Leverage and Debt Maturity: The Implication of Size and Market Quotation

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Abstract

This thesis aims to add empirical evidence to the corporate finance literature by looking at the financing decisions with a specific application to small companies in the context of the UK relatively highly regulated Main market, versus the lightly regulated Alternative Investment Market (AIM). I do this by gathering data on all quoted dead and alive companies in both markets from 1995 to 2008. I then split my sample firms in each market into different size groups and test my hypothesis within and across each group and each market. The thesis consists of six chapters. After an introductory chapter, I review the existing literature on capital structure and debt maturity controversies with an emphasis on recent empirical work. The next three chapters consist of three research papers. The first paper looks at the capital structure decisions of companies quoted in AIM and Main market across different size groups. In the second research paper, the maturity structure of debt is investigated in both markets. The third research paper tests the determinants of the delisting decision, particularly the effect of leverage using a sample of AIM companies. In the last chapter, I provide a summary of the main conclusions of the study and highlight some promising ideas for future research.

The first empirical chapter analyses the drivers of leverage across firms' sizes and market of quotation. I find that companies that are listed on the Main market have higher leverage than those listed on AIM. My results show that AIM companies are subject to higher business risk and tend to have lower profitability and tangible assets. In addition, in both markets, small companies are different from large firms in their level of leverage, tangibility of assets, and profitability, suggesting that the drivers of the financing choice are size dependent. Interestingly, the impact of taxation is limited to only large companies in both markets. Similarly, the impact of the agency conflict is also limited to large companies, as for small firms I find a positive relationship between leverage and growth opportunities, in contrast to the predictions of the agency theory. These results suggest that size rather than market of quotation is more likely to explain firms' leverage. However, I find that the market of quotation affects their speed of adjustment toward target leverage ratios. Using the dynamic model of capital structure, I find that in the Main market, small companies adjust more rapidly than large firms, suggesting that they rely more on bank debt and thus result in lower costs of adjustment. In contrast, large firms on the AIM adjust

more rapidly than small companies, suggesting that small AIM companies are subject to the highest costs of adjustment as they have the highest business risk and the lowest profitability.

The second empirical paper investigates the determinants of the structure of debt maturity across firms' size groups in both markets. I find that firms quoted in the Main market use longer maturity of debt in contrast to their AIM counterparts. However, the structure of debt maturity is different between small and large companies, as small companies use shorter debt maturity. Moreover, I find that the determinants of debt maturity are relatively different across the two sets of markets, suggesting that the market of quotation, are likely to affect the structure of debt maturity. Particularly, the effect of leverage is mixed in those markets. In the Main market, companies with higher leverage use more long-term debt in contrast to those quoted in the AIM. In line with my results in the previous chapter, I find that the speed of adjustment depends on the market of quotation. Using a dynamic framework, I find that companies have a target debt maturity, but, while in the AIM large companies adjust more rapidly than small companies, I find the opposite in the Main market.

I also contribute to the literature by assessing the impact of firm's life cycle on its choice of debt maturity. I use a sample of newly listed firms and assess the evolution of the maturity structure of their debt four years after their IPO. I find strong differences across the two markets. In the Main market, my empirical evidence shows that in contrast with small companies, large companies change the structure of their debt maturity significantly as they are more likely to use longer maturity of debt in the post-IPO period. While in the AIM, the structure of debt maturity is not affected by size as neither large companies nor small companies change their debt maturity significantly.

In the last empirical chapter, I study the impact of leverage on the delisting decision. I address the following questions: Do firms delist from the stock market because they are unable to raise equity capital and redress their balance sheet? Previous studies state that raising equity capital is one of the main benefits of stock market quotation. I expect firms that are not likely to take advantage of this benefit to have higher listing costs and more likely to delist. I use leverage as a proxy variable and a sample of voluntary delisting from AIM. I find that delisted companies have higher leverage as they did not raise equity capital over their public life. My results suggest that companies with higher leverage are more likely to delist voluntarily. These results hold even after controlling for agency conflicts, liquidity, and asymmetric information. I also investigate how the market reacts to the delisting announcement. I find that on the announcement date, stock prices decrease significantly. However, this reaction is not consistent with previous studies that report positive excess returns for companies that go private through different forms of buyouts. The voluntary delisting does not deliver good news to the market and hence voluntary delisting leads to a decrease in stock prices. I also find that firms that increased their leverage in the year prior to the delisting decision generate significantly lower excess returns than other firms. I compare my results to firms that delisted from the AIM but moved to the Main market. I find that that these firms generate statistically higher and positive returns than the remaining firms that delisted voluntarily. My results highlight the negative impact of leverage and a lack of equity financing on firms' market valuation.

My results contribute to the literature and to policy making in several ways. First, I test various controversial and new hypotheses by focussing on differences in institutional settings between the AIM and the Main market. The former is less regulated and it is more likely to attract younger, high growth, and riskier companies. These differences allow me to test various hypotheses developed in previous literature relating to the financing choices of firms. In addition, I provide a deeper analysis of the impact of size on the firms' financing choices. I focus on the differences in leverages across the two markets, changes in maturity from the IPO dates, and the drivers of the decision and timing from the IPO date of companies in the UK. Unlike previous studies, I show that the theoretical determinants of leverage, such as taxation and agency costs, across firms' size groups are not homogeneous, independently of the market quotation. However, I find significant differences across the two markets in terms of dynamic changes in leverage. In addition, my results highlight the impact of leverage on the decision to delist, and imply that policy makers need to facilitate the financing of companies when they list on the market, so that the benefits of listings outweigh the costs, and firms will not rush to voluntary delisting.

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Chapter 1 - Introduction and Overview of the Thesis

1.1 Introduction

More than fifty years ago, Modigliani and Miller (MM, 1958) showed that the value of the firm is independent of its capital structure. This theoretical finding is based on a number of critical assumptions, namely, a perfect capital market where there are no taxes at both corporate and personal levels, no transaction and bankruptcy costs, managers are rational, thus no agency costs, investors and companies can borrow at the same rate, and all participants have access to all relevant information. They use arbitrage argument to show that if firms can change their market value, rational investors can take actions to offset any changes in the firms' capital structure. In particular, investors are able to substitute personal leverage (home-made leverage) for corporate leverage and therefore, any profit for the firms and the investors would be eliminated.

One of the main contributions of MM is the identification of the factors that are expected to affect the choice of leverage and, thus to make capital structure relevant for firm's valuation. Subsequently, a large number of studies focus on these factors and the impact of leverage on firm's value by assessing how and why each of the assumptions in the MM model contributes to the determination of the firm's capital structure. The relaxation of the MM assumptions has led to what is referred to as the trade-off theory. This theory is based on the premise that companies are expected to set up their level of leverage by weighing the costs and the benefits of debt financing. Firms would benefit from using debt through the interest tax deduction and mitigating the agency conflict. At the same time, debt is subject to potential bankruptcy and financial flexibility costs. Therefore, firms are expected to set up their optimal level of leverage by maximising the benefits of debt and minimising its costs.

An alternative framework is provided by Myers (1984) who developed the pecking order theory, under which firm's capital structure is not driven by the MM assumptions but the preference of firms to use internal funding before recurring to raise capital in the form of, first, debt, and then equity, to minimise the transaction and the monitoring costs. This theory suggests that firms with high cash flows are expected to use less debt because they would prefer to finance their investments internally, rather than recurring to external financing. In contrast, under the trade-off theory, profitable firms are more likely to use more debt because they are less likely to have high expected bankruptcy costs as their probability of going bankrupt is low.

There are also additional fundamental differences between the two theories. In terms of agency conflicts, the trade-off theory suggests that firms that are likely to have high agency conflicts should use more debt. Jensen (1986) and Stulz (1990) put forward alternative debate in favour of using debt as a device to mitigate the free cash flow problem due to the conflict between managers and shareholders. These conflicts can include the possibility that the managers may prefer to reinvest funds even if paying out cash is better for shareholders, to continue with firm's operation even if liquidation is preferred by shareholders, or to choose risky projects that will benefit shareholders at the expense of debt-holders. In this case debt can reduce the free cash flow, allows bondholders the option to liquidate, and allows shareholders to gain if financially distressed firms make risky investments. However, Myers (1977) argues that the conflict between shareholders and debt-holders would result in underinvestment problem, covenant constraints, and costs of production of information about firm's prospects.

Myers (1977) also suggests that the maturity structure of debt will affect the underinvestment problem as it can be alleviated through shorter debt maturity. Accordingly, the maturity structure is expected to be affected by the conflicts between managers, shareholders, and debt-holders, together with other factors such as the liquidity hypothesis (Diamond, 1991 and 1993) and taxation (Brick and Rivid, 1985). In particular, these theories predict that firms with shorter maturity of debt are more likely to have low tax benefits, high underinvestment problem, and more vulnerable to financial distress. As a result, they are expected to prefer lower leverage. These theories will be discussed in more details in chapter two.

The empirical analysis provided to-date is mixed. First, there are difficulties in finding good proxy variables for each of the theoretical determinants. For example, previous studies (e.g., Booth et al., 2001) use the effective tax, the ratio of corporate tax liability over profit before tax, to assess the tax impact. They find that, in contrast to the theoretical predictions, a negative and significant coefficient, suggesting that firms that pay higher taxes have higher leverage. They suggest that the measure of taxation is likely to reflect profitability rather than tax impact. The predictions of the proxy variables are also controversial. In particular, while the trade-off theory predicts a positive relationship between leverage and profitability, as profitable firms are more likely to have a higher debt capacity because they are less risky, the pecking order theory predicts a negative relationship as profitable firms will have internal funds to use first before recurring to debt financing. Similarly, the relationship between leverage and growth opportunities, as measured by market-to-book ratio, is expected to be negative under the trade off theory as high growth firms are more risky and have higher agency conflicts between shareholders and debt-holders in the form of underinvestment problem, while the pecking order theory predicts a positive relationship as high growth companies prefer to use debt financing because they are more likely to have lower internal funds to finance their high growth potentials.

Previous studies account for the size effect by including in the regressions the size variable. However, this method misses the specific characteristics of small companies which are likely to affect the choice of leverage and debt maturity. In addition the interpretation of the regression coefficient of this variable is likely to be controversial, as size does not relate to only a single hypothesis. From the trade-off theory, large companies are less likely to have high growth opportunities and/or less likely to go bankrupt, thus they have lower risk and lower expected bankruptcy costs, and as a result, they should have higher leverage. Similarly, large firms are more likely to have higher agency conflicts between shareholders and managers (Jensen, 1986), thus they are expected to have a higher leverage. However, the pecking order theory predicts that large firms will have low leverage because of their higher internal cash flow and lower information asymmetries that will allow them to raise equity at lower transaction costs.

In this thesis I contribute to the literature for focussing more on the differences in the determinants of capital structure and the maturity structure of debt of small and large firms, and on the impact of market quotation. I also expand my analysis to assess whether leverage contributes to the stock market delisting decision. I explore further the size effect on leverage and debt maturity. Early studies (e.g., Evans, 1987) suggest that small firms have higher growth opportunities. However, the growth of those firms is constrained by internal and external finance. Small companies are more likely to have asymmetric information problems, and, thus, they would raise little external finance. More specially, the extensive use of debt is not appropriate for those firms with little collateral value. As small firms have lower tangible assets, they may have difficulties in raising external finance (e.g., Hubbard, 1998; Carpenter and Petersen, 2002; and Beck et al., 2008). Tamari (1980) argues that small firms have higher variability in their earnings and thus more likely to experience a greater degree of risk. Therefore, the differences between small and large companies provide a recent path of research to examine the related factors on the debt-equity decision and ability to raise external financing.

However, the question whether small firms have different drivers of capital structure and debt maturity is still controversial. Previous studies provide mixed evidence on the impact of the trade-off and pecking order theoretical predictions on leverage and debt maturity of small and medium sized companies. For example, inconsistent with the trade-off theory, Cassar and Holmes (2003) find that growth opportunities are positively related to leverage, while and Esperanca et al. (2003) show no impact of growth opportunities on leverage. Similarly, Jordan et al., (1998), Michaelas et al., (1999), and Jõeveer, (2005) provide inconsistent results on the impact of taxes on leverage of small firms. In addition, inconsistent with asymmetric information and bankruptcy hypotheses, Esperanca et al. (2003) find that size in negatively related to leverage, but other empirical studies support the positive effect of size on leverage (e.g., Cassar and Holmes, 2003 and Daskalakis and Psillaki, 2008).

Previous studies also provide mixed results on the determinants of the maturity structure of debt. For example, Cressy and Olofsson (1997) find that small companies have high proportion of short-term debt; in particular they use debt in the form of overdrafts to cover their growth opportunities. Chittenden et al. (1996) suggest that the use of short-term debt is related to the structure of assets and small companies with lower fixed assets have less collateral, thus they are less able to rely on long-term debt. In addition, Myers (1977) argues that the underinvestment problem that happens in the case of the conflict between shareholders and debt-holders is mitigated if firms with more growth opportunities use shorter maturity of debt. Therefore, empirical studies expect a negative relationship between the maturity structure of debt and growth opportunities, but to date, the results are mixed. Inconsistent with the agency conflict in the form of underinvestment problem, Hall et al. (2004) find that the effect of growth opportunities is not significant on the maturity structure of debt. Scherr and Hulburt (2001) also report little empirical support for the impact of growth opportunities on debt maturity structure. The literature investigates the impact of asymmetric information on the maturity structure of debt, yet this literature does not find conclusive evidence. Empirical studies use size as a proxy for asymmetric information and they argue that larger companies use longer maturity of debt because they established a reputation and thus they have lower level of asymmetric information. Hall et al. (2004) and García-Teruel and Martínez-Solano (2007)find that size is positively related to long-term debt but in contrast to Scherr and Hulburt (2001), who find that larger firms use short-term debt.

In the IPO literature, the focus is more on whether firms, by accessing the capital market, raise further capital to rebalance their leverage. For example Pegano et al. (1998) and Kim and Weisbach (2005) find that companies issue shares to reduce their leverage after going public. Similarly, Bancel and Mittoo (2008) survey a number of newly-listed firms in Europe. They find a significant reduction in leverage after the IPO suggesting that firms raise equity capital to rebalance their leverage. Using US data, Brau and Fawsett (2006) find that firms go public to raise capital to continue to grow, mainly by merging and/or taking over other companies.

Therefore, it is expected that companies that are not able to raise equity capital, either to reduce their leverage or to finance their growth opportunities, are more likely to delist voluntarily. To my knowledge, there are only two related empirical studies that investigate the determinants of the delisting decision (Marosi and Massoud, 2007 and Leuz et al., 2008). However, both these studies mainly look at the impact of the corporate governance and the regulatory compliance of the Sarbanes-Oxley Act on July 31, 2002 on the decision to delist. Marosi and Massoud (2007) find that the Sarbanes-Oxley Act (SOX) and the compliance cost are major determinants of the delisting decision. Leuz et al. (2008) find a large impact of the SOX on the delisting decision. In addition, they find that the free cash flow problem associated with the agency cost is highly significant. These two studies are based on US institutional setting where, when companies delist voluntarily, they mainly carry on trading on the Pink Sheets,[1] while in the UK they transfer into another market or they go private, and they relatively ignore the impact of debt-equity financing on such a decision.

1.2 Gaps in the Literature

With respect to previous empirical studies, various criticisms can be addressed. First, to-date, the literature provided mixed and controversial evidence on the determinants of capital and debt maturity structures. For example, firm size is found in many studies to be positively related to leverage (e.g., Rajan and Zingales, 1995 and Booth et al., 2001), but Titman and Wessels (1988) find a weaker relationship between leverage and size, and, more especially, the positive relation is not reported by Mehran (1992). Similarly, the results for the market-to-book ratio as a proxy for

[1] Pink Sheets is a trading system. “The term “pink sheets” derives from the colour of the paper on which stock prices for the firms traded in this market are printed and distributed to traders.” (see Macey et al., 2008, p. 15)

growth opportunities are mixed. Using large companies, Rajan and Zingales (1995), Baker and Wurgler (2003), Booth et al. (2001) and Frank and Goyal (2004, 2009) show that leverage is inversely related to the market-to-book ratio, while for small companies, Michaelas et al. (1999) and Jordan et al. (1998) find that growing firms use more debt in their capital structure. Small growing companies are less likely to generate sufficient internal financing and less likely to issue equity owing to the asymmetric information problem. Therefore, they rely more on debt to finance their growth opportunities. With respect to the maturity structure of debt, consistent with the agency theory, Barclay and Smith (1995) find that debt maturity is positively related to firm size. They suggest that larger firms with less growth opportunities are less likely to suffer from the underinvestment problem associated with the agency conflict between shareholders and debt-holders, and hence use more long-term debt. Unlike large firms, small companies rely more on bank debt, which has shorter maturity than public debt. Therefore, I expect that small companies have lower leverage and shorter maturity of debt.

The literature on leverage and debt maturity structure predominantly analysed theoretically and empirically the capital structure decision of large companies. Relatively, less research is focused on small companies. In particular, the application to the theoretical determinants of the debt maturity structure to the characteristics of small firms has not been exhaustive. The specific characteristics of small companies are likely to highlight a large number of interesting issues relating to the way companies make this crucial decision. For instance, Chittenden et al. (1996) argue that small firms are subject to a significant agency problem in the form of asymmetric information, as insiders have higher information than outside investors. In addition, unlike large companies, small companies are not required to disclose much information and hence monitoring becomes costly and more difficult. Small firms also encounter difficulties in raising external finance owing to significant costs of dealing with the asymmetric information and hence the role played by collateral is more crucial for small firms. Prior literature generally uses size as an explanatory variable to control for asymmetric information, bankruptcy costs, and agency conflicts. Other studies highlight the strong differences in fundamental characteristics between small and large companies. To my knowledge, previous studies do not provide an in-depth analysis of the impact of the differences in characteristics between large and small firms on leverage and debt maturity structure. I attempt to fill this gap by investigating the determinants of leverage and debt maturity structure of small companies relative to large firms and noting whether the specific characteristics of small companies would result in different drivers of the decision. I expect that the determinants of capital and debt maturity structures depend upon firm size.

Previous studies document the determinants of capital structure and debt maturity structure in predominantly the US market, but they do not address the impact of the market of quotation. Fan et al. (Forthcoming in *JFQA*) argue that the corporate financing choices are determined by the characteristics of the firm as well as the institutional environment. They suggest that a firm's capital structure is likely to be affected first by the differences in institutional factors and then by firms' characteristics. They find that firms operating in weaker legal system use less external equity and shorter maturity of debt. Prior literature addresses the institutional differences between countries (e.g., Rajan and Zingales, 1995 and Fan et al., Forthcoming in *JFQA*), but does not address the institutional differences in the market of quotation in a country. I focus on the UK institutional setting, where the

London Stock Exchange includes two distinct markets, the Main or Official List Market which is relatively highly regulated, and AIM, a market mainly for small and high growth firms, with relatively lighter regulation. In particular, AIM companies are subject to a minimum market capitalisation, minimum free float, and no trading record, compared to IPOs on the Main market which should have a minimum of three years trading record and at least 25% of shares in public hands (see Jenkinson and Ramadorai, 2008).[2] Thus, I distinguish between these two markets as they are not previously explored in the literature, and they provide good testing grounds for the various hypotheses developed in the past literature to explain leverage and debt maturity.

The literature on debt maturity generally applies firms' characteristics as major determinants of the maturity structure of debt, but does not investigate firms' characteristics in the post-IPO period. A fundamental gap in the literature is the lack of examination of how firms' characteristics, in particular debt maturity, have changed over firms' life cycle. This thesis attempts to fill this gap with studies of how the structure of debt maturity may change in both the Main market and AIM. I aim to answer whether the changes of debt maturity are fairly similar across firm size and in both markets, after controlling for other IPO fundamental factors that proxy for information asymmetries, agency costs and risk.

Since its launch in 1995, AIM has attracted a large number of small and high growth companies that would not be eligible for quotation on the Official List market. Despite its development, the number of companies choosing to delist from AIM increased significantly, particularly in the last few years. In 2011, the Financial Times reports "the first quarter saw 30 delistings, down from 51 in the first quarter of

[2] The differences between AIM and the Main market are explained in details in Chapter 2 (Literature Review, section 2.4.1).

2010. But news emerged ahead of the Easter break of two more companies asking shareholders for permission to leave. Both have been on AIM for several years….”.[3] So far, to the best of my knowledge, prior empirical studies have not addressed the determinants and the consequences of the delisting decision in AIM. The majority of IPO studies (e.g., Pagano et al., 1998; Kim and Weisbach, 2005; and Bancel and Mittoo, 2008) suggest that raising equity capital in order to rebalance the level of leverage is a main benefit of going public as an IPO. They find that companies with high leverage are more likely to be listed. A major gap in those studies is an examination of the debt-equity financing and the decision making of companies in order to opt to delist. However, more recently, Marosi and Massoud (2007) and Leuz et al. (2008) investigate the determinants of voluntary delisted firms in the US, but they have not provided evidence on the impact of financing opportunities on the decision to delist. Those studies mainly look at the impact of the corporate governance and the regulatory compliance of the Sarbanes-Oxley Act on July 31, 2002 on the going-dark decision using larger companies. Marosi and Massoud (2007) find that the Sarbanes-Oxley Act (SOX) and the compliance cost are the major determinant of the delisting decision. Leuz et al. (2008) find a large impact of the SOX but not all, as the free cash flow problem associated with the agency cost is reported highly significant. In addition, these two studies include both financial and non-financial companies. However, previous studies argue that leverage of financial companies is strongly affected by capital requirements and investor insurance schemes and hence their level of leverage is not comparable with that of non-financial companies (e.g., Rajan and Zingales, 1995). Therefore, leverage that

[3] Financial Times, April 28, 2011.

Marosi and Massoud (2007) and Leuz et al. (2008) use could have different interpretations.

There are significant institutional differences between the UK and the US in terms of the delisting decision. In the US companies that intend to delist have two options; fist, they need to delist from the exchange (NYSE, AMEX, or NASDAQ), which may take about 21 days depending on the exchange. In this situation, firms continue to trade over the counter or on the Pink Sheets. Then they may need to file a form 15 in order to deregister from SEC and this step takes about 60 days. Once they deregistered, they are not required to provide public information (e.g., Macey et al., 2008, and Marosi and Massoud, 2007). In contrast, in the UK, a firm decides to delist voluntarily either to transfer to another market, or, more importantly, to become a private company. In this situation, investors have two choices; either sell their shares before the delisting date, or remain shareholders in the privately owned company. The delisting process goes through one step. In accordance with Rule 41 of AIM, a firm should notify the London Stock Exchange to cancel its trading at least 20 days prior to such date. This should be conditional upon the approval of not less than 75% of votes cast by shareholders in the general meetings (see AIM publications in London Stock Exchange).[4] Very recently, Espenlaub et al. (Forthcoming in *JBFA*) investigate the impact of the regulation on the survival AIM IPOs. They find that if AIM increases the minimum requirements on the size and the age of the company, IPOs have greater chance for long-term survival. They compare survivors to companies that delist due to merger and acquisition and other negative reasons, but they do not distinguish between voluntary delisting and other forms of delisting, such

[4] AIM rules can be downloaded from the London Stock Exchange, http://www.londonstockexchange.com/companies-and-advisors/aim/advisers/rules/aim-rules-for-companies.pdf

as delisting due to market regulations, which is important to the propose of their study.

1.3 Main Contributions and Findings

The financing decision of small and medium sized companies is still controversial and the relatively mixed results in the previous literature beg the following questions; first, what factors determine capital structure decision. Under the capital structure theory, to maximise its value, a firm needs to decide on the level of its leverage, whether to raise debt or equity, if it needs external financing, and whether to use long or short-term debt. My aim in this thesis is to assess the factors that determine small firms' debt level and its maturity structure, and whether their limited ability to raise equity leads them to delist from the stock exchange, as one of the main purpose of being quoted is to rebalance their leverage. I, therefore, focus on the impact of leverage on the delisting decision. I contribute to the existing literature by analysing the effect of size, as small companies have different asset tangibility, asymmetric information, agency conflicts, and bankruptcy probability. I also investigate the impact of market of quotation on debt financing, by distinguishing between the AIM and Main market in the UK to assess further the impact of stock market regulation.

The findings of this thesis can be summarised as follows. The first empirical paper (Chapter three) assesses the similarities and differences in the determinants of capital structure across firms' sizes listed on both the Main market and AIM of the London Stock Exchange (LSE). I hand-collect data on FTSE index series (FTSE 100, FTSE 250, FTSE SmallCap, and FTSE Fledgling).[5] I investigate 2,894 companies over the sample period from 1995 to 2008. The empirical evidence has been

[5]FTSE 100 presents the largest companies while FTSE Fledgling presents the smallest companies in the Main market.

estimated by panel data methodologies, including the fixed effects model and Generalised Method of Moments (GMM), which allow me to control for unobserved firm-specific effects as well as the endogeneity problem by using instruments. I find that the determinants of leverage are likely to be dependent critically on firms' size and the regulation inherent in the market in which they are quoted. I show that the tax effect depends on the size of the firm. While for large firms the effective tax rates are positively related to leverage, they are not significant for small firms. These results suggest that, since small firms are likely to have high income volatility, they are not able to fully set their debt level optimally to take full advantage of the interest tax shields. In addition, I find that consistent with the trade-off theory, leverage is positively related to tangibility across firms' sizes. Unlike previous empirical studies, I use asset beta as a proxy for bankruptcy costs signifying that all observed companies are considerably negatively affected by their business risk. However, the sensitivity of leverage to asset beta is greater for companies that are listed on AIM.

My results also provide strong evidence to support the prediction of the pecking order theory. All measures of leverage are inversely related to profitability in line with the empirical studies of Michaelas et al. (1999), Rajan and Zingales (1995) and Booth et al (2001), but in contrast to Hall et al. (2004). However, the leverage of small companies listed on AIM and the Main market are less sensitive to profitability. It is likely that the profitability of those companies is also a proxy for quality of investment opportunities discussed by Rajan and Zingales (1995) who argue that profitability for small firms may be a proxy for internal fund as well as investment opportunities, which have conflicting effects on leverage.

Interestingly, the relationship between leverage and market-to-book is dependent on firm size but not on market of quotation. In both AIM and the Main market, while, for large firms, consistent with the trade-off theory, market to book is negatively related to leverage, the relationship is positive for small firms, in line with the predictions of the pecking order theory. These results suggest that large firms are more likely to finance their growth opportunities with equity, while small firms are more likely to rely on debt financing, even to finance their growth options. The positive impact of growth opportunities on leverage for small companies is not consistent with the agency hypothesis in the form of underinvestment problem. Titman and Wessels (1988) suggest a firm's value increases with its growth opportunities, and this would result in an increase in its debt capacity and thus its leverage. The positive relationship between leverage and growth opportunities are also reported by Michaelas at al. (1999), Cassar and Holmes (2003), and Hall et al. (2004) also report similar results based on small companies.

Finally, I find that firms appear to have target debt ratios, but they eliminate their deviation by different speed of adjustment depending on the capital market in which they are listed. In the Main market, the findings show that small companies adjust more rapidly than large ones but in contrast to firms quoted in AIM. These results suggest that in the Main market, larger companies use more public debt, which is more expensive than the private debt, and, hence, larger companies adjust towards their target leverage at relatively slower speed. However, AIM companies rely more on private debt and it is likely that the financing constraint has a first-order effect on the speed of adjustment towards target leverage. The smallest AIM companies appear to be the most financially constrained, and thus they adjust towards the target least rapidly.

The second empirical paper (Chapter four) focuses on the impact of size and market of quotation on debt maturity structure. Following the first empirical paper, I use FTSE index series to control for firms' size. Like the first paper, my sample comprises 2,894 companies over the period 1995-2008 and similar methodologies are used in this paper. The results show that small companies have shorter maturity of debt relative to large companies. However, I find that companies listed on the Main market have longer maturity of debt and thus AIM small companies have the shortest maturity of debt in the UK. Moreover, I find that the determinants of debt maturity are relatively different across the two sets of markets, suggesting that market of quotation is likely to affect debt maturity structure. My findings provide strong support for the signalling hypothesis across firms' sizes that are listed on the Main market in contrast to AIM, where the negative effects of abnormal earnings are not significant. In the Main market, I find a negative and significant relationship between abnormal earnings as a proxy for firms' quality and long-term debt.

I also find mixed evidence for the effect of leverage, used as a control variable and expected to be positively related to debt maturity. In the Main market, long-term debt is positively related to leverage while in AIM, the relationship is negative. The results for Main companies are in line with the liquidity argument that firms with long-term debt have low liquidity risk, thus have high leverage. In contrast, the results for AIM suggest that the underinvestment problem is highly significant and hence firms that maintain long-term debt have an incentive reduce their leverage to mitigate the underinvestment problem. In addition, consistent with the tax hypothesis, the term structure of interest rate has a positive and significant effect across firms' sizes. However, when I use the effective tax rate as an explanatory variable, the positive and significant relationship is limited to large firms in both markets. These results are likely to be driven by the level and variability of small firms' earnings. Pettit and Singer (1985) argue that small firms tend to have lower profits margins, resulting in lower tax rates as they operate in less concentrated markets, and, thus, greater competitive pressures. Consistent with the underinvestment problem associated with the agency theory, in both the Main market and AIM, the results indicate that market-to-book ratio has a considerable negative effect on debt maturity structure across different companies.

I account for the dynamic effect of debt maturity structure by using the GMM panel data methodology. I find that firms appear to have target debt maturity but they eliminate their deviation by different speeds of adjustment, depending on the capital market in which they are listed. In AIM (Main market), the findings suggest that small companies adjust more rapidly (slowly) than large ones. The empirical literature on the dynamic framework of debt maturity structure provides mixed evidence for the speed of adjustment. For the UK data, Ozkan (2000) finds that companies adjust to the target ratio relatively fast (0.55%). Antoniou et al. (2006) concludes that the French companies have a higher speed of adjustment than their UK counterparts. A fundamental gap in those studies is the lack of examination of how macroeconomic factors would affect the speed of adjustment. I find that in both markets, the default spread as a proxy for global risk has a positive and significant effect on the speed of adjustment. This result is generally consistent across firms' sizes.

I also assess how firms' characteristics of the newly listed sample evolve over the IPO period. In particular, I try to add insight as to how debt maturity changes for the four years following the IPO. I find strong differences across the two markets, as Main and AIM companies differ substantially in the change of their debt maturity after the IPO. In the Main market, my empirical evidence shows that, in contrast with small companies, large companies increase the maturity of their debt, probably because of their higher tax benefits and lower business risk. While in AIM, the structure of debt maturity is not dependent on size, as both large and small companies do not change their debt maturity significantly. One possible explanation for this result has to do with the lack of debt market access for AIM companies.

The last empirical paper (Chapter five) of this thesis tests for the impact of leverage on the delisting decision from AIM. I hand-collect the sample of 184 companies that decide to delist voluntarily from AIM over the period 1995 to 2009. The data set at the time of the IPO is unique as it is hand collected from company prospectuses. I apply two alternative estimation methods (the logit and Cox proportional hazard model) to test my hypotheses. I find that leverage and growth opportunities at the time of the IPO contribute significantly to the delisting decision. The logit analysis reports that leverage has a significant and positive impact of the delisting decision. This finding is also supported by Cox proportional hazard model, which controls for the period that the delisted companies were publicly listed on AIM. I analyse the debt-equity financing over the IPOs' life cycle. The results indicate that delisted companies issue debt over their public life in contrast to the remained public companies that raise significant amount of equity. My results suggest that firms delist when there is no benefit of being quoted, as measured by their inability to raise equity capital and to rebalance their leverage. Moreover, I use the market model as one of the frequent methodologies in event studies to investigate the reaction of stock returns to the delisting announcement. I find significant negative abnormal returns upon delisting from AIM, while those companies that move to the Main market experience positive abnormal returns.

The three empirical papers presented in this thesis contribute to the exiting literature in several ways. First, although a large number of studies have analysed theoretically and empirically the determinants of leverage, the main drivers of capital structure decision is still a puzzle. More especially, previous empirical studies predominantly focus on large public companies and the application to small firms has not been exhaustive. The specific characteristics of small companies allow me to highlight a large number of interesting issues relating to the way companies make this crucial decision.

Second, studies based on the maturity structure of debt do not consider the UK market quotations as well as firms' entire IPO life cycle. I contribute to the extensive literature by assessing maturity structure through the firm's life cycle. For this purpose, I study the characteristics of IPOs in both the Main market and AIM, where those characteristics are relatively different in the post-IPO period. I find that for the Main market, the mean (median) of maturity is increasing after IPO for large firms but for small firms maturity is constant. For AIM, the mean (median) of maturity is relatively constant, decreasing for small firms.

Moreover, by constructing a unique data set on FTSE index series, this research provides further empirical evidence on characteristics of firms of different size in order to investigate capital structure as well as debt maturity structure. Whilst the literature on capital and debt maturity structures is extensive (see reviews of Harris and Raviv, 1991, Rajan and Zigales, 1995; Booth et al., 2001; Fama and French, 2002; and Frank and Goyal, 2009), the reported evidence is still puzzling, and the question as to whether companies with different size and in different institutional settings have the same financing behaviour is still contentious. I contribute to previous evidence by focussing on the impact of size and regulations of the market of quotation which, previous studies have not analysed extensively. In particular, while previous studies use size as an explanatory variable in the leverage regressions to proxy for the signalling, free cash flow, financial flexibility and bankruptcy costs hypotheses, I analyse the determinants of leverage and the maturity structure of debt across and within different size groups to assess whether the firm specific factors contribute to the significant differences in leverage and debt maturities between small and large firms. I also assess whether the determinants of leverage and debt maturity structures tested in previous studies apply also to different size groups.

Similarly, while previous studies are either market specific, or analyse leverage across countries with aggregate country-level classifications, I test my hypotheses by focussing on the regulation and other institutional settings in one country with two different markets. More specifically, I assess whether the financing behaviour of firms in the UK depends on whether the firm is quoted in the Main market, which is relatively more regulated, or on AIM where firms are relatively younger, riskier, have high growth, and subject to less governance restrictions and regulations, but they have to maintain a corporate broker, referred to as Nomad (Nominated Adviser), which underwrites any new equity capital raised by the firm. I identified the size and market of quotations as significant gaps in the literature which I tried to fill in my thesis.

I find strong differences across firms' size groups and market of quotation in terms of their leverage and debt maturity structures which I relate more the firms' specific characteristics within each size group, and to the institutional settings of the specific market in which the firm is quoted. In particular, I show that since large firms are relatively more mature with low risk and high interest tax deductibility potentials that results from their high profitability, they can afford to have higher leverage and longer debt maturities than smaller firms. However, I also find strong differences across the two markets as, after controlling for size, firms in the Main market have higher leverage and maturities than firms quoted in AIM. My analysis also shows that size affects changes in leverage of newly listed firms. I find that in the post-IPO period, small firms tend to have lower leverage and lower maturity, while large firms tend to increase their level of debt and the proportion of their long-term debt. Large firms tend also to become even larger after quotation while small firms remain relatively the same or decline. These results imply that small firms do not benefit from market quotation and this is highlighted even more in my last paper where I show that small firms quoted mainly on AIM are more likely to delist voluntarily because their leverage remains high after quotation as they are unable to raise equity capital and to finance their growth options. As far as I am aware, these results are not documented in previous studies and my contribution implies that size cannot just be considered as a simple proxy variable in leverage and maturity regressions as firms in different size groups have different specific characteristics which impact on their financing decisions.

Finally, I use a unique hand collected data set to define the characteristics of delisted companies. To the best of my knowledge, the determinants and the consequences of the delisting decision in AIM has not been fully analysed in the literature. However, two recent published papers (Marosi and Massoud, 2007; and Leuz et al., 2008) analyse the determinants of the delisting decision in the US market. I add to those studies by analysing AIM, as the delisting transaction is significantly different from the US market.

The rest of this thesis is organised as follows. Chapter 2 provides the theoretical and empirical review of the related literature. Chapter 3 presents the first empirical paper, which focuses on the determinants of leverage across firms' sizes.

Chapter 4 provides the second empirical paper, which examines the impact of size and market of quotation on the maturity structure of debt. Chapter 5 presents the third empirical paper, which analyses the impact of leverage on the delisting decision. Chapter 6 summarises the findings and concludes the study. It also presents the limitation of this thesis and provides some suggestions for future research.

Chapter 2 - Literature Review

2.1 Introduction

In this section, I provide a summary of the development of the related literature, which is vast and controversial, and identify gaps in previous studies. The overall aim of my thesis is to study the determinants of capital and debt maturity structures, with particular application to small companies. Therefore, I will cover two main issues in this chapter. First, I review the prominent theories of capital structure. The second part reviews the controversies in the literature, providing the theoretical arguments followed by a review on empirical debates.

2.2 Theoretical Background

2.2.1 Modigliani and Miller

The question as to whether firms can create value by combining securities has been the subject of many theoretical as well as empirical investigations. Starting with the proposition of Modigliani and Miller (MM model, 1958) that the capital structure is irrelevant to firm's valuation, a number of studies assess the conditions under which this statement applies. MM (1958) derive their model under a number of critical assumptions, namely, a perfect capital market in which there are no taxes at either corporate or personal level, no transaction costs, and no agency costs (because managers are rational); investors and companies can borrow at the same rate; and all participants have access to all relevant information. However, this theory does not reject the possible preference of a firm's owner for a certain type of financing over others and, particularly, it provides conditions under which the capital structure of a firm is irrelevant to total firm value. Previous studies focus on the extent to which each of the assumptions in the MM model contributes to the determination of the firm's capital structure. Three main theories, the trade-off theory, the pecking order theory, and the market timing theory, have been developed. I shall discuss the main theories of capital structure in detail in the following sections.

2.2.2 Trade-off Theory (TOT)

Modigliani and Miller (1963) started by relaxing the assumption of corporation tax, keeping the remaining assumptions of perfect capital markets with no bankruptcy or agency costs. They show that firm value becomes an increasing function of debt because the tax deductibility of interest payments decreases the expected tax liability, resulting in an increase in the after-tax return to all shareholders. Therefore, using debt would be preferred to issuing equity, because of the expected reduction in tax liability. Their main finding is that the value of a levered firm is equal to that of an unlevered firm plus the present value of tax benefits, equal to the amount of debt when in perpetuity *times* the corporate tax rate. Subsequent studies suggest, however, that the assumption of a fixed corporate tax rate at different levels of debt may be excessively strong. In particular, as the level of debt increases, the potential corporation tax rate decreases since the firm may be making losses, and thus may be unable to pay/claim corporation tax (Brealey et al., 2008). Moreover, the analysis is limited to corporation tax. In practice, this effect should also include personal taxes. Miller (1977) introduces such effects into the analysis of leverage. He shows that, since the income tax on dividend is likely to be zero, the optimal level of debt becomes irrelevant at the firm's level as it is determined by the relationship between personal tax and interest at income level but not at individual firm level.

The introduction of bankruptcy costs could result in a lower preference for debt financing. Warner (1977) argues that the market value of securities would decrease when investors believed that there was the probability of bankruptcy, and thus that the bankruptcy costs would offset the benefits of tax. The arguments concerning tax and bankruptcy reflect that, in reality, firms cannot only rely on debt and should contribute to their optimal capital structure by allowing for the costs and benefits of borrowing. The costs of debt are mainly bankruptcy costs. Warner (1977) distinguishes between direct costs, namely, lawyers' and accountants' fees, and indirect costs, namely, lost sales, lost profits, and credit rating problems. He finds that the direct bankruptcy costs (with a range of 0.4% to 5.9% of the market value of the railroad companies he considered) are distinctly lower than the tax benefits of debt. However, the costs are not too small to be ignored. Indirect costs are likely to be much larger, but they are difficult to measure, and thus the foregone sales and profit could be the proxies for the indirect bankruptcy costs. More recently, Andrade and Kaplan (1998) argue that the costs of financial distress appear to be small relative to the tax incentive benefits of debt. They report the net costs of bankruptcy at 10% to 20% of firm's value, indicating modest expected costs of financial distress. They even control for highly leveraged firms and find that fewer than one-third of those companies face a bankruptcy situation.

Accordingly, when tax and bankruptcy costs are added to the irrelevance proportion in the MM model, the trade-off theory is developed. It suggests that the value of a levered firm is equal to that of an unlevered counterpart, plus the present value of tax benefits minus the expected bankruptcy costs; i.e., the probability of bankruptcy times the bankruptcy costs. In this case, the optimal level of capital structure emanates from the trade-off between the tax benefits and the expected bankruptcy costs. When these two are not equal, capital structure becomes relevant, while when the tax benefits are higher (lower), firms are expected to have more (less) debt financing.

The tax and bankruptcy costs are, however, not the only respective benefits and costs of securities. Jensen and Meckling (1976) argue that the agency costs are also a matter of capital structure when added to the irrelevance proposition. In the irrelevance proposition of the MM model, it does not matter whether the company raises equity or debt, since the conflicts between managers, shareholders, and debt-holders are not considered. Jensen and Meckling (1976) highlight the agency costs of equity, as there are conflicts between managers and shareholders when management has control over the firm’s cash flow with which to invest in non-profitable projects. They find that debt commits the firm to paying out its obligation, and hence can reduce the free cash flow problem. This mitigation of the conflict between managers and shareholders compounds the benefits of debt financing.

However, debt can also intensify the conflict between shareholders and debt-holders in the form of the asset substitution problem. Jensen and Meckling (1976) argue that this problem occurs when shareholders insist that the company invest in assets that are much riskier than those on which the bondholders want to take risks. Bondholders are paid first, a circumstance that causes the assets of a company to be liquidated before stockholders receive a penny. As a result, shareholders may benefit from investing in risky projects because this riskier investment generally increases the return for shareholders, but at the same time, it increases the risk that bondholders are forced to take, and so could result in an increased bankruptcy risk. Thus, the costs of investing in non-profitable projects arranged by debt are the agency costs of debt financing, plus the asset substitution problem (risk shifting).

This problem can be alleviated by forming bond contracts which prevent asset substitution, such as those containing an interest coverage requirement.

In addition, the literature considers the underinvestment problem as representing alternative costs of debt, which would exacerbate the conflict between shareholders and debt-holders. This problem arises when debt-holders desire to invest in safe projects which may not create any benefits for shareholders, so that they may reject the positive NPV projects. Conversely, shareholders get the benefits of investing in a negative NPV project at the expense of debt-holders. In this situation, debt-holders will lose if the project is unsuccessful while shareholders are protected since they share a sufficiently bad loss with debt-holders. Accordingly, firms expecting high growth opportunities should use a lesser amount of debt financing to mitigate the underinvestment problem (Myers, 1977).

Harris and Raviv (1991) and Stulz (1990) consider the agency conflicts between managers and shareholders but offer different interpretations of how debt mitigates the agency problem. Specifically, Harris and Raviv (1991) use liquidation value to show that a higher debt level results in a lower probability of bankruptcy, because of providing more opportunity for debt-holders to liquidate if cash flows are not sufficient. In addition, they refer to the costs of debt such as investigation costs, so that the optimal capital structure is driven by trading the liquidation value and the investigation costs. On the other hand, Stulz (1990) presents a model in which debt mitigates the free cash flow problem, but increases the underinvestment problem, resulting in the loss of positive NPV projects. Therefore, his model implies that capital structure is determined by trading the benefit of debt, that is, mitigation of the free cash flow problem, against the cost of debt, that is, the underinvestment problem.

