exempt reserves, exchange gains/losses and any other items not relating to the normal trading activities of the company. For Germany: This is the total earnings figure as calculated according to the Deutsche Vereinigung Fur Finanzanalyse Und Anlageberatung (DVFA).

NET EARNINGS PER SHARE (211):

This is the adjusted earned for ordinary (item 210) divided by the year end number of shares. The average number of shares is used for UK where the figure is available for all companies. This item is adjusted for subsequent rights and scrip issues. For Germany: This is the per share earnings figure per share as calculated according to the Deutsche Vereinigung Fur Finanzanalyse Und Anlageberatung (DVFA).

NET EARNINGS PER SHARE (254):

The published earned for ordinary divided by the average number of shares in issue during the period. It is adjusted for subsequent rights and scrip issues. Year-end number of shares is used for France where the average number of shares is not consistently available.
For Germany: This is defined as the company's published earnings after minorities divided by the average number of shares in issue during the year. This item is adjusted for scrip and rights, subsequent to the year-end.

LOAN CAPITAL REPAYABLE 1-2 YEARS (263):

This shows all loans (except those which are convertible, leasing finance and hire purchase), due between 1 and 2 years.

LOAN CAPITAL REPAYABLE 2-5 YEARS (264):

This shows all loans (except those which are convertible, leasing finance and hire purchase), due between 2 and 5 years.

BANK BORROWING (275):
This shows bank borrowings due after one year.

TOTAL SHARE CAPITAL AND RESERVES (307):

In general, it shows the total share capital and reserves, including preference capital. (Book value of equity).
[307] = (305 +306) = [Equity capital and reserves] + [Preference capital].
[305] = (301+302+303+304+589)
= [Ordinary share capital + Other equity capital + Share- premium account + Reserves + Total untaxed reserves].

Standard adjustments include:- goodwill shown against reserves is transferred to total intangibles.- capital and other grants shown elsewhere are transferred to reserves.- proposed dividends are deducted if reserves are shown before appropriations.- hybrid capital and other non-equity capital may have been excluded and shown at item [321] if perceived as a financial instrument.- for Europe and Japan, treasury stock is shown as an asset rather than as a deduction from equity.

BORROWING REPAYABLE <1 YEAR (309):

It shows bank overdrafts, loans and other short-term borrowing. The current portion of long-term loans is included.

SHORT-TERM LOANS (318):

This shows all loans (except those which are convertible, leasing finance and hire purchase) which are due for repayment within 5 years. [318] = [263] + [264].

LONG-TERM LOANS (319):

This shows loans (other than convertibles, leasing finance and hire purchase) which are repayable in more than five years.

TOTAL LOAN CAPITAL (321):

In general, it relates to all loans repayable in more than one year. Loans from group companies and associates are included.
[321] = (318+319+320+267)
= [Short-term loans + Long-term loans + Convertible loans + Leasing finance and HP].

NET TOTAL FIXED ASSETS (339):

In general, it shows the net total of land and buildings, plant and machinery, construction in progress and any other fixed assets. Assets leased out here are excluded.
[339] = (330-338) = [Total fixed assets-gross]-[Total fixed assets-depreciation].

TOTAL CURRENT ASSETS (376):

It includes stocks, work in progress, trade and other debtors, cash and equivalent, and any other current assets. Trade accounts receivable after 1-year are included. For Europe, common adjustments to the as reported figure are; to exclude treasury stock if shown as part of current assets; to exclude long term loans and receivables not directly related to the trading activities of the company; to reposition deferred tax asset to net deferred tax liabilities.

BANK BORROWING (387):

It shows the bank borrowings repayable within one year (part of Borrowings repayable within 1 year (item 309)).

OTHER SHORT-TERM BORROWING (388):

It shows the non-bank borrowings repayable within one year. [388] = [309] - [387].

TOTAL CURRENT LIABILITIES (389):

In general, it includes current provisions, creditors, borrowing repayable within one year and any other current liabilities. It also includes trade accounts payable after one year.
[389] = (379+380+381+382+385+309)
= [Other current liabilities + Provisions due in less than one year + Current taxation + Dividends payable + Total creditors and equivalent + Borrowings repayable within one year].