Overall, according to the trade-off theory, firms are expected to use debt financing to obtain the benefits of tax shields and also to mitigate the agency conflict between managers and shareholders. However, in practice, firms cannot rely only on debt financing because it increases the probability of bankruptcy risks besides intensifying the agency problem as between debt-holders and shareholders (e.g., under-investment problem and asset substitution). Therefore, managers choose the optimal level of capital structure, which maximises the tax benefits of debt but at the same time, their debt level should minimise total costs of debt such as agency and bankruptcy costs.

2.2.3 Pecking Order Theory (POT)

Myers and Majluf (1984) show that when the current firm's insiders are better informed than outside investors, equity may be mispriced by the market. Their model is based on the premise that managers might have more information about the firm's assets in place and its future investment opportunities, but that this is not reflected in the stock price. In this case, the shares may be undervalued because outside investors have access only to public information. On the basis of this notion, undervalued firms tend to avoid issuing equity and the equity which is offered to the market is likely to be overpriced. As a result, the issuer's stock price will drop to hedge the investors by way of compensation for their insufficient information. This problem can be avoided if companies finance their investments with the least information-sensitive securities; thus common stock should be the last resort as it is highly sensitive to information asymmetries. Myers (1984) refers to this as the pecking order theory, originally introduced by Donaldson (1961). According to this theory, firms' leverage is not determined simply by the costs and benefits of debt as explained by the trade-off theory; the preference of a firm is to use internal finance, then low-risk debt, and finally equity to mitigate the asymmetric information and transaction costs. The costs of issuing securities, that is, transaction costs, also have been taken into account and thus the pecking order theory argues that internal cash flow involves the lowest transaction costs, while issuing debt incurs lower transaction costs than equity issues (see Myers, 2000 and 2001 for the recent argument of the pecking order theory).

Contrary to the predictions of the pecking order theory, Halvo and Heider (2005) have recently suggested that if there is asymmetric information about firms' risk, firms prefer to issue equity before debt. In their model, recent firm's asset volatilities and the impact of credit ratings are used as proxies for asymmetric information about risk. Moreover, Frank and Goyal (2008, p. 53) argue "that the adverse selection model of Myers and Majluf (1984) considers one-sided asymmetric information in which a firm selects securities for cash. However, if information asymmetry is two sided, there are several possible equilibriums leading to the firm's preference for stock or a combination of stock and cash over pure cash". Making a decision whether to issue equity or debt depends on whether asymmetric information concerns the firm's value or its risk. Eckbo (2008) also extends the model, which can diminish the adverse selection problems by underwriting the right offers. This model considers that when shareholders' take-up is greater, adverse selection would be less severe, and hence the current shareholders prefer to issue equity. Accordingly, asymmetric information and the resulting adverse selection costs could be interpreted in favour of the pecking order theory, although it does not explain the whole story.

Furthermore, other studies link asymmetric information and firms' quality while providing mixed debate. Leland and Pyle (1977) and Ross (1977) contend that, under asymmetric information, firms' value is positively related to debt level, so their model does not contribute to the pecking order predictions. Ross (1977) expands on the model of asymmetric information, under which managers know the true distribution of firms' returns but investors do not. If the market information is adequate to signal the firms' quality, the managers of high value firms issue debt to signal their type of quality to the market. Low quality managers tend to avoid the additional risk imposed by debt financing and thus prefer to issue equity. In addition, a higher level of debt signals to the capital market that the company is in a stable financial situation because they can meet their commitments. The model predicts a positive relation between firms' quality and leverage in the case of asymmetric information, which is in line with Leland and Pyle (1977) and Blazenko (1987). In contrast, Brick et al. (1998) develop a model which considers the asymmetric information about firms' risk and variance of returns. In their model, a lower level of leverage signals a lower variance of returns; therefore, high quality firms would have a lower debt level.

In general, the main predictions of asymmetric information theories consider the stock price reaction, the amount of leverage, and signalling effects; however, they make different contributions. Myers and Majluf (1984) apply the asymmetric information to examine the pecking order theory, under which there is no notion of an optimal leverage ratio. But Leland and Pyle (1977) and Ross (1977) argue that under asymmetric information, firms' value is positively related to debt level, so their model does not fulfil the pecking order predictions.

2.2.4 Market Timing Theory

The market timing theory of capital structure argues that firms issue new stock when the stock price is perceived to be overvalued and buy back their own shares when there is undervaluation. Therefore, fluctuations in stock prices affect firms' capital structures. Baker and Wurgler (2002) argue that two concepts of the market timing theory, asymmetric information and irrational investors, lead to similar capital structure dynamics. Korajczyk et al. (1991) study the impact of asymmetric information on the timing of new equity issues. Managers believe that the firm's shares are undervalued by the market when the market has incomplete information about the true value of the firm, and consequently they are not willing to issue equity. More specifically, they find the price drop at the announcement of issuing equity increases with the degree of asymmetric information. Over time, firms disclose more information in the form of annual reports to avoid adverse selection. Hence, in the case of information asymmetry, firms with good quality are not willing to issue equity to prevent their existing shareholders from selling equity at a lower price. They wait until their information becomes public. In line with the notion of asymmetric information, the price is expected to drop further when information is not released. Previous studies use the market-to-book ratio as a proxy for asymmetric information resulting in an adverse selection problem. If the costs of deviating from an optimal capital structure are small compared to the resulting variation in issuing costs, past variation in the market-to-book ratio can then have a long-lasting effect (Baker and Wurgler, 2002).

The second concept of the market timing theory, as mentioned above, is participation of irrational investors. Baker and Wurgler (2002, p. 27) report "that managers issue equity when they believe its cost is irrationally low and repurchase equity when they believe its cost is irrationally high". They analyse the equity issues and repurchases where the historical market-to-book ratio is used to estimate the market timing opportunities. However, based on the notion of the second concept of the market timing theory, managers believe that they can time the market, and this is a critical assumption of the second concept. In their studies, Baker and Wurgler (2002) find that past market valuation has a significant effect on leverage. Firms are likely to raise equity when their market value is high and therefore their leverage will decrease. In contrast, high leverage firms are those who tend to raise funds when their valuation is low. In other words, they use the external finance-weighted average of historical market-to-book ratios to show that this measure is negatively related to current leverage.

The empirical studies provide mixed evidence for the market timing theory. Hovakimian(2006) and Flannery and Rangan (2006) confirm the existence of market timing for securities, though they do not find the persistent effects of market timing on capital structure, in contrast with Baker and Wurgler (2002). Hovakimian(2006) investigate the market timing argument based on the historical weighted average market-to-book ratio.[6] However, they find some consistent results with equity issues to support the basis of the theory (a negative relationship between leverage and market-to-book ratio), but the effects are not strong to explain long-run equity transactions. They find, further, that debt issues have a significant effect on capital structure, while debt reductions also have a significant effect on leverage. However, the changes in market-to-book around debt reductions are the opposite of what equity market timing implies and may induce a positive rather than a negative relation between market-to-book and leverage. The interpretation of market value's effect on debt–equity choice is also not in line with Frank and Goyal's (2004) results, who examine the influence of market conditions on capital structure using a vector auto regression framework. They find that high market-to-book ratios have a short-term

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[6] Hovakimian(2006) calculated weighted average market-to-book ratio as:$\sum_{s=1}^{t-1} \frac{e_s+d_s}{\sum_{r=1}^{t-1} e_r+d_r} * \left(\frac{M}{B}\right)_S$, where e and d denote net equity and net debt issued, respectively.

influence on debt issuance, through reduction in debt burden, but there is no a clear relationship between market valuations and equity issue activity in the long term.

Despite the empirical studies, Graham and Harvey (2001), surveying the US CFOs, find strong evidence that managers tend to issue equity when the stock price is relatively high. From the managers' perspective, the amount of stock which is undervalued or overvalued is an important factor if equity is to be issued.

2.3 Controversies in the Literature

2.3.1 TOT vs. POT

A firm follows the pecking order theory if it prefers internal financing independently of the trade-off theory predicted factors, such as taxes, bankruptcy costs and agency costs. However, if the firm uses external financing, it will prefer debt not only because of asymmetric information and transaction costs but also the tax and agency considerations in the trade-off theory can generate the pecking order hierarchy. Frank and Goyal (2009) show that the agency costs of equity results in the pecking order theory. Given the risk free debt, using external debt financing could lead a firm to invest optimally and repay appropriately but using external equity financing may result in underinvestment problem and hence internal financing is preferred.

The pecking order and the trade-off theories disagree on some proxies. The first controversy in empirical studies is the relationship between leverage and profitability. The pecking order theory predicts that the higher the profitability, the more firms are likely to have internal financing, and hence those firms have less leverage. In contrast, the trade-off theory predicts that more profitable firms are less likely to confront bankruptcy and thus have more leverage. The agency conflict between managers and shareholders also could explain the positive relationship between leverage and profitability. Consistent with the trade-off theory, more profitable firms have higher leverage to control the free cash flow problem. Therefore, under the pecking trade-off theory (pecking order theory), the relationship between leverage and profitability is expected to be positive (negative).

Moreover, the pecking order and the trade-off theories have mixed prediction on the relationship between size and leverage. Consistent with the trade-off theory, larger firms are more diversified and have lower probability of bankruptcy and thus have higher leverage. Large firms are also more likely to suffer from the agency conflicts (Jensen, 1986), which can be mitigated through the use of debt financing. However, the pecking order theory predicts that large firms have greater retained earnings and hence they need less external financing. In addition, given the adverse selection problem, larger firms are able to issue equity easier than smaller firms and hence larger firms tend to have lower leverage (Frank and Goyal, 2009). Therefore, in line with the predictions relating to profitability, under the pecking order theory (trade-off theory), the relationship between leverage and size is expected to be negative (positive).

Similarly, the relationship between leverage and growth opportunities differs across the two theories. Consistent with the trade-off theory, growing firms are subject to greater agency conflicts between shareholders and debt-holders and hence they reduce their leverage. These firms are also likely to be more risky, to suffer less from the agency conflicts between managers and shareholders and to have lower collateral assets. These factors suggest a negative relationship between leverage and measures of growth opportunities. In contrast, the pecking order theory predicts that firms with more growth opportunities use more debt, as their internal cash flows are low and their need external financing through debt. Therefore, in contrast to the trade-off theory, the pecking order theory predicts a positive relationship between debt and growth opportunities.

A number of studies contrasted empirically the pecking order theory and the trade-off theory. Shyam-Sunder and Myers (1999) investigate 157 US firms during 1971–1989 and argue that net debt issues track the financing deficit more closely than net equity issues, in line with this theory. Allen (1993), Baskin (1989) and the survey by, Graham and Harvey (2001) for US large companies, and by Hamilton and Fox (1998) for small businesses in New Zealand, support the pecking order theory. These surveys show that, in line with the prediction of the pecking order theory, firms issue debt when recent profit is insufficient. In contrast, Frank and Goyal (2003a) show that firms issue equity to finance their cash deficit. They report that, on average, net equity issues track the financing deficit and, the evidence for the pecking order theory is becoming weaker over time. In a relatively more recent study, Haung and Ritter (2009) find that the coefficient on the financing deficit varies over time, depending on the cost of equity. They find that firms finance their deficit with external equity when the cost of equity is not significant, providing less support for the pecking order theory. In addition, Lemmon and Zender (2010) investigate the financing deficit with attentions to the debt capacity phenomenon. They suggest that firms use debt to finance their deficit when they are not constrained by debt capacity, whereas equity would be issued when they are constrained.

Other empirical studies (e.g., Booth et al., 2001; Fama and French, 2002; and Frank and Goyal, 2009) find that the main striking difference between the two theories is the impact of profitability. These studies show that, consistent with the pecking order theory, the relationship between leverage and profitability is negative, suggesting that more profitable companies are likely to rely more on internal funding than external financing, in the form of first debt and then equity. For example, using multivariate regression method with various measures of leverage as the dependent variable, previous studies find negative and significant coefficient for the coefficient of return on assets of -1.1 (Booth et al., 2001), -0.6 (Fama and French, 2002), -0.75 (Shyam-Sunder and Myers, 1999), -0.793 (Haung and Ritter, 2009). However, the remaining determinants of leverage are more consistent with the trade-off theory, in line with Rajan and Zingales (1995), Titman and Wessels (1998), and Graham and Harvey (2000). I discuss the controversies in empirical studies in section 2.3.3, after surveying the link between these two theories and the determinants of debt maturity structure.

2.3.2 TOT, POT, and Debt Maturity

Earlier studies argue that when firms decide to use debt financing in their capital structure, they presumably choose the maturity of debt (e.g., Morris, 1975). Therefore, another facet of capital structure is to choose finance between short-term and long-term debt (Barclayet al., 2003). The decision of debt maturity is based on the trade-off between the costs and the benefit of debt with different maturities. Thus, the theories that attempt to explain the decision of debt-equity financing become more controversial when the maturity structure of debt is taken into account. Similar to the debt-equity decision, the optimal mix of long-term and short-term debt is also affected by the tax, risk, agency costs, and the asset life.

Taxation is expected to affect the level of debt and also its maturity. Brick and Ravid (1985) provide a model for debt maturity structure based on tax effects. They argue that long-term debt is optimal when the structure of interest rate is upward sloping. Their model controls first for leverage and then for debt maturity. In contrast, when leverage and debt maturity are considered simultaneously, Lewis (1990) shows that the tax does not have any effect on the structure of debt maturity. He assumes that there is no difference in tax expenses between short-term and long-term debt.

Furthermore, Kane et al. (1985) show that the optimal debt maturity is determined by trading the tax advantages of debt and the costs of debt, including bankruptcy and flotation costs. Greater flotation costs and higher firms' volatility increase debt maturity. Firms use long-term debt when the tax advantage of debt decreases, so that the tax advantage of debt is not less than flotation costs. Alternatively, Mauer and Lewellen (1987) propose that long-term debt would result in higher tax shields, and hence the higher the tax rate, the more likely firms are to take advantage of the benefits of tax shields. In addition, Mauer and Lewellen (1987) and Brick and Palmon (1992) consider tax timing effects. They argue that the present value of short-term debt decreases when interest rates fluctuate. However, the present value of long-term debt is unaffected, and thus firms prefer to finance with long-term debt.

With regard to agency costs, Myers (1977) argues that the underinvestment problem can be mitigated by lowering leverage. He also suggests that another way to control the underinvestment problem is to apply short-term debt. Short-term debt matures before growth opportunities are exercised and hence the disincentive to invest in positive NPV projects decreases for shareholders. Therefore, using shorter maturity of debt mitigates the underinvestment problem. However, the underinvestment problem is not only controlled by lowering leverage and using shorter maturity of debt, but by the priority of securities. Stulz and Johnson (1985) consider fixed claims securities with high priority as mitigating the underinvestment problem. In this situation, there is a small possibility that firms' wealth would be transferred from shareholders to debt-holders. As a result, shareholders are less likely to reject the project with fixed claims and high priority, and thus the underinvestment problem can be controlled.

Prior literature suggests that debt intensifies the costs of bankruptcy. However, the firm's matching principle of the maturity of its liabilities to that of its assets is widely accepted as a device to control for the firm's risk. If debt has short-term maturity then long-term assets cannot pay the commitments when they are due. In addition, this interpretation is interlinked with agency costs. Myers (1977) argues that when the maturity of a firm's liabilities matches that of its assets, the conflicts between debt-holders and shareholders will be mitigated by assuring them that their debt can be repaid.

Myers and Majluf (1984) and Myers (1984) explain how the information asymmetry affects firms' financing decision, but it is worth nothing that the asymmetric information not only affects leverage, but also the structure of debt maturity. Falnnery (1986) develops a model to show that a firm's debt maturity structure can signal information about its quality. In that model, under asymmetric information, high quality firms use short-term debt to signal the markets that they can afford to repay the short-term principal when it is due. He argues that, under asymmetric information, both long-term debt and short-term debt are mispriced in the market. However, long-term debt is more sensitive to asymmetric information. Therefore, when the capital market cannot distinguish between low quality and high quality firms, high quality ones (undervalued firms) suppose that long-term debt is relatively overpriced. Therefore, they prefer to issue short-term debt while low quality (overvalued) firms decide to issue overpriced debt (long-term debt). In these circumstances, two types of equilibrium, a pooling and a separating equilibrium, would occur in the market as a result of interactions between investors and borrowers.

In the pooling equilibrium model, when transaction costs are not considered, both low and high quality firms use the short maturity of debt. If high quality and low quality firms issued their preferred maturities, long-term debt would be issued by low quality firms, and, conversely, short-term debt would be issued by high quality firms, which have greater chance of refinancing. If some firms borrow short-term debt and others borrow long-term debt, lender rationality will distinguish between two types of firms. Therefore, the capital market makes it impossible for both types of firm to issue their preferred maturity, and thus low quality firms mimic high quality ones and issue short-term debt. Alternatively, the separating equilibrium suggests that, in the presence of transaction costs, low quality firms cannot imitate high quality ones. High quality firms use short-term debt to signal markets that they can afford to repay the short-term covenant when it is due, while low quality firms cannot afford to roll over short-term debt, and hence prefer to issue long-term debt.[7]

Diamond (1991) uses the information asymmetry and liquidity risk to explain the maturity of debt. He shows that borrowers whose private information is favourable use short-term debt and thus the liquidity risk is compensated by the credit quality of good borrowers. In contrast, if lenders receive bad news at the date of refinancing debt, they will be unwilling to refinance it. Therefore, firms with poor credit history prefer long-term debt to overcome the risk of refinancing. However, firms with a very low credit rating are not able to incur long-term debt. They can

[7]"Roll over or to refinance is classified the obligation as non-current, even if it would otherwise be due within a shorter period" (IFRS Interpretations Committee Meeting, November 2010, p. 2, http://www.ifrs.org/NR/rdonlyres/3A756C3A-D1B0-41F1-AA68 9D78ABA08756/0/1011obs1111AIAS1.pdf).

only use short-term debt. Therefore, long-term debt is used by firms with moderate credit ratings. These implications show a non-monotonic relationship between credit ratings and debt maturity structure.

As I discussed in the previous sections, the tax, agency, asymmetric information, and agency conflict hypotheses would explain the choice of the optimal leverage as well as the structure of debt maturity. Therefore, leverage and debt maturity are strongly correlated, but the relationship between leverage and debt maturity is mixed and controversial. Leland and Toft (1996) develop a model of optimal leverage, in which firms with higher leverage use more long-term debt. In contrast, Dennis et al. (2000) argue that firms with higher leverage use more short-term debt to mitigate the underinvestment problem. In the analyses of debt maturity structure, following Stohs and Mauer (1996), leverage should also be included as a control variable. They argue that the regressions used by Barclay and Smith (1995) are misspecified as leverage is not included in their regressions. Stohs and Mauer (1996) suggest that the probability of bankruptcy costs increases with the use of greater debt in firms' capital structure. Therefore, firms with higher leverage are more likely to use long-term debt to avoid the risk exposure, and a positive relationship between leverage and debt maturity is predicted.

2.3.3 Controversies in Empirical Studies

2.3.3.1 Measurement of the Variables

The empirical literature provided to date on the determinants of leverage is mixed and controversial. One of the fundamental problems is the measurement of leverage as well as the variables that proxy for the different theoretical effects. Rajan and Zingales (1995) argue that in order to control for the agency problem of debt which is highly related to the firm's financing in the past and the relative claims on firm value, total debt relative to firm value is suggested as one of the measures of leverage. Therefore, the use the ratio of total debt over capital employed and the ratio of total debt over total assets to measure leverage. However, most studies differ in the measurement of leverage, as some base their measures on total debt rather than focus on long-term debt and others use market compared to book value of equity. To overcome these problems, simulate for alternative measures. For example, Frank and Goyal (2009) and Booth et al. (2001) use the ratio of total debt to book value of assets, the ratio of long-term debt to book value as well as to market value of assets. Fama and French (2002) use both market and book values of leverage. Despite the common measures of leverage in the literature, Bates et al. (2009) argue that cash holdings are negative debt and hence they should be deducted from the total debt to measure leverage.

A large number of empirical studies (e.g., DeAngelo and Masulis, 1980; Titman and Wessels, 1988; Harris and Raviv, 1991; Rajan and Zingelas, 1995; and Graham and Harvey, 2001) use different proxies to investigate whether tax and bankruptcy issues really matter for a firm's capital structure. For instance, DeAngelo and Masulis (1980) study the impact of tax-shield items in the balance sheet, using depreciation and investment tax credits rather than interest payments. They find that if the effects of non-debt tax shields are high enough for firms to benefit from tax losses, they will use less debt, and thus a negative relationship between non-debt tax shields and leverage is expected. Barclay and Smith (1999), in line with DeAngelo and Masulis (1980), find that leverage is inversely related to non-debt tax shields. However, other studies provide mixed evidence on the impact of non-debt tax shields. For example, Titman and Wessels (1988) argue that non-debt tax shields would not support the tax effects because of being highly correlated with profitability. Some other studies use tax rate as an alternative proxy for tax effects (e.g., Booth et al., 2001 and Frank and Goyal, 2009). Inconsistent with the tax prediction, Booth et al. (2001) find either a negative effect of the average tax rate on leverage in some counties including India, Korea, Pakistan, and Zimbabwe or no effects of the tax in Jordan, Malaysia, and Turkey. Similarly, the recent study of Frank and Goyal (2009) find that tax rate has the lowest t-statistic in their model reporting as an insignificant determinant of leverage. Empirical studies also use the effective tax rate to investigate the determinants of debt maturity. However, the results are similarly controversial. Barclay and Smith (1995) and Guedes and Oplimer (1996) on US companies, and Ozkan (2002) on UK companies, respectively, do not support the tax effect. Stohs and Mauer (1996) find that the maturity structure of debt is negatively related to the effective tax rate. Their findings are not consistent with those of Brick and Ravid (1985), who suggest that debt maturity is positively affected by tax, while the results of Stohs and Mauer (1996) are in line with the model of Kane et al. (1985).

Previous studies also use various proxy variables to measure the effect of bankruptcy costs. The first is size which is considered to be is inversely related to default risk. Large companies are subject to lower bankruptcy costs and hence a positive relation between leverage and size is expected. However, the results are mixed and controversial. For instance, Marsh (1982), Rajan and Zingales (1995), and Antoniou et al. (2008) find that leverage is positively related to size, while Titman and Wessels (1988) do not provide such evidence. Small companies may suffer from a greater probability of bankruptcy and thus should have less debt issued, but at the same time, they have more difficulty in issuing equity and therefore rely on debt when they need external financing. For example, Frank and Goyal (2007) point out that larger firms might have lower adverse selection and thus have greater access to equity markets.

Other studies use the volatility of earnings as an additional proxy for bankruptcy. For example, Titman and Wessels (1988), Booth et al. (2001), and Antoniou et al. (2008) argue that the greater is the earnings' volatility, the higher is the probability of defaulting and bankruptcy costs. Examining large companies, they do not identify the inverse relationship between leverage and volatility of earnings as a proxy for bankruptcy costs. However, using a sample of UK small companies, Michaelas et al. (1999) and Jordan et al. (1998) find a positive association in contrast to the bankruptcy hypothesis. Although the positive relationship between volatility and leverage is puzzling, Jordan et al. (1998), in order to preserve their results, maintain that small companies face a hostile economy during the sample period. They argue that there is distress borrowing during their observation period and that this may explain the positive impact of volatility on leverage.

To assess the impact of agency costs, previous studies use market value of assets over book value of assets and profitability as common proxy variables for the asset substitution problem and the free cash flow problem, respectively (Rajan and Zingelas, 1995; Goyal et al., 2002; and Barclay and Smith, 1999). They find an inverse relationship between leverage and growth opportunities, confirming the agency conflict between shareholders and debt-holders, while their findings are not consistent with the free cash flow problem, regarding which they report that leverage is negatively related to profitability. However, profitability may also be used as a proxy for the pecking order theory and thus its significance is not limited to the trade-off theory.

The agency conflict is also assessed in empirical studies of the structure of debt maturity. For example, Barclay and Smith (1995) find strong evidence of a negative relationship between the market-to-book ratio as a proxy for growth opportunities and debt maturity structure in the US. Using UK companies, Ozkan (2002) arrives at the same result, as firms with greater growth opportunities use shorter maturity of debt. Stohs and Mauer (1996) and Guedes and Opler (1996) find mixed support for the agency hypothesis. Consistently with that hypothesis, Guedes and Opler (1996) find that firms with higher market-to-book ratio use shorter maturity of debt, but they do not support the agency concept when they use R&D expenses as an alternative proxy for growth opportunities. However, they suggest that firms with higher R&D use longer maturity of debt to avoid refinancing costs, as those firms are more financially distressed. Stohs and Mauer (1996) do not find either positive or insignificant impact of the market-to-book ratio on the maturity structure of debt, inconsistently with the agency hypothesis. They show that short-term debt is positively related to the market-to-book ratio when the fixed-effects model is used, but this relationship becomes negative and insignificant when they use cross-sectional analysis.

Table 1 summarises key literature on the determinants of leverage considering the two main theories of capital structure, the trade-off and pecking order theories.

Table 2-1: Summary of the Previous Literature on the Determinants of Leverage

Theoretical Background		**Proxy**	**Sign**	**References**	**Main Results**
Trade-off Theory	Tax	Tax rate	+	Frank and Goyal (2009),	Mixed support
				Booth et al. (2001)	
				Antoniou et al. (2008)	No support
		Non-debt tax shields	-	Barclay and Smith (1999)	Strong support
				Titman and Wessels (1988)	No support
				Antoniou et al. (2008)	Mixed support
				Ozkan (2001)	No support
	Bankruptcy Costs	Size	+	Frank and Goyal (2009),	Strong support
				Antoniou et al. (2008)	
				Titman and Wessels (1988)	Weak support
				Rajan and Zingales (1995)	Mixed support
				Booth et al. (2001)	Strong support
				Ozkan (2001)	Weak support
				Mehran (1992)	No support
				Marsh (1982)	Strong support
		Earnings Volatility	-	Booth et al. (2001),	Mixed support
				Titman and Wessels (1988),	No support

					Antoniou et al. (2008)	
			Profitability	+	Titman and Wessels (1988), Rajan and Zingales (1995), Booth et al. (2001), Frank and Goyal (2009),	No support
					Antoniou et al. (2008)	Mixed support
					Ozkan (2001)	No support
			Asset tangibility	+	Titman and Wessels (1988), Rajan and Zingales (1995), Booth et al. (2001), Frank and Goyal (2009), Antoniou et al. (2008)	Strong support
	Agency Costs	Free Cash Flow Problem	Profitability	+	Titman and Wessels (1988), Rajan and Zingales (1995), Booth et al. (2001)	No support
		Underinvestment Problem	Growth Opportunities	-	Rajan and Zingales (1995) Baker and Wurgler (2002), Frank and Goyal (2004, 2009) Antoniou et al. (2008),	Strong support

				Ozkan (2001)	
				Baskin (1989)	No support
Pecking order Theory	Asymmetric Information	Profitability	-	Titman and Wessels (1988), Rajan and Zingales (1995), Booth et al. (2001), Ozkan (2001)	Strong support
		Size	-	Titman and Wessels (1988)	Weak support
				Rajan and Zingales (1995)	Mixed support
				Booth et al. (2001)	Strong support
				Mehran (1992)	No support
		Growth Opportunities	+	Rajan and Zingales (1995)	Strong support
				Baker and Wurgler (2002), Frank and Goyal (2004, 2009)	
				Baskin (1989)	No support

The Table provides a summary of the hypotheses tested and the empirical evidence provide in the previous literature. Firm size is found in many studies to be positively related to leverage (e.g., Booth et al., 2001), but Titman and Wessels (1988) find a weaker relationship between leverage and size, and, more particularly, the positive relationship is not reported by Mehran (1992). Similarly, the results for market-to-book ratio as proxy for growth opportunities are mixed. Rajan and Zingales (1995), Baker and Wurgler (2002), and Frank and Goyal (2004) show that leverage is inversely related to market-to-book ratio; whereas Baskin (1989) does not find a negative relationship between leverage and market-to-book ratio, based on the US companies. Other previous studies, using alternative variables for proxy of growth opportunities (e.g., Michaelas et al. (1999) use percentage increase of total assets), find a positive relation. Moreover, previous studies also provide mixed evidence on the impact of profitability on leverage, Titman and Wessels (1988), Rajan and Zingales (1995), and Booth et al. (2001) finding the negative association between leverage and profitability contrary to the indications of the trade-off theory. However, the empirical studies show that leverage is strongly and directly related to tangibility (e.g., Titman and Wessels, 1988; Rajan and Zingales, 1995; and Booth et al., 2001). Accordingly, there are also some variables that are significant and others that are not.

2.3.3.2 Institutional Settings

Companies may have different patterns of financing based on different markets, countries, and industries. For instance, the importance of the institutional settings in identifying the fundamental determinants of capital structure have been emphasised by previous studies (e.g., Jong et al., 2008 and Rajan and Zigales, 1995). Rajan and Zingales (1995) argue that the US and the UK are market-oriented countries and should have some common features, so that it might not be surprising if the US models can be applied in the UK. However, they address various institutional differences in both countries that are in line with the findings of La Porta et al. (1997). They argue that, in the UK, the level of creditor's rights is higher than in the US, and thus it would be expected that results based on the UK would be different. Franks and Torous (1993) also compare the UK bankruptcy code with that of the US, and argue that the UK appears to have the highest creditor incentive while the US keeps firms as a main concern. Therefore, the US and the UK are likely to represent two extremes, with other countries falling between. Empirical studies by Rajan and Zingales (1995) and Fan et al. (Forthcoming in *JFQA*) find that, in the US, companies have higher leverage than other countries including the UK. A recent study, Faccio and Xu (2011), investigates the impact of taxes on leverage in countries with an enforced tax system as opposed to countries with high tax evasion.[8] They find that tax effects vary across counties, as taxes are as significant as other determinates of leverage in countries with low tax evasion. In countries that tax lows

[8] Their sample includes 29 OECD countries. They categorise low tax evasion countries as, Australia, Austria, Canada, Denmark, Finland, Iceland, Ireland, Japan, Luxembourg, Netherlands, New Zealand, Norway, South Korea, Spain, Switzerland, the US, and the UK. High tax evasion countries are Belgium, Czech Republic, France, Germany, Greece, Hungary, Italy, Mexico, Poland, Portugal, Slovakia, and Sweden.

are strongly enforced, firms tend to increase their leverage when tax benefits increase, while in countries in which tax enforcement is low, taxes do not matter.

Cross-country analysis of leverage shows mixed evidence. Using US companies, Frank and Goyal (2009) and Rajan and Zingales (1995) and UK companies, Rajan and Zingales (1995) find strong size effects on leverage as larger companies tend to have higher leverage. In contrast, using data in other counties including France and Italy, Rajan and Zingales (1995) find that size is not a significant determinant. Similarly, the study of Booth et al. (2001) in some developing countries shows controversial results for the effect of size. Consistent with the trade-off theory, they find a positive and significant relationship between size and leverage in Jordan, Malaysia, and Turkey but consistent with the pecking order theory, they report a negative association between leverage and size in Korea and India. Using Turkish data as an emerging economy, Guney et al. (2009) find that leverage is negatively related to size. In consistent with the agency hypothesis, they find that leverage is positively related to growth opportunities, suggesting that Turkish firms prefer debt rather than equity financing because of the weak legal protection of minority shareholders. Recently, Antoniou et al. (2008) compare the determinants of leverage in bank-oriented countries (France, Germany, and Japan) with those in market-oriented countries (the UK and the US). They find that the relationship between leverage and size is significantly positive in all observed countries, apart from the US. They find that more profitable firms have lower leverage in the US, the UK, Germany, and France supporting the pecking order theory. In contrast, the results in Japan are in favour of the trade-off theory that profitability has a positive effect. Another recent study, Fan et al. (Forthcoming in *JFQA*) investigates capital and debt maturity structures in 39 developed countries.

They find that size is positively related to leverage in some countries but it is negatively related to leverage in South Africa.[9] Moreover, inconsistent with the tax prediction, Booth et al. (2001) find either a negative effect of the tax on leverage in some counties including India, Korea, Pakistan, and Zimbabwe or no effects in Jordan, Malaysia, and Turkey.

Prior literature addresses the determinants of leverage in the UK, but there is no UK study investigating the two different markets. Two major markets are run by the London Stock Exchange (LSE), the Main market and AIM. The former is a highly regulated market, as listing on the Main market needs to satisfy the requirements of the UK Listing Authority (UKLA), which is part of the UK Financial Services Authority (FSA). The rules of the UKLA are also consistent with EU legislation. In other words, the admission of those companies must be approved by the UKLA and meet the LSE requirements and therefore admission to the Main takes several months. In comparison, companies seeking admission to AIM need to obtain the approval of a nominated advisor (Nomad), which clarifies whether those companies are eligible to trade on AIM. This rule is determined by the LSE, which is not responsible for reviewing the admission documents while a Nomad has this responsibility. Once a Nomad agrees that a company can trade on AIM, the company should provide descriptive information about its business to the LSE at least 10 days before the expected date of admission (Rule 2).[10] Therefore, trading on AIM takes about three weeks. Despite the regulatory differences between the Main and AIM, both markets are subject to the requirement to protect the rights of shareholders (see Jenkinson and Ramadorai, 2008).

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[9]Fan et al. (Forthcoming in *JFQA*) report a positive and significant relationship between leverage and size in Australia, Austria, Belgium, Canada, China, Finland, France, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Philippines, Singapore, Thailand, Turkey, Taiwan, and US.

[10] AIM rules can be found at the London Stock Exchange website: http://www.londonstockexchange.com/companies-and-advisors/aim/advisers/rules/aim-rules.pdf

The summary of the admission requirements for both the Main market and AIM are presented in Table 2-2. In particular, the companies seeking admission to the Main market are required to have established a trading record, normally 3 years' trading with at least 25% shares in public hands. They also need to have a minimum market capitalisation (£700K). Those companies are subject to a higher level of transparency and disclosure and need to prepare regular financial reports as well as six-monthly management statements. In addition, various types of transactions such as mergers and acquisitions, takeovers, open offers, and dividend declarations require shareholders' approval. According to guidance provided by the London Stock Exchange (p. 8), "there are two segments for listing on the Main, premium and standard. A premium listing means that a company must meet standards that are over and above (often described as 'super-equivalent') those set forth in the EU legislation, including the UK's corporate governance code.[11] Investors trust the super equivalent standards as they provide them with additional protections. By virtue of these higher standards, companies may have access to a broader range of investors and may enjoy a lower cost of capital owing to heightened shareholder confidence. A premium listing is only available to equity shares issued by commercial trading companies. With a standard listing, a company has to meet the requirements laid down by EU legislation. This means that their overall compliance burden will be lighter, both in terms of preparing for listing and on an on-going basis." Overall, the Main market regulations are very close to those that are applied at major stock exchanges in the US.

However, most of the regulations of the Main market do not apply to AIM. For example, admission to AIM does not require a minimum market capitalisation

[11] Main rules can be downloaded at the London Stock Exchange website: http://www.londonstockexchange.com/companies-and-advisors/main-market/documents/brochures/gudetolisting.pdf

and minimum shares in public hands, and no trading record is needed. Furthermore, a large number of AIM companies do not generate substantial profit. Therefore, AIM companies tend to be riskier than those listed on the Main market, which have an established trading record and a considerable market capitalisation (see Jenkinson and Ramadorai, 2008 and Campbell and Tabner, 2010). Since AIM was launched in 1995, it has been attracting companies. The number of firms joining it has been increasing from 2004, with a peak in 2007 at 1,694 companies, including 394 international companies.

Table 2-2: Comparison of the Main Market and the Alternative Investment Market

Main Market	**Alternative Investment Market (AIM)**
Admissions requirements	
Minimum 25% shares in public hands	No minimum shares in public hands
Normally 3 year trading record required	No trading record requirement
Pre-vetting of admission documents by the UKLA, or another recognised EU authority	Admission documents not pre-vetted by Exchange or any listing authority
Admission takes several months	Admission can be achieved within 2 weeks
Minimum market capitalisation on entry (£700K)	No minimum market capitalisation
Sliding scale admission fees: e.g., £16K, £49K,	Nominated adviser required at all times
£142K respectively for £10m, £100m and £1bnmarket cap at issue	Flat rate admission fee: £4K

This table compares the admission requirements for the Main market and AIM (Source: Jenkinson and Ramadorai, 2008).

2.3.3.3 Firm Size

Although many studies investigate the determinants of leverage, there has been relatively limited research on small companies. The literature suggests that small firms have limited access to sources of funds and greater transaction and bankruptcy costs (Pettit and Singer, 1985; Finley, 1984; Barton and Matthews, 1989; and Berger and Udell, 1998). The available source of financing changes over firms' life cycle as larger firms have greater access to equity markets (Van Auken and Holman, 1995). Pettit and Singer (1985) argue that small firms tend to operate in less concentrated markets and have greater competitive pressures. Therefore, lower profit margins would result in a lower tax rate, and hence they may not collect the tax benefits of debt. In addition, Tamari (1980) and Osteryoung et al. (1995) argue that small firms have greater variability in profits, and thus are more likely to gain or lose a large amount of funds. Accordingly, it is expected that small and large firms will differ considerably in tax effect. Small firms may not have tax incentives when they have higher income volatility, whereas large firms are those with diversified business lines, and thus higher profit margins, resulting in greater tax incentives. Small firms have a higher proportion of short-term assets compared to large companies that operate mainly in the manufacturing sector. Small firms might not be able to use long-term debt because of the lower proportion of their long-term assets (Scherr and Hulburt, 2001; Heyman et al., 2003).

Small number of empirical studies has investigated capital structure of small companies (Jordan et al., 1998; Michaelas et al., 1999; Van der Wijst and Thurik, 1993; and Lopez-Gracia and Sogorb-Mira, 2008). Yet these studies do not empirically find conclusive evidence and they report mixed and controversial results. The majority of those studies do not provide any evidence to support the tax hypothesis. Lopez-Gracia and Sogorb-Mira (2008) use the effective tax rate and non-debt tax shields as two proxies for the tax hypothesis. Their results show that the effective tax rate is not significant but, consistent with the tax hypothesis; they report a negative relationship between non-debt tax shields and leverage. Using UK data, Jordan et al. (1998) and Michaelas et al. (1999) find a significant and negative relationship between the effective tax rate and leverage, in contrast to the tax prediction. In addition, Michaelas et al. (1999) do not report any significant effect from the impact of non-debt tax shields on leverage.

Jordan et al. (1998) provide little evidence for the impact of size on leverage, but Michaelas et al. (1999) support the size effect. Their results are in line with those of Van der Wijst and Thurik (1993) in Germany, who find that leverage is positively related to size. Moreover, Cassar and Holmes (2003) find a weaker relationship between size and long-term leverage for small and medium sized companies in Australia. When they split their SMEs sample into small and larger companies, they only support the effect of size on long-term leverage for larger SMEs in contrast to smaller ones. The relationship between size and long-term leverage is not significant for smaller SMEs.

Inconsistent with the underinvestment problem, Michaelas et al. (1999) find a positive and significant relationship between growth opportunities and leverage, but Chittenden et al. (1996) and Jordan et al. (1998) report no significant effects. However, small companies use other proxies for growth opportunities such as percentage increase of assets rather than the market-to-book ratio, as this proxy might not be available for small companies. Furthermore, the results for the free cash flow problem are controversial. Jordan et al. (1998) provide little support for the free cash flow problem when they use profitability as a proxy for the agency conflict between managers and shareholders. Michaelas et al. (1999), Cassar and Holmes (2003), and Lopez-Gracia and Sogorb-Mira (2008) strongly reject the free cash flow problem, as they find a negative and significant impact of profitability on leverage in contrast with the agency hypothesis.

In addition, some small studies assess the pecking order theory through financing deficit (investment plus change in working capital plus dividend less internal cash flow). According to the theory, the financing deficit should be financed by debt issuing when internal funds are not sufficient but again, the results are mixed. For instance, Watson and Wilson (2002) investigate UK small and medium sized companies and support the pecking order theory. They find that those companies prefer the use of retained earnings and, in case of need for external financing, debt will be preferred over new shares. However, despite empirical studies, the survey conducted by Paul et al. (2007) for UK small companies provides weaker evidence for the pecking order theory. They find that small companies would prefer internal funds but equity is preferred ahead of debt for external financing.

The number of empirical studies investigates the determinant of debt maturity, but the number of studies using small and medium sized companies is very limited. Moreover, there is no research investigating the structure of debt maturity over the IPO period. In particular, prior literature argues that small companies use shorter maturity of debt but this literature does not address whether small companies manage to change the structure of their debt maturity using more long-term debt after the IPO. The existing studies that investigate the determinants of debt maturity find mixed evidence. They provide mixed and less supportive evidence regarding the agency hypothesis. Garcia-Teruel and Martinez-Solano (2007), examining Spanish small and medium sized companies (SMEs), and Michaelas (1999), examining UK

SMEs, find a positive relationship between growth opportunities and short-term debt. This could support the agency hypothesis provided by Myers (1977), indicating that firms with a greater probability of agency conflict between shareholders and debt-holders are more likely to use short-term debt. In contrast, Heyman et al. (2003), studying Belgian SMEs, and Scherr and Hulburt (2001), studying US small companies, find no evidence in support of the growth opportunities effect. However, those empirical studies use other variables– such as the percentage change in assets and R&D – in order to estimate growth opportunities, since market values of assets for small companies are not available. The limited number of empirical studies based on small companies provides an interesting avenue for future research.

Similarly, empirical studies provide mixed evidence for tax effects. Using small and medium sized companies, Garcia-Teruel and Martinez-Solano (2007) find a positive relationship between the term structure of interest rate and the maturity structure of debt. Their results are consistent with the model provided by Brick and Ravid (1985). In addition, another study of small companies, that of Demirgüc-Kunt and Maksimovic (1999), does not control for the tax hypothesis. Demirgüc-Kunt and Maksimovic (1999) mainly investigate the impact of institutions and financial markets (such as GDP, inflation, law, and market capitalisation) on the maturity structure of debt.

Interestingly, so far, the existing empirical studies based on small companies (Demirgüc-Kunt and Maksimovic, 1999; Scherr and Hulburt, 2001; and Garcia-Teruel and Martinez-Solano, 2007) do not control for firms' quality and hence those studies cannot contribute to the signalling hypothesis either by accepting or by rejecting it. But to date, empirical studies based on large companies use bond rating and abnormal earnings as proxies for firms' quality (e.g., Barclay and Smith, 1995;

Stohs and Mauer, 1996; and Ozkan, 2002).[12] Studying large companies, Stohs and Mauer (1996) use bond rating to test the signalling hypothesis and they report a negative relationship between firms' quality and the maturity structure of debt. Their results are in line with those of Barclay and Smith (1995), who find a negative relationship between long-term debt and abnormal earnings as a proxy for firms' quality, supporting the signalling hypothesis. But their results are inconsistent with the findings of Ozkan (2000), Antoniou et al. (2006), and Cai et al. (2008), who do not provide any evidence to support the signalling hypothesis. Given the existing gap in research on small companies, a question remains regarding the extent to which the data related to the signalling hypothesis will strengthen or alter the results.

[12] Abnormal earnings are calculated as earnings per share in year t+1 minus earnings per share in year t, all divided by share price in year t.

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Chapter 3 - The Determinants of Capital Structure across Firms' Size and Market of Quotation[13]

Abstract

I test the determinants of leverage of large and small firms quoted in a regulated (Main) and relatively unregulated market (AIM) in the UK between 1995 and 2008. I find strong differences across firm size and market of quotation. I show that the level of leverage of small firms is significantly lower than that of large companies. In addition, consistent with the trade-off theory, leverage of large firms quoted mainly on the Main market is affected by measures of taxes, bankruptcy costs and agency costs. However, for small firms quoted mainly on AIM, leverage is more affected by firms' asset tangibility, and unlike the theoretical predictions, it is positively related to the market-to-book reflecting the difficulties of these firms to raise equity capital to finance their growth, and is not affected by taxes or profitability.

Key words: Capital structure, trade-off theory, pecking order theory, partial adjustment model, dynamic panel data

JEL Classification: G32, G33

[13] This chapter was presented in 6th Portuguese Finance Conference. I thank all participants of the conference and, more especially, Prof. Stewart Myers for his useful comments. All errors remain my own responsibility.

3.1 Introduction

Previous studies identified two main theories to explain the on-going capital structure puzzle. The trade-off theory, which originated from the Modigliani and Miller's (1958) proposition that firm's value is independent of its capital structure in a perfect capital market where all participants have access to all relevant information and where the arbitrage eliminates any profit for the firms and the investors. When these assumptions are relaxed, leverage is determined as a result of a trade-off between the costs and benefits of debt financing. These costs include financial distress costs, the increase in agency costs between managers and debt-holders and financial flexibility. The benefits refer mainly to tax shields and the mitigation of agency conflicts between managers and shareholders in the form of free cash flow problem. Myers (1984), on the other hand, developed the pecking order theory, where leverage is a by-product of the financing hierarchy as firms prefer internal to external financing, and if they have to resort to external funds, they chose first debt and then equity because of transaction and monitoring costs (for latest reviews of the extensive literature, see Frank and Goyal, 2008 and Graham and Leary, Forthcoming in *ARFE*).

Empirically, there is a debate as to whether firms follow the trade-off theory or the pecking order theory. Fama and French (2002) show that both theories appear to explain the level of leverage of US firms, with the exception of profitability which is expected to be positively related to leverage in the case of the trade-off theory, as profitable firms can afford high leverage because they are less likely to go bankrupt and they are more likely to benefit from tax shields, but empirically, the relationship is negative, in line with the pecking order theory predictions as profitable firms use more internal funds, and thus have lower leverage. This negative relationship between profitability and leverage is also observed in cross-country studies (e.g., Rajan and Zingales, 1995 and Booth et al., 2001).

However, the impact of firm size is more controversial. Under the trade-off theory, size is expected to be positively related to leverage as large firms are more diversified, have lower default risk, are typically more mature and face lower agency costs of debt because they have a reputation in debt markets. On the other hand, the pecking order predicts the opposite as large firms face lower adverse selection problem and can more easily issue equity, because they have been around longer and are well known. However, Frank and Goyal (2008) argue that since large firms have also more assets, their adverse selection is more important if it impinges on a larger base. Therefore, under the pecking order, the relationship between firm size and leverage is ambiguous. Empirically, studies based on both large and small firms provide mixed evidence (e.g., Baskin, 1989; Allen, 1993; Rajan and Zingales, 1995; Adedeji, 1998; Ozkan, 2001; Booth et al., 2001; Fama and French, 2002; Watson and Wilson, 2002; Frank and Goyal, 2003a, 2007; and Lopez-Gracia and Sogorb-Mira, 2008). For example, Rajan and Zingales (1995) find a negative relationship between size and leverage in Germany in contrast to their results in Japan, France, UK, US, and Canada. Booth et al. (2001) also find that size is not a factor in India and Korea while they find a positive size effect on leverage in Malaysia, Pakistan and Turkey. The negative relationship between size and leverage can be explained by the pecking order theory. Rajan and Zingales (1995) and Frank and Goyal (2007) argue that size may be a proxy for asymmetric information between firms and capital markets, suggesting that large firms can issue sensitive-information securities and use less debt.

The purpose of this chapter is to contribute to these controversial results documented in previous studies by providing a deeper analysis of the determinants of leverage of small and large companies and by assessing whether the market of quotation affects firms' capital structure. I analyse firm's capital structure within different institutional settings, namely the Main Market in the UK which is relatively more regulated and includes large companies, and the Alternative Investment Market (AIM), a market for small firms with minimal regulation. I expect smaller companies quoted in AIM to have a lower leverage compared to small firms quoted in the Main market. I test this hypothesis within the partial adjustment model in a dynamic framework of the trade-off theory (e.g., Ozkan, 2001, Leary and Roberts, 2005; Flannery and Rangan, 2006; Antoniou et al., 2008, and Guney et al., 2009), and I use the Generalized Method of Moment (GMM) in the panel data based on the instrumental variables to overcome the endogeneity problem. I also expect the speed of adjustment to be higher in larger companies in line with Flannery and Rangan (2006) and Antoniou et al. (2008) but inconsistent with Lööf (2004).

I find that firms quoted in AIM have significantly lower leverage than those listed on the Main market, even after accounting for all other effects, such as firm size. I also find that the determinants of leverage are relatively similar across the two sets of markets but I show strong differences in the level of leverage between small and large companies. The effective tax rate is positive and significant for large firms, whereas it is not significant for small firms, suggesting that large firms are more likely to be able to gains from the tax shields. In addition I find strong size effect on the relationship between leverage and market-to-book. For large companies in the AIM and Main market, consistent with the trade-off theory, an increase in the market-to-book ratio results in a decrease in all different measures of leverage, but the reverse occurs for the smallest companies in both markets, suggesting that the financing difficulties of small companies result in an increase in debt financing to cover their growth opportunities, in line with the predictions of pecking order theory. These results are also in line with the argument of Titman and Wessels (1988) that a firm's value increases when it has higher growth opportunities and this would result in an increase in the firm's debt capacity and thus leverage. The positive relationship between leverage and growth opportunities are also reported by Michaelas at al. (1999), Cassar and Holmes (2003), and Hall et al. (2004) using small companies.

In addition, I find that consistent with the trade-off theory, all different measures of leverage are positively related to tangibility across firms' sizes, suggesting that firms use tangible assets as collateral to mitigate the bankruptcy probability. However, I show that in both markets, the tangibility effects on different measures of leverage are economically more significant for small companies, suggesting that, unlike large firms, small companies suffer from a higher loss of value when they go into distress. It is difficult for lenders to assess the risk of those companies, and therefore they require greater collateral to hedge the risk composed by small companies. This empirical study also supports Berger and Udell (2006), who argue that asset-based lending has a higher significant effect on small firms than on larger ones that are well known. I also find that size is positively related to all measures of leverage across firms' sizes supporting bankruptcy and agency conflicts effects. Similarly, I show that the sign of asset beta (as a proxy for bankruptcy costs) is negative and significant for all size groups. However, firms listed on AIM are more economically affected by beta.

The impact of profitability is also not homogeneous across firms' sizes. For the sample as a whole, I find strong and negative relationship between leverage and profitability, consistent with the pecking order theory and in line with previous empirical studies of Michaelas (1999) and Rajan and Zingales (1995), but in contrast with Hall et al. (2004). However, the leverage of small companies listed on the AIM and Main market is less sensitive to profitability. It is likely that the profitability of those companies is also a proxy for quality of investment opportunities discussed by Rajan and Zingales (1995), as profitability of small firms may be a proxy for internal fund as well as investment opportunities, which have conflicting effects on leverage.

Finally, I find that firms appear to have target debt ratios, but they eliminate their deviation by different adjustment speeds depending on the capital market in which they are listed. In the Main market, the findings suggest that small companies adjust more rapidly than large ones. However, in AIM, large companies appear to adjust more quickly towards their target, while smaller companies are relatively sluggish. Previous studies show that leverage is mean reverting, but find different speeds of adjustments.[14] I show that this speed of adjustment is affected by size and market of quotation reflecting firm’s ability to raise external capital.

The rest of the paper proceeds as follows. In Section 2, I review the literature and present my hypotheses focussing mainly on the differences in the theoretical predictions between small and large firms. Section 3 describes the data and the methodologies I use to test my hypotheses. In Section 4, I discuss the empirical results and finally section 5, summarises the findings and concludes the paper.

[14]See Frank and Goyal (2008) for a survey. For example, Fama and French (2002) find speed of adjustments 7%-18% per year, Lemmon and Roberts (2008) 25% per year for book leverage, Flannery and Rangan (2006) 35.5% per year using market leverage and 34.2% per year using book leverage, suggesting that it takes about 1.6 years for a firm to remove half of the effect of a shock on its leverage. Huang and Ritter (2009), using a more robust methodology, find 3.7 years for book leverage

3.2 Review of Literature and Hypotheses

3.2.1 Empirical Studies of Capital Structure

More than fifty years ago, Modigliani and Miller (MM, 1958) showed that the value of the firm is independent of its capital structure. This theoretical finding is based on a number of critical assumptions, namely, a perfect capital market where there are no taxes at both corporate and personal levels, no transaction and bankruptcy costs, managers are rational, thus no agency costs, investors and companies can borrow at the same rate, and all participants have access to all relevant information. They use arbitrage argument to show that if firms can change their market value, rational investors can take actions to offset any changes in the firms' capital structure. Therefore, any profit for the firms and the investors would be eliminated. The critical contribution of MM is the identification of the conditions under which the capital structure becomes relevant, and many subsequent studies addressed the fundamental question of how these assumptions can be relaxed to derive an optimal capital structure under the trade-off theory which states that a firm's optimal capital structure is determined by trading the costs of debt and the benefits of debt (see, e.g., Harris and Raviv, 1991 for a review). However, Chittenden et al. (1996) argue that the MM proposition does not address the size effect in determining the capital structure. Thus, other studies consider the impact of the financing constraints and the lack of market access as additional factors that might explain particularly the small firms' capital structure. Myers (1984), on the other hand focuses on the financing hierarchy of firms. He argues that, because of transaction, monitoring and information costs, firms are expected to prefer internal to external financing and, if they recur to external funding, they will use first debt, and then equity. From this perspective there is no concept of an optimal leverage.

The trade-off theory and the pecking order theory are the predominant theories of capital structure. They differ in terms of their predictions and the empirical evidence provided to-date is controversial and provides mixed evidence (e.g., Rajan and Zingales, 1995; Booth et al., 2001; Fama and French, 2002; Frank and Goyal, 2008; and Frank and Goyal, 2009). Part of this controversy can be related to the conceptual differences across the two theories, another is due to the proxy variables used to test the predictions of each theory.[15]

The literature on capital structure mainly uses size as proxy for a number of factors, including the costs of bankruptcy, the extent of the agency conflicts between managers, shareholders and debt-holders, and asymmetric information (e.g., Rajan and Zingales, 1995; Booth et al., 2001; Fama and French, 2002; and Frank and Goyal, 2009). Although some studies focus on the specific characteristics of small firms which may affect firms' capital structure, to my knowledge there is no direct evidence on the differences in leverage between small and large companies. This chapter attempts to fill the gap with studies that seek to ascertain whether the determinants of capital structure are different for small and large companies. I also contribute to the literature on the determinants of leverage of small and medium sized companies (SMEs) (e.g., Jordan et al., 1998; Michaelas et al., 1999; and Lopez-Gracia and Sogorb-Mira, 2008), which provides relatively mixed evidence. For example, Lopez-Gracia and Sogorb-Mira (2008) recently find that non-debt tax shields play an important role in Spanish small and medium sized firms (SMEs), while Michaelas et al. (1999), using UK SMEs, find that non-debt tax shields are not

[15] A more detailed review of the capital structure literature is provided in Chapter 2 (Literature Review).

significant factors. Inconsistently with the bankruptcy prediction, Michaelas et al. (1999) and Jordan et al. (1998) find a positive relation between leverage and volatility of earnings, thus contradicting Lopez-Gracia and Sogorb-Mira (2008). So far, only two papers have investigated the determinants of leverage on the basis of UK small and medium sized companies (Michaelas et al., 1999 and Jordan et al., 1998), yet this literature does not take into account the institutional setting in the UK. I fill this gap by assessing the determinants of leverage across market of quotation; in particular, by specifically investigating the capital structure across firms' sizes in the AIM and Main market.

Recent studies (e.g., Flannery and Rangan, 2006) accounted for the dynamic nature of a firm's capital structure where, under the classic trade-off theory, target leverage is considered to be time-varying. If there are deviations from the optimal capital structure, an adjustment towards the optimal target will take place. The speed of adjustment can be estimated using the dynamic partial adjustment model (e.g., Huang and Ritter, 2009; Drobetz and Fix, 2005; and Flannery and Rangan, 2006). Some prior studies exclude small firms because their adjustment costs may be different. I contribute to this literature by assessing precisely the differences in the speed of adjustment between small and large firms. I run separate regression for each size group of companies to compare whether characteristics of small firms would result in different speeds of adjustment to the target level of capital structure. I also expand the growing body of literature on the dynamic model of capital structure, which is predominantly limited to the US instructional setting. Previous studies provide mixed and controversial results as many studies document different speed of adjustments. For example, Flannery and Rangan (2006) find that about 34% of the deviation from optimal leverage is eliminated in each period. It takes about three years for the average firm to adjust to its target capital structure following shocks. Their finding is also consistent with Drobetz and Fix (2005). However, Huang and Ritter (2009) report the slower speed of adjustment of about 11.3%. Using 390 UK companies, Ozkan (2001) finds a faster adjustment speed of about 50%. Despite the studies that confirm the mean reversion in leverage, Chang and Dasgupta (2009) argue that converging to leverage probably happen randomly rather than the intention of rebalancing leverage. Another recent study, DeAngelo and Roll (2011), find no evidence of stability or reverting in leverage, in contrast, find substantial instability in leverage which is highly associated with asset growth. In the next section, I focus on the literature that dealt with the capital structure of small firms.

3.2.2 Small Firms' Characteristics and Capital Structure

Previous studies identified a number of small firms' specific factors that might affect their level leverage. For example, in terms of the tax effect, Pettit and Singer (1985) argue that small firms tend to operate in less concentrated markets and greater competitive pressures and lower profit margins could result in lower tax rates, implying that small firms may not take the tax benefits of debt. In addition, Tamari (1980) and Osteryoung et al. (1995) argue that small firms have greater variability in profits, and thus are more likely to gain or lose large amounts of funds. The survey of 405 US small companies conducted by Norton (1991) shows that managers would not respond to the effect of tax on the financing decision.

In terms of costs of financial distress, early studies including Altman (1984), Tamari (1980), and Evans (1987), as well as relatively recent studies such as Osteryoung et al. (1995) argue that bankruptcy costs are highly relevant to small firms, which show a higher probability of failure. Osteryoung et al. (1995) argue that small firms have greater variability in their profits and earnings. This may be due to a higher level of economic risk resulting from a lower degree of diversification and higher volatility of sales in competitive markets.

Small and large companies also differ in level of asymmetric information. Pettit and Singer (1985) and Ang et al. (1982) argue that small companies provide less information about firms' operations. Differences in available information between managers and outsiders are more significant for small companies. It is more costly for small firms to provide audited information, and thus outsiders do not have sufficient information about firms' value. Chittenden et al. (1996) suggest that as monitoring information is expensive for small companies, a considerable amount of collateral is required by lenders in order to hedge. In addition, small firms are more likely to have a greater cost of equity due to size effects and thus would attempt to avoid using external equity (Chittenden et al., 1996). Schoubben and Van Hull (2004) also argue that small firms are likely to have higher transaction costs than large companies and thus may prefer to issue debt to reduce the issuance costs of securities.

In addition, small companies are significantly different from large companies in level of growth opportunities. Previous studies find a significant and negative relationship between size and firm's growth opportunities (see Evans, 1987). While, small firms have greater growth opportunities, Beck and Demirguc-Kunt (2006) argue that their growth opportunities are constrained due to the lack of market access following limited access to external financing. Moreover, previous studies argue that small companies are different from large companies in asset structure. Small firms have a lower proportion of fixed assets (Hughes, 1996).

The size effect on asset substitution is controversial and the views are mixed. Jensen (1986) and Stulz (1990) consider that the controlling role of debt is not crucial for firms that have high growth opportunities. They are more likely to have good investment prospects, and hence the agency costs are less severe. However, Pettit and Singer (1985) argue that small firms suffer from the asset substitution problem. While those firms have greater growth opportunities, due to their higher flexibility, they find it easier to substitute one asset for another, but this will depend on the owner's preferences. Hence, it is likely that the asset substitution problem associated with agency costs for those companies are larger than those of large firms.

3.2.3 Research Hypothesis

Previous sections address the differences between small and large companies and the controversies in empirical findings for the determinants of leverage. I expect that the determinants of leverage are likely to be size dependent as they have different characteristics. In addition, prior literature investigates the determinants of leverage across different countries to control for different institutional settings, but to the best of my knowledge, no empirical study investigates leverage determinants across two markets in the same country with different regulatory settings, such as AIM and the Main market in the UK. I first start by analysing the determinants of capital structure for small and large companies. The different characteristics of small and large companies as argued in the previous section, lead me to set up the following hypotheses:

Hypothesis 1: Small companies have lower leverage relative to large companies.

As argued above, small firms are more risky, less likely to benefit from tax shields and/or to have high agency conflicts in the form of underinvestment and asset substitution problems. Therefore, since for small companies the costs of debt are likely to be higher than the benefit of debt, I expect small companies to refrain from using debt finance. However, small firms may rely on debt financing to finance mainly their high growth prospects if they cannot access easily the equity market. In this case, I expect small firms to have a higher level of debt than large firms.

Hypothesis 2: The determinants of leverage are not homogenous across the two sets of companies.

I expect the fundamental characteristics of small firms relating to their volatility in earning, their ability to claim tax shields, their level of agency conflicts and their growth potentials, to have different impact on their level of leverage. For example, smaller firms might have a little attention of tax considerations since their high income volatility would offset tax shield benefits, while large firms might have a larger corporate tax deduction through interest payments as those firms have diversified business lines and higher profit margins resulting in greater tax advantages. In terms of the impact of growth opportunities, I expect high growth firms to have lower level of leverage when they are large, but higher leverage when they are small.

In the second stage, this research investigates the dynamic framework of capital structure. Recently, the dynamic model of capital structure has received a significant attention in the literature (see Tsyplakov, 2008; Huang and Ritter, 2009; Drobetz and Fix, 2005; and Flannery and Rangan, 2006). As I know, only Flannery and Rangan (2006) distinguish between small and large companies in the US. Therefore, the application of partial adjustment model to small companies has not been exhaustive. This leads me to set up my further hypothesis as:

Hypothesis 3: Small and large companies have different adjustment speed towards the target leverage. I predict that small companies have lower adjustment speed as they are financially constrained.

Finally, I contrast my research with previous predominantly US evidence and in particular the studies based on the UK, by analysing the structure of capital across the two sets of markets in the UK, Main and AIM. Most regulations of the Main market do not apply to AIM. For example, admission to AIM does not require a minimum market capitalisation and minimum shares in public hands, and no trading record is required. Furthermore, a large number of AIM companies do not generate a substantial profit. Therefore, AIM companies tend to be riskier than those listed on the Main market, as the latter have an established trading record and considerable market capitalisation (see Jenkinson and Ramadorai, 2008; and Campbell and Tabner, 2010). Given the UK institutional settings, especially the differences between the Main market and AIM, my further hypothesis is:

Hypothesis 4: AIM companies have lower leverage opposes to the companies listed on the Main market.

Hypothesis 5: The speed of adjustment is different between the Main market and AIM.

I expect that AIM companies adjust later towards the target leverage as those companies are subject to higher risk and have limited ability to raise external financing as they do not have an established trading record.

3.3 Data and Methodology

3.3.1 Sample

Data for this study includes 2,894 firms, which originally is drawn from the Company Analysis database. The data contains all the detailed items of the balance sheet, income and cash flow statements for the period from 1995 to 2008. This database does not include data on government bond yields and hence these data are collected from DataStream. I also hand-collect data on the constituent names of companies listed on both the AIM and Main market from Bloomberg and London Share Price Data (LSPD) databases. I also contacted the FTSE group (provider of stock market indices) directly to supplement the data on the quotation of the two markets I obtained from these two databases.

I classify each individual company into financial years spanning from the 1st of April in a year *t* to the 31st of March in year *t+1*. For example, 2008 includes all the UK companies with year-ends ranging between the 1st of April 2008 and the 31st of March 2009. This is to reflect the relatively high proportion of companies that have their year-ends in December and March, and thus report their financial statements in roughly March and June, respectively. Following previous studies, I exclude financial firms such as banks, life and non-life insurance and real estate companies. These companies operate differently and thus their capital structures are different. However, the sample includes dead companies to avoid survivorship bias. Since many firm-specific variables are needed, the sample tended to trim down due to non-availability of data. Subsequently, these exclusions leave me with 2,894 firms, resulting in 14,437 firm-year observations for a 14 year period.

I follow the various Financial Times indices to classify my companies into different size groups. I, therefore, use FTSE 100, FTSE 250, FTSE Small Cap, and FTSE Fledgling (the smallest companies of the FTSE) in the Main market, and FTSE AIM index series to distribute my sample from large to small firms. However, some companies listed on AIM may be as large as those companies that are listed on FTSE 100 and 250 in the Main market. Therefore, FTSE AIM companies are split into large, medium, and small companies. Large AIM companies are those with top 20% of market capitalisation and small AIM companies are allocated as bottom 20%

firms' year-end market capitalisation. The remaining companies are considered as medium AIM companies.

Table 3-1 reports the market capitalisation of all listed companies. It indicates that AIM companies are those with the lowest average market capitalisation compared to the Main market. The table shows the size distribution in each market. FTSE 100 includes the largest companies relative to FTSE Fledgling which is the smallest companies in the Main market and it also shows that AIM is split into small, medium, and large companies. The table shows that out of 14,437 observations, 64.11% are in the Main market with 98.45% of total market values while 35.89% of total observations are in AIM with only 1.55% of total market values. With respect to different size groups, the table shows that the proportion of observations in FTSE Fledgling (24.69%) is comparable to those in medium AIM companies (21.46%). The proportion of market values is also comparable across these two sets of groups, as FTSE Fledgling includes 0.20% of total market values compared to medium AIM companies which include 0.11%. The results of table 3-1 also suggest that the market value of FTSE Small Cap is 1.09%, which is comparable to the market value of large AIM companies (1.42%). The results for small AIM companies show that this group includes only 0.02% of total market capitalisations, suggesting that small AIM companies are the smallest companies in the UK, thus are expected to be highly different in level of leverage and determinants. Table 3-2 reports the number of sample firms in each year.

Table 3-1: Market Capitalisation of the AIM and Main Market

	Firms			Market Capitalisation (£m)			
	N	**% of N**	**% of MV**	**Min**	**Mean**	**Median**	**Max**
Main market:	9,896	64.11	98.45	0.28	1477.42	111.13	213,696
FTSE 100	953	6.17	90.89	17.00	12800.5	5243.00	213,696
FTSE 250	2,109	13.66	6.27	7.87	882.72	679.10	11,217
FTSE Small Cap	3,023	19.58	1.09	3.76	153.05	132	1,986
FTSE Fledgling	3,811	24.69	0.20	0.28	28.50	20.80	1,115
AIM:	4,541	35.89	1.55	0.01	50.21	11.97	12,002
Large AIM	1119	7.25	1.42	16.17	200.04	72.30	12,003
Medium AIM	3,313	21.46	0.11	2.50	15.61	11.93	62.79
Small AIM	1,109	7.18	0.02	0.01	2.40	2.20	5.90
All Sample (2,894)	15,437	100	100	0.01	965.04	420.51	213,696

This table reports the distribution of companies across various size groups in the AIM and Main market. N is number of observations. FTSE 100 represents the largest companies in the Main market, FTSE 250 includes the next 250 largest companies, and FTSE Fledgling represents the smallest companies in the Main market. The second column shows the proportion of each size group in the total sample. The third column shows the proportion of companies across various size groups. The fourth column shows the proportion of market capitalisation for each size group in the total sample. The fifth, sixth, and seventh columns show minimum, mean, median, and maximum of the market capitalisation in £m across indices, respectively.

Table 3-2: Annual Distribution of the Number of Companies by Size Groups

	Main Market				AIM		
	FTSE 100	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large**	**Medium**	**Small**
1995	65	150	320	471	23	57	19
1996	77	172	292	464	31	88	30
1997	66	167	316	477	30	90	30
1998	65	169	234	406	34	99	33
1999	68	144	285	386	59	174	59
2000	68	156	248	349	72	213	71
2001	66	159	211	298	79	234	79
2002	68	159	188	253	77	228	76
2003	65	144	171	191	82	243	81
2004	74	135	173	160	104	310	104
2005	69	140	161	120	112	336	112
2006	64	132	152	92	152	453	151
2007	72	139	150	79	152	453	152
2008	66	143	122	65	112	335	112
Total	953	2109	3023	3811	1119	3313	1109

This table reports the annual distribution of the total number of companies between 1995 and 2008 across various size groups in AIM and the Main market.

3.3.2 Variables

I follow previous studies (e.g., Rajan and Zingales, 1995; and Booth et al, 2001) and define a set of dependent and independent variables to test the two main theories of capital structure, the trade-off theory and the pecking order theory. Table 3-3 summaries the explanatory variables and their expected sign for the panel regression.

Table 3-3: Proxies for the Determinants of Leverage and Expected Sign Observed From the Hypotheses

Variables	Description	Hypothesis	Sign
Taxes/EBIT	Effective tax rate (EFTR)	Tax/ Trade-off theory	+
Asset beta	Risk (Asset beta)	Bankruptcy/ Trade-off theory	-
Tangible fixed assets/TA	Tangibility (Tg)	Bankruptcy/ Trade-off theory	+
ROA	Profitability (ROA)	Agency (Free cash flow problem)	+
ROA	Profitability (ROA)	Asymmetric information/ Pecking order	-
MB	Growth opportunities (MB)	Agency (Share-holders and debt-holders/ Underinvestment)/ Trade off theory	-
MB	Growth Opportunities (MB)	Asymmetric information/ Pecking order	+
Ln (total assets)	Size (LnTA)	Bankruptcy/ Trade-off theory	+
Ln (total assets)	Size (LnTA)	Agency (Conflicts between lenders and managers) / Trade off theory	+
Ln (total assets)	Size (LnTA)	Asymmetric information/ Pecking order	-

This tables presents the proxies that I use in this chapter in order to test the related hypotheses. The first column shows the measurement of variables following by their descriptions in the second column. The third column presents the related hypotheses and the predicted effects of those proxies are reported in the last column.

3.3.2.1 Dependent Variables

Debt ratios: most of the finance literature use debt ratio as total debt divided by total assets. However, recent studies (e.g., Bates et al., 2009) measure debt ratio as net debt excluding cash holdings because cash is simply a negative debt. Therefore, I use net debt ratio as an additional measure of leverage to contribute to the previous studies, which ignore the evaluation of net leverage. Long-term debt ratio is also used. While book value of debt ratio is the common measure of capital structure in the literature, market value of leverage is also an important evaluation of firms' capital structure. As a result, I use long-term debt ratio based on both book and market values. In sum, I use four different measures of capital structure:

$$Net\ DR: \frac{Bookvalueoftotaldebt - Cash}{Bookvalueoftotalassets} \tag{3.1}$$

$$TDR: \frac{Bookvalueoftotaldebt}{Book\ valueoftotalassets} \tag{3.2}$$

$$LTBDR: \frac{Bookvalueoflongtermdebt}{Bookvalueoflongtermdebt + Bookvalueofequity} \tag{3.3}$$

$$LTMDR: \frac{Book\ valueoflongtermdebt}{Bookvalueoflongtermdebt + Marketvalueofequity} \tag{3.4}$$

3.3.2.2 Independent Variables

Effective tax rate (EFTR): DeAngelo and Masulis (1980) and Fama and French (2002) take the effective tax rate into account to show the role played by interest payments, which is deductible from corporate income. It is the ratio between tax paid and earnings before interest and tax. The trade-off theory predicts a positive relationship between leverage and the effective tax rate. Firms use more debt to take advantage of higher interest tax shields.

Growth opportunities (MB): The market-to-book ratio is a common ratio to measure growth opportunities used by previous studies (e.g., Rajan and Zingales, 1995; Flannery and Rangan, 2006; and Adam and Goyal, 2008). Rajan and Zingales (1995, p. 1453) measure the market-to-book ratio "as the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets". I expect conflicting relationships between the market-to-book ratio and leverage based on the trade-off theory and the pecking order theory. The trade-off theory predicts a negative relationship between growth opportunities measured by the market-to-book ratio because of the underinvestment problem. In contrast, the pecking order theory predicts a positive relationship between growth opportunities and leverage as high growth firms use debt financing to cover their investments.

Profitability (ROA): It is return on assets and is measured as earnings before interest and tax divided by total assets (Titman and Wessels, 1998; Fama and French, 2002; and Flannery and Rangan, 2006). The relationship between profitability and leverage is also mixed. The pecking order theory argues that firms with greater internal funds measured by profitability prefer internal finance over external funds and hence leverage is negatively related to profitability. While, consistent with the trade-off theory, leverage is positively related to profitability as profitable firms face free cash flow problem and thus they use more debt to mitigate the agency conflict.

Risk (Asset Beta): It is computed as $\frac{B_L}{\left[1+\frac{D}{E}(1-TC)\right]}$. B_L is levered beta obtained from the London Share Price Index database, D/E is total debt divided by equity, and TC is corporation tax rate. Alternatively, Booth et al. (2001) use earnings volatility to measure business risks but argue that this proxy cannot capture long-term risks and hence I prefer asset beta as a proxy for business risk. Consistent with the trade-off theory, I expect that firms with higher beta have greater business risk and thus use less debt.

Size (LnTA): Firm size is computed as the natural logarithm of total assets (Titman and Wesseles, 1988; Rajan and Zingales, 1995; and Michaelas et al., 1999). The trade-off theory argues that larger firms have an established reputation and are less likely to face default risk. Therefore, larger firms use more debt. In contrast, the pecking order theory predicts a negative relationship between leverage and size. Larger firms have better reputation and more likely to generate retained earnings, thus they issue relatively more equity.

Tangibility (Tg): It is measured by the ratio of tangible fixed assets divided by total assets (Rajan and Zingales, 1995; and Frank and Goyal, 2003a). The trade-off theory predicts that firms with more tangible assets expect lower costs of distress and thus they use more debt.

3.3.3 The Model

I use the model proposed by Booth et al. (2001), Equation (3.5). The model is based on unbalance panel data, which has some advantages in comparison to other models. It gives a large number of observations and reduces the correlation between explanatory variables to improve the efficiency of the estimations (Daskalakis and Psillaki, 2008). Booth et al. (2001) also argue that the insufficient direct proxies for factors such as industry effects or bankruptcy costs imply that the capital structure models are not fully specified. Though, the fixed-effects model in the panel data should be used to allow the intercept to be varied across firms and time. Therefore, the effects of inflationary environment and also omitted explanatory variables such as industry effects can be captured in the changing company intercept.[16]For the purpose of this study, E-Views (Econometric Views) package is used to find the regression coefficients.

$$Lev_{i,t} = (\alpha_i + \alpha_t) + \sum_{j=t}^{n} \beta_j X_{i,j,t} + \varepsilon_{i,t} \qquad (3.5)$$

Where:

$Lev_{i,t}$: One of the four measures of leverage for firm *i* at time *t*

$X_{i,j,t}$: The vector of *jth* explanatory variable for the *ith* firm at time *t*, including:

$EFTR_{i,t}$: Effective tax rate of firm *i* at time *t*

$GO_{i,t}$: Growth opportunities of firm *i* at time *t*

$Tg_{i,t}$: Tangibility of firm *i* at time *t*

$Risk_{i,t}$: Asset beta coefficient of firm *i* at time *t*

$ROA_{i,t}$: Return on assets of firm *i* at time *t*

$Size_{i,t}$: The size of the firm *i* at time *t*

$\varepsilon_{i,t}$: The error term

In addition, with respect to the dynamic model of the trade-off theory, I use the partial adjustment model of Flannery and Rangan (2006) to find the adjustment speed across firms' sizes. Their model considers the possibility that target adjustments might differ across firms or over time by specifying a target capital ratio of the firm, Equation (3.6):

$$MDR^*_{i,t+1} = \beta X_{i,t} \qquad (3.6)$$

Where:

$MDR^*_{i,t+1}$: The target debt ratio of firm *i* at time *t+1*

$X_{i,t}$: A vector of firm characteristics considering the costs and the benefits of debt at time *t*

[16]Previous studies refer to the important role of industry (e.g., Hovakimian et al., 2004; and Frank and Goyal, 2009) and thus I attempt to control for it.

Previous studies use industry averages to proxy for firms' target leverage. This proxy assumes that firms in the same industry respond to unexpected external changes in the same way, and, thus, they have a similar financing decision (e.g., Ang, 1976; and Lev and Pekelman, 1975). Marsh (1982) and Shyam-Sunder and Myers (1999) use historical average debt ratio over 10 and 19 years, respectively, as a proxy for target leverage. However, Shyam-Sunder and Myers (1999) argue that this proxy variable assumes a constant debt ratio over time, and this is not satisfactory, theoretically and empirically. Instead, they estimated the target leverage using firms' characteristics such as risk, tax, and earnings to allow targets leverage ratios to vary through time and across firms. This estimation is used by other recent studies such as Flannery and Rangan (2006) and Antoniou et al. (2008).

A standard partial adjustment model is given as Equation (3.7):

$$MDR_{i,t+1} - MDR_{i,t} = \lambda\left(MDR^{*}_{i,t+1} - MDR_{i,t}\right) + \varepsilon_{i,t+1} \tag{3.7}$$

Where:

λ: The adjustment speed coefficient

$\varepsilon_{i,t+1}$= An error term

The estimated model is given by substituting (3.6) into (3.7) and rearranging, Equation 3.8:

$$MDR_{i,t+1} = \lambda\beta X_{i,t} + (1-\lambda)MDR_{i,t} + \varepsilon_{i,t+1} \tag{3.8}$$

Flannery and Rangan (2006) use instrumental variables with fixed effects regressions. Panel data accounts for the partial adjustment model. However, the standard panel estimators such as the fixed effects regression are biased when a lagged dependent variable is included in the model (Arellano and Bond, 1991). In this situation, there is a correlation between the lagged dependent variable and the error term. Arellano and Bond (1991) use the Generalized Method of Moments framework (GMM) and consider the first differences of variables to fix the observed problem in the dynamic panel data. However, recent studies argue that the GMM-DIF estimator has a problem with weak instruments (e.g., Antoniou et al., 2008). The GMM system method considers lagged repressors in both levels and first differences to reduce the finite sample bias substantially by exploiting the additional moment conditions (Blundell and Bond, 1998). Therefore, I apply a two-step GMM-system in which the first lag of all explanatory variables and the second lag of dependent variable are used as instruments.

3.4 Results and Discussions

3.4.1 Descriptive Statistics

Table 3-4 presents a summary of the descriptive statistics of the dependent and explanatory variables. I use FTSE 100, FTSE 250, FTSE Small Cap, and FTSE Fledgling to split my sample into large, medium, and small firms in the Main market. AIM also includes small, medium, and large companies. Some companies listed on FTSE AIM may be as large as those listed on the Main market. Therefore, FTSE AIM companies are divided into small, medium, and large companies. The top 20% and the bottom 20% of FTSE AIM companies' year-end market capitalisations are allocated to large and small AIM companies, respectively. The remaining companies are considered AIM medium sized companies.

Panel A in Table 3-4 reports the means and medians of the sample variables. The dependent variables of the study are net debt ratio (Net DR), total debt ratio (TDR), book value of long-term debt ratio (LTBDT), and the market value of long-term debt ratio (LTMDT). The chi-square (χ^2) is also reported to show whether the distribution of all variables is statistically different across firms' sizes in the AIM and Main market.

Panel A of Table 3-4 provides evidence on the effect of different measures of debt ratios across firms' sizes in the UK markets (both the Main market and AIM). In the Main market, the largest companies (FTSE 100) use more debt in their capital structure, the mean (median) of total debt ratio for those companies being 0.27 (0.25) in comparison to the smallest firms' (FTSE Fledgling) 0.18 (0.16). Therefore, as firms become larger, the portion of debt in their capital structure also becomes larger. In particular, when I consider the net leverage, which excludes cash from total debt, I obtain considerably different ratios across firms' sizes. The average book value of net leverage is 0.20 for the largest companies (FTSE 100) and 0.06 for the smallest companies (FTSE Fledgling). A significant decrease in net leverage for small companies shows that small companies hold more cash than large companies. The results are similar when I use the book and market values of long-term debt ratios suggesting that large companies use more long-term debt in their capital structure than small companies.

The results based on AIM show that small companies rely less than large companies on debt and long-term debt. Moreover, the net debt ratio for all companies listed on AIM is negative, which suggests that AIM companies hold more cash in their capital structure than companies listed on the Main market

Table 3-4 also reports the firm characteristics used as determinants of leverage, including the effective tax-rate (EFTR), growth opportunities (MB), profitability (ROA), risk (Asset beta), natural logarithm of total assets (LnTA), and tangibility (Tg). With respect to Main companies, the table shows a clear pattern of higher profitability for larger firms. In fact, the mean (median) for return on assets is negative for the smallest companies over the observation period. Furthermore, the table shows that, as companies become larger, the level of the effective tax rate and tangibility increase while their growth opportunities and risk decrease. The results are also consistent when AIM companies split into small, medium, and large sized groups. Small AIM companies are those with higher risk and growth opportunities and less profitability, tangibility and effective tax rate.

In addition, the chi-square is reported so as to test the equality distribution of each variable across firms' sizes in the AIM and Main market. The significant chi-squares in both markets indicate that the distribution for each variable across firms' sizes is not equal. These results show that the characteristics of small firms are significantly different from those of large firms.

Panel B in Table 3-4 provides the t-statistics and Wilcoxon-Mann-Whitney test of the differences in means and medians for each variable between the Main market and AIM. All the differences in means and medians are statistically significant at the 0.01 level, apart from the differences between the two markets in the mean of the effective tax rate, which is not significant. The results for different measures of leverage show that Main companies have higher leverage than AIM companies. For example, the total debt ratio is 0.20 for Main companies compared to 0.14 for AIM companies. The results of Main companies are consistent with those of Brav (2009), who finds that, on average, UK public companies have leverage about 0.23. Moreover, the results suggest that Main companies are larger and have greater profitability, while AIM companies are smaller with higher growth opportunities. In contrast to AIM, the companies listed on the Main market are subject to higher business risk. This finding is in line with the argument of Gerakos et al. (2011) that AIM is more risky as it attracts high risk firms.

Panel C in Table 3-4 reports the annual distribution of leverage across firms' sizes in both markets. It shows that Net debt is negative for AIM companies in contrast to Main companies, which have positive leverage in the observation period. The results of Panel C are also illustrated in Figure 3-1. Panel A of this figure, shows that the net debt ratio decreases significantly for AIM companies between 1998 and 2007. In contrast, in the Main market, the net debt ratio increases for larger companies (FTSE 100 and 250) and remains steady for medium-sized companies (FTSE Small Cap) but decreases for the smallest companies (FTSE Fledgling). Panel B shows the same trend for total debt ratios. Panel C illustrates that the book value of long-term leverage is higher for Main companies than small companies, in particular, increases for larger companies in the Main market while decreases for AIM companies between 1998 and 2000 and remains steady from 2000 onwards. Similarly, the results in Panel D show that Main companies have greater market values of long-term leverage than AIM companies, in particular, it relatively increases for all companies but more for larger companies in the Main market. Overall, the figure shows that in both markets, large companies have higher leverage than small companies.

In sum, the results show that small and large firms are significantly different in profitability, tangibility, effective tax rate, and natural logarithm of total assets. Small companies are those with greater growth opportunities, higher risk, and less profitability, tangibility, and effective tax rate, while large companies are those with higher profitability, tangibility, effective tax rate, and lower growth opportunities and risk.