TOTAL ASSETS EMPLOYED (391):

It shows the sum of all assets less all current liabilities.
[391] = (339+344+356+359+390)
= [Net total fixed assets + Total intangibles + Total investment including associates + Other assets + Net current assets].

TOTAL ASSETS (392):
It shows the sum of tangible fixed assets, intangible assets, investments (including associates), other assets, total stocks & WIP, total debtors & equivalent and cash & cash equivalents. Common adjustments: deferred tax, if shown as an asset, is offset against any deferred tax liability; goodwill carried in reserves is transferred to intangible assets; treasury stock is shown as an asset rather than deducted from share capital and reserves.; advances on work in progress if disclosed as a liability by the company has been offset against stocks and work in progress.

ADJUSTMENTS TO OPERATING PROFIT (981):

This shows the total of all items that have been excluded from the published operating profit. This will include items of an exceptional nature, which do not form part of a company's normal trading activities.

OPERATING PROFIT (993):

This is the profit derived from operating activities i.e., *before* the inclusion of financial income /expense, financial and extraordinary provisions and extraordinary profits / losses. The most common adjustments made by Datastream to the published figure are as follows:
i) Capital grants/investment credits when disclosed as operating income by the company is excluded from operating profit and repositioned to non-operating income.
ii) For the French companies, profit sharing (participation des salaries aux fruits de l'expansion) and the normal write off of goodwill is included in operating profit. iii) For German companies, taxes other than income taxes are included. iv) Profits from associates/joint ventures and investment income when shown by the company as part of operating profit is excluded.

EBIT (1300):

It shows Earnings before Interest & Tax (EBIT). All industry groups The earnings of a company before interest expense and income taxes. Calculated by taking the pre-tax income and adding back only the total interest expense on debt.

TOTAL DEBT (1301):

It is the total of all long and short-term borrowings, including any subordinate debt and 'debt like ' hybrid finance instruments.

EBITDA (1502):

It is the earnings of a company before total interest expense, depreciation, amortisation and provisions.

BANK LOANS AND OVERDRAFTS (2029)
German Industrials (Hoppenstedt): Amounts payable in less than 1-year are highlighted at item [2065] and greater than 5-years at item [2066].

9.3. INDUSTRY CLASSIFICATION

9.3.1. DATASTREAM SECTOR CODES [DIS]

030 Building & Construction Materials
031 Gas Distribution
032 Builders Merchants
033 Chemicals, Speciality
034 Computer Hardware
035 Farming & Fishing
036 House Building
037 Electrical Equipment
038 Forestry
039 Other Construction
040 Distributors - Other
041 Media Agencies
043 Engineering - Contractors
044 Defence
045 Health Maintenance Organisations
046 Distributors of Industrial Components & Equipment
047 Environmental Control
048 Personal Products
049 Hospital Management & Long Term Care
050 Oil & Gas - Exploration & Production
051 Oil - Services
052 Home Entertainment
053 Tyres & Rubber
054 Non-Ferrous Metals
055 Leisure Facilities
056 Steel
057 Electronic Equipment
058 Software
059 Household Appliances & Housewares
060 Furnishings & Floor Coverings