Table 3-4: Descriptive Statistics

Panel A: Means and (Medians) of Dependent and Independent Variables

	Net DR	**TDR**	**LTBDR**	**LTMDR**	**$Beta_u$**	**EFTR**	**LnTA**	**MB**	**ROA**	**Tg**
Main Market companies:	0.09	0.20	0.24	0.16	062	0.12	5.03	0.03	0.04	0.35
	(0.13)	(0.19)	(0.20)	(0.13)	(0.58)	(0.14)	(4.77)	(0.00)	(0.08)	(0.24)
Large: FTSE 100	0.20	0.27	0.36	0.20	0.50	0.27	8.70	1.25	0.10	0.40
	(0.20)	(0.25)	(0.33)	(0.18)	(0.45)	(0.20)	(8.63)	(0.87)	(0.10)	(0.38)
FTSE 250	0.16	0.25	0.34	0.18	0.60	0.18	6.64	1.61	0.08	0.36
	(0.17)	(0.24)	(0.30)	(0.16)	(0.58)	(0.17)	(6.65)	(1.06)	(0.09)	(0.30)
FTSE Small Cap	0.05	0.18	0.22	0.14	0.64	0.08	4.84	2.84	0.05	0.32
	(0.09)	(0.16)	(0.17)	(0.09)	(062)	(0.10)	(4.89)	(1.52)	(0.08)	(0.28)
FTSE Fledgling	0.06	0.18	0.17	0.14	0.63	0.03	3.37	1.65	-0.04	0.33
	(0.11)	(0.16)	(0.12)	(0.08)	(0.62)	(0.05)	(3.43)	(1.15)	(0.06)	(0.29)
$\chi^2(4)$	**275.83**	**426.97**	**933.10**	**371.74**	**209.98**	**229.23**	**5518.69**	**4605.70**	**3222.25**	**43.99**
p-value	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
AIM Companies:	-0.07	0.14	0.16	0.10	0.90	0.10	2.44	3.44	-0.58	0.22
	(-0.02)	(0.09)	(0.04)	(0.02)	(0.82)	(0.04)	(2.48)	(2.50)	(-0.01)	(0.10)
Large AIM	-0.07	0.14	0.18	0.12	0.82	0.14	3.81	3.04	-0.03	0.24
	(-0.03)	(0.10)	(0.08)	(0.04)	(0.78)	(0.15)	(3.90)	(1.96)	(0.04)	(0.12)
Medium AIM	-0.05	0.14	0.14	0.10	0.90	0.12	2.46	3.05	-0.16	0.21
	(-0.02)	(0.09)	(0.05)	(0.02)	(0.92)	(0.05)	(2.50)	(2.00)	(0.00)	(0.10)
Small AIM	-0.11	0.13	0.13	0.08	0.98	0.03	1.00	4.32	-2.41	0.19
	(-0.02)	(0.06)	(0.02)	(0.01)	(0.95)	(0.00)	(1.14)	(2.12)	(-1.11)	(0.08)
$\chi^2(3)$	**31.06**	**129.33**	**23.42**	**16.71**	**11.96**	**203.22**	**129.33**	**94.06**	**217.37**	**17.11**
p-value	**0.000**	**0.000**	**0.000**	**0.003**	**0.003**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

Panel B: T-statistics of the Differences in Means and Wilcoxon-Mann-Whitney Tests of the Differences in Medians between the AIM and Main Market

	Net DR	TDR	LTBDR	LTMDR	$Beta_u$	EFTR	LnTA	MB	ROA	Tg
t-test	33.06	24.21	28.20	19.90	-21.40	0.12	74.85	-8.93	3.17	29.33
p- value	0.000	0.000	0.000	0.000	0.000	0.90	0.000	0.001	0.001	0.000
Wilcoxon-Mann-Whitney	31.48	30.08	34.41	32.31	19.20	8.56	63.43	3.03	38.32	29.33
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000

Panel C: Annual Distribution of Leverage

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Average of Net Debt														
FTSE 100	0.15	0.17	0.18	0.21	0.21	0.19	0.21	0.21	0.22	0.20	0.20	0.17	0.21	0.20
FTSE 250	0.11	0.10	0.13	0.14	0.15	0.16	0.20	0.20	0.18	0.16	0.15	0.17	0.16	0.19
FTSE Small Cap	0.05	0.06	0.05	0.04	0.05	0.05	0.04	0.06	0.08	0.04	0.03	0.03	0.05	0.09
FTSE Fledgling	0.10	0.09	0.07	0.09	0.05	0.07	0.04	0.03	0.01	0.01	0.03	0.00	-0.04	0.05
Large AIM	0.05	-0.01	-0.03	0.11	-0.18	-0.17	-0.02	0.00	-0.06	-0.11	-0.10	-0.11	-0.04	-0.04
Medium AIM	0.11	0.09	0.07	0.12	0.02	-0.07	-0.04	-0.05	-0.06	-0.09	-0.10	-0.12	-0.10	-0.02
Small AIM	0.21	0.13	0.14	0.19	0.03	-0.16	-0.23	-0.15	-0.17	-0.17	-0.12	-0.13	-0.14	-0.11
Average of TDR														
FTSE 100	0.24	0.25	0.25	0.29	0.28	0.26	0.27	0.27	0.29	0.28	0.28	0.27	0.28	0.28
FTSE 250	0.20	0.21	0.23	0.24	0.26	0.25	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.27
FTSE Small Cap	0.16	0.17	0.16	0.17	0.19	0.20	0.19	0.18	0.19	0.17	0.17	0.17	0.19	0.20
FTSE Fledgling	0.19	0.19	0.18	0.19	0.17	0.19	0.18	0.17	0.16	0.16	0.15	0.14	0.13	0.16
Large AIM	0.18	0.16	0.17	0.21	0.12	0.10	0.16	0.17	0.14	0.12	0.12	0.13	0.15	0.15
Medium AIM	0.22	0.21	0.20	0.23	0.19	0.15	0.16	0.15	0.14	0.13	0.13	0.11	0.12	0.15
Small AIM	0.26	0.23	0.21	0.25	0.15	0.11	0.11	0.12	0.12	0.11	0.15	0.14	0.11	0.12

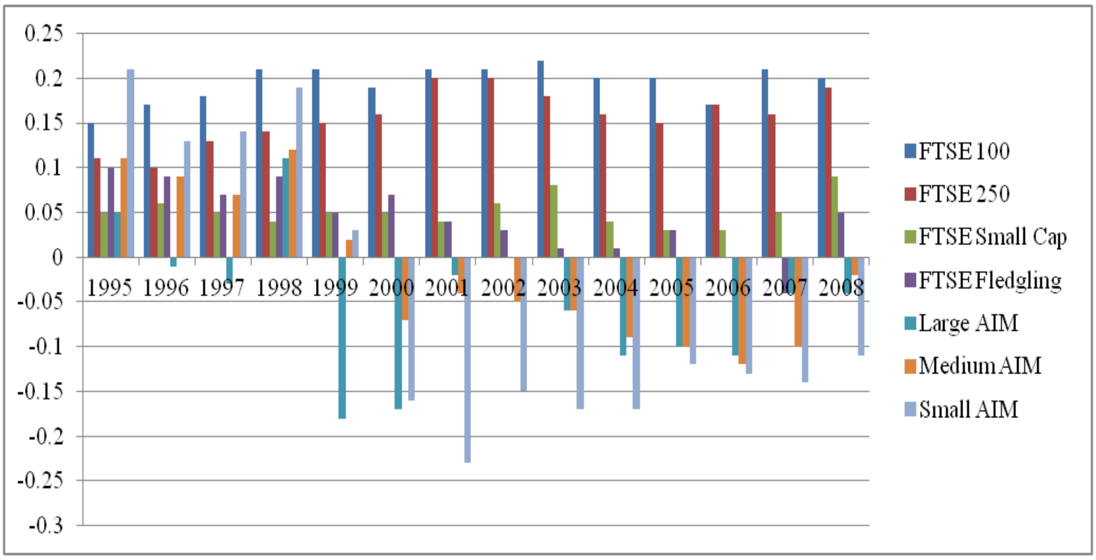
(Table 3-4, Panel C., Continued)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Average of LTBDR														
FTSE 100	0.29	0.31	0.32	0.36	0.33	0.32	0.34	0.35	0.39	0.41	0.41	0.37	0.38	0.40
FTSE 250	0.26	0.27	0.30	0.31	0.32	0.31	0.35	0.36	0.36	0.37	0.38	0.38	0.36	0.39
FTSE Small Cap	0.18	0.20	0.18	0.20	0.23	0.23	0.22	0.22	0.25	0.22	0.22	0.24	0.25	0.28
FTSE Fledgling	0.19	0.19	0.18	0.17	0.16	0.18	0.16	0.17	0.17	0.18	0.16	0.16	0.13	0.18
Large AIM	0.20	0.17	0.21	0.24	0.13	0.09	0.15	0.16	0.14	0.13	0.11	0.14	0.16	0.17
Medium AIM	0.18	0.20	0.19	0.22	0.18	0.14	0.15	0.14	0.14	0.14	0.13	0.11	0.13	0.16
Small AIM	0.25	0.17	0.17	0.20	0.13	0.08	0.09	0.12	0.12	0.11	0.15	0.14	0.11	0.11
Average of LTMDR														
FTSE 100	0.14	0.15	0.13	0.14	0.15	0.16	0.19	0.22	0.22	0.21	0.19	0.16	0.19	0.27
FTSE 250	0.14	0.14	0.15	0.18	0.18	0.18	0.22	0.27	0.22	0.21	0.19	0.17	0.19	0.34
FTSE Small Cap	0.11	0.11	0.10	0.13	0.12	0.15	0.15	0.20	0.18	0.14	0.12	0.12	0.16	0.29
FTSE Fledgling	0.13	0.12	0.12	0.15	0.13	0.16	0.17	0.19	0.14	0.13	0.13	0.12	0.13	0.23
Large AIM	0.18	0.12	0.13	0.18	0.11	0.08	0.11	0.12	0.13	0.11	0.11	0.12	0.10	0.17
Medium AIM	0.14	0.13	0.08	0.15	0.09	0.10	0.11	0.13	0.10	0.09	0.09	0.08	0.09	0.18
Small AIM	0.10	0.08	0.08	0.10	0.04	0.05	0.08	0.11	0.09	0.07	0.07	0.07	0.09	0.13

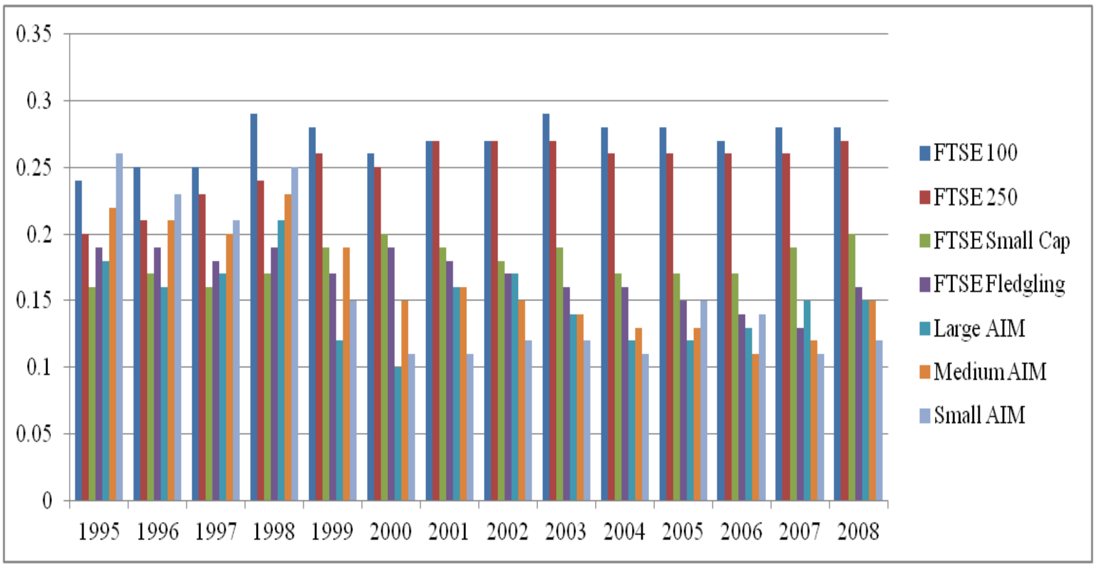
Net DR is net debt ratio defined as the difference between total debt and cash over total assets. TDR is total debt ratio calculated as total debt divided by total assets. LTBDR book value of long-term debt ratio computed as long-term debt divided by long-term debt plus book value of equity. LTMDRis market value of long-term debt ratio defined as long-term debt divided by long-term debt plus market value of equity. $Beta_u$ is the asset beta, which is computed as $\frac{B_L}{\left[1+\frac{D}{E}(1-TC)\right]}$. B_L is levered beta obtained from the London Share Price Index database, D/E is total debt divided by equity, and TC is corporation tax rate. EFTR is the effective tax rate computed as corporate tax over earnings before interest and tax. LnTA is the natural logarithm of total assets. MB is the market to book ratio computed as the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets. ROA is return on assets, which is the ratio of earnings before interest and tax over total assets. Tg is tangibly computed as tangible fixed assets over total assets. All the explanatory variables are 14-year average (1995-2008) and medians are reported in parentheses.

Figure 3-1: Annual Distribution of Different Measures of Leverage

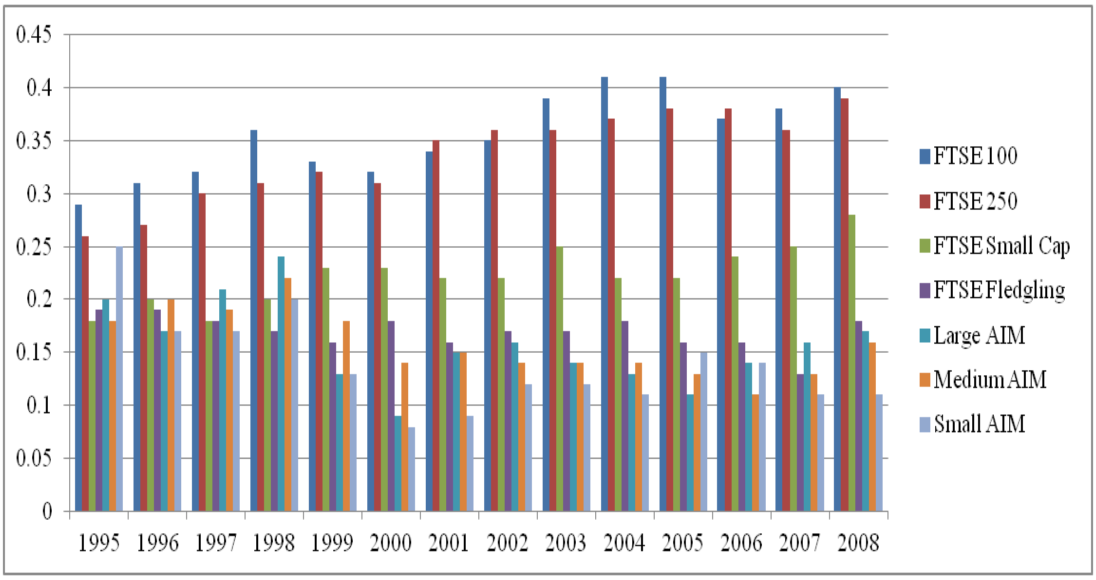
Panel A: Average of Net Debt



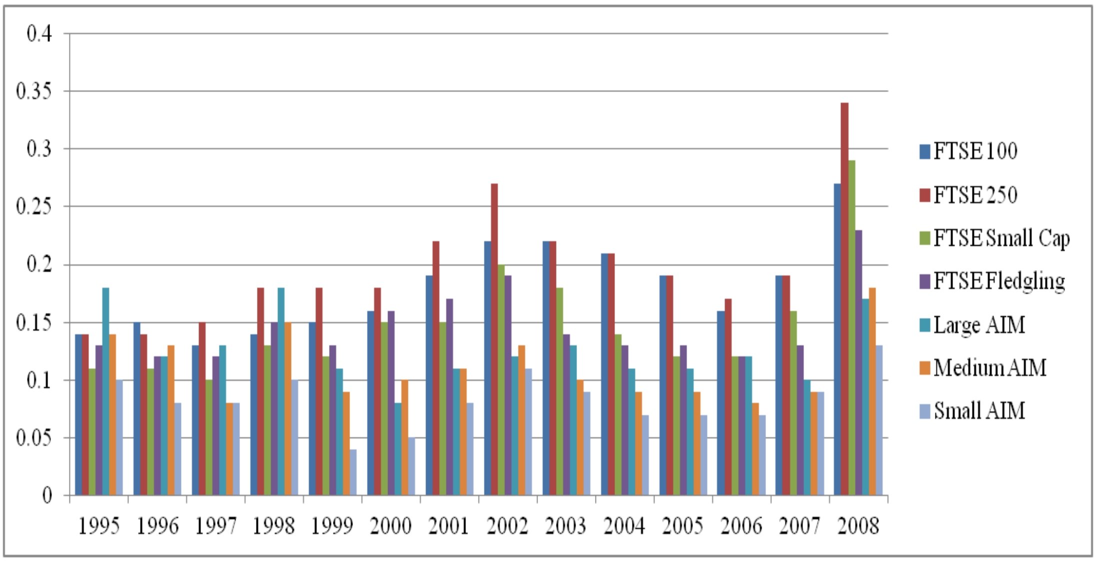
Panel B: Average of TDR



Panel C: Average of LTBDR



Panel D: Average of LTMDR



This figure shows the annual distribution of different measures of leverage between 1995 and 2008. Panel A shows Net DR, which is net debt ratio defined as the difference between total debt and cash over total assets. Panel B shows TDR, which is total debt ratio calculated as total debt divided by total assets. Panel C shows LTBDR, book value of long-term debt ratio, computed as long-term debt divided by long-term debt plus book value of equity. Panel D shows LTMDR, whichis market value of long-term debt ratio defined as long-term debt divided by the long-term debt plus market value of equity.

3.4.2 Determinants of Leverage

Taken in conjunction with the results from Panel A in Table 3-4, I find that large companies use more debt in their capital structure compared to small companies in both markets. This difference is even more considerable when I compare long-term debt ratios, which are greater for the largest companies than for the smallest firms. Accordingly, size has a positive effect on firms' leverage. When I compare the Main market to AIM, using a natural logarithm of total assets as a proxy for size, I find that large AIM companies are larger than the companies listed on FTSE Fledgling. Interestingly, large AIM companies use less debt in their capital structure than the companies listed on FTSE Fledgling. Therefore, the results suggest that, while large AIM companies are bigger than the smallest companies in the Main market (FTSE Fledgling), they do not, on average, have higher leverage. One interpretation could be that the market quotation plays an important role in the debt-equity financing, indicating that AIM companies have less access to external financing because of being more risky. In contrast, Main companies are more likely to have access to external finance by virtue of their better reputation and lower level of asymmetric information. Therefore, given the fact that Fledgling companies are smaller than large AIM companies, Fledgling companies rely more on debt. It is expected, as a consequence, that companies listed on AIM have lower leverage due to their limited ability to raise external financing. If so, there should be a negative relationship between leverage and a dummy for AIM companies. For this purpose, I use the dummy variable equal to one for firms listed on AIM to test whether those companies have lower leverage relative to the Main market companies. Table 3-5 reports the results for the ordinary least square including time dummy variables to control for time effects. It shows the relationship between different measures of debt ratio and explanatory variables as discussed in Table 3-4. However, there is multicollinearity between a dummy variable for AIM and size measured by the natural logarithm of total assets. Thus, I exclude size to control for the multicollinearity problem.

The results reported in Table 3-5 show that the total debt ratio is negatively related to a dummy variable for AIM, which suggest that the quotation of the market is significantly important in firms' capital structure. The companies listed on AIM may not have easy access to debt financing. In particular, there is a stronger negative relationship between a dummy variable of AIM and the book (market) value of long-term debt ratio showing that AIM companies have less access to long-term financing. The results for net leverage also show a significant and negative relationship between net leverage and AIM companies. Bates et al. (2009) argue that firms hold cash to diminish the risk when they have access to capital markets. Therefore, when cash is excluded, firms may be able to rely less on debt. The cash holding effect would be more important to AIM companies, which are subject to higher risk in the capital market.

Overall, when I control for market effects, I find that Main companies use more debt in their capital structure. In the next section, I aim to find the leverage determinants across firms' sizes in both markets.

Table 3-5: Least Square Dummy Variable Regression (LSDV)

	Net TDR	TDR	LTBDR	LTMDR
AIM	-0.108***	-0.042***	-0.097***	-0.047***
	(-23.27)	(-16.62)	(-27.84)	(-17.63)
$Beta_u$	-0.183***	-0.134***	-0.171***	-0.093***
	(-29.60)	(-39.25)	(-36.72)	(-25.86)
EFTR	0.007***	0.004***	0.006***	0.004***
	(5.38)	(5.06)	(5.91)	(5.23)
MB	-0.009	-0.001**	-0.004***	-0.011**
	(-1.07)	(-2.22)	(-2.56)	(-2.16)
ROA	-0.000***	-0.000**	-0.001**	-0.003
	(-4.02)	(-2.55)	(-3.22)	(-1.69)
Tg	0.344***	0.152***	0.140***	0.166***
	(39.95)	(32.05)	(21.50)	(32.19)
Median DR	0.543***	0.377***	0.412***	0.464***
	(28.00)	(24.86)	(24.75)	(27.63)
C	0.043***	0.173***	0.216***	0.105***
	(7.23)	(43.68)	(39.28)	(27.30)
Industry effect	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes
Adj R^2	0.320	0.284	0.248	0.270
F-statistic	362.608	304.980	255.633	287.197
Prob	0.000	0.000	0.000	0.000

This table reports determinant of capital structure for the whole sample including dummy variable for FTSE AIM listed companies. The dependent variable is leverage defined as follows. Net DR is net debt ratio defined as the difference between total debt and cash over total assets. TDR is total debt ratio calculated as total debt divided by total assets. LTBDR book value of long-term debt ratio computed as long-term debt divided by long-term debt plus book value of equity. LTMDRis market value of long-term debt ratio defined as long-term debt divided by the long-term debt plus market value of equity. The independent variables include: AIM is a dummy variable indicating that the firm listed on AIM. $Beta_u$ is the asset beta, which is computed as $\frac{B_L}{\left[1+\frac{D}{E}(1-TC)\right]}$. B_L is levered beta obtained from the London Share Price Index database, D/E is total debt divided by equity, and TC is corporation tax rate. EFTR is the effective tax rate computed as corporate tax over earnings before interest and tax. MB is the market to book ratio computed as the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets. ROA is return on assets measured as the ratio of earnings before interest and tax over total assets. Tg is tangibly computed as total tangible fixed assets over total assets. Median DR is the firms' industry median debt ratio at time t to control industry effects. Time effects are captured by dummy variables. (T-statistic) and ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

3.4.3 Determinants of Leverage across Firms' Size

To consider the joint effects of the variables that proxy for the costs and benefits of debt, I report the regression results in Table 3-6. The results are based on the regression estimation used by Booth et al. (2001) to find the determinants of leverage across firms' sizes. Booth et al. (2001) argue that the insufficient direct proxies for factors like industry effects or bankruptcy costs imply that the capital structure models are not fully specified. They suggest that the fixed-effects model should be used to allow the intercept to vary across firms and time. Therefore, I use the fixed-effects method to control for the effects of time as well as of omitted explanatory variables.

Panel A in Table 3-6 accounts for leverage determinants, using the net debt ratio. The results show that the major determinants of firms' net leverage are similar to those reported in previous studies using leverage of large listed companies. Net leverage of FTSE 100 and FTSE 250 as a proxy of large companies in the Main market is significantly positively related to the effective tax rate, size and tangibility, while it is considerably negatively related to growth opportunities, risk, and profitability. The results of total debt ratio, book and market values of long-term debt ratio are reported in panels B, C, and D, respectively.

Tax Effects

I use the effective tax rate as a proxy for tax effects based on the trade-off theory and predict a positive relationship between tax and leverage. The results show that in the AIM and Main market, the impact of the effective tax rate on leverage is limited to large companies. Table 3-6 reports that as is consistent with the trade-off theory, regression coefficients of the effective tax rate are significantly positively related to different measures of debt ratio for large companies. In contrast, the effective tax rate is not significant for smaller companies. The results for small companies are in line with those of Michaelas et al. (1999), using UK small companies, who find that the relationship between leverage and tax is not significant.

Small companies are those with low profitability; hence, they may have smaller tax shields than large companies. Pettit and Singer (1985) argue that small firms tend to operate in less concentrated markets, and thus face greater competitive pressures which reduce profit margins. These will result in lower tax rates. Therefore, they may not take the tax benefits of debt. Tamari (1980) and Osteryoung et al. (1995) also argue that small firms have greater variability in profits, and thus are more likely to gain or lose a large amount of funds. My findings are in line with this idea, namely, that the higher income volatility of small firms is likely to result in lower tax advantages, while large firms are those with diversified business lines and higher profit margins, and hence greater tax benefits.

Bankruptcy Costs

The trade-off theory predicts a negative relationship between bankruptcy costs and leverage. Following previous empirical studies, I use tangibility and size as proxies for bankruptcy costs. I also use the asset beta as an alternative proxy for bankruptcy costs that are not investigated in previous studies. However, the estimated beta is subject to some limitations. First, this estimation is not adjusted for changes in the business environment as well as in the industry in which the company operates. Thus, any changes in industry including innovation and new strategies, which affect companies, are missing. Second, beta will be biased for less frequently traded firms (Kapil, 2011). Therefore, asset beta may fail to incorporate the total business risk, especially for small companies.

First, the results reveal that asset beta as a proxy for risk is always negatively related to all measures of debt ratio across firms' sizes, supporting the trade-off theory. However, Table 3-6 shows that risk has a more negative effect on AIM companies than on those listed on the Main market. For example, a unit increase in asset beta decreases the total (net) value of debt ratio of the largest companies listed on AIM by 2.34 (3.48) and 2.20 (2.40) for the largest companies (FTSE 100) in the Main market. I also find a significant negative relationship between book (market) value of long-term debt and asset beta across firms' sizes. The negative relationship between risk and leverage is in line with the findings of Booth et al. (2001), but conflicts with those of Titman and Wessels (1988). The negative relationship between debt ratios and risk for small firms in my sample is not consistent with Michaelas et al. (1999), who find a positive relationship between risk and leverage for UK small and medium sized companies. The positive coefficient in their findings could be explained by Frank and Goyal (2003b, p. 23), who argue that "if high volatility means high asymmetric information then the pecking order theory would predict that high volatility is positively related to leverage". In addition, in AIM, I find that the asset beta has substantially greater economic effects on long-term debt ratios across firms' sizes, suggesting that AIM companies are subject to higher risk than those listed on the Main market.

Second, as Table 3-6 shows, the natural logarithm of assets as a proxy for size is positively related to all different measures of leverage across companies, which support the bankruptcy and agency costs principles. Greater agency and bankruptcy costs for smaller firms indicate a positive relationship between debt financing and size. This provides evidence that larger firms are likely to borrow at cheaper rates. Total (net) debt ratios of small companies listed on both the Main market and AIM are more strongly affected by total assets implying that as firms become larger they are likely to rely more on debt financing. Empirical studies, including those of Rajan and Zigales (1995), Titman and Wessels (1988) and Booth et al. (2001), report mixed results with respect to the relationship between leverage and size. Rajan and Zingales (1995) find a negative relationship between size and leverage based on market and book values in Germany, in contrast with Japan, France, the UK, the US, and Canada. Booth et al. (2001) also find that size is not a factor in India and Korea, but find a positive size effect on leverage in Malaysia, Pakistan and Turkey. A positive relationship between size and leverage is also consistent with Michaelas et al. (1999) and Lasfer (1995), who study UK small and large listed companies, respectively. However, Frank and Goyal (2007) argue that size effects are not clear. Large firms have a better reputation in capital markets and a lesser asymmetric information problem, and thus more equity financing. At the same time, the greater level of assets in large firms makes the adverse selection problem more important, with debt financing as the result.

Third, empirical studies suggest that firms with more tangible assets lose less firm value when they go into bankruptcy, and thus are less financially distressed than those companies with lower tangible assets. Therefore, it is expected that firms with higher collateral will obtain more external financing. Marsh (1982), Titman and Wessels (1988), Michaelas (1999), Frank and Goyal (2003a), and Guney et al. (2009) support the notion of a positive association between leverage and tangible fixed assets. My findings also provide strong evidence for the significant positive relationship between all measures of debt ratio and tangibility across firms' sizes in both the AIM and Main market. However, my results indicate how anxious small and medium firms are to mitigate the bankruptcy probability by using tangible assets as collateral. Table 3-6 shows that, in the Main market, the impact of collateral on total (net) debt ratio is 0.19 (0.54) for the smallest companies (FTSE Fledgling), as compared to 0.04 (0.18) for the largest companies (FTSE 100). AIM companies also exhibit a tangibility effect on total (net) debt ratio of 0.22 (0.70) for the smallest companies and 0.10 (0.39) for the largest ones, indicating that small companies are economically more strongly affected by tangible assets. The results of net debt ratio show more substantial tangibility effects on capital structure across firms' sizes. This demonstrates that companies may need more tangible assets to hedge themselves when cash holding is excluded.

In addition, in the AIM and Main market, it is apparent that, for small companies, the book (market) value of long-term debt is more strongly affected by tangible assets than that of the largest companies. These findings are in line with those of Altman (1984), Tamari (1980), and Osteryoung et al. (1995). They argue that bankruptcy costs are highly relevant to small firms, which show a higher probability of failure because of higher economic risk, lower degree of diversification, and higher volatility of sales from competitive markets. Small firms would get more access to debt financing and, especially, long-term debt financing if they were able to insure lenders. I also support Berger and Udell (2006), who argue that asset-based lending has a significant effect on small and medium sized companies in the UK.

Agency and Asymmetric Information Costs

According to Jensen and Meckling (1976), the agency problem between managers and debt-holders is a distinctive feature of firms with fewer growth opportunities. The underinvestment and asset substitution problems can explain the negative relationship between growth opportunities and debt, based on the trade-off theory.

Moreover, previous studies (e.g., Rajan and Zingales, 1995; Booth et al., 2001; Ozkan, 2001, Fama and French, 2002; and Guney et al., 2009) use the market-to-book ratio as a proxy for growth opportunities reporting the negative effect. In contrast, the pecking order theory argues that firms have greater debt issued when they pursue higher growth opportunities, and hence a positive association is predicted. In the Main market and AIM, the regression coefficients on the market-to-book ratio are decidedly negative for all different measures of leverage for large companies, as is consistent with the trade-off theory. But the results for smaller companies in both markets are consistent with the pecking order theory rather than with the trade-off theory. Small companies are financially constrained, and hence they use debt to cover their growth opportunities.

Furthermore, the agency costs involved in the conflict between managers and shareholders (free cash flow problem) can be mitigated by debt financing. Debt financing commits firms to paying what they owe, and thus a positive relationship between profitability and leverage is predicted. Alternatively, Myers (1984) argues that, in accordance with the asymmetric information problem, managers are assumed to have prior information while outside investors suffer from insufficient information about firms' characteristics. Therefore, firms prefer internal finance to external finance for the purpose of mitigating this asymmetric information problem A preference for financing first with internal funds indicates that leverage is negatively related to profitability as a proxy for internal funds. In keeping with the pecking order theory, Table 3-6 reports that profitability is inversely related to the four measures of debt ratio across firms' sizes, which supports the notion of asymmetric information.

The results show that, in the Main market, a unit increase in profitability decreases total (net) value of debt ratio by 0.08 (0.07) for the largest companies (FTSE100) and 0.01 (0.04) for the smallest companies (FTSE Fledgling). Consistently, in AIM, the economic effects of profitability on small companies are smaller than those on large ones. These findings are also consistent with book and market values of long-term debt across firms' sizes. Therefore, there is a clear pattern with in which the economic effects of profitability on leverage are significantly more important to large companies, in line with Rajan and Zingales (1995). They argue that profitability for small firms may be a proxy for both internal funds and investment opportunities, which have conflicting effects on leverage. My results suggest that small firms with greater profitability tend to have more investment opportunities as well as more substantial internal funds. They use more debt to cover their investment opportunities, given the fact that they prefer to use internal financing because of having more profitability, and thus the net effect of profitability on leverage is small for those companies.

A negative relationship between leverage and profitability is supported by many empirical studies (e.g., Rajan and Zingales, 1995; Panno, 2003; Michaelas et al., 1999; Ozkan, 2001; and Guney et al., 2009). The negative relationship between leverage and profitability is also consistent with Beattie et al. (2006) who surveyed large UK companies. Accordingly, the evidence provides strong support for the pecking order theory in preference to the trade-off theory.

In sum, the determinants of leverage appear to be firm size specific. In particular, while for large firms, leverage is positively related to the effective tax rates, in line with the predictions of the trade-off theory and independently of the market of quotation, for small firms, leverage is independent of the firm's tax position, suggesting that the income volatility of small companies prevents them from taking the benefits of interest tax shields. Furthermore, consistent with bankruptcy costs, size and tangibility are significantly positively related to leverage across firms' sizes in both markets. In addition, all different measures of debt ratios are inversely related to risk in line with the trade-off theory. However, the sensitivity of leverage determinants for small companies is significantly different from than those of large companies. For example, small firms are more sensitive to tangibility than large companies. The possession of smaller tangible assets means that lenders find it more difficulties to assess the risk of those companies, and hence they require greater collateral. With respect to the agency conflict between shareholders and debt-holders, there is a significant negative relationship between leverage and growth opportunities in large companies. In contrast, leverage of small companies is positively related to growth opportunities, and that difference is highly significant, as it suggests that small companies are financially constrained. Accordingly, in keeping with the pecking order theory, they are likely to rely on debt if they should need external financing.

Table 3-6: Estimated Fixed Effects Least Squares

	Main Market				AIM		
Panel A: Net DR	**FTSE 100**	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
$Beta_u$	-2.401***	-0.945***	-2.572***	-2.018***	-3.485***	-2.822***	-3.532***
	(-14.10)	(-11.28)	(-24.09)	(-30.52)	(-10.86)	(-17.41)	(-8.48)
EFTR	0.028***	0.005***	0.003	0.000	0.016*	0.003	0.006
	(5.33)	(2.96)	(1.65)	(0.18)	(1.69)	(0.80)	(1.19)
LnTA	0.009**	0.079***	0.002	0.075***	0.050***	0.058***	0.079***
	(2.25)	(11.53)	(1.12)	(14.48)	(3.68)	(8.97)	(6.89)
MB	-0.006***	-0.007***	0.000	0.004***	-0.000**	0.029	0.001***
	(-2.30)	(-4.96)	(1.54)	(3.40)	(-2.38)	(1.55)	(3.57)
ROA	-0.078*	-0.135***	-0.054***	-0.043***	0.027	-0.028***	-0.010**
	(-1.72)	(-5.40)	(-4.19)	(-5.47)	(1.14)	(-4.68)	(-2.08)
Tg	0.185***	0.375***	0.350***	0.545***	0.398***	0.550***	0.699***
	(4.48)	(10.22)	(9.75)	(20.09)	(7.36)	(15.04)	(10.44)
C	1.232***	0.090	1.573***	0.891***	1.654***	1.275***	1.692***
	(10.54)	(1.24)	(22.67)	(17.74)	(8.20)	(13.30)	(6.96)
Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.769	0.795	0.812	0.808	0.789	0.741	0.763

(Table 3-6 continued)

	Main Market				AIM		
Panel B: TDR	**FTSE 100**	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
$Beta_u$	-2.206***	-1.023***	-2.116***	-2.550***	-2.345***	-2.003***	-2.166***
	(-15.18)	(-15.98)	(-34.08)	(-40.98)	(-13.66)	(-24.56)	(-12.33)
EFTR	0.014***	0.003**	0.001	0.000	0.007**	0.004*	0.001
	(3.00)	(2.33)	(0.44)	(0.16)	(2.31)	(1.93)	(0.64)
LnTA	0.006***	0.054***	0.001	0.031***	0.021***	0.018***	0.081***
	(8.89)	(10.44)	(1.54)	(10.36)	(2.92)	(5.51)	(3.78)
MB	-0.004*	-0.002*	0.000	0.005***	-0.000**	0.003	0.000***
	(-1.85)	(-1.89)	(-0.48)	(7.91)	(-2.34)	(0.28)	(3.33)
ROA	-0.087**	-0.107***	-0.029***	-0.016***	-0.025**	-0.015***	-0.000
	(-2.26)	(-5.58)	(-3.78)	(-3.60)	(-1.99)	(-4.93)	(-0.95)
Tg	0.047	0.081***	0.016	0.191***	0.100***	0.188***	0.227***
	(1.33)	(2.88)	(0.78)	(13.30)	(3.44)	(10.20)	(8.03)
C	1.400***	0.486***	1.517***	0.978***	1.386***	1.189***	1.314***
	(14.04)	(8.78)	(37.60)	(34.06)	(12.85)	(24.64)	(12.82)
Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.758	0.777	0.813	0.808	0.740	0.740	0.7773

(Table 3-6 continued)

	Main Market				AIM		
Panel C: LTBDR	**FTSE 100**	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
$Beta_u$	-3.214***	-1.391***	-2.731***	-1.452***	-3.428***	-1.935***	-1.912***
	(-12.49)	(-12.52)	(-23.78)	(-22.78)	(-9.98)	(-16.31)	(-8.30)
EFTR	0.022***	0.005**	0.002	0.000	0.012*	0.007**	0.004
	(2.72)	(2.17)	(0.73)	(0.19)	(1.65)	(2.40)	(1.60)
LnTA	0.030***	0.060***	0.001	0.039***	0.022**	0.017***	0.042**
	(2.61)	(6.61)	(0.88)	(7.78)	(2.15)	(3.70)	(1.96)
MB	-0.001**	-0.002***	0.000***	0.007***	-0.000***	0.004	0.000*
	(-2.16)	(-3.22)	(2.88)	(6.52)	(-3.01)	(0.29)	(1.66)
ROA	-0.098	-0.125***	-0.047***	-0.017**	-0.035**	-0.021***	-0.000
	(-1.43)	(-3.77)	(-3.36)	(-2.26)	(-2.00)	(-4.67)	(-0.29)
Tg	0.060***	0.103**	0.037	0.267***	0.117***	0.255***	0.226***
	(2.96)	(2.12)	(0.96)	(10.23)	(2.86)	(9.52)	(6.11)
C	2.180***	0.752***	1.965***	0.856***	1.432***	1.136***	1.164***
	(12.35)	(7.82)	(26.32)	(17.70)	(9.36)	(16.19)	(8.65)
Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.660	0.695	0.694	0.632	0.652	0.605	0.683

(Table 3-6 continued)

	Main Market				AIM M		
Panel D: LTMDR	**FTSE 100**	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
$Beta_u$	-1.162***	-0.839***	-1.580***	-1.033***	-1.311***	-1.207***	-1.323***
	(-7.95)	(-11.01)	(-17.05)	(-18.65)	(-7.27)	(-13.87)	(-6.70)
EFTR	0.017***	0.005***	0.000	0.000	0.012**	0.009***	0.004
	(3.66)	(2.94)	(0.22)	(0.33)	(2.54)	(4.26)	(1.61)
LnTA	0.022***	0.080***	0.004***	0.046***	0.039***	0.047***	0.045***
	(3.35)	(12.88)	(3.71)	(10.66)	(6.00)	(13.53)	(5.59)
MB	-0.011***	-0.001	-0.000***	-0.001	-0.000***	-0.004	0.000**
	(-4.82)	(-0.83)	(-2.68)	(-0.95)	(-2.91)	(-0.41)	(2.06)
ROA	-0.221***	-0.179***	-0.051***	-0.011*	-0.019*	-0.009***	-0.000**
	(-5.69)	(-7.87)	(-4.54)	(-1.76)	(-1.70)	(-2.66)	(-2.10)
Tg	0.016***	0.005	0.051*	0.213***	0.072***	0.157***	0.189***
	(3.46)	(0.14)***	(1.66)	(9.37)	(2.81)	(7.98)	(5.97)
C	0.591***	0.186	1.158***	0.566***	0.556***	0.637***	0.807***
	(5.89)	(2.82)	(19.23)	(13.46)	(5.78)	(12.39)	(7.01)
Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.751	0.746	0.683	0.654	0.692	0.704	0.765

This table reports the determinants of capital structure across firms' sizes. Panel A reports the fixed effects model for dependent variable as Net DR, net debt ratio, defined as the difference between total debt and cash over total assets. Panel B reports the results for TDR, total debt ratio, computed as total debt over total assets. Panel C reports the results of the regression for LTBDR, book value of long-term debt, whichis long-term debt divided by long-term debt plus book value of equity. Panel D reports the results for LTMDR, market value of long-term debt, computed as long-term debt divided by long-term debt plus market value of equity. $Beta_u$ is the asset beta, which is computed as $\frac{B_L}{\left[1+\frac{D}{E}(1-TC)\right]}$. B_L is levered beta obtained from the London Share Price Index database, D/E is total debt divided by equity, and TC is corporation tax rate. EFTR is the effective tax rate computed as corporate tax over earnings before interest and tax. LnTA is the natural logarithm of total assets. MB is the market to book ratio computed as the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets. ROA is return on assets measured as the ratio of earnings before interest and tax over total assets. Tg is tangibly computed as total tangible fixed assets over total assets. (T-statistic) and ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

3.4.4 Size Effect on the Speed of Adjustment

In this section, I study the size effect on the speed of adjustment using the partial adjustment model of Flannery and Rangan (2006). I include all the explanatory variables used in their model; accordingly, I use non-debt tax shields instead of the effective tax rate and include R&D expenses in addition to the other variables used in previous sections. I attempt to ascertain whether the different characteristics of small firms are likely to result in different speeds of adjustment towards the target leverage. Some previous studies do not consider small companies because those companies are involved in higher transaction costs. However, my sample includes all companies listed on the AIM and Main market.

For the purpose of this section, I apply a dynamic GMM-system method. Although previous literature uses the GMM method of the first differences (GMM-DIF), recent studies argue that the GMM-DIF estimator has a problem with weak instruments (e.g., Antoniou et al., 2008). The GMM-system method considers lagged repressors in both levels and first differences to reduce the finite sample bias substantially by exploiting the additional moment conditions (Blundell and Bond, 1998). Therefore, both level and first differenced lagged repressors are used as instruments in the two-step GMM system. Table 3-7 report the results.

Table 3-7 also presents J-statistics and instrument ranks. The J-statistic is simply the Sargan statistic (value of the GMM objective function at estimated parameters). The reported instrument ranks are greater than the number of estimated coefficients, which includes period dummy variables. I construct the Sargan test to test the null hypothesis of over-identifying restrictions. Actually, the hypothesis being tested concerns whether the instrumental variables are uncorrelated to the set of residuals. The p-values show that the tests of over-identifying restrictions are not rejected; hence the instruments are valid by this criterion. The results, therefore, indicate that GMM estimation can be applied to this study.

Panel B in Table 3-7 shows that, according to the coefficients estimated on the total debt ratio in the Main market, the speed of adjustment for the largest companies is $\lambda=1-0.647=0.353$, as compared to that of the smallest companies, $\lambda=1-0.395=0.605$, thus economically significant. Thus, large and small companies eliminate their deviation from their optimal leverage by about 35% and 60%, respectively, each year. This indicates a faster adjustment speed for small companies. My results are consistent with those of Flannery and Rangan (2006), who find that large companies move towards the target less rapidly than small companies. They argue that large companies rely more on public debt than private funding. Public funding is more expensive, and thus large companies tend to have greater adjusting costs. Moreover, large companies may have lower costs when they are away from their target leverage due to the lower volatility of their cash flows. These factors might result in lower speeds of adjustment for large companies. Ozkan (2001) also argues that the speed of adjustment depends on the cost of being away from the target and the cost of adjustment. If the latter is more relevant, firms are expected to adjust at a slower speed than companies with more significant costs of being away from their target. I show that, although the access to external financing is limited for small companies, the cost of being away from their target exceeds the cost of adjustment. As a result, they adjust faster than large companies.

In addition, adjustment speeds decrease across firms' sizes when I use the book (market) value of long-term debt ratio. Panel C reports that, in the Main market, the adjustment speed of the largest companies is $\lambda=1-0.695=0.305$ compared to that of the smallest firms: $\lambda=1-0.463=0.537$. The respective results when I use the market value of leverage in Panel D are 0.350 and 0.502: The results of long-term debt ratios reveal the lower adjustment speed across firms' sizes. Long-term debt is more expensive to adjust than short-term debt, resulting in a lower adjustment speed. However, large companies still adjust less rapidly than small companies, suggesting that large companies rely more on public debt and, more especially, public long-term debt, which is more expensive than the private financing used by small companies.

Interestingly, with respect to results for AIM, I find that small companies listed on AIM adjust less rapidly than do large AIM companies. According to Panel A in Table 3-7, speeds of adjustment for large and small AIM companies are 0.564 ($\lambda=1-0.436$) and 0.537 ($\lambda=1-0.463$), respectively. These adjustment speeds indicate that small companies listed on AIM adjust to their target level within two years, given a constant speed of adjustment. However, large AIM companies adjust in less than two years. These results are also consistent with the book (market) value of long-term debt ratio. It is possible that the financial constraints of AIM companies will result in more substantial transaction costs for small companies, drawing them away from their target. Following the arguments of Ozkan (2001), my results suggest that for small AIM companies, it is more costly to adjust towards their target leverage due to limited access to external financing. In particular, the cost of being away from their target is less significant than the cost of moving towards their target. As a result, they adjust at a slower speed than large AIM companies which are likely to have a greater access to external financing.

Overall, the results support the dynamic model of capital structure decisions across firms' sizes in the AIM and Main market. However, the speed of adjustment across firms' sizes depends on the market in which they are listed. The findings suggest that, in the Main market, small companies adjust more rapidly than large ones; whereas, in AIM, small companies adjust less rapidly than large companies.

In addition to the size effect, recent theoretical studies (e.g., Hackbarth et al., 2006) show that macroeconomic conditions have significant effects on the speed of adjustment. They suggest that the speed of adjustment should be higher in boom periods than in recessions. Previous empirical studies provide support to these arguments (see Drobetz and Wanzenried, 2006 and Cook and Tang, 2010). I control for time effects in the GMM system by adding time dummy variables. In both markets, the results for the impact of size on the speed of adjustment are consistent when I use different measures of leverage after controlling for the time effect.