061 Leisure Equipment
062 Household Products
063 Auto Parts
064 Vehicle Distribution
065 Automobiles
066 Retailers - Soft Goods
067 Beverages - Brewers
068 Beverages - Distillers & Vintners
069 Clothing & Footwear
070 Other Health Care
071 Food Processors
072 Restaurants & Pubs
074 Engineering - General
075 Packaging
078 Other Textiles & Leather Goods
079 Tobacco
080 Hotels
081 Security & Alarm Services
082 Paper
083 Food & Drug Retailers
084 Publishing & Printing
085 Discount & Super Stores and Warehouses
086 Business Support Services
087 Retailers - Multi Department
090 Retailers - Hardlines
091 Laundries & Cleaners
092 Chemicals, Commodity
093 Chemicals, Advanced Materials
094 Broadcasting Contractors
095 Pharmaceuticals
097 Oil - Integrated
098 Aerospace
099 Shipping & Ports
100 Gaming
101 Diversified Industrials
114 Soft Drinks
115 Cable & Satellite
116 Other Business
117 Commercial Vehicles & Trucks
119 Gold Mining
120 Engineering Fabricators
122 Other Mineral Extractors & Mines
126 Telecommunications Equipment
129 Airlines & Airports
130 Semiconductors
131 Rail, Road & Freight
132 Medical Equipment & Supplies
134 Education, Business Training & Employment Agencies
140 Electricity
142 Fixed-Line Telecommunication Services

143 Wireless Telecommunication Services
144 Water
150 Computer Services
151 Internet
155 Photography
156 Retailers e-commerce

9.3.2. DATASTREAM SECTOR DEFINITIONS, SORTED BY SECTOR NAME:

Aerospace (098): Manufacturers and assemblers of aircraft and aircraft parts primarily used in commercial or private transport.
Airlines & Airports (129): Air transport companies and operators of airports and related facilities and Services.
Automobiles (065): Companies which manufacture and assemble passenger automobiles and motor Cycles.
Auto Parts (063): Manufacturers of auto parts other than those classified elsewhere (e.g. in Tyres & Rubber).
Beverages - Brewers (067): Manufacturers and shippers of malt and malt liquors such as beers, ales and stout.
Beverages - Distillers & Vintners (068): Distillers, blenders and shippers of alcoholic beverages such as whisky, brandy, rum, gin or liquors. Also producers of wine and cider.
Broadcasting Contractors (094): Independent radio and television contractors, not classified elsewhere (e.g., 'Cable & Satellite'). Companies providing facilities and/or programmes for contractors. Film production.
Builders Merchants (032): Wholesalers of building materials and timber importers.
Building & Construction Materials (030): Producers of materials used in the construction and refurbishment of buildings and structures (e.g. cement, glass and flooring materials other than carpets - not classified in 'Furnishings & Floor Coverings') and refractory materials.
Business Support Services (086): Providers of non-financial services to organisations which could have been provided "in-house" excluding those activities classified elsewhere.
Cable & Satellite (115): Providers of television, media services and programming facilities driven by Subscriptions.
Chemicals, Advanced Materials (093): Producers of cellular polymers and specialist plastics.
Chemicals, Commodity (092): Producers of commodity and industrial chemicals, industrial gases, coatings and paints, fibres and films.
Chemicals, Speciality (033): Producers of fine chemicals, dyestuffs and chemicals for specialised applications. Biotechnology products not classified elsewhere.
Clothing & Footwear (069): Manufacturers of all types of clothing and footwear, including those for Sportswear.
Commercial Vehicles & Trucks (117): Manufacturers of commercial vehicles, railway rolling stock and heavy agricultural and construction machinery.
Computer Hardware (034): Manufacturers of computers and associated electronic data processing equipment and accessories.
Computer Services (150): Providers of computer services. Consultants for information technology not classified elsewhere (e.g. Education, Business Training & Employment Agencies).