Table 3-7: Regression Results of the Partial Adjustment Model

	Main Market				AIM		
Panel A: Net DR$_{t+1}$	**FTSE 100**	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
Net DR$_t$ (TD-Cash/TA$_t$)	0.707***	0.601***	0.580***	0.419***	0.448***	0.464***	0.503***
	(19.95)	(5.69)	(11.02)	(17.09)	(4.09)	(8.14)	(16.44)
LnTA$_t$	0.020***	0.109***	0.410***	0.119***	0.023***	0.027**	0.114***
	(3.13)	(8.56)	(5.80)	(8.32)	(2.92)	(2.50)	(10.57)
MB$_t$	-0.038***	-0.017**	-0.001**	0.003*	-0.003***	0.002***	0.011***
	(-10.95)	(-2.37)	(-2.52)	(1.80)	(-9.36)	(2.60)	(6.38)
NDTS$_t$	-1.298***	-0.423*	-0.144	-0.617**	1.047***	-0.029	-0.146***
	(-7.18)	(-1.90)	(-0.84)	(-2.03)	(3.29)	(-0.10)	(-11.38)
ROA$_t$	0.144***	0.050*	0.080***	0.013*	0.110*	0.029**	-0.005***
	(8.79)	(1.71)	(3.47)	(1.74)	(1.92)	(2.45)	(-11.19)
RD$_t$	-0.001***	-0.001*	-0.000*	-0.243***	0.001***	-0.000	-0.000
	(-2.69)	(-1.74)	(-1.70)	(-4.57)	(2.98)	(-0.21)	(-1.04)
Tg$_t$	0.016**	0.087*	0.269***	0.157**	0.223***	0.208***	0.421***
	(2.51)	(1.69)	(4.22)	(2.49)	(9.13)	(3.45)	(7.01)
DRD$_t$	-0.019*	-0.040*	-0.017	0.330***	0.053	0.020	0.058***
	(-1.95)	(-1.69)	(-1.20)	(3.43)	(1.50)	(0.94)	(2.78)
Ind. Median$_t$	0.128***	-0.119*	0.119	-0.079	-0.099	0.051	-0.247**
	(3.19)	(-1.86)	(1.38)	(-1.37)	(-0.49)	(0.50)	(-2.32)
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument rank	89	93	92	93	70	90	64

J-statistic	65.910	86.513	73.762	81.616	48.261	66.342	53.258
p-value	0.410	0.134	0.420	0.2330	0.543	0.602	0.160

(Table 3-7 continued)

	Main Market				AIM		
Panel B: TDR_{t+1}	**FTSE 100**	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
TD/TA_t	0.647***	0.556***	0.521***	0.395***	0.436***	0.447***	0.463***
	(26.13)	(20.05)	(13.49)	(11.73)	(64.63)	(12.77)	(45.51)
$LnTA_t$	0.016***	0.097**	0.002*	0.068***	0.004**	0.014**	0.052***
	(3.61)	(2.02)	(1.91)	(8.26)	(2.48)	(2.10)	(21.73)
MB_t	-0.024***	-0.001***	-0.002**	0.001**	-0.000	0.000	0.002***
	(-11.60)	(-5.40)	(-2.22)	(2.47)	(-0.69)	(0.34)	(3.02)
$NDTS_t$	-1.017***	-0.275*	-0.088	-0.127	0.108	0.072	-0.034***
	(-9.38)	(-1.81)	(-0.59)	(-0.79)	(0.93)	(0.50)	(-2.89)
ROA_t	0.050***	0.025**	0.095***	0.007**	0.028	0.017***	-0.001*
	(5.49)	(2.03)	(5.39)	(1.97)	(1.46)	(4.36)	(-1.80)
RD_t	-0.001***	-0.001***	-0.000***	-0.046	-0.000**	-0.000	-0.000**
	(-2.71)	(-3.00)	(-4.40)	(-1.52)	(-2.18)	(-0.94)	(-2.22)
Tg_t	0.053***	0.089*	0.009**	0.102***	0.058***	0.300	0.108***
	(2.63)	(1.77)	(2.23)	(2.74)	(4.44)	(0.90)	(5.98)
$D.\ RD_t$	-0.004	-0.006**	-0.018*	0.016	0.063***	0.015	0.038***
	(-0.70)	(-2.03)	(-1.80)	(0.62)	(5.23)	(1.43)	(2.95)
$Ind.\ Median_t$	-0.052***	-0.042*	-0.019	-0.045	-0.322***	0.080*	-0.113***

	(-2.97)	(-1.80)	(-0.33)	(-1.53)	(-6.53)	(1.69)	(-3.16)
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument rank	89	93	92	93	70	90	64
J-statistic	62.219	85.281	70.724	82.647	53.589	72.966	46.710
p-value	0.854	0.154	0.520	0.206	0.338	0.380	0.361

(Table 3-7 continued)

	Main Market				**AIM**		
Panel C: $LTBDR_{t+1}$	**FTSE 100**	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
$LTDR_t$	0.695***	0.641***	0.615***	0.463***	0.497***	0.514***	0.596***
	(16.17)	(5.30)	(15.66)	(46.56)	(10.41)	(15.00)	(25.78)
$LnTA_t$	0.003**	0.062***	0.094	0.050***	0.005***	0.004***	0.023***
	(2.38)	(3.78)	(1.32)	(10.46)	(3.80)	(3.43)	(8.82)
MB_t	-0.009***	-0.007**	-0.005*	-0.004**	0.002***	0.003***	-0.002***
	(-3.60)	(-1.98)	(-1.87)	(-2.28)	(5.06)	(2.80)	(-2.90)
$NDTS_t$	-1.526***	-0.308	-0.345*	-0.169**	1.367***	-0.466***	-0.028***
	(-5.90)	(-0.98)	(-1.80)	(-2.21)	(6.79)	(-3.61)	(-3.23)
ROA_t	0.004	0.025	0.048	0.014**	0.012	0.035***	-0.001
	(0.16)	(0.82)	(1.03)	(2.06)	(0.63)	(6.61)	(-1.62)
RD_t	-0.001**	-0.001***	-0.000*	-0.008***	-0.000*	-0.000	-0.001**
	(-2.34)	(-3.98)	(-1.67)	(-2.95)	(-1.77)	(-1.13)	(-1.89)
Tg_t	0.274***	0.073**	0.061*	0.084***	0.269***	0.001***	0.001***
	(9.14)	(2.11)	(1.90)	(4.71)	(9.71)	(3.30)	(3.06)

D. RD_t	-0.001	-0.056*	-0.070***	-0.051***	0.016	-0.000	0.067***
	(-0.09)	(-1.89)	(-3.85)	(-4.99)	(1.14)	(-0.10)	(11.06)
Ind. $Median_t$	0.013	0.099	-0.014	-0.072***	-0.257***	-0.008	0.477***
	(0.30)	(0.96)	(-0.17)	(-8.49)	(-2.92)	(-0.42)	(10.83)
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument rank	89	93	92	93	70	90	64
J-statistic	72.303	71.283	82.617	146.536	48.745	89.483	46.251
p-value	0.223	0.535	0.184	0.133	0.523	0.184	0.380

(Table 3-7 continued)

	Main Market				**AIM**		
Panel D: $LTBMR_{t+1}$	**FTSE 100**	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
$LTMR_t$	0.650***	0.637***	0.591***	0.498***	0.397***	0.454***	0.574***
	(10.37)	(8.05)	(9.23)	(17.61)	(16.35)	(10.13)	(30.73)
$LnTA_t$	0.012***	0.093***	0.087*	0.064***	0.011**	0.022***	0.018***
	(2.60)	(7.05)	(1.89)	(6.99)	(1.98)	(2.80)	(10.94)
MB_t	-0.011***	-0.002***	-0.002*	-0.002	0.000*	0.003**	-0.001***
	(-3.97)	(-2.58)	(-1.92)	(-1.09)	(1.86)	(2.44)	(-3.05)
$NDTS_t$	-0.464***	-0.062	-0.138	-0.277*	-0.560***	-0.222	-0.008**
	(-2.92)	(-0.22)	(-0.81)	(-1.88)	(-4.90)	(-1.66)	(-2.08)
ROA_t	0.060***	0.071**	0.092***	-0.002	0.017	0.003	-0.001***
	(4.91)	(2.38)	(3.96)	(-0.19)	(0.73)	(0.59)	(-3.31)
RD_t	-0.001***	-0.001***	-0.000	-0.003***	-0.000*	-0.000	-0.000***

	(-5.35)	(-3.92)	(-1.32)	(-3.12)	(-1.78)	(-0.57)	(-6.61)
Tg_t	0.113***	0.044***	0.040***	0.048**	0.011	0.055	0.123***
	(5.06)	(2.84)	(3.86)	(2.04)	(0.62)	(1.52)	(9.98)
D. RD_t	-0.029***	-0.041**	-0.027**	0.021	0.008	-0.000	-0.033***
	(-3.18)	(-2.22)	(-2.28)	(1.18)	(0.76)	(-0.57)	(-7.06)
Ind. $Median_t$	0.008	0.013	0.065	-0.059	0.132**	0.013	-0.185***
	(0.38)	(0.15)	(1.03)	(-1.35)	(2.39)	(-0.16)	(-5.09)
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument rank	89	93	92	93	70	90	64
J-statistic	71.412	86.893	91.957	81.633	60.676	85.579	36.869
p-value	0.245	0.127	0.198	0.228	0.143	0.128	0.768

This table reports adjustment speeds across firms' sizes based on the GMM system including fixed effects and year dummies. The first lag of all explanatory variables and the second lag of dependent variable are used as instruments. My sample spans from 1995 to 2008 and t-statistics are reported in the parentheses. Panel A reports the fixed effects model for the dependent variable as Net DR_{t+1}, net debt ratio, defined as the difference between total debt and cash over total assets at t+1. Panel B reports results for TDR_{t+1}, total debt ratio, which is total debt over total assets at t+1. Panel C reports the results of regression for $LTBDR_{t+1}$, book value of long-term debt ratio, computed as long-term debt divided by long-term debt plus book value of equity at t+1. Panel D reports the regression results for LTMDR, market value of long-term debt ratio, which is the long-term debt divided by long-term debt plus market value of equity at t+1. LnTA is the natural logarithm of total assets. MB is market to book ratio computed as the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets. NDTS is the ratio of depreciation over total assets. ROA is return on assets measured as the ratio of earnings before interest and tax over total assets. RD is R&D expenses as a proportion of total assets. Tg is tangibly computed as total tangible fixed assets over total assets. DRD is dummy variable indicating that the firm did not report R&D expenses. Ind. Median is median debt ratio of firm i's Fama and French (2002) industry classification (T-statistic) and ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively. J-statistic is also reported, which is simply the Sargan statistic (value of the GMM objective function at estimated parameters).

3.5 Conclusions

This chapter presents empirical results on the capital structure of UK listed firms in the AIM and Main market including small, medium, and large firms, based on a large panel of data for the period 1995-2008. I attempt to examine the factors that affect the capital structure across firms' sizes and to apply a dynamic framework of capital structure to identify the adjustment speed across firms' sizes. The analysis of 2,894 companies demonstrates that the quotation of the market is significantly important to firms' capital structure. The results show that companies listed on AIM have lower leverage, which suggests that those firms have limited ability to use debt financing. Moreover, I find that AIM companies are subject to higher business risk, as measured by asset beta, and thus tend to have lower leverage than Main market companies. Therefore, I suggest that market policy should place greater emphasis on reducing business risk, in order to facilitate the raising of debt capital.

The results of leverage determinants show that the interpretation of tax effects based on the trade-off theory does not hold for all observed companies. In both markets, for small companies the impact of the effective tax rate is not significant, whereas, for large companies, it is positive and highly significant. Consistent with the trade-off theory, I find a strong and negative relationship between debt ratios and the market-to-book ratio as a proxy for growth opportunities across large companies listed on both markets. The results are in line with previous studies using large companies (e.g., Rajan and Zingales, 1995, using G-7 countries including the UK, and Lasfer, 1995 using the UK data). However, I do not find a negative effect of growth opportunities for small companies, in line with studies of Michaelas et al. (1999) and Jordan et al. (1998), who find that leverage is positively related to growth opportunities, using UK small and medium sized companies. They argue that such companies are financially constrained and therefore use more debt.

In addition, all observed companies are considerably affected by risk, supporting the bankruptcy hypothesis. However, small and large companies listed on AIM are more negatively affected by asset beta as a proxy for risk, suggesting that small companies face a greater probability of economic risk because of their lower degree of diversification and higher volatility of sales from competitive markets. The results also support the role of asset tangibility across firms' sizes, as consistent with the trade-off theory, bankruptcy hypothesis. The results for the net debt ratio show more substantial tangibility effects on capital structure across firms' sizes. This indicates that companies may need more tangible assets to use for hedging purposes when cash holding is excluded. The results also indicate how anxious small and medium firms are to mitigate the bankruptcy probability by using tangible assets as collateral. In both markets, the economic impact of the collateral on total (net) debt ratio for the smallest companies is considerably greater than that for the largest companies.

Consistent with the pecking order theory, I find that profitability is inversely related to different measures of leverage for small, medium, and large companies. The findings show that the effect of earnings on leverage is significantly more important for large companies in both markets, in line with Rajan and Zingales (1995). They argue that profitability for small firms may be a proxy for both internal funding and investment opportunities, which have conflicting effects on leverage. On the basis of this premise, I find smaller effects of profitability on leverage for small companies.

The overall results show that, in both markets, small companies have lower leverage than large companies. Small firms are less likely to benefit from tax shields since their high income volatility would offset any potential for tax shield benefits. In contrast large firms have a higher corporate tax deduction through interest payments, because of their diversified business lines and, hence, their higher profit margins result in greater tax advantages. In addition, small companies are likely to be riskier and have high growth, increasing their agency conflicts in the form of underinvestment and asset substitution problems. Therefore, for small companies, the costs of debt are likely to be higher than the benefit of debt, suggesting lower leverage. Moreover, small companies tend to be financially constrained and thus have higher external financing costs, suggesting that these costs of external financing prevent small firms from relying more on debt financing. These arguments suggest that small firms are likely to have relatively low leverage.

Finally, the partial adjustment model based on the GMM system is used to investigate whether firms deviate from their target capital structure. In support of the dynamic trade-off theory, firms do have target leverage ratios, but the adjustment speed varies significantly across firms' sizes. The analysis of the firm's size effect on the adjustment also shows that in the Main market, small firms adjust towards their target leverage more rapidly than large companies. The opposite is true in AIM, which presents a lower speed of adjustment for small companies. It is possible that the financing difficulties of AIM companies result in more substantial transaction costs and, therefore, they tend to eliminate their deviation at a lower speed.

In sum, this chapter contributes to the growing literature on the capital structure decision by providing empirical analyses of the dynamic model of trade-off theory across firms' sizes in two different markets in the UK, the AIM and Main market. In future, I will focus more on explaining the significant differences in the speed of adjustment in both markets and assess how, through their life cycle, companies change their debt maturity and their speed of adjustment.

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Chapter 4 - Size, Market Quotation, and Debt Maturity Structure[17]

Abstract

I analyse the impact of size and market regulation on the debt maturity structure of 2,894 firms between 1995 and 2008. The results provide support to the signalling, agency, and asset maturity hypotheses. I find that companies have a target maturity. However, the speed of adjustment for small and large companies depends on the market in which they are listed, as in the regulated market small companies adjust more rapidly, in contrast to the unregulated market. I also show that the maturity structure increases after the IPO for large firms but decreases for small firms.

Keywords: Small firms; AIM; London Stock Exchange; Debt maturity; Taxation; Agency Costs

JEL classification: G32

[17] This paper was presented at Cass Business School. I thank seminar participants at Cass Business School for their useful comments. Moreover, I will present this paper in the Financial Management Association (FMA) conference in October. All remaining errors are my own responsibility.

4.1 Introduction

Previous studies identified four main theories to explain how firms choose between short-term and long-term debt in imperfect capital markets: agency costs, signalling, tax, and matching hypotheses. Within the agency costs theory, firms are expected to use more short-term debt to mitigate their underinvestment problem (Myers, 1977) and the asset substitution problem as short-term debt is less sensitive to shift in risk of the firm's underlying assets (Barnea et al., 1980). Similarly, the signalling theory also suggests that firms should rely on short-term debt to signal their quality in the presence of transaction costs (Flannery, 1986). However, under the tax hypothesis, firms should prefer to use long-term debt in the presence of a non-monotonic structure of interest rates, when the term structure of interest rates is upward sloping (Brick and Ravid, 1985), Finally, the matching principle argues that debt maturity would be matched by life maturity of assets as when debt has a longer maturity, the firm's assets should generate enough cash flow in the future (Morris, 1976).

However, the empirical evidence provided to-date is mixed. For example, Barclay and Smith (1995) find a positive relationship between debt maturity and size as a proxy for the agency hypothesis regarding underinvestment problem, in contrast with Guedes and Opler (1996). Similarly, Antoniou et al. (2006) find positive and significant effects of term structure of interest rates on debt maturity in the UK, in line with the tax predictions, but inconsistent with Barclay and Smith (1995), Stohs and Mauer (1996), Guedes and Opler (1996), Scherr and Hulburt (2001), and Ozkan (2002). These controversial results beg the following questions: Do firms of different size have different drivers for their debt maturity? Is the firm's debt maturity dependent on the market in which it is quoted? Does maturity structure change through the firm's life cycle? To answer these questions, I use a sample of 2,894 firms from 1995 to 2008, resulting in about 14,858 firm-year observations. I analyse the size effect by identifying a sample of companies that are listed on the Main market and those on the alternative investment market (AIM), a market for small companies, and within each market I construct size-based indices on the basis of each firm's financial year-end market capitalisation.

The results can be summarised as follows. I find that firms quoted in AIM have significantly shorter debt maturity structure than those listed on the Main market. Moreover, I find that the determinants of debt maturity are relatively different across the two sets of markets, suggesting that markets of quotation are likely to affect their debt maturity structure. In particular, I provide strong support for the signalling hypothesis, as measured by the abnormal earning, across firms' sizes that are listed on the Main market. I find that in the Main market, long-term debt is negatively related to abnormal earnings as a proxy for a firm's quality and long-term debt.[18] The results are in line with those of Barclay and Smith (1995) and Stohs and Mauer (1996), but inconsistent with Ozkan (2000) and Antoniou (2006). In contrast, for companies quoted in AIM, the relationship between debt maturity and abnormal earnings is not significant.

I also find mixed evidence for the effect of leverage, used as a control variable and which is expected to have a positive impact on debt maturity. I find that this is the case in the Main market, but for firms on AIM I show that long-term debt is negatively related to leverage. Unlike previous studies, I control for the proportion of traded debt over total debt and overseas sales over total sales. In the Main market, the proportion of overseas sales over total sales is significant and positive in contrast to AIM, which is not significant. The positive relationship between foreign

[18] Managers of high quality firms are informed better than investors about the firm's value and hence consistent with the signalling hypothesis, are more likely to issue short-term debt.

operations and long-term debt is not consistent with Barclay and Smith (1995) who argue that firms with overseas operations are more likely to have foreign debt to refrain currency exposures and their debt maturity is shorter. Their study is based on the US market, and, as they suggest, many foreign markets are less liquid than the US and thus US companies that operate in foreign markets use shorter maturity of debt. However, their results may not be applicable to other markets, including the UK. An alternative interpretation for the positive relationship between the long-term debt and foreign operations would be the impact of diversification on the degree of risk. In line with the argument of the early study of Hughes et al. (1975) that international firms have lower risk, Reeb et al. (2001) find that international diversification is positively related to credit ratings and the cost of debt is an inverse function of the degree of firms' internationalisation. Therefore, firms with overseas activities are more likely to use debt financing, in particular long-term debt. I control for traded debt and the results show that, in both markets, the maturity of debt is longer for those companies that have traded debt.

I also find that, consistent with the tax hypothesis, the term structure of interest rate has a positive and significant effect across firms' sizes. This suggests that when the term structure of interest rate is upward sloping, companies use longer maturity of debt. However, when I use the effective tax rate as an explanatory variable, I find that the positive and significant relationship is limited to large firms in both markets. These results are likely to be driven by the level and variability of small firms' earnings. Pettit and Singer (1985) argue that small firms tend to have lower profit margins, resulting in lower tax rates as they operate in less concentrated markets, and thus greater competitive pressures. Tamari (1980) and Osteryoung et al. (1995) also argue that small firms have greater variability in profits. In contrast, large firms are likely to be diversified and to have higher profits margins, and hence greater tax benefits.

Consistent with the underinvestment problem associated with the agency theory, I find that in both markets, the market-to-book ratio is negatively related to debt maturity structure across different companies. Myers (1977) argues that firms with greater growth opportunities use shorter maturity of debt in order to mitigate the underinvestment problem. I also control for the matching principle, which emphasises on matching the debt maturity and asset maturity. I use the proportion of tangible fixed assets to total assets. I find this ratio to be positively related to the proportion of long-term debt.

To account for the dynamic effect of debt maturity structure, I use the GMM panel data. I find that firms appear to have target debt maturity but they eliminate their deviation by different speeds of adjustment, depending on the capital market in which they are listed. In AIM, the findings suggest that small companies adjust more rapidly than large ones. The opposite is true in the Main market. I test for the effects of macroeconomic conditions in determining the speed of adjustment. I find that in both markets, global risk has a positive and significant effect on the speed of adjustment. These results are generally consistent across firms' sizes. In addition, I find that firms tend to adjust more quickly towards their target debt maturity in good economic conditions.

Finally, I analyse the evolution of the maturity structure of a sample of IPO firms across the two markets and different size groups. I find that in the Main market the mean (median) maturity increases after the IPO for large firms but not for small firms. In AIM, the mean (median) maturity is relatively constant, but decreases for small firms. My result also show that changes in growth opportunities can explain the changes in debt maturity, as the findings for growth opportunities (MB) show that in the Main market, MB decreases for large firms (they become mature) after the IPO resulting in an increase in long-term debt, while for the remaining firms, MB stays relatively constant. The results for AIM companies show that they have higher growth opportunities and thus tend to have shorter maturity of debt, while their growth opportunities decrease in the post-IPO period. Therefore, my results suggest that the maturity structure of debt depends also on the life cycle of the firm, in addition to size and market of quotation.

I contribute to the literature in several ways. Previous empirical studies predominantly focus on large, mainly US, public companies. Demirguc-Kunt and Maksimovic's (1999) is the only study considers the maturity structure of small firms as opposed to large firms. They include developing countries as well as developed countries, including the UK. But this study and other studies using UK large companies (e.g., Antoniou et al., 2006 and Ozkan, 2002) do not control for the market of quotation. I contribute to UK studies by investigating small companies as opposed to large companies in two sets of market. For this purpose, I split the sample into a regulated market (Main) and a relatively less regulated market (AIM) to control for the market quotation on debt maturity structure. In the UK, small companies have an opportunity to be quoted in AIM. AIM companies are subject to minimum market capitalisation, minimum free float, and no trading record in contrast to the Main market. The Main companies should have minimum three years trading record and at least 25% of shares in public hands. Therefore, I expect that these two markets are different in the maturity structure of debt as well as the drivers of their debt maturity.

To the best of my knowledge, Garcia-Teruel and Martinez-Solono's (2007), Scherr and Hulburt's (2001) and Demirguc-Kunt and Maksimovic's (1999) studies are the only published works on debt maturity structure of small firms, but these paper does not address the structure of debt maturity considering the market quotation as well as firms' entire IPO life cycle. I contribute to this extensive literature by assessing debt maturity structure through the firm's life cycle, starting from the IPO date.

Finally, recent empirical studies document the impact of macroeconomic factors on the adjustment speed of the firm's target capital structure. However to-date, the literature on debt maturity has largely ignored the impact of macroeconomic conditions (such as term spread and default spread) on the speed of adjustment towards the target debt maturity. Accordingly, I add to the literature by investigating the role of macroeconomic conditions in determining the speed of adjustment towards target debt maturity.

The rest of the chapter is organised as follows. Section 2 provides the theoretical and empirical review of debt maturity structure. It also presents research hypotheses as well as the proxies that are used to measure the theoretical effects. Section 3 discusses the sample and methodology. Section 4 presents the empirical results and the last section concludes the paper.

4.2 Review of Literature and Hypotheses

4.2.1 Empirical Studies of Debt Maturity

A substantial theoretical and empirical literature on debt maturity is based on four main theories; signalling, tax, agency costs, and matching principles. These theories are discussed in details in chapter 2 (Literature Review). Here I provide a summary of those theories and present the gaps in previous studies.

There are only a handful of empirical papers which investigate the determinants of corporate debt maturity (see Barclay and Smith, 1995; Stohs and Mauer, 1996; Guedes and Opler, 1996; Ozkan, 2000, 2002; Antoniou et al., 2006; and Fan et al., *JFQA* forthcoming). However, these studies provide mixed evidence, and they are predominantly based on large US companies. Consistent with the agency hypothesis in the form of underinvestment problem of Myers (1977), the empirical studies of Barclay and Smith (1995) and Guedes and Opler (1996) find that firms with lower growth opportunities use longer maturity of debt, which is inconsistent with Stohs and Mauer (1996), who report mixed evidence. Using the pooled regression and fixed effects estimation methodology, Stohs and Mauer (1996) find a positive and significant relationship between debt maturity and growth opportunities, but find no significant correlation when using cross sectional regressions.

Similarly, previous empirical studies provide mixed evidence for tax effects. Using US large companies, Barclay and Smith (1995) do not support the tax effect but Guedes and Oplimer (1996) do. Using UK data, Ozkan (2002) do not provide any evidence for the tax effect, as report an insignificant and negative relationship between tax and debt maturity. Inconsistent with the tax hypothesis of Brick and Ravid (1985), Stohs and Mauer (1996) find that the maturity structure of debt is negatively related to the effective tax rate, but their results are in line with those of Kane et al. (1985), who show that the optimal debt maturity is determined by trading the tax advantage of debt and costs of debt, including bankruptcy and flotation costs. They show that greater flotation costs and lower volatility increase the debt maturity and firms use long-term debt when the tax advantage of debt decreases, to insure that the tax advantage of debt does not fall below the flotation costs.

With respect to the signalling hypothesis, Flannery (1986) predicts that high-quality firms use shorter maturity of debt in order to signal their quality. However, empirical studies (e.g., Stohs and Mauer, 1996) argue that the signalling model is difficult to test because the type of firm is private information. Barclay and Smith (1995) support the prediction of the signalling hypothesis, inconsistent with Antoniou et al. (2006).

Given the asset maturity hypothesis discussed by Morris (1976), firms can choose the debt maturity along with their assets life to mitigate the risk when their cash flows are not sufficient to cover their commitments. Empirical studies (Guedes and Opler, 1996; and Stohs and Mauer, 1996) support this notion, against Antoniou et al. (2006). Despite these empirical studies, the survey conducted by Graham and Harvey (2001) of CFOs in the US shows that companies choose their maturity structure of debt in line with their assets maturity.

To my knowledge, there are a few studies that investigate the debt maturity of small companies (Michaelas, 1999; Scherr and Hulburt, 2001; Heyman et al., 2003; and Garcia-Teruel and Martinez-Solano, 2007); however, they report controversial results. For example, in keeping with the agency conflict between shareholders and debt-holders, Garcia-Teruel and Martinez-Solano (2007) for Spanish small and medium sized companies (SMEs) and Michaelas (1999) for UK SMEs find a positive relationship between growth opportunities and short-term debt. In contrast, Heyman et al. (2003) for Belgian SMEs and Scherr and Hulburt (2001) for the US find no evidence in support of the growth opportunities hypothesis. In another recent study using small companies, Ortiz-Molina and Penas (2008) examine the determinants of maturity with a different focus. They investigate the relationship between lenders and maturity of loans, particularly at the time that the loans are negotiated. They find that lenders use shorter maturity of loans, which is required for higher disclosure and transparency in order to control for the information problems of small firms. It is worth noting that the focus of their study differs from the aim of this chapter.

The controversial results reported by previous studies, as well as the lack of empirical research based on small companies, provide a further opportunity to investigate the determinants of the debt maturity structure of large companies as opposed to those of small companies. I expect that the determinants of debt maturity are not homogeneous across the two sets of companies. For example, Scherr and Hulburt (2001) argue that small firms have a higher proportion of short-term debt. Therefore, it is expected that small firms might not be able to use long-term debt because of a lower proportion of long-term assets in their structure.

Previous studies based on small and medium sized companies also suffer from some additional limitations. First, as far as I know, only one study investigates the maturity of debt in the UK (Michaelas, 1999). This study includes a random sample of small companies without considering the different institutional settings in the UK. There are significant differences between the Main market and AIM that are not discussed by Michaelas (1999). In addition, none of studies using small and medium sized companies investigates debt maturity over the IPO’s life cycle, which would constitute a good contribution to the existing literature. Previous studies do not control for the effect of bank debt. Prior literature argues that small firms use relatively more bank debt, especially short-term bank debt (see review of Chittenden et al., 1996). Hence, this chapter addresses the impact of non-bank debt as an additional determinant of debt maturity structure. It is expected that the larger the amount of tradable debt such as bonds, the more likely firms are to use longer maturity of debt. However, this expectation tends to be applied for large companies while small companies are less likely to use tradable debt. I also control for foreign operations and the proportion of traded debt, as this is not investigated by previous studies. In a recent empirical study, Reeb et al. (2001) find that international diversification is positively related to credit ratings and that the cost of debt is an inverse function of the degree of firms' internationalisation. Therefore, international firms are more likely to use long-term debt financing. Singh and Nejadmalayeri (2004) also argue that the cost of capital decreases with the degree of international diversification and hence greater debt financing. The results of recent empirical studies are in line with the early study of Hughes et al. (1975), who suggest that international firms face lower risk. As a consequence, I predict a positive relationship between overseas operations and the maturity of debt.

Furthermore, previous studies that focus on small companies are based on the static framework of debt maturity structure. However, some recent studies that use large companies (e.g., Antoniou et al., 2006) put forward an alternative framework, namely, the dynamic model of debt maturity structure. Finally, yet importantly, previous studies do not control for market conditions (such as default spread and TED spread). Early studies such as Taggart (1977) and Marsh (1982) document the impact of market conditions on debt maturity. They find that market conditions have significant effects on the choice of long-term debt. Surprisingly, empirical studies have largely ignored the impact of these conditions on the dynamic framework of debt maturity. The impact of market conditions in the dynamic framework is limited only to the literature on capital structure. Recently, Hackbarth et al. (2006) theoretically show that macroeconomic conditions have significant effects on the speed of adjustment towards the target leverage. They suggest that the business cycle plays an important role in determining the speed of adjustment: it is higher in booms than in recessions. Empirical studies are in line with the theoretical model of Hackbarth et al. (2006), supporting the impact of macroeconomic factors on the speed of adjustment towards the firm's optimal capital structure (see Drobetz and Wanzenried, 2006 and Cook and Tang, 2010).

To the best of my knowledge, Baker et al. (2003) is the only study that assessed the impact of market conditions on debt maturity. Their results confirm the market effects on debt maturity, particularly the effects of debt market conditions. However, their focus is on the relationship between the maturity of debt and variation in excess bond returns. They find that companies issue long-term debt when future excess bond returns are low. They do not investigate the impact of the market condition on the adjustment speed in the dynamic framework of debt maturity. For that purpose, I attempt to ascertain the role of macroeconomic conditions in determining the speed of adjustment towards the target structure of debt maturity. Due to lack of debt maturity studies based on macroeconomic conditions, I follow the dynamic model of capital structure studies which include macroeconomic conditions. I expect that any shocks in the market could cause firms to deviate from their target debt maturity. Following Hackbarth et al. (2006), I assume that the speed of adjustment depends on the economic conditions, becoming higher in booms than in recessions.

I apply three proxies for economic conditions that have been used by recent studies in the dynamic model of capital structure. Paya et al. (2005) and Estrella and Hardouvelis (1991) argue that term spread is an indicator of future economic condition, pointing to a good condition when positive. Drobetz and Wazaenried

(2006) observe that if a currently good economy expects a general slowdown, investors will buy long-term and sell short-term bonds, respectively, to hedge themselves. These circumstances would result in a decrease in yield on long-term bonds and an increase in yield on short-term bonds. Accordingly, the term spread will be downward-sloping when future economic downturn is expected. Following Hackbarth et al. (2006), who predict that the adjustment speed is faster in good economic conditions, I expect a positive relationship between term spread and the speed of adjustment. Drobetz and Wanzenried (2006), Cook and Tang (2010), Binsbergen et al. (2011) use default spread and TED spread as proxies for risk. Default spread is calculated as the difference between the yield on low-grade corporate bonds (BAA) and high-grade US corporate bonds (AAA). TED spread is defined as the difference between the three-month London Inter-Bank Offered Rate(LIBOR rate) and the three-month yield on UK Treasury bills. This difference grows larger when the risk to the economy increases. Treasury bills are risk-free while the other mechanism reflects the interest rates on interbank loans. When the spread increases, it signals the belief of lenders that the risk of interbank loans also increases, resulting in a demand for a higher interest rate. Following Hackbarth et al. (2006), I expect that the adjustment speed is negatively related to default and TED spread.

4.2.2 Research Hypotheses

As I previously discuss the differences between small and large companies and the lack of empirical findings for the debt maturity determinants of small companies, set up the following hypotheses:

Hypothesis 1: Small companies have less long-term debt relative to large companies.

As argued in previous sections, small companies have lower tangible assets and are different from large companies considerably in tax considerations. Smaller firms might have a little attention to the tax consideration since their high income volatility would offset the benefits of tax. Therefore, I expect small companies use more short-term than long-term debt.

Hypothesis 2: The determinants of debt maturity are not homogenous across firm size groups.

I expect the main characteristics of small firms in terms of tax considerations, agency conflicts, and the level of their operations, to have different impact on their maturity structure of debt. For example, small and large firms are different considerably in tax considerations. Smaller companies are less likely to benefit from tax shields as they have higher volatility in earnings. Whereas large firms might have a larger corporate tax deduction through interest payments as those firms have diversified business lines and higher profit margins resulting in greater tax advantages. Therefore, I expect that small companies might not benefit from tax considerations. In terms of the impact of overseas operation, I expect that small companies are likely to have overseas activities and thus are not affected by foreign operations significantly.

Moreover, this research attempts to investigate the dynamic version of debt maturity structure. Recently, this framework has received a significant attention in the literature (see Antoniou et al., 2006). Yet as far as I know, the dynamic version of debt maturity structure has not been studied for small companies. Therefore, my further hypothesis is:

Hypothesis 3: Small and large companies have different adjustment speed towards the target debt maturity.

Small companies are financially constrained and have higher asymmetric information, thus are more likely to have higher costs of issuing long-term debt. However, the cost of issuing long-term debt is relatively smaller for large companies and thus they are more likely to eliminate their deviation from their target debt maturity faster than small companies. Therefore, I expect that, small companies have a lower adjustment speed in contrast to large companies.

Finally, I contrast my research with previous studies by analysing the structure of debt maturity across the two different markets in the UK (AIM and Main market). Most of the regulations of the Main market do not apply to AIM. Over the past 15 years, AIM has been an ideal market for smaller and growing companies. It gives opportunities to smaller companies to be quoted, which would not be eligible for the official list. Since its launch in 1995, it has been attracting companies. AIM companies are subject to minimum market capitalisation, minimum free float, and no trading record opposite to the Main market. The Main companies should have minimum three years recording record and at least 25% of shares in public hands. Furthermore, a large number of AIM companies do not generate considerable profits. Therefore, AIM companies tend to be riskier than those listed on the Main market because of established trading records and considerable market capitalisations (see Jenkinson and Ramadorai, 2008 and Campbell and Tabner, 2010). Therefore, I expect that:

Hypothesis 4: AIM companies have shorter maturity of debt in contrast to the companies listed on the Main market.

Hypothesis 5: Drivers of the maturity structure of debt are different between the AIM and Main market.

Hypothesis 6: The speed of adjustment is different between the Main market and AIM. It is expected that the companies in the Main market eliminate their deviation from the target debt maturity faster than those listed on AIM.

Table 4-1provides a summary of the proxy variables I use test the hypotheses.

Table 4-1: The Summary of Proxies and Expected Signs

Variables	Description	Hypothesis	Sign
	Panel A: The symmetry of proxies for debt maturity determinants		
$BY_{10y} - BY_{3m}$	Term structure	Tax	+
Tax/EBIT	Effective tax rate	Tax	+
MB	Growth opportunities	Agency(Share-holders and debt-holders)/Underinvestment	_
$(EPS_{t+1} - EPS_t)/ SP_t$	Abnormal earnings	Signalling	-
TG/TA	Asset maturity	Matching	+
LNMK	Size	Risk	+
TD/TA	Leverage	Control variable	+
D.Traded debt	Non-bank debt	Control variable	+
Overseas sales/TS	Foreign operations	Control variable	+
	Panel B: The symmetry of proxies for adjustment speed determinants		
Default. SP	Default spread	Global risk	_
TED. SP	TED spread	Risk	_
T. SP	Term spread	Healthy economy	+

Panel A: This panel shows the empirical predictions of proxy variables based on the main theories. Term structure calculated as the differences between the month-end yields on 10-year government bond and three-month treasury bills (BY_{10y}-BY_{3m}). Tax/EBIT is an effective tax rate computed as tax expenses divided by earnings before tax and interest. In line with previous studies (e.g., Rajan and Zingales, 1995; Antoniou et al., 2008), I compute the market-to-book ratio, MB, as the market value of equity plus the book value of assets less the book value of equity, all divided by the book value of assets. EPS_{t+1}-EPS_t/SP_t is abnormal earnings computed as earnings per share in year *t+1* minus earnings per share in year *t*, divided by share price in year *t*. TG/TA is tangible fixed assets divided by total assets.. TD/TA is leverage measured as total debt divided by total assets. LNMK is the natural logarithm of market value of firms to measure size of companies. D.Traded debt refers to non-bank debt and it is a dummy variable set to one if a company use non-bank debt.Overseas sales/$TS_{i,t}$ is the proportion of overseas sales is foreign sales divided by total sales.

Panel B: This panel shows the empirical predictions of determinants of the adjustment speed. Default. SP is default spread, computed as the difference between the yield on US low-grade, BAA, and high-grade, AAA, corporate bonds. TED. SP defined as the difference betweenthree-month LIBOR rate and three-month yield on the UK Treasury bills. T.SP is term spread, which computed as the difference between the month-end yields on 10-year government bond and three-month treasury bills.

4.3 Data and Methodology

4.3.1 Sample

I follow the procedure of the Financial Times Indices and split my sample firms that are quoted in the Main market into four size groups, FTSE 100, FTSE 250, FTSE Small Cap, and FTSE Fledgling, and those listed on AIM into FTSE AIM index However, some companies listed on AIM may be as large as those companies that are listed on FTSE 100 and 250 in the Main market. Therefore, FTSE AIM companies are split into large, medium, and small companies. Large AIM companies are those with top 20% of market capitalisation and small AIM companies are allocated as bottom 20% firms' year-end market capitalisation. The remaining companies are considered as medium AIM companies.

The accounting data is constructed from Company Analysis Database (CAD) for the period from 1995 to 2008. CAD provides data on balance sheet, income, and cash flow statements. This database does not include data on government bond yields, and hence they are collected from DataStream and Bloomberg. The yield on UK treasury bills, UK government bonds, and the rate of Eurodollars are obtained from Data Stream. The yield on low-grade (BAA) and high-grade (AAA) US corporate bonds are collected from Bloomberg. I also hand-collect data on the constituent names of companies listed on the UK AIM and Main market from Bloomberg and London Share Price Data (LSPD) databases. The lack of data collected from these databases lead us to contact FTSE group (provider of stock market indices) directly to gather the data on the quotation of the AIM and Main market.

I classify each individual company into a financial year spanning from the 1st of April in year *t*to the 31st of March in year *t+1*. For example, 2008 includes all UK companies during the 1st of April 2008 to the 31st of March 2009. Following previous studies, financial firms such as banks, life and non-life insurance and real estate companies are excluded. These companies operate differently, and thus their capital structure is different. However, this sample includes dead companies to avoid survivorship bias. Since I need many firm-specific variables, the sample is reduced due to data non-availability. Subsequently, these exclusions leave 2,894 firms, resulting in about 14,800 firm-year observations for a 14-year period.

4.3.2 The Model

Firms decide how to choose between debt and equity to optimise their value. If the firm decides to finance with debt, it must choose the maturity, type, and priority of debt. The common firms' characteristics related to both theories on firms' capital structure and debt maturity structure would result in some restrictions. For instance, Barclay and Smith (1995) argue that a firm with more growth opportunities prefers to use less debt and its debt is likely to be a short-term one. Their model includes the explanatory variables, which are more likely to be exogenous. Therefore, I set the set proxies which are used by Barclay and Smith (1995). However, they do not consider the matching hypotheses as well as leverage as a control variable. Stohs and Mauer (1996) argue that the regressions used in the study of Barclay and Smith (1995) are misspecified as they do not include leverage. In addition, unlike previous studies, I control for overseas activities and non-bank debt, thus the estimation of this chapter includes leverage and some other control variables. It is based on unbalance panel data, which has some advantages in comparison to the other models. It gives a large number of observations and reduces the correlation between explanatory variables to improve the efficiency of the estimates (Daskalakis and Psillaki, 2008).

Furthermore, I use the fixed-effects model, Equation (4.1). In the panel data, the fixed effects model allows the intercept to vary across firms and time. Therefore, the effects of time as well as the omitted explanatory variables such as industry effects can be captured in the changing company intercept.

$$LTDR_{i,t} = \sum_{j=1}^{J} B_j\, X_{i,j,t} + (\alpha_i + \alpha_t) + \varepsilon_{i,t} \qquad (4.1)$$

Where:

$LTDR_{i,t}$: Long-term debt of firm *i* divided by total debt at time *t*
$X_{i,j,t}$: The vector of the *jth* explanatory variable for the *ith* firm at time *t*, including:

$ABE_{i,t}$:Abnormal earnings of firm *i* at time *t.* Barclay and Smith (1995) define abnormal earnings as earnings per share in year *t+1* minus earnings per share in year *t*, divided by share price in year *t.*

$EFTR_{i,t:}$: Effective tax rate of firm *i* at time *t. C*omputed as the ratio of tax expense to earnings before interest and tax (e.g., Stohs andMauer, 1996; and Antoniou et al., 2006).

$LNMK_{i,t}$: The natural logarithm of market value of firm *i* at time *t*

$Leverage_{i,t:}$ The ratio of total debt to total assets of firm *i* at time *t*

$MB_{i,t}$: Growth opportunities of firm *i* at time *t*

$TG_{i,t}$: Proportion of fixed tangible assets to total assets of firm *i* at time *t*

$TS_{i,t}$: Term structure of interest rate computed as the differences between the yields on ten-year government bonds and yield on three-month government bonds. It is matched to the month of the firm *i'*s fiscal year-end (Barclay and Smith, 1995).

D.Traded $debt_{i,t}$:It is a dummy variable set to one if a company uses non-bank debt.

Overseas sales/$TS_{i,t}$: The proportion of overseas sales is foreign sales divided by total sales.

α_i: Firm-specific effects

α_t: Time-specific effects

$\varepsilon_{i,t}$: The error term

The majority of previous studies use long-term debt divided by total debt to measure the maturity structure of debt (e.g., Antoniou et al., 2006; and Barclay and Smith, 1995). They consider long-term debt firstly as debt with a maturity of more than one year, and then as debt with a maturity of more than three years. Stohs and Mauer (1996) employ a weighted method to calculate all debt including capital leases and current liabilities. Following the majority of prior studies and considering the data limitation, I use the ratio of long-term debt (with a maturity of more than a year) to total debt to measure the debt maturity.

Furthermore, I use the partial adjustment model in order to find whether firms adjust their debt maturity ratio towards their target level within each time periods. If doing so, how quickly small and large companies adjust to their target ratio. There is a considerable number of studies presenting a dynamic model of capital structure (e.g., Falnnery and Rangan, 2006; Maghyereh, 2005; and Drobetz and Fix, 2005). Despite the substantial literature in the dynamic framework of capital structure, little attention has been paid to the dynamic model of debt maturity structure. Following work by Ozkan (2000) and Antoniou et al. (2006), a dynamic debt maturity structure is given in Equation (4.2):

$$LTDR_{i,t} - LTDR_{i,t-1} = \delta\left(LTDR^{*}{}_{i,t} - LTDR_{i,t-1}\right) + \varepsilon_{i,t} \qquad (4.2)$$

Where:

$LTDR_{i,t}$: Long-term debt of firm *i* divided by total debt at time *t*

$LTDR_{i,t-1}$: Long-term debt of firm *i* divided by total debt at time *t-1*

$LTDR^{*}_{i,t}$: Target ratio of long-term debt of firm *i* divided by total debt at time *t*

δ*:* The speed of adjustment

The target ratio is a function of firms' explanatory variables as given in Equation (4.3):

$$LTDR^{*}_{i,t} = \sum_{j=1}^{J} B_j X_{i,j,t} \tag{4.3}$$

Substituting Equation (4.3) into Equation (4.2), result in the partial adjustment model, Equation (4.4):

$$LTDR_{i,t} = (1-\delta)\, LTDR_{i,t-1} + \delta \sum_{j=1}^{J} B_j X_{i,j,t} + \varepsilon_{i,t} \tag{4.4}$$

In addition, I extend the model presented in Equation (4.4) to analyse the factors determining the speed of adjustment, which, following previous studies (e.g., Drobetz and Wanzeried, 2006 and Cook and Tang (2010), I assume to be a linear function of a constant term and some explanatory variables, as follows:

$$\delta_{i,t} = \alpha_0 + \alpha_1 Z_{i,t} \tag{4.5}$$

Replacing Equations (4.5) and (4.3) into Equation (4.2) and rearranging gives Equation (4.6), which is the empirical model for the determinants of adjustment speed:

$$LTDR_{i,t} = (1-\alpha_0)\, LTDR_{i,t-1} - \alpha_1 Z_{i,t} LTDR_{i,t-1} + \alpha_0 \sum_{j=1}^{\mathrm{J}} B_j X_{i,j,t} +$$

$$\alpha_1 \sum_{j=1}^{\mathrm{J}} B_j Z_{i,t} X_{i,j,t} + \varphi_i + \omega_t + u_{i,t} \tag{4.6}$$

Where:

$LTDR_{i,t}$: Long-term debt of firm *i* divided by total debt at time *t*

$LTDR_{i,t-1}$: Long-term debt of firm *i* divided by total debt at time *t-1*

$X_{i,j,t}$*:* The vector of the *jth* explanatory variable for the *ith* firm at time *t (Equation 4.1)*

$Z_{i,t}$: The vector of explanatory variables for adjustment speed, including:

T.SP: Term spread which is computed as the difference between the yields on ten-year and three-month UK government bonds

Default.SP: Default spread is calculated as the difference between the yield on low-grade corporate bonds (BAA) and high-grade US corporate bonds (AAA)

TED.SP: TED spread is defined as the difference between the three-month LIBOR rate and the three-month yield on UK Treasury bills

φ_i: Firm-specific effects

ω_t: Time-specific effects

$u_{i,t}$: An error term

In Equation (4.6), the focus is on α_1, which shows the coefficient on the interaction between lagged debt maturity and macroeconomic factors determining the adjustment speed. Previous studies have predominately used ordinary least squares or fixed effects models to examine the structure of debt maturity. Hsiao (1985) argues that OLS regression is biased when firm specific effects are included. It is likely that an error term is correlated with the lagged dependent variable resulting in an endogeneity problem. The endogeneity problem could be solved through instrumental variables to have consistent estimations. Arellano and Bond (1991) refer to the Generalized Method of Moments (GMM) estimation to control for the endogeneity problem by using instrumental variables. For that purpose, I estimate the regression under the GMM system.

4.4 Results and Discussions

4.4.1 Descriptive Statistics

Table 4-2, Panel A, shows that the average long-term debt issued on the AIM and Main market are 63% and 55%, respectively. In addition, on average, 37% and 45% of the debt issued on the AIM and Main market is short-term debt. The same trend is true for the medians in both markets. These indicate that the long-term debt ratio is higher in the Main market than in AIM, in contrast to the short-term debt ratio. This implies that companies listed on the Main market are likely to have easier access to long-term debt financing. Panel B shows that the differences between the Main market and AIM are highly significant.

With respect to the firms' sizes, Panel A of Table 4-2 shows that in both AIM and the Main market, larger companies have more long-term debt financing than smaller companies. In the Main market, the average percentage of debt maturing in more than one year for large companies is 74%, in contrast to the small firms' 51% long-term debt ratio. This difference is even more notable if I compare the median ratios, which are 82% for the largest companies and 54% for the smallest. Large companies quoted in AIM also use long maturity of debt as the average percentage of debt maturity is 61% for large firms compared to 49% for small companies. The results suggest that large companies are those with a better reputation in the market, lower probabilities of bankruptcy and lower agency costs in the form of underinvestment problems. Therefore, they are more likely to use long-term debt.

Table 4-2 also reports the t-statistics of the differences in means of long-term debt and the Wilcoxon-Mann-Whitney test of the differences in medians of long-term debt between FTSE 100 and FTSE Fledgling as well as the t-statistics of the differences in means and the Wilcoxon-Mann-Whitney test of the differences in medians between large and small AIM companies. The results show that the means and medians are statistically different between the largest companies (FTSE 100) and the smallest companies (FTSE Fledgling) in the Main market. The same results are reported for AIM as the largest firms have significantly different long-term debt relative to the smallest companies. These results suggest that, since large companies have greater tangible assets and lower probabilities of bankruptcy and asymmetric information (e.g., Ang, 1992; and Pettit and Singer, 1985), they have a greater capacity to use long-term debt.

Table 4-2: Descriptive Statistics of LT/TD for Companies Listed on the AIM and Main Market

	LT/TD			
	Min	**Mean**	**Median**	**Max**
Panel A				
Main Market	**0.00**	**0.63**	**0.70**	**1.00**
FTSE 100	0.00	0.74	0.82	1.00
FTSE 250	0.00	0.75	0.78	1.00
FTSE Small Cap	0.00	0.64	0.72	1.00
FTSE Fledgling	0.00	0.51	0.54	1.00
t FTSE 100 - FTSE Fledgling		21.54***		
MW FTSE 100 - FTSE Fledgling			20.61***	
AIM	**0.00**	**0.55**	**0.59**	**1.00**
Large AIM	0.00	0.61	0.66	1.00
Medium AIM	0.00	0.55	0.59	1.00
Small AIM	0.00	0.49	0.50	1.00
t Large - Small		7.63***		
MW Large - Small			7.43***	
Panel B				
Main vs. AIM:				
t Main-AIM		5.98***		
MW Main-AIM			6.52***	

Panel Ashows LT/TD, which is long-term debt ratio computed as long-term debt that matures in more than a year divided by total debt. The second, third, fourth, and fifth columns present the minimum, average, median, and maximum of long-term debt.t-statistics and Wilcoxon-Mann-Whitney test are also reported.t is t-statistics to test for differences in means. MW is Wilcoxon-Mann-Whitney to test for differences in medians
Panel B reports t and MN for the differences between the Main market and AIM.***, **, * significant at 0.01, 0.05, and 0.1 level, respectively.

Table 4-3 presents univariate correlations between debt maturity structure and the independent variables across firms' sizes in the AIM and Main market. A firm's debt maturity is defined, as long-term maturity (short-term) if its proportion of long-term debt to total debt is above (below) each sub-sample median. I also test whether the means of each explanatory variable are significantly different between longer maturity and shorter maturity of debt. The results shows that in both the AIM and Main market, the greater the effective tax rate (EFTR), the greater the natural logarithm of the market value of firm (LNMK), the higher the proportion of tangible fixed assets to total assets (TG), the higher the term spread of interest rate (TS), the greater the proportion of traded debt to total debt and the greater the proportion of overseas sales to total sales, the more likely firms are to use longer maturity of debt. In contrast, the higher the abnormal earnings (ABE) and market-to-book ratio (MB), the more likely firms are to use shorter maturity of debt.

The results support the matching hypothesis that firms with higher proportion of tangible fixed assets to total assets use long-term debt. For instance, in the Main (AIM) market, the average of TG is 38% (19%) for the largest companies with short-term debt and 52% (43%) for those companies with long-term debt. The remaining companies follow the same structure. In particular, in both markets, the differences in means of TG between firms with shorter maturity and longer maturity of debt are highly significant at the 1% level across firms' sizes.

Consistent with the agency conflict between shareholders and debt-holders, firms with greater market-to-book ratio, a proxy for growth opportunities, use short-term debt to mitigate the underinvestment problem. For example, in the Main (AIM) market, the largest companies, with longer maturity of debt, have an average market-to-book ratio of 1.17 (0.98), and this ratio is 1.76 (5.26) for companies with short-term maturity. The t-statistics for the differences in means of market-to-book ratio between short and long maturity of debt are also significant in both markets, and the same trend is true across other firms' sizes.

According to the tax hypothesis, the effective tax rate and term structure of interest rate have positive effects on the maturity structure of debt. The results of

Table 4-3 support the tax hypothesis. In the Main (AIM) market, the average of the effective tax rate increases from 21% (10%) for firms with short maturity of debt to 31% (27%) for those firms with long-term debt, suggesting the positive relationship between debt maturity and the effective tax rate. In both markets, the t-statistics for the differences in means of the effective tax rate between firms with long-term debt ratio and those companies with short-term debt ratio are significant except for the smallest companies. It is likely that small companies may not take the benefit of interest tax shields due to higher variability of earnings and lower profit margins. The results also show that in the Main (AIM) market, the average spread of interest rate is 14% (4%) for the group of short maturity compared to 38% (20%) for the group of long maturity. The t-statistics of the term spread between these two groups is highly significant. I find the same trend across the firms' sizes.

The results are also in line with the signalling hypothesis of Flannery (1986), who argues that high quality firms use short-term debt to signal to the market that they are able to pay off their commitments. I find that abnormal earnings as a proxy for firms' quality are higher for the group with shorter maturity of debt. For example, in the Main (AIM) market, the average of abnormal earnings for the largest companies is 3% (18%) in the group with short debt maturity and 0% (1%) in the group with long debt maturity. The remaining companies show a clear upward trend in groups with short maturity of debt compared to those groups with long maturity of debt. However, apart from the smallest companies listed on AIM, the differences in means of this proxy for long maturity and short maturity of debt ratios are highly significant across firms' sizes.

Finally, I use leverage, a dummy variable for firms that use traded debt, and the proportion of overseas sales as control variables. Following Leland and Toft

(1996) and Morris (1992), I expect a positive relationship between long-term debt and leverage. Consistent with this prediction, Table 4-3 indicates that the average leverage is significantly higher for firms with longer maturity of debt. I also expect the firms with higher traded debt, such as bonds and overseas sales, to have longer maturity of debt. The results support these expectations across firms' sizes in both markets. The table shows that, in the Main market, the t-statistics reported for all these control variables are statistically significant between firms with short maturity of debt and firms with long maturity of debt. However, in AIM, the results for the smallest AIM companies show that the t-statistics of abnormal earnings (ABE), the effective tax rate (EFTR), and the dummy variable for traded debt are not significant between the group with shorter maturity of debt and the group with longer maturity of debt.

Table 4-3: Univariate Analysis

Panel A: Main Market

	FTSE 100			FTSE 250			FTSE Small Cap			FTSE Fledgling		
	Short Mat.	Long Mat.	t-statistics	Short Mat.	Long Mat.	t-statistics	Short Mat.	Long Mat.	t-statistics	Short Mat.	Long Mat.	t-statistics
ABE	0.03	0.00	2.41**	0.15	0.01	11.26***	0.16	0.02	13.46***	0.27	0.06	3.60***
EFTR	0.21	0.31	-4.64***	0.16	0.28	-4.46***	0.05	0.12	-1.98**	002	0.03	-0.13
LNMK	7.98	8.55	-6.45***	6.51	6.61	-3.46***	4.79	4.91	-5.14***	2.78	3.12	-10.97***
Leverage	0.24	0.30	-6.54***	0.20	0.30	-15.82***	0.13	0.24	-23.36***	0.15	0.21	-12.53***
MB	1.76	1.17	2.28**	2.05	0.96	7.17***	3.64	1.86	2.51**	3.10	1.42	15.22***
TG	0.38	0.52	-8.19***	0.32	0.50	-16.30***	0.27	0.43	-16.95***	0.28	0.50	-29.44***
TM	0.14	0.38	-4.43***	0.18	0.37	-4.68***	0.12	0.35	-7.64***	0.14	0.40	-8.98***
D. Traded debt	0.70	0.84	-4.22***	0.44	0.52	-1.98**	0.25	0.32	-2.45**	0.19	0.23	-2.68***
Overseas Sales/TS	0.18	0.85	-50.36***	0.10	0.74	-72.71***	0.04	0.60	-67.25***	0.00	0.49	-50.16***

(Table 4-3 continued)

Panel B: AIM

	Large AIM			Medium AIM			Small AIM		
	Short Mat.	Long Mat.	t-statistics	Short Mat.	Long Mat.	t-statistics	Short Mat.	Long Mat.	t-statistics
ABE	0.18	0.01	7.47***	0.28	0.02	7.12***	0.32	0.03	1.04
EFTR	0.10	0.27	-5.83***	0.08	0.18	-3.40***	0.01	0.08	-0.62
LNMK	4.39	4.51	-2.16**	2.47	2.57	-3.97***	0.62	0.81	-4.04***
Leverage	0.09	0.23	-16.76***	0.10	0.22	-21.75***	0.09	0.24	-13.20***
MB	5.26	0.98	4.08***	3.81	1.68	4.13***	6.21	1.17	1.76*
TG	0.19	0.43	-14.90***	0.16	0.40	-26.21***	0.14	0.41	-16.50***
TM	0.04	0.20	-3.26***	0.07	0.21	-4.95***	0.08	0.26	-3.57***
D. Traded debt	0.19	0.25	-2.65***	0.15	0.19	-2.09**	0.13	0.15	-1.06
Overseas Sales/TS	0.00	0.59	-21.78***	0.00	0.46	-39.78***	0.00	0.44	-28.01***

This table presents univariate correlations between independent variables and the structure of debt maturity across firms. A firm's debt maturity is defined to be longer maturity (shorter maturity), if its proportion of long-term debt to total debt is above (below) each sub-sample median. ABE is abnormal earnings computed as earnings per share in year *t+1* minus earnings per share in year *t*, divided by share price in year *t* (EPS_{t+1}-EPS_t/ SP_t). EFTR is an effective tax rate computed as tax expenses divided by earnings before tax and interest. In line with previous studies (e.g., Rajan and Zingales, 1995; Antoniou et al., 2008), I compute the market-to-book ratio, MB, as the market value of equity plus the book value of assets less the book value of equity, all divided by the book value of assets. LNMK is the natural logarithm of market value of a firm. Leverage measured as total debt divided by total assets. TG is tangibility computed as tangible fixed assets divided by total assets. TM, is term structure of interest rate which is calculated as the differences between the month-end yields on 10-year government bond and three-month treasury bills (BY_{10y}-BY_{3m}). D. Traded debt is a dummy variable set to one if a company use non-bank debt. Overseas sales/TS is foreign sales divided by total sales. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively. All the explanatory variables are 14 year average (1995-2008).

4.4.2 Determinants of Debt Maturity Structure

In this section, I consider the joint effects of the variables that proxy for the costs and benefits of debt between 1995 and 2008 using Equation (4.1) based on the fixed effects model. Table 4-4 reports the empirical results of the debt maturity structure for the whole sample, companies that are listed on the Main market, and companies that are listed on AIM. The second, third, fourth, and fifth column in each panel shows the determinants of debt maturity for the whole sample, whole sample including the dummy for AIM, companies that are listed on the Main market, and companies that are listed on AIM, respectively.

The table shows that, as predicted, the coefficient of abnormal earnings as a proxy for firm's quality is negative and significant for the whole sample as well as for the companies listed on the Main market, but this coefficient is not significant for AIM companies. Therefore, the results are mixed, as the Main market supports the signalling hypothesis that high quality, unlike low quality firms which use long-term debt. These results are not in line with those for AIM companies, suggesting that they do not use the maturity structure of debt as an instrument with which to signal their quality to the market.

With respect to the tax hypothesis, I do find a significant and positive relationship between the effective tax rate and long-term debt ratio for the whole sample as well as for both the AIM and Main market. The results suggest that more long-term debt is used in those companies that assign a higher tax advantage to it. In particular, increase in the effective tax rate is associated with significantly higher long-term debt. Alternatively, consistent with the tax hypothesis, I find that the term structure of interest rate has a positive and significant effect on the maturity structure of debt for the whole sample and for both the AIM and Main market. This supports the tax hypothesis discussed by Brick and Ravid (1985), who argue that the tax benefit of using long-term debt increases when the term structure of interest rate is upward sloping.

Consistent with the underinvestment problem associated with agency hypothesis, firms with higher growth opportunities, as measured by the market-to-book ratio use shorter maturity of debt. The negative and significant effect of growth opportunities on the long-term debt ratio is consistent across the whole sample as well as across the two sets of markets. These results support the argument of Myers (1977) that firms with higher growth opportunities use short maturity of debt to mitigate the underinvestment problem and are in line with those of Barclay and Smith (1995) and Ozkan (2002).

The results also support the matching hypothesis. Morris (1976) argues that firms can choose their debt maturity along with their assets life to mitigate the risk. I use the proportion of tangible fixed assets to total assets as a proxy for the structure of asset maturity. The table reveals that the coefficient of asset tangibility is positive and highly significant, which indicates that firms with greater tangible fixed assets use long maturity of debt. Consequently, the results are consistent with the prediction of the matching principle.

Finally, I provide mixed evidence for the effect of leverage. Table 4-4 shows that, in the Main market, increase in leverage is associated with significantly higher long-term debt, whereas in AIM, increase in leverage is associated with significantly lower long-term debt. The positive relationship between leverage and the structure of debt maturity in the Main market supports Morris (1992), who argues that firms with higher leverage use long-term debt to postpone their probability of bankruptcy. But the results for AIM companies are consistent with those of Dennis et al. (2000), who show that leverage is inversely related to debt maturity. They suggest that the underinvestment problem could result in the use of short-term debt. I also control for overseas sales and traded debt. I find that the coefficient of overseas sales is significant and positive for the whole sample, but is not significant for AIM companies. This suggests that AIM companies may not have opportunities to operate overseas, unlike Main companies. Moreover, the results show that, in both markets, companies that use non-bank debt such as bonds have longer maturity of debt.

The results in the second column, which includes a dummy variable for AIM, are also consistent with the earlier findings. However, the dummy variable is negative and significant, suggesting that companies quoted in AIM are more financially constrained than those listed on the Main market, and hence AIM companies use less long-term debt.

Overall, the results of the effective tax rate, growth opportunities, and the asset maturity are relatively similar in both the AIM and Main market, but the results of leverage, abnormal earnings, and overseas activities are different across the two sets of markets. In the next section, I split the sample into different firms' sizes in order to find the size effects on debt maturity structure.

Table 4-4: Determinants of Debt Maturity Structure for Whole Sample, Companies Listed on the AIM and Main Market

Dependent variable: LT/TD	All Sample	All Sample (Inc. AIM dummy)	Main Market	AIM
ABE	-0.007***	-0.007***	-0.010***	-0.006
	(-2.91)	(-2.94)	(-2.75)	(-0.99)
LNMK	0.044***	0.045***	0.044***	0.051***
	(11.30)	(11.49)	(9.13)	(6.52)
MB	-0.013***	-0.013***	-0.017***	-0.023***
	(-9.10)	(-8.74)	(-8.85)	(-4.44)
TG	0.693***	0.693***	0.668***	0.788***
	(23.88)	(23.89)	(18.88)	(14.89)
EFTR	0.012***	0.012***	0.009**	0.022**
	(3.00)	(2.99)	(2.28)	(2.03)
TM	0.049***	0.049***	0.051***	0.035***
	(8.12)	(8.15)	(7.28)	(2.95)
Leverage	0.095***	0.096***	0.233***	-0.224***
	(3.37)	(3.43)	(6.79)	(-4.06)
Overseas sale/TS	0.035**	0.037**	0.039***	0.010
	(2.06)	(2.16)	(2.71)	(0.68)
D. Traded debt	0.038**	0.039**	0.039***	0.030*
	(4.94)	(4.83)	(4.47)	(1.76)
AIM Dummy		-0.045***		
		(-2.92)		
C	0.117***	0.097***	0.084***	0.209***
	(5.20)	(4.28)	(2.82)	(7.12)
Adjusted R^2	0.556	0.558	0.584	0.516

F-statistic	7.428	7.256	8.512	7.995
Prob (F-statistic)	0.000	0.000	0.000	0.000

This table shows the empirical results of debt maturity structure using the fixed effects model between 1995 and 2008.

$$LTDR_{i,t} = \sum_{j=1}^{J} B_j X_{i,j,t} + (\alpha_i + \alpha_t) + \varepsilon_{i,t} \qquad Equation\ (4.1)$$

The dependent variable is LTD/TD, defined as book value of long-term debt divided by total debt. The explanatory variables are: ABE is abnormal earnings computed as earnings per share in year *t+1* minus earnings per share in year *t*, divided by share price in year *t* $(EPS_{t+1}\text{-}EPS)_t/SP_t$. In line with previous studies (e.g., Rajan and Zingales, 1995; Antoniou et al., 2008), I compute the market-to-book ratio, MB, as the market value of equity plus the book value of assets less the book value of equity, all divided by the book value of assets. LNMK is the natural logarithm of market value of a firm. TG is tangibility computed as tangible fixed assets divided by total assets.EFTR is an effective tax rate computed as tax expenses divided by earnings before tax and interest. TM is term structure of interest rate, which is calculated as the differences between the month-end yields on 10-year government bond and three-month treasury bills $(BY_{10y}\text{-}BY_{3m})$. Leverage measured as total debt divided by total assets. Overseas saleS/TS, is foreign sales divided by total sales. D.Traded debt is a dummy variable set to one if a company use non-bank debt. AIM Dummy is a dummy variable equal to one if a company listed on AIM. T-statistic are reported in parentheses, and ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

4.4.3. Determinants of Debt Maturity Structure across Firms' Size

I use the fixed effects model (Equation 4.1) to test the joint effects of the variables across firms' sizes. The results, reported in Table 4-5, show that, in both the AIM and Main market, the relationship between the effective tax rate and debt maturity is significant for large companies but not for small companies. The positive relationship between the effective tax rate and long-term debt implies that the higher the tax rate, the more likely firms are to have interest tax shields, and thus long-term debt is preferred. The effective tax rate is not significant for small companies. However, consistent with the tax hypothesis, the relationship between the effective tax rate and long-term debt is positive. Tamari (1980) and Osteryoung et al. (1995) argue that small firms have greater variability in profits, and they are more likely to gain or lose a large amount of funds. Therefore, my results suggest that the income variability and lower profit margin of those companies may result in a lower tax incentive.

In addition, I use the term structure of interest rate as an additional proxy for the tax hypothesis. The results show that in both markets, as is consistent with the tax hypothesis, the term structure of interest rate is significantly positively related to long-term debt across firms' sizes. The findings are in line with the argument of Brick and Ravid (1985) that the value of the firm is an increasing function of long-term debt when the term structure of interest rate is upward sloping. My empirical results are in line with those of Antoniou et al. (2006), who find a significant and positive relationship between term structure of interest rate and debt maturity in the UK and Germany. On the other hand, Barclay and Smith (1995), and Guedes and

Opler (1996) do not support the tax hypothesis in the US when they use the term structure of interest rate.

The signalling hypothesis predicts a negative relationship between long-term debt and firm's quality (Flannery, 1986). In line with the signalling prediction, I find that, in the Main market, the effects of abnormal earnings as a proxy for firm's quality on debt maturity are negative. In contrast, the table shows that, in AIM, the coefficients of abnormal earnings are not significant although they have a negative effect on debt maturity. Previous empirical studies provide mixed findings. Ozkan (2000) presents little evidence for the signalling hypothesis in contrast to Stohs and Mauer (1996), who find that firms with larger abnormal earnings tend to use short-term debt.

My results do support the matching hypothesis. I find that the relationship between long-term debt and tangibility ratio as a proxy for the asset maturity is positive and statistically significant. Long-term debt is used more by firms with greater asset tangibility. This result is consistent across firms' sizes in both markets. The findings are in line with Ozkan (2000, 2002), who supports the matching hypothesis in the UK. However, some other empirical studies report mixed evidence for the matching hypothesis. Antoniou et al. (2006) find no support for it in the UK, as against the findings in France and Germany.

Table 4-5 shows that for small companies in both markets, market-to-book, used as a proxy for growth opportunities, is negatively related to long-term debt, in line with the agency theory predictions. Myers (1977) argues that firms with greater growth opportunities use shorter maturity of debt to mitigate the underinvestment problem. My findings are consistent with Barclay and Smith (1995) and Guedes and Opler (1996) but different from Stohs and Mauer (1996) and Antoniou et al. (2006), who report mixed evidence. However, in line with the finding of Scherr and Hulburt (2001) in the US, the coefficient of the market-to-book ratio is insignificant for the smallest AIM companies.

I use leverage as a control variable, following Leland and Toft (1996), who show that firms with higher leverage choose longer maturity of debt to offset the higher probability of liquidity risk, and hence a positive relationship between leverage and debt maturity is predicted. Empirical studies (e.g., Stohs and Mauer, 1996) find that long-term debt is directly related to leverage. My results also confirm the positive and significant effects of leverage on debt maturity across firms' sizes in the Main market but not in AIM. I find a negative and significant relationship between long-term debt and leverage for AIM companies. This result is in line with the argument of Dennis et al. (2000) that firms with higher leverage are more likely to suffer from the underinvestment problem and hence the use short-term debt to mitigate such a problem. As discussed by Smith and Warner (1979), small companies are more likely to face potential conflicts between shareholders and debt-holders and therefore short-term debt to alleviate the underinvestment problem. Given the fact that companies quoted in AIM are smaller than those in the Main market, my results show that AIM companies with higher leverage use shorter maturity of debt, supporting the notion of an underinvestment problem. These companies are also more likely to be more risky, thus, they will lower long-term debt capacity. To assess further this risk effect, I control for size, inasmuch as smaller companies face a greater business risk, in addition to the agency costs of debt. I expect a positive relationship between size and debt maturity. My results support the significant and positive effect of size on debt maturity across firms' sizes in both markets. These results are consistent with Barclay and Smith (1995) but conflict with

Stohs and Mauer (1996), who find a strong negative relationship between size and debt maturity.

I also control for overseas operation and traded debt. In the Main market, the proportion of overseas sales over total sales is positively related to the maturity structure of debt. The results are highly significant and positive across firms' sizes, except for the smallest companies (Fledgling), which show a negative relationship between debt maturity and overseas activities. The findings indicate that large and medium companies have opportunities to operate in other countries, resulting in significant coefficients. In contrast, the results for AIM are not significant. AIM companies are less likely to have overseas activities, which suggest an insignificant relationship between debt maturity and foreign operations. Finally, the table shows that companies which use traded debt (non-bank debt) have longer maturity of debt. The results are highly significant across firms' sizes in the Main market but not in AIM, probably because AIM companies may not be able to use extensively traded debt.

Table 4-5: Determinants of Debt Maturity Structure across Firms' Sizes in the AIM and Main Market

	Main Market				AIM		
	FTSE 100	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
ABE	-0.228**	-0.527***	-0.505***	-0.001	-0.030	-0.007	-0.001
	(-2.04)	(-10.86)	(-12.43)	(-0.25)	(-1.15)	(-1.42)	(-0.25)
LNMK	0.032**	0.018**	0.001**	0.087***	0.056*	0.077***	0.070**
	(1.98)	(1.86)	(2.18)	(10.11)	(1.78)	(4.79)	(2.43)
MB	-0.025***	-0.002***	-0.004***	-0.063***	-0.003**	-0.021**	0.010
	(-2.66)	(-2.58)	(-2.95)	(-13.11)	(2.17)	(-2.49)	(0.30)
TG	0.157*	0.748***	0.428***	0.962***	0.332*	0.902**	0.525***
	(1.73)	(9.21)	(5.51)	(16.20)	(1.72)	(2.32)	(3.95)
EFTR	0.027**	0.017*	0.013	0.004	0.307***	0.072***	0.005
	(1.95)	(1.81)	(1.57)	(0.31)	(3.40)	(3.89)	(0.42)
TM	0.063***	0.046***	0.038***	0.04***	0.060*	0.043***	0.090**
	(3.33)	(3.50)	(2.70)	(4.10)	(1.83)	(2.80)	(2.40)
Leverage	0.152*	0.419***	0.440***	-0.108	0.003	-0.166**	-0.533***
	(1.75)	(6.13)	(6.27)	(-1.55)	(0.01)	(-2.21)	(-3.47)
Overseas sale/TS	0.114**	0.016***	0.087*	-0.055*	0.070	0.068	-0.017
	(2.56)	(2.76)	(1.90)	(1.75)	(0.87)	(1.55)	(-0.10)
D. Traded debt	0.073***	0.027*	0.037**	0.034**	0.026	0.015	0.017
	(2.68)	(1.67)	(2.03)	(2.35)	(0.48)	(0.69)	(0.28)
C	0.242	0.241**	0.401***	-0.002	0.211	0.106**	0.351
	(1.36)	(2.22)	(5.30)	(-0.50)	(1.31)	(2.13)	(4.50)

Adjusted R^2	0.574	0.573	0.693	0.780	0.811	0.738	0.816
F-statistic	6.895	6.231	5.300	7.655	3.900	4.506	3.698
Prob (F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N. Observations	545	1446	1944	2042	442	1381	389

This table shows the empirical results of debt maturity structure across firms' sizes using the fixed effects model.

$$LTDR_{i,t} = \sum_{j=1}^{J} B_j X_{i,j,t} + (\alpha_i + \alpha_t) + \varepsilon_{i,t} Equation \text{ (4.1)}$$

The dependent variable is LTD/TD, defined as book value of long-term debt divided by total debt. The explanatory variables are: ABE is abnormal earnings computed as earnings per share in year *t+1* minus earnings per share in year *t*, divided by share price in year *t* (EPS_{t+1}-EPS_t/SP_t). In line with previous studies (e.g., Rajan and Zingales, 1995; Antoniou et al., 2008), I compute the market-to-book ratio, MB, as the market value of equity plus the book value of assets less the book value of equity, all divided by the book value of assets. LNMK is natural logarithm of market value of a firm. Leverage measured as total debt divided by total assets. TG is tangibility computed as tangible fixed assets divided by total assets. EFTR is an effective tax rate computed as tax expenses divided by earnings before tax and interest. TM is term structure of interest rate which is calculated as the differences between the month-end yields on 10-year government bond and three-month treasury bills (BY_{10y}-BY_{3m}). Overseas sales/TS, is foreign sales divided by total sales. D. Traded debt is a dummy variable set to one if a company use non-bank debt. T-statistic are reported in parentheses, and ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

4.4.4 Dynamic Framework of Debt Maturity Structure

In this section, I study the partial adjustment model of debt maturity structure in order to find the adjustment speed (Equation 4.4). I also attempt to find out whether the specific characteristics of small firms might result in different speeds of adjustment towards the target level of debt maturity. Some previous studies do not consider small companies because of the higher transaction costs that those companies are involved in. However, my sample includes both small and large companies listed on the AIM and Main market.

For the purposes of this section, I apply a dynamic GMM method. Although, previous literature uses the GMM method of the first differences (GMM-DIF), recent studies argue that the GMM-DIF estimator has a problem with weak instruments (e.g., Antoniou et al., 2008). The GMM-system method considers lagged regressors in both levels and first differences to reduce the finite sample bias substantially by exploiting the additional moment conditions (Blundell and Bond, 1998). Therefore, I use the two-step GMM system and the first lag of all explanatory variables and the second lag of dependent variable are used as instruments.

Table 4-6 also presents the Sargan statistic (value of the GMM objective function at estimated parameters) that tests the null hypothesis of over-identifying restrictions. Actually, the tested hypothesis concerns whether the instrumental variables are uncorrelated to the set of residuals. The p-values show that the tests of over-identifying restrictions are not rejected, and therefore the instruments are valid by this criterion. Therefore, the results indicate that the GMM estimation can be applied to these data.

Panel A in Table 4-6 shows that companies quoted in the Main market eliminate their deviation more slowly than companies listed on AIM, after controlling for other variables. The adjustment speed in the Main market is $\lambda=1-0.625=0.375$, compared to AIM: $\lambda=1-0.433=0.567$. These results indicate that Main companies complete their target debt maturity deviation in about three years. However, in AIM, companies complete their deviation in about two years. The results of descriptive statistics reported in Table 4-4 show that AIM companies rely more on short-term debt than Main companies. These findings suggest that AIM companies have lower costs of adjustment and hence are able to move towards their target long-term debt more quickly than Main companies.

Panel B reports that in the Main market, the speed of adjustment for the largest companies is $\lambda=1-0.615=0.385$, compared to that of the smallest companies: $\lambda=1-0.460=0.540$; thus both coefficients are statistically and economically significant. The results suggest that large and small companies eliminate their deviation from their optimal debt maturity by about 38% and 54%, respectively, each year. This indicates a faster adjustment speed for the smallest companies in the Main market. The results are consistent with those of Flannery and Rangan (2006) for the case capital structure, not debt maturity, adjustment, as they show that large companies move towards their target leverage less rapidly than small companies. They argue that large companies rely more on public debt than on private funds. Public funds are more expensive, and thus large companies would have greater adjusting costs. In line with Flannery and Rangan (2006), I find that large companies are more likely to use non-bank debt, thus have lower adjustment speed. Moreover, large companies may have lower costs when they are away from their target leverage due to the lesser volatility of their cash flows, resulting in lower speeds of adjustment for large companies. These arguments are also likely to be applied to debt maturity adjustments for large and small companies in my sample.

Interestingly, with respect to results in AIM, I find that smaller companies listed on AIM adjust less rapidly than larger AIM companies. The speeds of adjustment for the largest and smallest AIM companies are 0.506 ($\lambda=1-0.494$) and 0.337 ($\lambda=1-0.663$), respectively, suggesting that the largest companies adjust to their target ratio in less than two years while the smallest companies adjust in about three years. The findings show that in AIM, the largest companies adjust to their target level faster than the smallest companies. It is possible that the financial constraints of AIM companies result in greater transaction costs for small companies, making them fall short of their target.

Overall, the results support the dynamic model of debt maturity structure across firms' sizes in the AIM and Main market. However, the speed of adjustment across firms' sizes depends on the market on which they are listed. In the Main market, the findings suggest that small companies adjust more rapidly than large ones but in AIM, small companies adjust less rapidly than large companies, suggesting that for AIM small companies, the cost of adjustment is more relevant than the cost of being away from their target, and thus adjust at a slower speed.

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Table 4-6: The Partial Adjustment Model of Debt Maturity Structure

Panel A: Determinants of Debt Maturity in the AIM and Main Market

	Main Market	AIM
LT/TD_{t-1}	0.625***	0.433***
	(17.72)	(42.34)
ABE_t	-0.038**	-0.021***
	(-2.15)	(-4.15)
$LNMK_t$	0.027***	0.088***
	(5.98)	(42.32)
MB_t	-0.022***	-0.005**
	(-3.91)	(2.18)
TG_t	0.053**	0.118***
	(1.98)	(8.87)
$EFTR_t$	0.019***	0.108***
	(3.98)	(8.01)
TM_t	0.031***	0.032***
	(7.18)	(17.56)
$Leverage_t$	0.261***	-0.172***
	(3.62)	(-8.17)
Overseas $sale_t/TS_t$	0.026***	0.008
	(3.87)	(1.36)
D. Traded $debt_t$	0.023***	0.024*
	(2.77)	(1.75)

Sargan test	196.39	224.48
p-value	0.341	0.193
N. Observations	4664	1532

Panel B: Determinants of Debt Maturity Structure across Firms' Sizes in the AIM and Main Market

	Main Market				AIM		
	FTSE 100	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
LT/TD_{t-1}	0.615***	0.636***	0.324***	0.460***	0.494***	0.535***	0.663***
	(55.48)	(60.23)	(29.09)	(74.28)	(15.84)	(14.23)	(5.66)
ABE_t	-0.411***	-1.137***	-0.137***	0.020***	-0.163**	-0.187***	0.002**
	(-6.17)	(-8.34)	(-8.87)	(5.46)	(-2.20)	(-3.59)	(2.06)
$LNMK_t$	0.026***	0.057***	0.073***	0.092***	0.062***	0.098***	0.092***
	(12.75)	(2.69)	(5.48)	(31.61)	(12.48)	(8.87)	(8.71)
MB_t	-0.005**	-0.015***	-0.006*	-0.070***	-0.006	-0.001***	-0.020***
	(-2.09)	(-7.13)	(-1.90)	(-16.17)	(-0.81)	(-4.65)	(-8.95)
TG_t	0.053**	0.081***	0.131***	0.092***	0.129**	0.094***	0.178***
	(2.39)	(9.94)	(4.69)	(8.60)	(2.38)	(4.17)	(3.46)
$EFTR_t$	0.138***	0.059***	0.010**	0.018	0.381***	0.075**	0.008
	(7.93)	(6.85)	(2.46)	(1.10)	(6.16)	(2.02)	(1.18)
TM_t	0.036***	0.023***	0.018***	0.028***	0.025***	0.035***	0.046***
	(4.00)	(3.79)	(8.25)	(7.84)	(3.45)	(8.34)	(5.62)
$Leverage_t$	0.122**	0.300***	0.321***	0.164***	-0.033**	-0.200***	0.062

	(2.14)	(4.89)	(11.55)	(16.77)	(-2.33)	(-4.29)	(0.88)
Overseas sale$_t$/TS$_t$	0.005**	0.085**	0.006	0.025	-0.135***	-0.010***	0.038
	(2.57)	(2.23)	(1.36)	(0.76)	(-3.67)	(-3.05)	(0.74)
D. Traded debt$_t$	0.029**	0.057***	0.030***	0.023***	0.030	0.008	0.039
	(2.34)	(9.62)	(5.46)	(10.16)	(1.16)	(1.11)	(1.29)
Sargan test	148.29	176.82	175.25	18.769	182.64	97.12	157.68
p-value	0.547	0.344	0.546	0.761	0.998	1.000	0.849
N. Observations	462	1199	1499	1504	300	958	274

This table reports the adjustment speeds based on GMM system including fixed effects and year dummies and the first lag of all explanatory variables and the second lag of dependent variable are used as instruments.

$$LTDR_{i,t} = (1-\delta)\, LTDR_{i,t-1} + \delta \sum_{j=1}^{J} B_i X_{i,j,t} + \varepsilon_{i,t} \qquad Equation(4.4)$$

This sample spans from 1995 to 2008 and t-statistics are reported in the parentheses. Panel A reports the result for the AIM and Main market. Panel B shows the results across firms' sizes. The dependent variable is LTD/TD$_t$ defined as book value of long-term debt divided by total debt at time *t*. The GMM system includes the lag of dependent variables as an explanatory factor (LT/TD$_{t-1}$). The other explanatory variables are reported at time *t* including: ABE is abnormal earnings computed as earnings per share in year *t+1* minus earnings per share in year *t*, divided by share price in year *t* (EPS$_{t+1}$-EPS$_t$/SP$_t$). In line with previous studies (e.g., Rajan and Zingales, 1995; Antoniou et al., 2008), I compute the market-to-book ratio, MB, as the market value of equity plus the book value of assets less the book value of equity, all divided by the book value of assets. LNMK is natural logarithm of market value of a firm.Leverage measured as total debt divided by total assets. TG is tangibility computed as tangible fixed assets divided by total assets. EFTR is an effective tax rate computed as tax expenses divided by earnings before tax and interest. TM is term structure of interest rate which is calculated as the differences between the month-end yields on 10-year government bond and three-month treasury bills (BY$_{10y}$-BY$_{3m}$). Overseas sale/TS, is foreign sales divided by total sales. D. Traded debt is a dummy variable set to one if a company use non-bank debt. (T-statistic are reported in parentheses, and ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively. Sargan statistic is a statistical test used to check for over-identifying restrictions in the GMM estimation.

4.4.5 Effects of Macroeconomic Conditions on the Adjustment Speed

I investigate the effect of macroeconomic factors on the speeds of adjustment in both markets. For the purposes of this section, I report the results based on Equation (4.6), which includes the determinants of speed of adjustment in the dynamic model of debt maturity structure. Equation (4.6) includes all parameters in a single estimation. In Equation (4.6), the focus is on α_1, which shows the coefficient of the interaction between the lagged debt maturity and macroeconomic factors determining the adjustment speed. Table 4-7 presents the results of Equation (4.6) based on the GMM estimation. The p-values show that tests of over-identifying restrictions are not rejected, and hence the instruments are valid by this criterion. The results, therefore, indicate that GMM estimation can be applied to these data. It is important to pay attention to the sign of α_1 in Equation (4.6), which is negative; the sign of the estimated coefficients should be interpreted accordingly. The estimated coefficients that are negative there should be considered positive here and vice-versa.

The results indicate that the term structure of interest rate has a positive and significant effect on the speed of adjustment. Since high term structure is a proxy for an economic growth, the results suggest that firms increase their debt maturity when the economic prospects are good. This effect is observed in both the AIM and Main market where debt maturity is positively affected by the spread.

In addition, in line with the macro-economic effects, Panel A of Table 4-7 reports that in both markets, the default spread and TED spread as proxies for risk have significant and positive effects on the speed of adjustment. These results are in line with those of Drobetz and Wazenried (2006), who study the macroeconomic conditions on the adjustment speed towards target leverage. They argue that in uncertain economic situations, companies cannot afford to stray from the optimal capital ratio, and thus adjust faster. An alternative interpretation is that companies try to correct their deviation more quickly in response to global risk signals. They attempt to move towards their target ratio to avoid unexpected refinancing costs. Recently, Binsberger et al. (2011) argue that the cost of debt is high in a bad economic condition measured by credit spread, and thus reduce debt financing. Following their argument, my results suggest that in an expected bad economic condition, firms use more long-term debt to avoid debt refinancing costs and thus have higher adjustment speed.

I report the results of the determinants of the speed of adjustment across firms' sizes in Panel B of Table 4-7. The results show that, in both the AIM and Main market, TED spread and default spread have positive and significant effects on speeds of adjustment.

Consistent with my hypotheses, I find that, in both markets, the term structure has a positive and significant impact on the speed of adjustment. This result is statistically significant for both markets. However, the smallest companies in the Main market display a negative and insignificant relationship between the term structure and the adjustment speed.