Defence (044): Producers of components and equipment for the defence industry.
Discount & Super Stores and Warehouses (085): Shops concentrating on mass distribution of both hardlines and soft goods at discounted prices due to volume.
Distributors of Industrial Components & Equipment (046): Distributors, wholesalers and/or stockists of electrical, electronic, engineering equipment and supplies.
Distributors-other (040): Distributors, wholesalers and/or stockists other than those classified elsewhere.
Diversified Industrials (101): Industrial companies engaged in three, or more, classes of business that differ substantially from each other, no one of which contributes 50%, or more, of pre-tax profit, nor less than 10%.
Education, Business Training & Employment Agencies (134): Providers of education, business and management training courses and employment services.
Electrical Equipment (037): Producers of electrical components and equipment.
Electricity (140): Generators and distributors of electricity.
Electronic Equipment (057): Producers of electronic components and equipment not classified elsewhere (e.g. in 'Aerospace & Defence', 'Household Appliances & Housewares' or 'Hardware').
Engineering - Contractors (043): Designers, manufacturers and installers of industrial plant and pollution control equipment.
Engineering Fabricators (120): Producers of castings, pressings, welded shapes; fabricators and erectors of structural steelwork.
Engineering - General (074): Engineering companies not classified elsewhere, making a variety of Products.
Environmental Control (047): Providers of solid and hazardous waste management, recovery and disposal Services.
Farming & Fishing (035): Crop growers excluding forestry. Companies which raise livestock, commercial fishers, manufacturers of livestock feeds. Owners of plantations.
Fixed-Line Telecommunication Services (142): Operators of fixed-line telecommunications networks.
Food Processors (071): Processors and wholesalers of food
Food & Drug Retailers (083): Retailers of food and drug products.
Forestry (038): Owners and operators of timber tracts, forest tree nurseries, sawmills.
Furnishings & Floor Coverings (060): Manufacturers of furniture (including office furniture) and furnishings, carpets and other materials for covering floors.
Gaming (100): Providers of gaming and casino facilities.
Gas Distribution (031): Distributors of natural and manufactured gas.
Gold Mining (119): Prospectors for, extractors and refiners of gold bearing ores
Health Maintenance Organisations (045): Owners and operators of health maintenance organisations.
Home Entertainment (052): Providers of products and of entertainment services, generally enjoyed at home, other than those classified in the 'Media & Photography' sector.
Hospital Management & Long Term Care (049): Owners and operators of hospitals, clinics, nursing homes, rehabilitation and retirement centres.
Hotels (080): Hoteliers
House Building (036): Constructors of residential buildings.
Household Appliances & Housewares (059): Manufacturers of consumer electronic and electrical equipment, domestic appliances, lighting, tools for use in the home, hardware, cutlery, tableware, giftware and watches.
Household Products (062): Producers of detergents, soaps and polishes.

Internet (151): Access providers, Internet software, on-line service providers.
Laundries & Cleaners (091): Launderers and dry cleaners.
Leisure Equipment (061): Manufacturers of leisure equipment not classified under 'Clothing & Footwear' or 'Home Entertainment'.
Leisure Facilities (055): Providers of leisure facilities.
Media Agencies (041): Advertising, marketing and public relations agencies and consultants.
Medical Equipment & Supplies (132): Manufacturers of medical equipment, devices and eye care products.
Non-Ferrous Metals (054): Producers of primary non-ferrous metal products, encompassing all processes from smelting to alloying, rolling and drawing.
Oil & Gas-Exploration & Production (050): Companies engaged in exploration for, and production of, mineral oil and gas.
Oil - Services (051): Providers of services, including drilling, for oil and natural gas exploration and production. (NB: Distinguish Gas distribution in the Utilities Economic Group).
Oil-Integrated (097): Companies engaged in the exploration for, production, refining, distribution and supply of mineral oil and gas products. Companies providing services to oil companies, other than those specified elsewhere (e.g. Oil- Services).
Other Business (116): Industrial companies not classified elsewhere.
Other Construction (039): Constructors of non-residential buildings. Civil engineering and infrastructure contractors.
Other Health Care (070): Diversified and other health care companies not classified elsewhere (e.g., Education, Business Training & Employment Agencies).
Other Mineral Extractors & Mines (122): Companies engaged in the extraction and/or refining of minerals other than Gold.
Other Textiles & Leather Goods (078): Manufacturers of textile materials and goods other than clothing, and of leather goods other than footwear. Processors of hides and skins.
Packaging (075): Manufacturers of containers from paper, board, plastic, film, glass and/or metal.
Paper (082): Producers, converters and merchants of all grades of paper.
Personal Products (048): Producers of toiletries, cosmetics and hygiene products.
Pharmaceuticals (095): Biotechnology and drug research and development and/or exploitation.
Photography (155): Manufacturers of photographic equipment for use by the general public. Operators of photographic studios and film development companies.
Publishing & Printing (084): Publishing, newspapers and printers of documents.
Rail, Road & Freight (131): Land transport and related facilities and services, including road and tunnel operators and vehicle rental, and agencies which undertake the transportation of goods from shippers to receivers.
Restaurants & Pubs (072): Operators of restaurants and pubs, including integrated brewery companies.
Retailers e-commerce (156): Retailers conducting the majority of their business on the Internet or other electronic systems (e.g. digital TV). Retailers also conducting business by traditional means will be classified under other retailing sub sectors until published figures reveal that over 50% of their business, as measured by profit or turnover, is derived from e-commerce-related activities.

Retailers - Hardlines (090): Shops concentrating on the sale of a single class of goods, not classified elsewhere (e.g., food and drugs; soft goods or vehicles), such as auto parts or home and office products.

Retailers - Multi Department (087): Retail outlets with more than one department, selling a varied range of goods not classified elsewhere (e.g. 'Discount & Super Stores and Warehouses').

Retailers - Soft Goods (066): Shops concentrating on the sale of a single class of soft goods - clothing, etc.

Security & Alarm Services (081): Companies installing, servicing and monitoring alarm systems and those providing security services.

Semiconductors (130): Semiconductor capital equipment, wafer and chip manufacturers.

Shipping & Ports (099): Water-borne transport and related services and terminal facilities

Soft Drinks (114): Manufacturers of non-alcoholic beverages including carbonated mineral waters

Software (058): Producers of computer software.

Steel (056): Manufacturers of primary iron and steel products, encompassing all processes from smelting in blast furnaces to rolling mills and foundries.

Telecom Equipment (126): Manufacturers of digital equipment used in telecommunications, including mobile telephones, switchboards, exchanges and microwave systems.

Tobacco (079): Cigarette and tobacco manufacturers.

Tyres & Rubber (053): Tyre manufacturers and tyre treaders for automobiles, trucks, tractors and aircraft.

Vehicle Distribution (064): Distributors, sellers and/or servicers of vehicles and distributors of vehicle parts and components.

Water (144): Companies responsible for the provision of water and the removal of sewage.

Wireless Telecommunication Services (143): Operators of mobile (cellular and satellite broadcast) telecommunications Networks.

Table A.1: Classification of fifteen industries.

NO	INDUSTRY NAME	DS SECTOR CODES
1	AUTOMOTIVE, AVIATION AND TRANSPORTATION	53, 63, 64, 65, 98, 99, 117, 129, 131
2	BEVERAGES, TOBACCO	67, 68, 79, 114
3	BUILDING AND CONSTRUCTION	30, 32, 36, 39
4	CHEMICALS, HEALTHCARE AND PHARMACEUTICALS	33, 48, 62, 70, 92, 93, 95, 132
5	COMPUTER, ELECTRICAL & ELECTRONIC EQUIPMENT	34, 37, 57, 58, 59, 126
6	DIVERSIFIED INDUSTRY	101
7	ENGINEERING, MINING, METALLURGY AND OIL-GAS EXPLORATION	43, 44, 50, 51, 54, 56, 74, 97, 119, 120, 122, 130
8	FOOD PRODUCER &PROCESSORS AND FARMING &FISHING	35, 71
9	LEISURE, HOTELS, RESTAURANTS AND PUBS	52, 55, 61, 72, 80, 100
10	OTHER BUSINESS	116
11	PAPER, FORESTRY, PACKAGING, PRINTING &PUBLISHING PHOTOGRAPHY	38, 75, 82, 84, 155
12	RETAILERS, WHOLESALERS AND DISTRIBUTORS	40, 46, 66, 83, 85, 87 90, 156
13	SERVICES	41, 45, 47, 49, 81, 86, 91, 94, 115, 134, 150, 151,
14	TEXTILE, LEATHER, CLOTHING &FOOTWEAR AND FURNITURE	60, 69, 78
15	UTILITIES	31, 140, 142, 143, 144

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