Table 4-7: Determinants of the Speed of Adjustment in the AIM and Main Market

Panel	Main Market	AIM
LT/TD$_{t-1}$	0.569***	0.387***
	(9.46)	(6.98)
T. SP* LT/TD$_{t-1}$	-0.024	-0.071***
	(-1.07)	(-3.25)
J-statistic	89.881	74.031
Instrument rank	109	108
p-value	0.115	0.447
LT/TD$_{t-1}$	0.665***	0.312***
	(11.462)	(6.824)
TED. SP* LT/TD$_{t-1}$	-1.459***	-0.570***
	(-14.24)	(-8.10)
J-statistic	86.149	68.903
Instrument rank	109	108
p-value	0.178	0.645
LT/TD$_{t-1}$	0.860***	0.580***
	(12.70)	(6.638)
Default. SP* LT/TD$_{t-1}$	-1.022***	-0.613***
	(-15.668)	(-8.213)
J-statistic	87.524	89.935
Instrument rank	108	109
p-value	0.162	0.102

(Table 4-7 continued) Panel B: Determinants of the Speed of Adjustment across Firms' Sizes in the AIM and Main Market

	Main Market				AIM		
	FTSE 100	**FTSE 250**	**FTSE Small Cap**	**FTSE Fledgling**	**Large AIM**	**Medium AIM**	**Small AIM**
LT/TD_{t-1}	0.599***	0.631***	0.352***	0.235***	0.410	0.528***	0.592***
	(6.54)	(6.35)	(3.90)	(6.86)	(0.55)	(4.18)	(5.70)
T. SP* LT/TD_{t-1}	-0.070*	-0.071***	-0.057**	0.027	-0.080*	-0.054*	-0.068*
	(-1.76)	(-2.82)	(-2.24)	(1.09)	(-1.81)	(-1.69)	(-1.83)
J-statistic	47.982	78.842	78.392	81.991	44.388	78.231	60.827
Instrument rank	83	109	109	101	81	104	92
p-value	0.514	0.371	0.371	0.103	0.581	0.233	0.346
LT/TD_{t-1}	0.562***	0.636***	0.391**	0.340***	0.359***	0.457***	0.515***
	(5.96)	(6.67)	(2.06)	(5.16)	(2.87)	(6.41)	(3.98)
TED. SP* LT/TD_{t-1}	-0.676***	-1.051***	-0.678**	-0.643***	-0.473***	-0.721***	-0.284***
	(-2.64)	(-11.44)	(-2.12)	(-8.35)	(-4.22)	(-7.23)	(-3.15)
J-statistic	52.717	73.135	90.980	1.595	57.025	75.276	56.135
Instrument rank	83	109	109	101	81	104	92
p-value	0.332	0.540	0.102	0.108	0.150	0.311	0.545
LT/TD_{t-1}	0.780***	0.626***	0.426***	0.381***	0.342***	0.593***	0.536***
	(5.79)	(8.56)	(7.14)	(7.42)	(3.69)	(6.37)	(6.94)
Default. SP* LT/TD_{t-1}	-1.219***	-0.736***	-0.637***	-0.568***	-0.430***	-0.610***	-0.308***
	(-6.15)	(-11.44)	(-12.03)	(-10.44)	(-4.78)	(-7.69)	(-4.98)
J-statistic	52.576	84.778	82.202	80.317	49.833	80.171	66.350
Instrument rank	83	109	109	101	81	104	92
p-value	0.337	0.206	0.266	0.361	0.361	0.190	0.211

This table shows the empirical results of Equation (4.6) using the GMM dynamic panel data for the companies listed on the AIM and Main market and the first lag of all explanatory variables and the second lag of dependent variable are used as instruments.

$$LTDR_{i,t} = (1-\alpha_0)\, LTDR_{i,t-1} - \alpha_1 Z_{i,t} LTDR_{i,t-1} + \alpha_0 \sum_{j=1}^{J} B_j X_{i,j,t} + \alpha_1 \sum_{\mathrm{j}=1}^{J} B_j Z_{i,t} X_{\mathrm{i,j},t} + \varphi_i + \omega_t + u_{i,t} \quad Equation\ (4.6)$$

The dependent variable is LTD/TD, defined as book value of long-term debt divided by total. The explanatory variables are: LT/TD_{t-1}, defined as the lagged book value of long-term debt divided by total debt. Default. SP* LT/TD_{t-1}, computed as interaction term between default spread (yield on US low-grade, BAA, and high-grade, AAA, corporate bonds) and lagged dependent variable. TED. SP* LT/$TD_{t-1,}$ defined as interaction between (the difference between three-month LIBOR rate and three-month yield on UK Treasury bills) and lagged dependent variable. T. SP* LT/TD_{t-1}, computed as term spread (the difference between the month-end yields on 10-year government bond and three-month treasury bills) and lagged dependent variable. T-statistic are reported in parentheses, and ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively. J-statistic is also reported, which is simply the Sargan statistic (value of the GMM objective function at estimated parameters).

4.4.6 Post-IPO Changes in Debt Maturity

In this section, I try to answer the question of how the maturity structure changes across firm's life cycle as firms become mature, i.e., older, larger and with low growth opportunities. I focus on firms that went public (IPOs) during my sample period. Table 4-8 reports the means and medians of the firms' debt maturity, leverage, market value and market-to-book ratio. I use FTSE 350 (aggregates FTSE 100 and 250) to allow for more observations.

Table 4-8 shows the main firms' characteristics from the time of going public (IPO) to four years after the IPO. For the Main market, the mean (median) of maturity increases after the IPO for large firms (FTSE 350) but for small firms (FTSE Fledgling) the maturity is constant. For AIM, the mean (median) of maturity is relatively constant, decreasing for small firms. In addition, the Main market shows the mean (median) of leverage increasing significantly for large firms (FTSE 350) and slightly for medium (FTSE Small Cap) and small (FTSE Fledgling) firms. This panel also indicates that for AIM, leverage is low and relatively constant after the IPO. Moreover, for the Main market, size increases for large (FTSE 350) firms. However, for medium (FTSE Small Cap) and small (FTSE Fledging) firms, size remains relatively constant. For AIM, size is relatively constant but decreases for small firms. Finally, the results for growth opportunities (MB) show that in the Main market, MB decreases for large firms (they become mature), while for the remaining firms, MB stays relatively constant. In AIM, MB decreases but is higher for small firms.

Overall, as companies get older (4 years after IPO), maturity increases, leverage increases, and MB decreases. The differences in means (medians) between the time of IPO and year (+4) is reported for the main characteristics. I also present these results in Figure 4-1. Brav (2009) finds that after going public, companies issue more equity and thus their leverage decreases accordingly the day after the IPO. However, he does not investigate how leverage changes over longer time frames in the post IPO period. My results in Table 4-8 shows that Main and AIM companies differ substantially in the way they change their leverage and debt maturity four years after their IPO. In the Main market, my empirical evidence shows that, in contrast to small companies, large companies increase the maturity of their debt, probably because of their higher tax benefits and lower business risk. In addition, their growth opportunities decreases after the IPO significantly, suggesting that they are less likely to suffer from the agency conflict between shareholders and debt-holders in the form of underinvestment problems, and thus their leverage and maturity of debt increases in the post-IPO period. In AIM, the structure of debt maturity is not dependent on size, as both large and small companies do not change their debt maturity significantly. One possible explanation for this result is to do with the lack of debt market access for AIM companies.

Table 4-8: Firms' Characteristics at the Time of Going Public (IPO) and the Post-IPOs

Main Market:

Main Market	**ftse350**				**Small-Cap**				**Fledgling**			
Means	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**
IPO	0.67	0.18	1256.37	2.80	0.66	0.15	160.20	3.13	0.56	0.14	44.88	3.21
+1	0.77	0.25	1922.02	1.61	0.62	0.15	159.62	3.08	0.55	0.17	35.62	2.76
+2	0.77	0.26	1644.54	1.20	0.63	0.17	144.90	2.82	0.58	0.18	27.20	2.74
+3	0.78	0.26	2530.37	1.44	0.63	0.18	149.45	2.82	0.60	0.18	24.58	2.37
+4	0.84	0.28	2854.76	1.41	0.78	0.22	145.18	2.30	0.62	0.18	31.99	2.15
T-statistics of the differences in Means between IPO and year (+4)												
t-test	-2.38**	-1.78*	-2.08***	2.68***	-0.76	-1.22	0.18	1.99**	-0.87	-0.378	0.74	2.76***
Medians	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**
IPO	0.71	0.11	811.07	1.80	0.72	0.06	147.67	2.39	0.57	0.10	31.05	2.47
+1	0.91	0.20	875.05	1.12	0.66	0.09	148.90	2.41	0.58	0.16	30.13	2.25
+2	0.82	0.21	1051.21	1.04	0.70	0.13	133.58	2.10	0.68	0.17	24.70	1.98
+3	0.89	0.27	898.20	0.91	0.76	0.17	109.91	1.05	0.70	0.17	17.02	1.59
+4	0.95	0.26	753.40	0.82	0.87	0.23	135.38	1.98	0.60	0.15	30.69	1.45
Wilcoxon-Mann-Whitney tests of the differences in Medians between IPO and year (+4)												
Wilcoxon test	2.96***	2.62**	1.04	2.21**	1.13	1.59	1.40	2.69***	0.91	0.41	0.54	3.06***

(Table 4-8 continued)

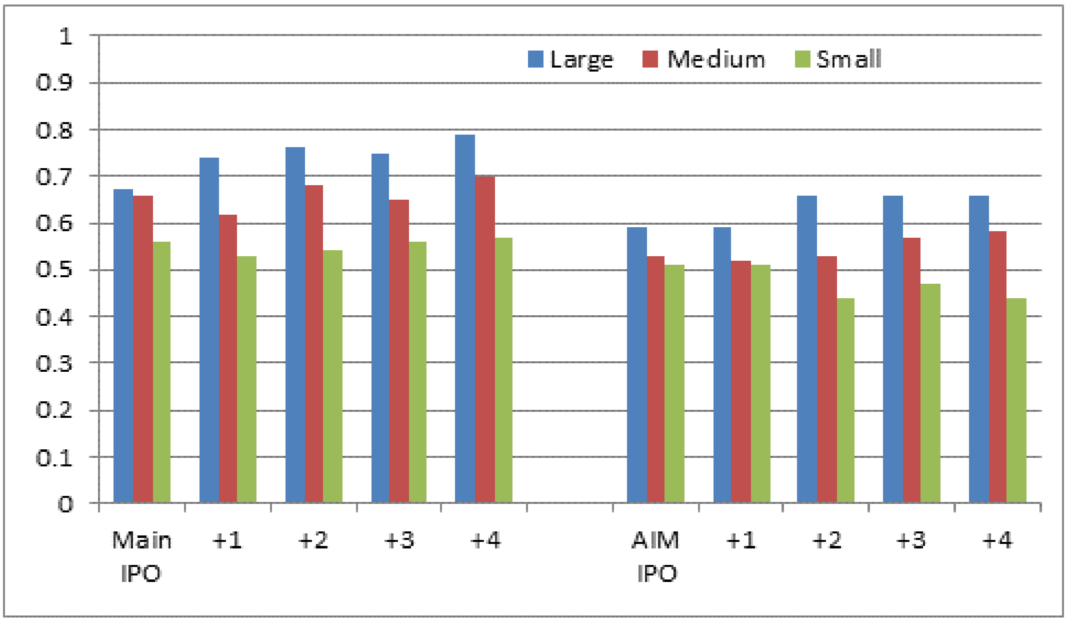
AIM:

AIM	**AIM Large**				**AIM Medium**				**AIM Small**			
Means	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**
IPO	0.59	0.12	159.58	3.02	0.53	0.14	15.60	3.56	0.51	0.12	2.70	3.54
+1	0.59	0.15	192.44	2.35	0.52	0.13	15.59	3.03	0.51	0.13	2.31	3.15
+2	0.66	0.16	107.54	2.32	0.53	0.14	13.26	2.91	0.44	0.11	2.30	2.35
+3	0.66	0.16	101.73	2.10	0.57	0.15	15.62	2.88	0.47	0.18	2.19	2.24
+4	0.66	0.14	109.59	2.10	0.58	0.14	14.86	2.58	0.44	0.16	2.47	2.11
T-statistics of the differences in Means between IPO and year (+4)												
t-test	-1.30	-0.84	0.46	1.80*	-1.065	-0.10	0.75	1.96**	1.17	-1.40	1.22	2.45**
Medians	**LT/DTD**	**TD/TA**	**MK(£M)**	**MB**	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**	**LTD/TD**	**TD/TA**	**MK(£M)**	**MB**
IPO	0.61	0.05	57.80	2.04	0.56	0.07	12.56	2.98	0.57	0.01	2.58	2.80
+1	0.65	0.12	62.21	1.65	0.54	0.08	11.20	2.58	0.53	0.04	2.18	2.57
+2	0.68	0.13	64.03	1.70	0.55	0.10	10.32	2.65	0.40	0.02	1.97	2.49
+3	0.69	0.10	73.45	1.53	0.56	0.10	11.29	2.02	0.46	0.12	2.12	2.15
+4	0.69	0.11	75.39	1.35	0.63	0.10	11.32	2.00	0.46	0.12	2.52	2.21
Wilcoxon-Mann-Whitney tests of the differences in Medians between IPO and year (+4)												
Wilcoxon test	1.11	1.46	2.61**	2.87***	1.72*	0.89	1.63	2.19***	1.13	1.47	1.29	2.84***

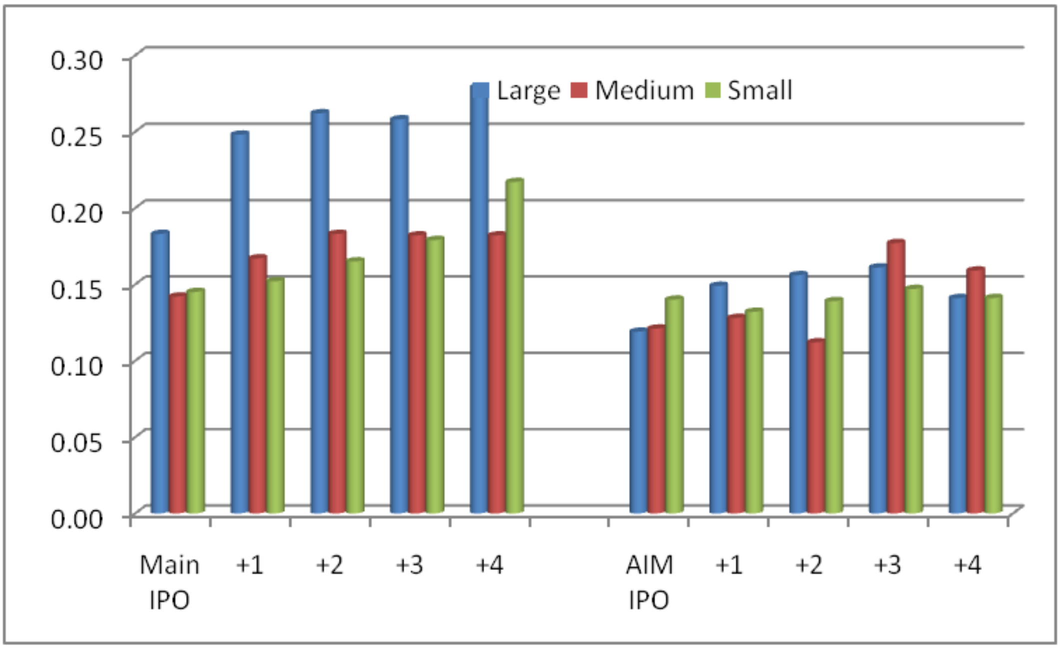
LTD/TD defined as book value of long-term debt divided by total debt. TD/TA is leverage, defined as total debt divided by total assets. MK (£m) is firm's market capitalisation. In line with previous studies (e.g., Rajan and Zingales, 1995; Antoniou et al., 2008), I compute the market-to-book ratio, MB, as the market value of equity plus the book value of assets less the book value of equity, all divided by the book value of assets.

Figure 4-1: Firms' Characteristics of the AIM and Main Market

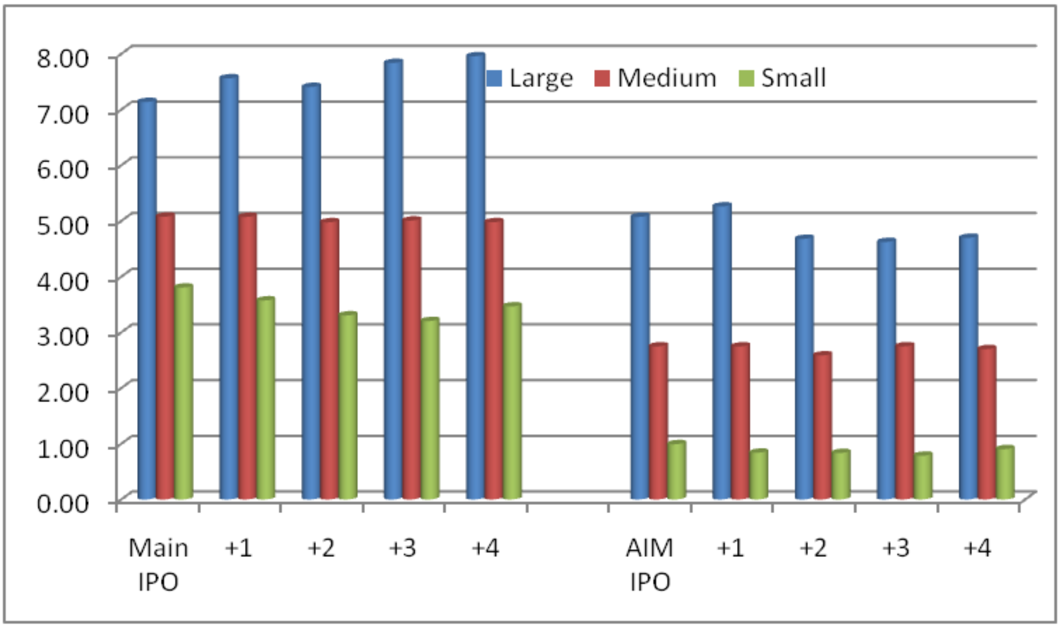
Panel A: Maturity (LT/TD)



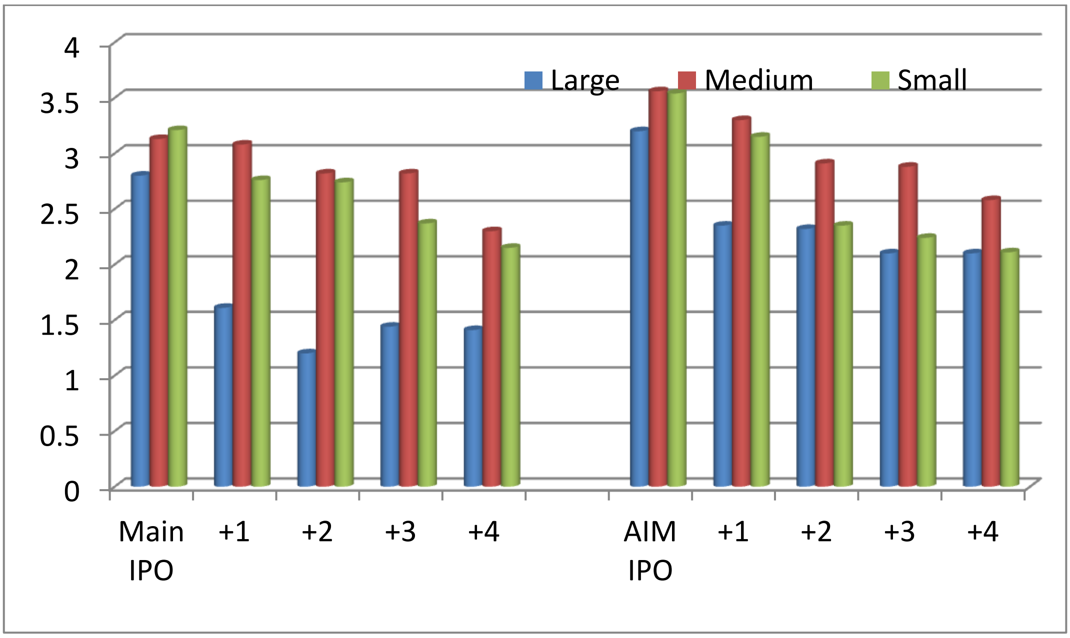
Panel B: Leverage (TD/TA)



Panel C: Size (Log of market capitalisation)



Panel D: Growth Opportunities (MB)



This figure shows how the main characteristics of firms change over the post-IPO period. Panel A shows debt maturity, which is long-term debt divided by total debt. Panel B shows leverage, which is computed as total debt over total assets. Panel C shows size, which is the natural logarithm of firms' market capitalisations. Panel D shows growth opportunities, measured by market-to-book, and computed as the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets.

Finally, I repeat the analyses of Equation (4.4) shown in Table 4-6 to find the adjustment speed in a dynamic framework of debt maturity structure for the IPO sample. The results are reported in Table 4-9, which shows that, among firms with access to the public market, IPOs in AIM adjust to their target debt maturity faster than IPOs in the Main market. The adjustment speed is 0.513 (λ=1−0.487) for the Main market and 0.619 (λ=1−0.381) for AIM, suggesting that for Main companies, it takes about two years to adjust towards their target ratio while AIM companies adjust in about one year and half. These results confirm that companies listed on the Main market have greater access to long-term debt and hence have higher adjustment speed. Overall, the results for other coefficients are consistent with my earlier findings.

I also report the Sargan test to test the null hypothesis of over-identifying restrictions. Actually, the tested hypothesis concerns whether the instrumental variables are uncorrelated to the set of residuals. The p-values show that the tests of over-identifying restrictions are not rejected; therefore, the instruments are valid by this criterion. Hence, the system-GMM estimation is a good predictor in this model.

Table 4-9: The Partial Adjustment Model of Debt Maturity Structure (IPO Sample)

	Main	AIM
LT/TD_{t-1}	0.487***	0.381***
	(16.42)	(62.81)
ABE_t	-0.350***	-0.004
	(-6.09)	(-1.12)
$LNMK_t$	0.040***	0.073***
	(7.31)	(39.95)
MB_t	-0.023***	-0.006***
	(-4.83)	(-6.98)
TG_t	0.064*	0.275***
	(1.71)	(8.89)
$EFTR_t$	0.116***	0.107***
	(3.55)	(5.86)
TM_t	0.043***	0.181***
	(10.66)	(16.06)
$Leverage_t$	0.447***	-0.179***
	(6.41)	(-26.14)
Overseas $sale_t/TS_t$	0.813***	0.002
	(2.60)	(0.43)
Traded $debt_t/TD_t$	0.013***	0.060***
	(11.20)	(14.34)
Sargan test	168.60	170.66
p-value	0.538	0.489
N. Observations	860	1,392

This table reports the adjustment speeds based on GMM system including fixed effects and year dummies for IPOs. The first lag of all explanatory variables and the second lag of dependent variable are used as instruments

$$LTDR_{i,t} = (1-\delta)\, LTDR_{i,t-1} + \delta \sum_{j=1}^{J} B_j X_{i,j,t} + \varepsilon_{i,t} \qquad Equation(4.4)$$

This sample spans from 1995 to 2008 and t-statistics are reported in the parentheses. Panel A reports the result for the Main and AIM. Panel B shows the results across firms' sizes. The dependent variable is LTD/TD_t defined as book value of long-term debt divided by total debt at time *t*. The GMM system includes the lag of dependent variables as an explanatory factor (LT/TD_{t-1}). The other explanatory variables are reported at time *t* including: ABE is abnormal earnings computed as earnings per share in year *t+1* minus earnings per share in year *t*, divided by share price in year *t* (EPS_{t+1}-EPS_t/SP_t). EFTR is an effective tax rate computed as tax expenses divided by earnings before tax and interest. MB is the market-to-book ratio and computed as the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets.. LNMK is the natural logarithm of market value of a firm. Leverage measured as total debt divided by total assets. TG is tangibility computed as tangible fixed assets divided by total assets. TS is term structure of interest rate which is calculated as the differences between the month-end yields on 10-year government bond and three-month treasury bills (BY_{10y}-BY_{3m}). (T-statistic are reported in parentheses, and ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively. J-statistic is also reported, which is simply the Sargan statistic (value of the GMM objective function at estimated parameters).

4.5 Conclusions

I examine the determinants of the maturity structure of debt across firms' sizes listed on the AIM and Main market. The sample includes 2,894 firms over the period from 1995 to 2008. This chapter investigates the theories discussed in the literature of debt maturity structure, including the agency, signalling, matching, and tax hypotheses. As far as I am aware, this analysis is distinctive, inasmuch as no previous study has investigated the structure of debt maturity with reference to the market quotation as well as to the firm's entire IPO life cycle. I control for market quotation by distinguishing between the two markets in the UK, a procedure which has not been previously followed, to the best of my knowledge. I find that the highly regulated market (Main) differs from the lightly regulated market (AIM) in the maturity structure of debt as well as in the drivers of debt maturity. I also study the characteristics of IPOs in both markets, where those characteristics vary relatively in the post-IPO period.

For the purposes of this study, I use the partial adjustment model of debt maturity in the GMM dynamic panel data to find speeds of adjustment across firms' sizes as well as the factors affecting the speed of adjustment. The results of this chapter support the signalling hypothesis across firms' sizes for companies listed on the Main market but not for those listed on AIM. In the Main market, I find a negative and significant relationship between abnormal earnings as a proxy for firm's quality and long-term debt. These results are consistent with Barclay and Smith (1995) and Stohs and Mauer (1996), but in contrast to Ozkan (2000, 2002) and Antoniou et al. (2006).

I also find mixed evidence for the impact of leverage and foreign operations in the AIM and Main market. In the Main market, consistent with my expectations, companies with higher leverage and overseas operations use longer maturity of debt; whereas, in AIM, companies with lower leverage use longer maturity of debt and overseas activities are not a significant. The positive relationship between overseas operations and debt maturity in the Main market supports the study of Reeb et al. (2001), who find that international diversification is positively related to credit ratings and that the cost of debt is an inverse function of the degree of firm's internationalisation. Therefore, firms with overseas activities are more likely to use long-term debt financing. Singh and Nejadmalayeri (2004) also argue that the cost of capital decreases with the degree of international diversification; hence the greater debt financing.

My results support the agency hypothesis in the form of underinvestment problem discussed by Myers (1977). I show that debt maturity is inversely related to the market-to-book ratio as a proxy for growth opportunities. In line with the empirical studies of Barclay and Smith (1995) in the US and Ozkan (2000, 2002) in the UK, I find that firms with greater growth opportunities use shorter maturity of debt to control for the conflicts between shareholders and debt-holders. Some empirical studies report mixed evidence for the effect of growth opportunities on the structure of debt maturity (e.g., Stohs and Mauer, 1996; and Antoniou et al., 2006)

I find strong support for the matching hypothesis, which predicts that firms will match their maturity of debt with their assets' structure. The coefficient of tangibility as a proxy for asset maturity is significant and positive across firms' sizes in both the AIM and Main market. Accordingly, the evidence of this study is consistent with the argument of Morris (1976) that debt with maturity longer than the maturity of assets is risky because the assets may not be sufficient to repay the debt covenants. Therefore, firms with more long-term assets use longer maturity of debt.

In keeping with the tax hypothesis, the results show that firms use long-term debt when the term structure of interest rate is upward sloping. Alternatively, I use effective tax rate as an additional variable to test the tax hypothesis; however, the results are consistent for large companies but not for small companies. Large companies in both markets support the positive and significant relationship between the effective tax rate and debt maturity but this association is not significant for small companies. Small companies are not likely to receive the full benefits of tax shields due to their income variability and lower profit margin.

The overall results show that small companies use shorter debt maturities, mainly because they have lower tangible assets and the tax impact is not statistically significant. Small firms are likely to consider less the tax benefits in setting up the maturity structure of their debt because of their high income volatility which is expected to offset the benefits of taxation. Moreover, they have higher growth opportunities and thus are likely to have higher agency costs in the form of underinvestment problem, suggesting that they rely more on short-term debt to mitigate the agency conflict between shareholders and debt-holders. In addition to the differences between small and large companies in agency costs, tax, and asset structure, small companies are more financially constraint than large companies. Therefore, size could be a proxy for financial constraint, capturing the impact of financing costs in the maturity structure of debt. Their higher financial constraint makes it difficult to use long term debt and, hence, they tend to rely more on short-term debt.

I use the partial adjustment model in order to ascertain whether small and large companies have target debt maturity, i.e. how fast small and large companies eliminate their deviation from the optimal ratio. The results strongly support the dynamic framework of debt maturity structure, suggesting that, in both markets, firms have long-term ratios and adjust towards their target ratio. However, small and large companies have different speeds of adjustment depending on the market in which they are listed. In the Main market, I find that small companies adjust to their target ratio faster than large companies. Large companies listed on the Main market rely more on public long-term debt, resulting in an increase in the costs of adjusting (Flannery et al., 2006). Interestingly, in AIM, small companies adjust more slowly than large companies, suggesting that the costs of deviation from the target are significant for the largest companies listed on AIM, so that they adjust faster than small companies.

I also test for the impact of the macroeconomic conditions in determining the adjustment speed in the dynamic model of debt maturity. I find that, in both markets, global risk has a positive and significant effect on the speed of adjustment. These results are generally consistent across firms' sizes. In addition, I find that firms tend to adjust more quickly towards their target debt maturity in good economic conditions.

Finally, I test the impact of the life cycle effect on debt maturity adjustments. I use a sample of IPOs during my sample period. I find that companies listed on the Main market have longer debt maturities and they adjust much more quickly to their debt maturity comparing to firms quoted in AIM. In addition, larger companies in both markets increase significantly their debt maturities. However, the debt maturity of small and medium size firms, in both markets, appears to stabilise or to decline.

While this chapter contributes to the previous studies that provide relatively mixed evidence and did not compare firms across size groups and markets, it did not fully distinguish between private and public debt and between domestic and foreign debt. It also relied on a number of proxy variables used in previous studies, such as the effective tax rates and market-to-book ratios to assess the impact of tax and growth opportunities. Since companies may have different types of debt and these proxy variables may be noisy, my results may be subject to some limitations. The extent to which these factors will strengthen or alter my findings will be the subject of further research.

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Chapter 5 - The Impact of Leverage on the Delisting Decision of AIM Companies[19]

Abstract

I analyse the characteristics of firms that chose voluntarily to delist from the stock market between 1995 and 2009. I find that, compared to matched firms that remained publicly quoted, the delisted firms have significantly higher leverage and are unable to raise additional capital. The results are strong after controlling for agency conflicts, liquidity, and asymmetric information. On the announcement date, stock prices decrease by an average of 8% compared to positive excess returns for firms that switch to a more regulated market, and firms that increased their leverage in the year prior to the delisting decision generate significantly lower excess returns than other firms.

Keywords: Small firms; AIM; London Stock Exchange; Leverage, and Delisting

JEL classification: G14, G32

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5.1 Introduction

Previous studies report that access to public markets for additional capital is the major motivation for firms to undertake IPOs (e.g., Aslan and Kumar, 2011; Bharath and Dittmar, 2010; Kim and Weisbach, 2005 and Marosi and Massoud, 2007).[20] For example, Kim and Weisbach (2005) report that raising capital is the key determinant for going public as firms raise substantial amount of new capital through IPOs in order to rebalance leverage. Similarly, extensive studies analyse going private transactions especially through leverage buyout (LBO), mainly in the US markets, focussing on how firms trade-off the costs and the benefits of being public in order to go private (e.g., Maupin et al., 1984; Kaplan, 1991; and Bharath and Dittmar, 2010).

However, the literature has paid relatively less attention to the determinants and consequences of the voluntary delisting decision, which is a situation where a company stops trading in the market at its own request. Earlier studies suggest that the firms go private substantially differ from those that decide to delist. Leuz et al. (2008) show that delisted companies are smaller and they have lower free cash flow compared to going private companies. Marosi and Massoud (2007) and Leuz et al. (2008) investigate the voluntary delisted firms referred to as *dark companies*. They suggest that firms decide to delist when the costs of being a public firm exceed the benefits.

However, these studies do not focus on the impact of financing decision and they are predominantly US, where the delisting transaction is different from other markets and firms deregister with the SEC but remain publicly traded over-the-counter (OTC) on the Pink Sheets (Marosi and Massoud, 2007), while, in the UK firms that delist, and do not to change their market quotation, become private. In this

[20] However, Brau and Fawcett (2006) survey financial managers of IPOs and report that their main reason for coming to the market is to create a currency to finance takeovers.

circumstance, investors have two options; either sell their shares before the delisting date or remain shareholders in what will become a privately owned company. Moreover, those studies mainly look at the impact of the corporate governance and the regulatory compliance of the Sarbanes-Oxley Act on July 31, 2002 on the going-dark decision using larger companies. Marosi and Massoud (2007) find that the Sarbanes-Oxley Act (SOX) and the compliance cost are the major determinant of the delisting decision. Leuz et al. (2008) find a large impact of the SOX but the free cash flow problem associated with the agency cost is also highly significant. They also include leverage as a control variable but they provide mixed evidence as leverage is only significant in the post-SOX period. Moreover, these two studies include financial companies for which leverage is difficult to measure and may have different interpretation, as it is strongly affected by capital requirements and investor insurance schemes, and, hence their level of leverage is not comparable with that of non-financial companies (e.g., Rajan and Zingalas, 1995). Other studies also investigate delisted companies in the US (Hensler et al., 1997; Jain and Kini, 1999, 2000; and Fama and French, 2004) but they do not distinguish between the types, as they mainly assess the characteristics of companies which survive compared to those companies that delist from the trading exchange for negative reasons.[21]

In this paper, I analyse the impact of debt financing on the voluntary decision to delist. I focus on the delisting from the Alternative Investment Market (AIM) where younger and high growth firms chose to be quoted to finance their growth

[21]Jain and Kini (2000) investigate the impact of VCs and underwriters' prestige on the IPO survival. They find that the post IPO survival time increases with the VC backing and with the prestige of investment bank. Fama and French (2004) focus on profitability and growth, as new listed companies have higher growth and lower profitability. However, those characteristics change over the IPO life cycle and would result in a decrease in survival rates of newly listed companies. Recently, Espenlaub et al. (2011) investigate the impact of the regulation on the survival AIM IPOs. They compare survivors to companies that delist due to merger and acquisition and other negative reasons, but they do not distinguish between voluntary delisting and delisting due to market regulations, which is important to the propose of their study.

opportunities. Gerakos et al. (2011) find that AIM companies are less likely to generate positive returns in the post-IPO period than companies listed on other markets, including the UK Main market, and AIM is subject to higher asymmetric information and lower liquidity, suggesting that AIM firms are more likely to fail than firms in other markets

Since its launch in 1995, it has been attracting a large number of companies, reaching a peak in 2007 at 1,694 companies, including 394 international companies. Despite the substantial attention of AIM in attracting listings, the reasons and consequences of the delisting decision remains an open question. I identify a total of 445 non-financial IPOs that delisted over the period 1995 to 2009. I exclude 137 takeovers, 119 involuntary delisted firms (e.g., breach of market regulations), and those with missing data. My final sample includes 184 delisted companies, split into 158 that went private and 26 that transferred to the Main market. I match each delisted firm (the test sample) with a control firm on the basis of their IPO date and the firm’s size measured by market capitalisation at the time of the IPO.

I first compare the characteristics of each test firm with its control peer at the time of the IPO to predict whether firm’s initial characteristics impact its delisting decision. I download all prospectuses to collect by hand data on debt, equity, market capitalisation, and ownership structure at the IPO date. I find that the delisted companies have higher leverage and lower growth opportunities, in line with the market access hypothesis. However, other factors, such as insider ownership, under-pricing, and profitability, used to proxy for the agency conflict between shareholders and managers in the form of free cash flow problem and information asymmetry effects, are not statistically different across the two samples. I find similar results when I use a multivariate logit regression model.

I use the logit model to forecast the determinants of the delisting decision at the exact time of the IPO. I find that firms with higher leverage and less growth opportunities are more likely to delist supporting the market access hypothesis. In contrast, I do not find evidence that agency cost between shareholders and managers as well as information asymmetry can predict delisting at the time of the IPO. Therefore, given the results at the time of IPO, I could only predict that firms are more likely to delist if they have too much leverage and low growth opportunities.

I then use the Cox proportional hazard model to investigate the determinants of the delisting decision given changes that happen to the firms' characteristics over time. In line with the logit regression results, I find that leverage and growth opportunities, as measured by market-to-book ratio or capital expenditure explain significantly the decision to delist. I also find that delisted firms are less likely to be from high-tech industries, and to raise seasoned equity capital. The results of hazard rates, used to assess how much the hazard the delisting event increases for a unit change in the explanatory variable, show that the marginal effect of leverage is the most important factor among other determinants of the delisting decision. My results imply that firms that do not raise equity capital, as they have high debt and low growth opportunities and capital expenditure, are more likely to delist.

However, my results may also indicate that delisted firms rely more on debt financing because they are not able to raise equity capital, making the cost of listing higher than the benefit. I assess this possibility by analysing other fundamental differences across firms in my sample. I find that smaller firms with a great proportion of intangible assets are more likely to delist, consistent with the prediction of asymmetric information. However, my results do not support the liquidity hypothesis, as delisted firms do not have lower trading volume. Moreover, my results provide mixed evidence for the impact of the agency conflict as the free cash flow is not a key determinant of the delisting decision, but, consistent with the agency hypothesis, closely held firms are more likely to delist. In particular, I find that delisted firms have more concentrated ownership, but they do not have higher undistributed cash flow and return on assets, used as alternative proxies for the free cash flow problem. My results suggest that the delisting decision is different from going private through leverage buy outs (LBOs) where firms have low leverage and high free cash flow (Lehn and Poulsen, 1989).

Overall, my results suggest that firms delist when they are not able to reduce their leverage after going public. Pagano et al. (1998) and Aslan and Kumar (2011) find that leverage has been decreasing in the post-IPO periods. However, these results are not likely to apply to the delisted companies, as their leverage increases significantly since the second year after the IPO, and they are not able to raise additional equity capital, questioning therefore, the benefits of listing. I find that for the delisted companies, debt financing increases during the first three years after the IPO. There is no considerable change in equity financing except the second and the fourth year after the IPO, which shows that equity financing declines significantly for the delisted companies.

Finally, I investigate the market reaction to the delisting announcement. I use the event study methodology and compute the abnormal returns over the event window -20, +20 days relative to the announcement date. I use the market model with the coefficients α and β computed over the -270, -21 days. I find that delisted firms experience cumulative accumulative abnormal returns (CARs) of -7% on the announcement period [0, 2]. The results are very similar to Leuz et al. (2008), who report CARs of -9% market reaction and Marosi and Massoud (2007) who find -

12% in the US. Interestingly, I show that these excess returns depend on the firm's post-delisting status. In particular, firms that switch their quotation into the main market experience positive announcement date excess returns of about 1%, in line with Jenkinson and Ramadorai (2008), who find that the announcement of a switch from AIM to the Main market generates a significant positive return about 5% on the announcement date and positive returns in the following 6 months, suggesting that switching to the Main market is associated with good news in the short and long-run. However, my sample size is considerably smaller than theirs as they do not exclude financial companies and they do not analyse voluntary delisting decision. In addition, I find that overlevered firms generate significantly higher returns in the pre-delisting period, but, on the announcement date, their abnormal returns are significantly lower, suggesting that the market reaction depends on the severity of leverage, i.e., the inability of the firm to raise equity capital.

The rest of the paper is structured as follows. Section 2 provides a review of the literature and sets up the hypotheses. Section 3 presents the data and methodology. Section 4 discusses the results, and the conclusions are in Section 5.

5.2 Review of Literature and Hypotheses

5.2.1 Empirical Studies of Listing/Delisting Decisions

The IPO literature suggests several benefits of listing on a stock exchange including relaxing borrowing constraints, greater liquidity, greater bargaining power with banks, and investor recognition (e.g., Ritter, 1987 and Pagano et al., 1998). Despite those benefits, listing is subject to substantial direct and indirect costs. Direct costs refer to administrative costs, underwriting fees, registration fees, and indirect costs deal with adverse selection and agency conflicts. Bharath and Dittmar (2010) argue that since the nature of the decision on whether to go public is affected by several factors and represents a trade-off between the costs and the benefits of listing, the decision to go out of the public market is in the same approach. Therefore, given the costs and the benefits, firms choose to delist when the costs of listing exceed the benefits. However, Leuz et al. (2008) document that those firms, which opt to delist, significantly differ from those go private in terms of determinants and economic consequences. In this section, I discuss empirical studies of why firms go public and identifying the related hypotheses on the delisting decision in the next section.

Pegano et al. (1998) provide an empirical investigation into the determinants of a firm's decision to go public. Using private data on a sample of Italian companies, they find that leverage decreases significantly after going public suggesting that companies tend to go public to rebalance their capital structure. These findings provide support to the market access hypothesis, which indicates that companies decide to tap public markets to get access to an alternative source of financing. However, other studies show that financing is not the primary determinant of listing. Survey studies find that although capital structure is one of the key motivations for going public, it is not rated the top. For example, the survey conducted by Brau and Fawcett (2006) show that companies go public primarily to create public shares for use in future acquisitions, and debt financing is only mentioned as 5th under the minimisation of the cost of capital and 10th under debt is becoming too expensive. Bancel and Mittoo (2008) suggest that IPOs that enhanced the bargaining power with bankers are more likely to reduce their leverage after going public. Using UK data, Aslan and Kumar (2011) test the going private decision thorough leverage buyouts and takeovers. They find firms with lower leverage are more likely to go private, but these studies do not focus on voluntary delisting decision.

With respect to the market access hypothesis, the benefits of going to public are more likely to be important for firms with high growth opportunities. Pagano et al. (1998), Fischer (2000), and Bharath and Dittmar (2006) argue that companies prefer to be public to overcome their financial constrains as listing on a stock exchange provides an opportunity to get access to low-cost external financing. Recent empirical studies on going private through leveraged buyouts (Bharath and Dittmar, 2006; and Aslan and Kumar, 2011) find that firms with high growth opportunities prefer to stay in the market to raise further capital. Similarly, Marosi and Massoud (2007) report the similar findings when they assess the voluntarily delisting decision using the US companies. Survey studies provide strong evidence. Bancel and Mittoo (2008) conduct a survey on CFOs of European firms; their results suggest that financing growth opportunities appears to be a significant determinant of the going-public decision. Similarly, the US survey of Brau and Fawcett (2006) provides strong support that firms obtain capital to fund growth opportunities through their IPOs. The two survey studies do not study directly the factors contributing to the going private decision.[22]

Prior literature also finds enhanced liquidity as an additional benefit for publicly listed companies. Shares of public companies can be traded on a stock exchange at cheaper costs resulting in a greater liquidity (Pagano et al., 1998). Similarly, the survey of Bancel and Mittoo (2008) document that share liquidity is an important criteria for the going-public decision and its significance is greater in

[22] Brau and Fawsett (2006) also survey CFOs of companies that had filed a prospectus to go public but then subsequently withdrew the offering and CFOs of private firms that were large enough to go public but chose not to. They find that these firms chose to stay private to maintain decision making control. The financing (already have enough capital) came only 6th in their preferences.

English system than their Continental European peers. With respect to the going private decision, Bharath and Dittmar (2010) find that firms with less liquidity are more likely to go private through leveraged buyouts. While the two existing studies that investigate the voluntarily delisting decision (Marosi and Massoud, 2007 and Leuz et al., 2008) do not test the effect of liquidity on the delisting decision.

Despite numerous benefits of listing, prior literature suggests that listing is also subject to significant costs. Publicly listed companies potentially suffer from the agency conflict between managers and shareholders that emanates from the free cash flow problem (Jensen and Meckling, 1976). This problem is particularly large when firms do not have growth opportunities to reinvest their free cash flow (Opler and Titman, 1993). The literature on the going private decision, suggests that the agency conflict between managers and shareholders would be mitigated through concentrating residual claim among management, suggesting that companies with significant free cash flow as well as low growth opportunities are more likely to go private (Marosi and Massoud, 2007). However, empirical studies report mixed results. Lehn and Poulsen (1989) find that free cash flow is a significant factor for the going private decision in contrast to Aslan and Kumar (2011). Marosi and Massoud (2007) investigate the voluntary delisted companies. They find that free cash flow is significant particularly for firms with high undistributed cash flow and low growth opportunities.

Previous studies also argue that investors are less informed than insiders about the true value of firms resulting in adverse selection problem. This problem inversely affects firms' quality as well as their share prices. Therefore, firms with asymmetric information are more likely to go private to avoid the cost of adverse selection, and this is likely to be more problematic for small companies that have low financial visibility (Bharath and Dittmar, 2010). However, Empirical studies provide mixed evidence. The study of the voluntary-delisting decision by Marosi and Massoud (2007) does not support the notion of information asymmetries. Bharath and Dittmar (2010) investigate the US companies that use private equity in order to go out of public markets. They report mixed evidence for the impact of information asymmetries on the going private decision, as they find that large companies are more likely to go private, while, consistent with the information asymmetry hypothesis, they find that firms with a greater visibility are more likely to stay in the market.

Mehran and Peristiani (2010) and Bharath and Dittmar (2010) test the financial visibility and investor interest as additional crucial factors that contribute to the listing decision. They suggest that IPOs that fail to attract investor interest with lack of financial visibility are more likely to go private. They suggest that firms with less financial visibility tend to have higher stock price volatility. They show that the significance of financial visibility increased significantly since the 1990s. Similarly the survey of European CFOs conducted by Bancel and Mittoo (2008) confirms that investor recognition is a major factor affecting on the listing-decision.

Extensive studies focus on going private transactions especially through leverage buyout (LBO), mainly in the US markets (Maupin et al., 1984; Kaplan, 1991; Mehran and Peristiani, 2010; and Bharath and Dittmar, 2010). However, the literature has paid relatively less attention to the determinants and consequences of voluntary delisting decision. Earlier studies suggest that firms that go private are different from those that decide to delist. To the best of my knowledge, so far, only Marosi and Massoud (2007) and Leuz et al. (2008) have investigated the voluntary delisted companies. They suggest that a firm decides to delist when the costs of being a public firm exceed the benefits. They refer to such firms as "*dark companies*", identifying the differences between the delisting decision and the going private decision. These two studies are based on the US markets, where the delisting transaction is different from the UK. I will discuss the delisting transaction in the UK and in the US in section 6.2.3.

5.2.2 The Survival and Failure of IPOs

There are a large number of studies investigating the survival of IPOs in the US market (Hensler et al., 1997; Jain and Kini, 1999, 2000; and Fama and French, 2004). However, while comparing surviving companies relative to non-surviving in the post-IPO periods, previous studies do not distinguish among the various reasons for delisting. Hensler et al. (1997) assess the survivability of IPOs and compare surviving IPOs with those delisted from NASDAQ for negative reasons. They control for a handful of firms' characteristics: size, age, initial return, risk, and insider ownership. They find that survival time increases with age, size, and initial return while it decreases with risk factors. Jain and Kini (1999) access the impact of VC and underwriters' prestige on IPO survival. They find that survival increases with VC backing and higher investment bank prestige. Fama and French (2004) consider those companies entered on the NYSE, AMEX, and NASDAQ between 1973 and 1991. They focus on profitability and growth, as newly listed companies have higher growth and lower profitability. However, those characteristics would result in a decrease in the survival rates of newly listed companies.

In another US study, Jain and Kini (2008), investigate the impact of strategic investment at the time of IPO on post-IPO performance and survival probability. Examining the newly listed companies during 1980 and 1997, they find that the extent of diversification through an additional line of business decreases the probability of failure significantly. Their results for the R&D effect on future operating performance are ambiguous and mixed, depending on the choice of expectation model. For example, when they measure post-IPO performance as the change in industry-adjusted operating returns on assets for the five years after the IPO, the impact of R&D is positive and significant. But when the change in industry-adjusted operating returns on assets for the year prior to the IPO is the criterion, R&D is neither positive nor significant. In addition, they find no evidence to support the relationship between post-IPO performance and firms' advertising intensity.

With respect to other countries, to the best of my knowledge, two recent papers have examined the Canadian market: Bradley et al. (2006) and Carpentier and Suret (2011). Bradley et al. (2006) investigate initial returns of penny stock IPOs (those that are not listed on a national exchange with an offer price below $5) versus ordinary IPOs, followed by the long-run performance of those companies over the 1990–1998 period. They show that penny stock IPOs experience higher initial returns than ordinary IPOs, but the long-run underperformance of those is better than that of penny stock IPOs. They find that quality of underwriters can support prediction of initial returns, and report mixed evidence for the impact of VC on initial returns. Carpentier and Suret (2011) mainly look at the impact of the listing requirements on the surviving IPOs during 1986 and 2003. They consider non-surviving companies as those delisted by the exchange, by reserve takeovers, and by company request. Therefore, they do not distinguish among different types of delisting. They find that venture capitalists (VC) backed IPOs are more likely to survive, but the impact of VC on the failure risk is not significant. They also suggest that the probability of survival in the post-IPO period is significantly affected by the initial listing requirements, such as prestigious underwriters and/or audit firms.

More recently, Espenlaub et al. (2011) have examined the probability of surviving post-IPO in the period 1995–2004. However, their focus is limited to investigating the effect of AIM regulations, as AIM is a lightly regulated market. They find that survival time is increased by tightening the listing requirement. They compare surviving companies with non-surviving companies that delist because of merger and acquisition or for other negative reasons.

5.2.3 Delisting Procedures in the US versus the UK

In the US, the delisting process goes through two steps. Fist, companies need to delist from the exchange (NYSE, AMEX, or NASDAQ), which may take about 21 days, depending on the exchange. In this situation, they will trade over the counter or on the Pink Sheets. The firm may then intend to deregister from the Securities and Exchange Commission (SEC). In doing so, the company needs to file a Form 15 and this needs only the approval of the company's board of directors. In general, the process of deregistration takes up to 60 days (Marosi and Massoud, 2007). Once they deregistered, they are not required to provide public information. (see Macey et al., 2008 and Marosi and Massoud, 2007).

Unlike the US delisting process, in the UK, a firm that decides to delist should notify the London Stock Exchange to cancel its trading on the exchange at least 20 days prior to such date. In AIM, this circumstance should be conditional upon the approval of not less than 75% of votes cast by shareholders in the general meetings (see AIM publications in London Stock Exchange).[23]The Main market, also, incorporates a somewhat equivalent transaction for the delisting. The company advises the exchanges of the delisting intention at least 20 days in advance. It also

[23]AIM rules can be downloaded from London Stock Exchange, http://www.londonstockexchange.com/companies-and-advisors/aim/advisers/rules/aim-rules-for-companies.pdf.

needs to announce its intention through a regulated information service. Once the intention is agreed, "the exchange will announce the intention to cancel individual securities through the reference data service and the intention to cancel issuers through a regulated information service" (see Main publications in London Stock Exchange, p. 31).[24] Shareholders' approval for the delisting decision depends on whether the company is a premium or standard listed one, as the former needs 75% of shareholders' approval in contrast to the standard listed that is not subject to shareholders' approval. Once the company is delisted from the exchange, it becomes private and investors have two options; either sell their shares before the delisting date or remain shareholders in what will become a privately owned company.

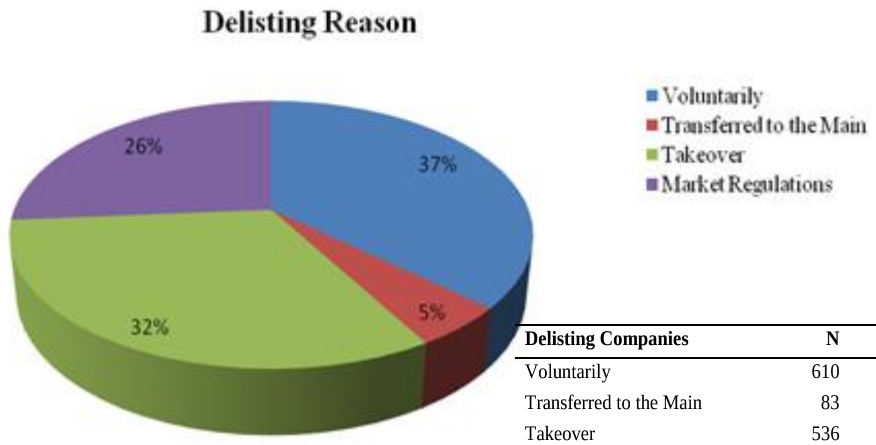
5.3 Data and Methodology

5.3.1 Sample

I use five main databases to collect my data. I first collect all IPOs on AIM between 1995 and 2009. This data is collected from New Issues and IPO Summary spreadsheet provided by the *London Stock Exchange (LSE), Londonstockexchange.co.uk.* I also use this website to construct the sample of the delisted firms and the reasons for such a decision. There are 1,666 year-firms delisted from AIM. LSE classifies delisted companies into five main categories: merger and acquisition, takeover, transfer to the Main market, company's request, and market regulations. Figure 5-1 shows delisting reasons in percentage.

[24] Main rules can be found at the London Stock Exchange website: http://www.londonstockexchange.com/companies-and-advisors/main-market/documents/brochures/admission-and-disclosure-standards.pdf

Figure 5-1: Delisting Reasons (AIM Evidence)



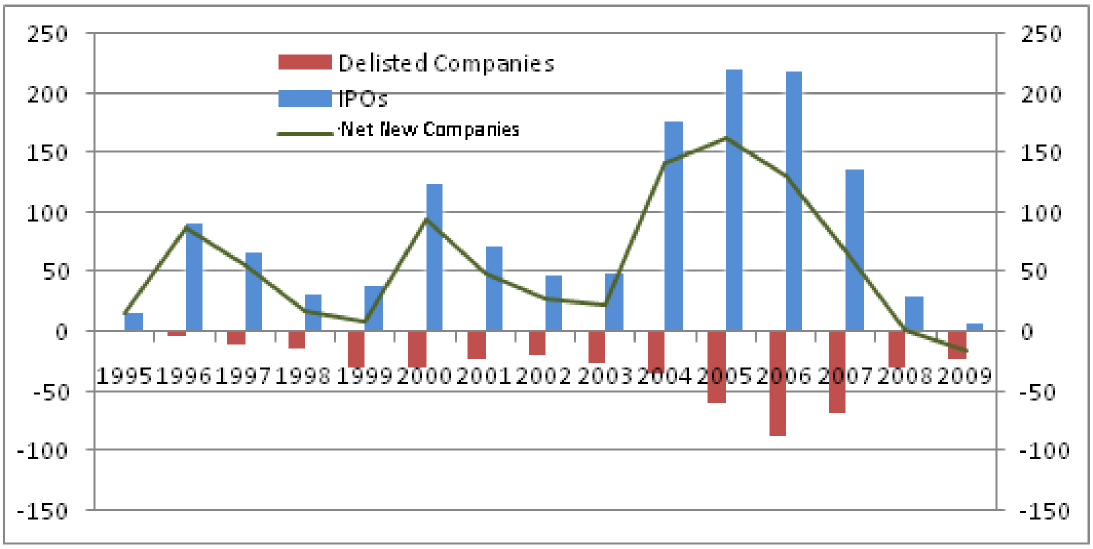
Delisting Companies	N	%
Voluntarily	610	37%
Transferred to the Main	83	5%
Takeover	536	32%
Market Regulations	437	26%

This figure shows the proportion of reasons for delisting on AIM.
Source: Own computation from the analysis of all hand-collect delisted firms from AIM statistics provided by the London Stock Exchange over the period 1998 to 2009.

M&A, takeover, and transfer to the Main market are specified directly in LSE. For the purpose of my analysis, I consider “delisted at the request of the company” and “transfer to the Main market” as voluntary reasons and other reasons such as market regulatory, M&A, and takeover as involuntary reasons. I exclude companies that delist because of involuntary reasons. For robustness, I screen all sample firms in *DataStream* to verify that they are no longer listed. I then match IPOs with my delisted companies to find how many IPOs delisted as well as the date of delisting. I also exclude financial companies. This procedure results in 445 non-financial IPO companies of which 195 of those companies delisted voluntarily. After excluding 11 firms with no data, my final sample includes 184 delisted companies. I also gather information on subsequent raising capital from the LSE, and then match it with my sample to find how many of them raise capital over their IPO life cycle.

Figure 5-2shows the number of listed and delisted companies in AIM during the sample period (1995-2009), suggesting that despite an increase in number of newly listed companies in AIM, the number of delisted companies increased significantly since 2000.

Figure 5-2: Non-Financial IPOs and Non-Financial Delisted Companies



This graph shows the number of listed and delisted of IPO companies in AIM during the sample period (1995-2009). The blue bar shows the number of IPOs in each year. The red bar presents the number of delisted IPOs (Voluntarily, Transferred to Main, Takeovers, and Market regulations) in each year. The green line shows net new companies (number of IPOs-Number of delisted companies).

In order to investigate the market reaction, I use two resources in order to find the delisting announcements. First, I use investegate.co.uk website, which offers a large archive for firms' announcements to find the delisting announcements. I then use *Factiva* database and hand-collect the delisting announcements for the firms that are not provided by investegate.co.uk.

I use *Thomson One Banker* Database to collect the accounting data on balance sheets and income statements during the sample period from 1995 to 2009. I extract the stock market data, which includes daily stock prices and indices to compute the stock returns, market capitalization, and market-to-book ratio from *DataStream.* In order to find the market and accounting data at the time of IPO, I download the prospectuses from *Perfect Filings* database and hand-collect all data including total debt, total assets, directors' ownership, venture capital, and market capitalisation.

My dataset is different from recent studies, which examine why firms go private (Mehran and Peristiani, 2010; Aslan and Kumar, 2011; and Bharath and Dittmar, 2010) rather than deciding to delist. They use number of public companies that went private in leveraged buyouts (LBOs). However, Marosi and Massoud (2007) and Leuz et al. (2008) study the firms that have "gone dark". Those companies opt to delist voluntarily in the US market, where the delisting rules are different from the UK.[25] They mainly assess the impact of SOX and agency costs on the delisting decision. Recently Espenlaub et al. (2011) investigate the impact of AIM's regulatory on the survival IPOs. They assess the characteristics of companies survive compared to those companies delist from the trading due to merger and acquisition and other negative reasons. However, they do not distinguish between companies that delist voluntarily and those that delist due to market regulations.

Table 5-1, Column 2 presents the year in which the companies decide to delist. Column 3 shows the year in which those companies went public. The table indicates that there is an increase in the number of delisted firms since the 2000s.

[25] In accordance with Rule 41, a firm should notify the London Stock Exchange to cancel its trading on the AIM at least 20 days prior to such date. This is conditional upon the approval of a minimum of 75% of the votes cast by shareholders at the general meetings. This transaction is very different from the delisting process in the US. In the US, the delisting process would go through two steps; fist, the companies need to delist from the exchange (NYSE, AMEX, or NASDAQ), which may take about 21 days depending on the exchange. In this situation, they would trade over the counter or on the Pink Sheets. Then they need to file a form 15 in order to deregister from SEC and this step takes about 60 days. Once they deregistered, they are not required to provide public information. (See Macey et al., 2008 and Marosi and Massoud, 2007).

Table 5-1: Time Series Distribution of Delisted Companies

Year	Delisted companies	IPO Year of Delisted companies
1995		4
1996		19
1997		21
1998	1	7
1999	13	15
2000	18	22
2001	9	8
2002	8	9
2003	14	9
2004	13	29
2005	13	28
2006	25	10
2007	16	3
2008	16	
2009	38	
Total	184	184

The second column of this table presents the number of firms in my sample that delist in each year. The third column shows the time series distribution of those firms based on their IPO year.

5.3.2 Model

For the purpose of this chapter, I use a range of methodologies. First, I use a matched logit model to predict the factors affecting firms' delisting decision. The dependent variable is binary, one if the company is delisted and zero otherwise. It forecasts the probability of the event with respect to the related independent variables. The dependent variable is determined by whether it exceeds a threshold value (Equation 5.1).

$$y_i = \begin{cases} 1 & y_i^* > 0 \\ 0 & y_i^* \leq 0 \end{cases} \tag{5.1}$$

The logit estimation is given in Equation (5.2):

$$E(y_i/x_i, B) = 1 * \Pr(y_i = 1/\, x_i, B) + \ 0 * \Pr(y_i = 0\,/x_i, B) = \ \Pr(y_i = 1\,/x_i, B) \tag{5.2}$$

I match the delisted firms (test sample) with those that remained public (control sample) using a clear starting point. I match the test sample with the control sample based on two factors: the date of the IPO and the firm's size measured by market capitalisations at the time of the IPO[26].

Table 5-2 provides the details of independent variables with the expected sign in order to test the hypotheses in terms of the delisting decision. I use all explanatory variables indicated in Table 5-2 in a year following the IPO. I also attempt to investigate the factors at the time of the IPO in order to predict to what extent they affect the delisting decision. However, at the exact time of the IPO, I could only find the information related to debt, equity, insider ownership, and under-pricing. Therefore, a limited number of variables could be used in order to test the hypotheses.

[26]For those times what I have difficulties to match the date of the IPO, I consider 11 months around the date of the IPO. The size of the company is matched within 15% range.

Table 5-2: Proxies for the Determinants of the Delisting Decision and Expected Sign Observed from the Hypotheses

Description	Variables	Hypothesis	Sign
Leverage	Debt/Total Assets	Access to capital/ Raising capital	+
Growth opportunities	Market-to-Book ratio	Access to capital/ Raising capital	-
Capital expenditure	Capex/Total Sales	Access to capital/ Raising capital	-
ROA	EBIT/Total Assets	Agency (Free cash flow problem)	+
Free cash flow	Free Cash Flow/Total Assets	Agency (Free cash flow problem)	+
Insider ownership	Common shares by directors/N. Outstanding shares	Agency Conflict	+
ROA	EBIT/Total assets	Agency (Free cash flow problem)	+
Size	LnMK	Asymmetric information	-
Intangibility	Intg Assets/Total Assets	Asymmetric information	+
Volume	Trade volume	Liquidity	-
Stock Turnover	Shares volume/N.S	Liquidity	-
Stock Turnover	Shares volume/N.S	Financial visibility	-
Stock volatility	STD stock price	Financial visibility	+

This table present the determinants of the delisting decision based on my hypotheses. Leverage is measured as total debt divided by total assets. Growth opportunities are MB, market-to-book ratio. Capital expenditure ratio computed as Capex/Sales is the proportion of capital expenditures over total sales.Free Cash Flow is the proportion of free cash flow over total assets. Insider Ownership is the ratio of holdings of common shares by all directors and officers as a group to total outstanding shares. ROA is measured as earnings before interest and tax over total assets. Size is natural logarithm of market capitalisation. Intangibility is the ratio of intangible assets over total assets. Volume is daily shares traded over the past 12 months. Sock Turnover is a ratio of daily turnover the past 12-month period divided by number of ordinary shares. Stock Volatility is yearly standard deviation of a firm's stock return.

Table 5-2 shows the factors contributing to the delisting decision, in particular the impact of leverage as well as other proxies to control for the agency, asymmetric information, and financial visibility hypotheses. According to the market access hypothesis, previous studies suggest that firms decide to go private to rebalance their capital structure, in particular reducing leverage (Pagano et al., 1998). The literature also argues that the market access is an important motivation for firms in order to finance their investment (Pagano et al., 1998; Fischer, 2000; and Bharath and Dittmar, 2006). Therefore, I expect that firms with less market access are more likely to delist voluntarily. In particular, firms that do not have opportunity to issue equity are overlevered and hence are more likely to go out of trading. Firms with higher growth opportunities are more likely to stay in the market in order to raise further capital to cover their investments. I use two alternative proxies for growth opportunities, market-to-book and capital expenditure ratios.

With respect to the agency hypothesis, previous studies suggest that firms with higher conflict between managers and shareholders have greater free cash flow problem and thus they are more likely to go private (Lehn and Poulsen, 1989; and Aslan and Kumar, 2011). Therefore, I expect that firms with greater free cash flows are more likely to go out of trading. In addition, the conflict between managers and shareholders is greater in more closely held firms and thus firms with higher insider ownership are more likely to delist.

Moreover, the degree of asymmetric information affects the decision of delisting. Insiders are better informed about the true value of assets than outsiders and hence insiders may take benefits of their private information by going private (Marosi and Massoud, 2007). I use two proxies to control the asymmetric information, size of the firms and the ratio of intangible assets to total assets. I expect that smaller firms and those firms with higher intangible assets are more likely to delist.

Recent studies by Mehran and Peristiani (2010) and Bharath and Dittmar (2010) test the financial visibility and investor interest as crucial factors over firms' life cycle. They suggest that those IPOs that fail to attract investor interest with lack of financial visibility are more likely to go private. They argue that firms with less financial visibility tend to have higher stock price volatility. However, the two existing empirical studies for the voluntary delisting decision (Marosi and Massoud, 2007 and Leuz et al., 2008) do not investigate the impact of financial visibility on such a decision. Therefore, I use stock turnover and stock volatility to control for financial visibility to fill the existing gap in previous empirical studies that investigate the voluntary delisting decision in the US. I expect that firms with higher stock volatility and lower stock turnover have lower financial visibility and hence they are more likely go out of public markets.

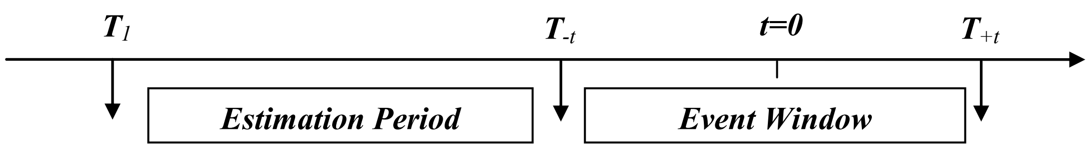
I then investigate the factors contributing to the delisting decision by using the Cox's Proportional hazard model, following Mehran and Prestiani (2009) and Bharath and Dittmar (2010), to find the length of time it takes to delist controlling for the related variables. The predictor variables are used to predict the event, which is the time of the delisting. This model measures the duration to the even that I defined. Following the logit model, in the hazard model, I control delisted companies with the remained public companies by size and the date of IPO. The hazard model is (Equation 5.3):

$$h\ (t, X\ (t)) = h\ (t,0)\ exp(B\ X(t)) \tag{5.3}$$

Where is h(t, X(t)) is the hazard rate at time t for a firm with covariates X(t). This model controls for the effects of differences between firms as well as changes over time. The hazard ratio (exp (B)) indicates the change in the hazard for a unit increase in the independent variable. However, for continuous explanatory variables, the hazard ratio measures the marginal effect of a unit increase in the independent variable. For discrete explanatory variables, the hazard ratio indicates the marginal effect when the event occurs. The hazard ratio greater than one means that the reference category (here 1) has a shorter time to event and otherwise. If the hazard ratio is equal to one, it indicates that there is no difference between the two groups.

In order to investigate the impact of delisting announcements on the market reaction, an event study is used.[27] This methodology includes several stages. First, the event should be identified following by the event window.[28]The event window is a period around the event, in which the stock price reaction will be assessed. In the last empirical study, I use the event methodology in order to test the market reaction to the delisting announcement. Therefore, the delisting announcement is the event and the period of interest around such an announcement is the event window. Depending on the purpose of the study, the event window includes some days before and after the event to investigate the price reaction. The further stage is to clarify the estimation period. It is a period prior to the event window to compute expected returns as well as standard deviation of the returns. Figure 5-3 illustrates the event window and the estimation period. As this figure shows, $t=0$ is the event and $[T_{-t}, T_{+t}]$ is the event window. The parameter from the estimation period $[T_1, T_{-t}]$ will be computed to calculate the abnormal returns.

Figure 5-3: Event Study



This figure illustrates the timeline of an event study. $t=0$ is a specific event and $[T_{-t}, T_{+t}]$ is the event window. $[T_1, T_{-t}]$ shows the estimation period.

I use the market model to investigate the market reaction to the delisting announcement. For this purpose, with daily data, the return on a stock would be calculated as Equation (5.4):

[27] In particular, it investigates the impact of a specific event on a firms' stock price. A firms' stock price could respond to any announcement such as earnings, capital change, merger and acquisitions, dividends, initial public offering, delisting, etc.
[28] In this thesis, I focus on the market reaction to delisting announcements.

$R_{i,t}= \alpha_i+ \beta_i R_{M,t} + \varepsilon_{i,t}$ (5.4)

Where $R_{i,t}$ is the return on the common stock of the *i*th company in the sample at day t; $R_{M,t}$ is the return on market index, which is FTSE all share at time t, and $\varepsilon_{i,t}$ is the error term.

The Equation (5.4) should be run for the security returns against the corresponding market index returns, which is the Financial Times All Shares Index (in this chapter) to find the α and β from the estimation period $[T_1, T_{-t}]$. Then Equation (5.5) will be computed to find the abnormal returns over the event window $[T_{-t}, T_{+t}]$ for each security (here I compute the accumulative abnormal returns over the event window [-20, +20] and the estimation period is [-270, -21] to find the α and β):

$AR_{i,t}= R_{i,t} - (\hat{\alpha}_i+ \hat{\beta}_i R_{M,t})$ (5.5)

Where $AR_{i,t}$ is the abnormal return on the common stock of the *i*th company in the sample over the event window; $R_{M,t}$ is the return on the market index for the event period.

For the event period, the abnormal returns are cumulated (CAR) as Equation (5.6):

$$CAR_{(T_{-t}T_{+t})} = \sum_{t=T_{-t}}^{T_{+t}} AR_t \qquad (5.6)$$

Finally, with respect to the number of companies (N) in the sample, cumulated average abnormal returns (CAAR) will be calculated as Equation (5.7):

$$CAAR_{it} = \frac{1}{N}\sum_{i=1}^{N} AAR_{it} \qquad (5.7)$$

To test whether the cumulative abnormal returns are statistically significant over the event period, the Equation (5.8) is used:

$$t = \frac{CAR_{(T_{-t}T_{+t})}}{S(AAR)\sqrt{T}} \qquad (5.8)$$

Where S is standard deviation and T is the event period $[T_{-t}, T_{+t}]$.

5.4 Results

5.4.1 Descriptive Statistics

Table 5-3 describes the number of years that delisted firms were in AIM. On average, the firms were in AIM for about 4 years. Interestingly, this result is significantly different from the studies based on the going private decision. For example, Bharath and Dittmar (2010) find that firms are in the public market for about 13 years before going private through leveraged buyouts (LBOs). My result suggests that firms delist much earlier than deciding to go private (LBOs). This indicates the differences in the choice between delisting voluntary and deciding to go private through LBOs.

Table 5-3: Number of Years that Delisted Firms Were Publicly Traded

	No. of Delisted Companies	%	Cumulative Distribution
IPO	3	1.63	3
+1	18	9.78	21
+2	31	16.85	52
+3	34	18.48	86
+4	45	24.46	131
+5	20	10.87	151
6-12	33	17.93	184
Total	184	100.00	

This table presents number of years the firms stayed public before delisting. The second column reports the number of delisted companies. Taken the available data, it shows that in total 184 companies delisted voluntarily between 1995 and 2009. The third column reports the proportion of delisted companies after the IPO. The last column shows the cumulative distribution of delisted companies in the post-IPO period.

Table 5-4 provides the characteristics of delisted companies over the public life. The last column of this table reports the t-statistics and Wilcoxon-Mann-Whitney test for the differences in means and medians between the test sample and the control sample, respectively. Consistent with the access to capital markets hypothesis, the results show that the delisted companies are overlevered, indicating that they were less likely to raise capital and hence they opt out of trading. They also have lower growth opportunities, as measured by market-to-book ratio as well as lower capital expenditure. These findings imply that either the test firms did not need to new capital as they do not have any growth opportunities, or they were not able to invest because they could not raise equity capital.

Consistent with the agency conflict between shareholders and managers, the results show that delisted companies have higher free cash flow and profitability as measured by return on assets, suggesting that firms may delist to overcome their agency conflicts. However, these results are only significant in medians. The result for insider ownership is not significant.

In order to test the asymmetric information problem, I use intangibility and size. The proportion of intangible assets over total assets measures the degree of asymmetric information between insiders and outsiders (Marosi and Massoud, 2007). My results show that the test sample has higher intangible assets than the control sample indicating a higher probability of asymmetric information for delisted companies. This result is inconsistent with Marosi and Massoud (2007), who examine US delisted companies. The results for size measured by natural logarithm of market capitalisation show that delisted companies are significantly smaller than the remained public companies. This indicates that delisted companies are smaller companies with greater probability of asymmetric information and thus are more likely to delist.

The results also show that delisted firms have lower liquidity and financial visibility as measured by trade volume. However, differences between delisted and control firms are statistically, but not economically significant. Finally, this table shows that although delisted companies are different from the remaining public companies in terms of their volatility, the economic differences are small. These results suggest that the trade volume and stock volatility may not affect economically the delisting decision.

Table 5-4: The Characteristics of Delisted Firms and Control Firms over Their Public Life

	Delisted Firms	Control Firms	t-statistics (Wilcoxon-Mann-Whitney)
Market Access			
Leverage	0.17	0.13	2.18**
	(0.09)	(0.04)	(5.61)***
Capex/Sales	0.43	0.50	-0.58
	(0.04)	(0.03)	(3.35)***
MB	2.38	4.03	-3.10***
	(1.53)	(1.91)	(2.99)***
Agency Conflicts			
Free Cash Flow	0.00	-0.35	1.05
	(0.06)	(0.00)	(4.66)***
ROA	-0.18	-0.52	0.87
	(0.01)	(-0.02)	(1.84)*
Insider Ownership	43.51	44.48	-0.89
	(43.47)	(44.20)	(0.66)
Asymmetric Information			
Intangibility	0.30	0.23	2.75***
	(0.14)	(0.13)	(0.71)
LnMK	2.63	2.96	-5.20***
	(2.58)	(2.85)	(4.51)***
Liquidity and Financial Visibility			
Stock Turnover	0.49	0.56	-0.78
	(0.22)	(0.23)	(1.26)
Log. Trade Volume	3.81	4.42	-9.38***
	(3.94)	(4.14)	(6.48)***
Stock Volatility	0.03	0.04	-3.60**
	(0.02)	(0.03)	(4.85)**

This table presents means (medians) of firms' characteristics for the delisted firms in column two and the control firms in column three over the 1995-2009 period. Delisted firms are those that decide to delist between 1995 and 2009. The control firms are those firms that remained public for over the sample period. t-statistics for the differences in means and Wilcoxon-Mann-Whitney test of the differences in medians are reported in the last column. Leverage is measured as total debt divided by total assets. Capex/Sales is the proportion of capital expenditures over total sales. MB is the market-to-book ratio. Free Cash Flow is the proportion of free cash flow over total assets. ROA is measured as earnings before interest and tax over total assets. Insider Ownership is the ratio of holdings of common shares by all directors and officers as a group to total outstanding shares. Intangibility is the ratio of intangible assets over total assets. LnMK is the natural logarithm of market capitalisation as a proxy for size. Stock Turnover is a ratio of daily turnover the past 12-month period divided by number of ordinary shares. Log. Trade Volume is the log of daily shares traded over past 12 months. Stock Volatility is yearly standard deviation of a firm's stock return over last 12 month. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

I then attempt to show firms' characteristics of test and control samples at the same point in time, which is the year after the IPO. This criterion is in line with Bharath and Dittmare (2010), who use one year following the IPO in order to have a comprehensive data. The results are reported in Table 5-5, Panel A. However, taking one year after the IPO as a starting point may lead to survivorship bias as some firms may have delisted during the first year of their IPO. Therefore, I compare the characteristics of both samples at the exact time of the IPO and the results are reported in Panel B of Table 5-5. For this purpose, the data, which includes leverage, market-to-book, insider ownership, return on assets, and size, is collected by hand from prospectuses.

Table 5-5, Panel A, shows that the test sample firms have significantly higher leverage, lower capital expenditure and growth opportunities, greater insider ownership, and more excess free cash flow. Some of these results are portrayed in Figure 5-4. Interestingly, the first panel (A) of Figure 5-4 shows for delisted firms, leverage carried on increasing in the post-IPO period. In contrast for the control firms, leverage stayed relatively stable. This suggests that delisted companies did not raise equity after their IPOs, and thus they use more debt in an increase in leverage, while the public remained companies would benefit from raising capital following IPOs and hence they have lower leverage. However, this may be also due to differences in growth opportunities and profitability. In order to assess these factors, I analyse also changes in market-to-book and profitably (ROA). The second panel (B) of Figure 5-4 shows that growth opportunities as measured by the market-to-book ratio declines for both test and control firms, but this ratio are lower for the delisted firms than for the remained public firms. Taken in conjunction with the results from Tables 5-4 and 5-5, these findings suggest that the delisted companies need less capital to invest and therefore they are more likely to opt out of trading. Panel C of Figure 5-4 shows that control firms have considerably lower excess free cash flow compared to the test firms. The last panel of Figure 5-4 describes the size of both the test and the control samples. It shows that remained public companies are larger than delisted companies.

In Panel B of Table 5-5, consistent with Panel A, I provide strong support for the impact of leverage, as market-to-book as a proxy for growth opportunities, on the decision to delist. This Panel shows that the delisted companies are highly levered companies with less growth opportunities in contrast to remained public companies. I predict that low growth companies need less capital to finance and thus they are more likely to delist.

Table 5-5: The Characteristics of Delisted Firms and Control Firms

Panel A	Delisted Firms t=IPO Year	Control Firms t=IPO Year	t-statistics (Wilcoxon-Mann-Whitney)
Market Access			
Leverage	0.14	0.09	2.97***
	(0.08)	(0.02)	(2.96)***
Capex/Sales	0.37	0.92	-2.25**
	(0.05)	(0.06)	0.04
MB	2.37	4.72	-2.53***
	(1.72)	(2.45)	(3.19)***
Agency Conflicts			
Free Cash Flow	-0.03	-0.08	1.24
	(0.02)	(-0.03)	(1.61)
ROA	-0.12	-0.19	1.04
	(0.00)	(-0.04)	(0.67)
Insider Ownership	0.45	0.42	1.14
	(0.45)	(0.45)	(0.82)
Asymmetric Information			
Intangibility	0.32	0.20	1.76*
	(0.11)	(0.05)	(1.14)
LnMK	2.80	2.89	-0.03
	(2.88)	(2.91)	(0.21)
Liquidity and Financial Visibility			
Stock Turnover	0.43	0.62	-0.81
	(0.22)	(0.30)	(0.48)
Log. Trade Volume	3.84	4.40	-3.49***
	(3.97)	(4.13)	(1.85)*
Stock Volatility	0.03	0.03	1.48
	(0.03)	(0.02)	(1.71)*

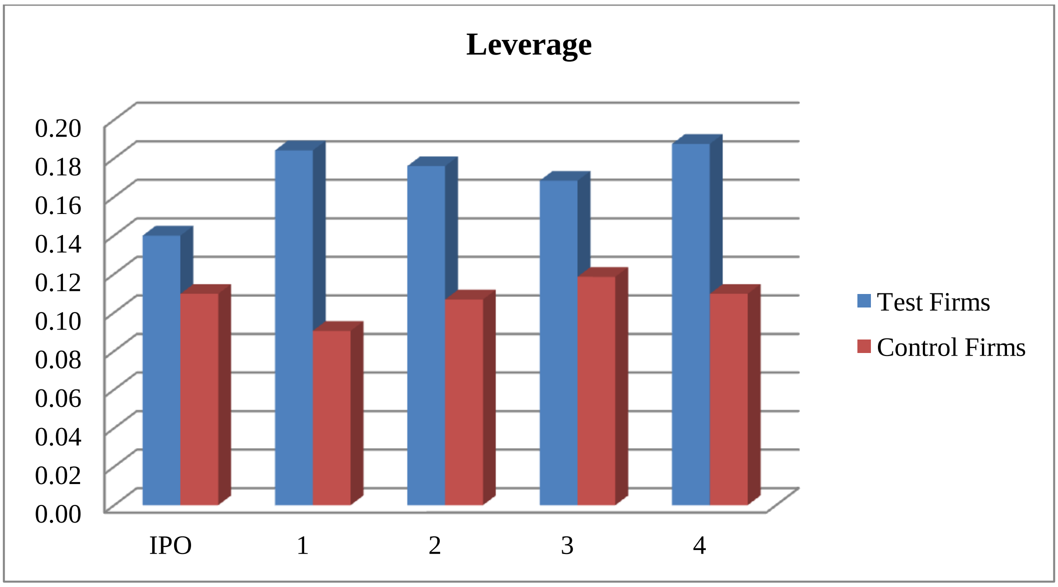
(Table 5-5 continued)

Panel B	Delisted Firms t=IPO time	Control Firms t=IPO time	t-statistics (Wilcoxon-Mann-Whitney)
Market Access			
Leverage	0.90	0.63	2.81***
	(0.61)	(0.24)	(4.74)***
MB	3.62	5.49	-2.01**
	(2.11)	(3.04)	(3.23)***
Agency Conflicts			
Insider Ownership	0.39	0.37	0.82
	(0.39)	(0.34)	(0.84)
ROA	-0.22	-1.38	0.94
	(0.00)	(-0.04)	(1.57)
Asymmetric Information			
LnMK	2.89	2.80	0.85
	(2.81)	(2.76)	(0.97)
Financial Visibility			
Under-pricing	0.09	0.11	-1.35
	(0.08)	(0.07)	(0.04)

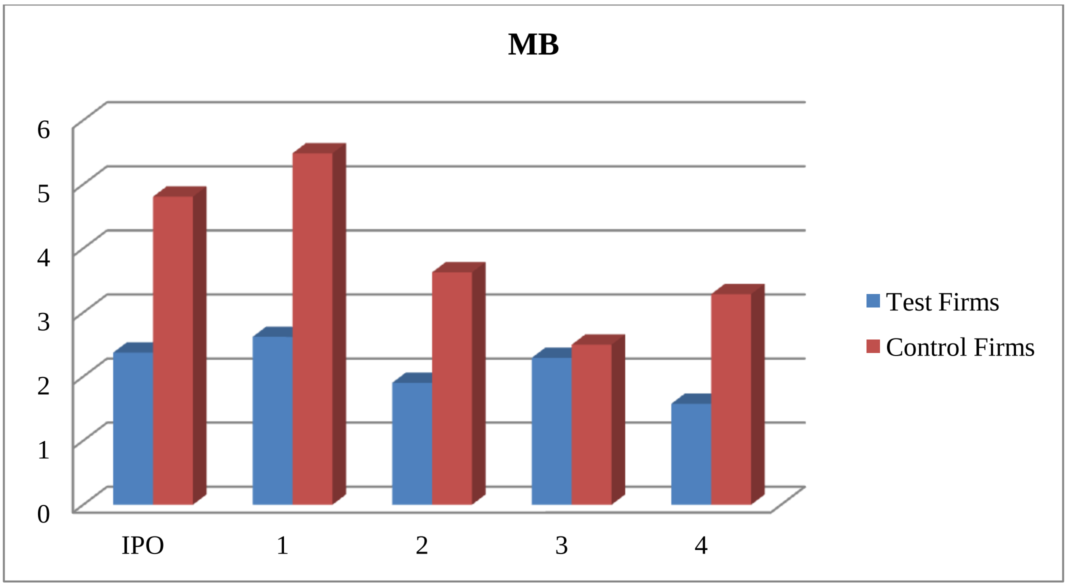
Panel A of this table presents means (medians) firms characteristics for the delisted firms in column two and the control firms in column three at the same point in time (the first year following the IPO). Panel B shows means (medians) of firms' characteristics for the delisted firms in column two and the control firms in column three at the exact time of the IPO. The data at the time of the IPO are collected form prospectuses. This data relates to the last accounts before the IPO. Delisted firms are those that decide to delist between 1995 and 2009. The control firms are those firms that remained public for over the sample period. t-statistics for the differences in means and Wilcoxon-Mann-Whitney test of the differences in medians are reported in the last column. Leverage is measured as total debt divided by total assets. Capex/Sales is the proportion of capital expenditures over total sales. MB is the market-to-book ratio. Free Cash Flow is the proportion of free cash flow over total assets. ROA is measured as earnings before interest and tax over total assets. Insider Ownership is the ratio of holdings of common shares by all directors and officers as a group to total outstanding shares. Intangibility is the ratio of intangible assets over total assets. LnMK is the natural logarithm of market capitalisation as a proxy for size. Stock Turnover is a ratio of daily turnover the past 12-month period divided by number of ordinary shares. Log. Trade Volume is the log of daily shares traded over past 12 months. Stock Volatility is yearly standard deviation of a firm's stock return. Under-pricing is price 1st day minus price offer over price offer. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

Figure 5-4: Key Firms' Characteristics over IPO Life Cycle

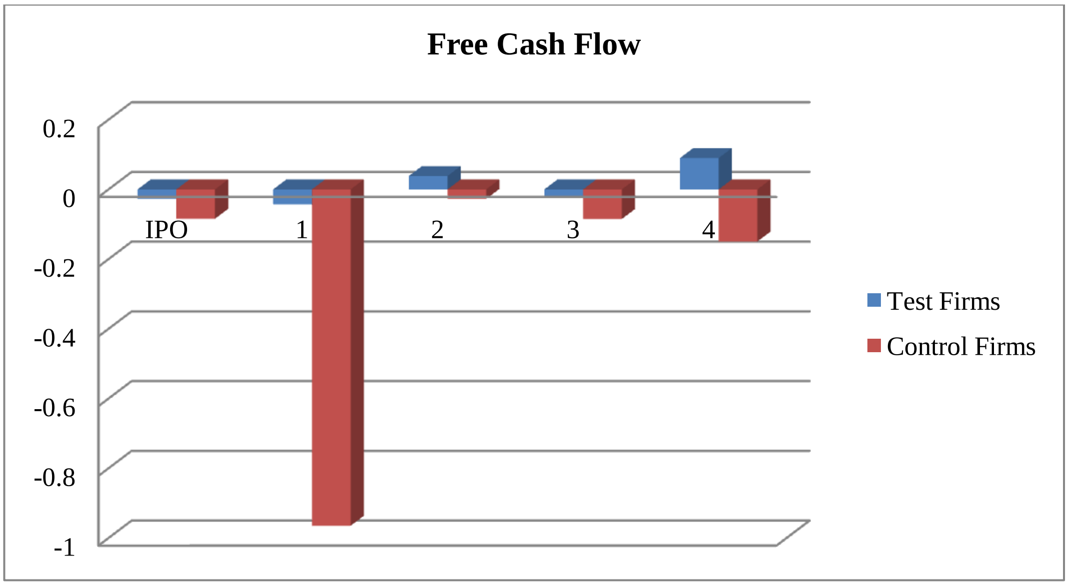
Panel (A)



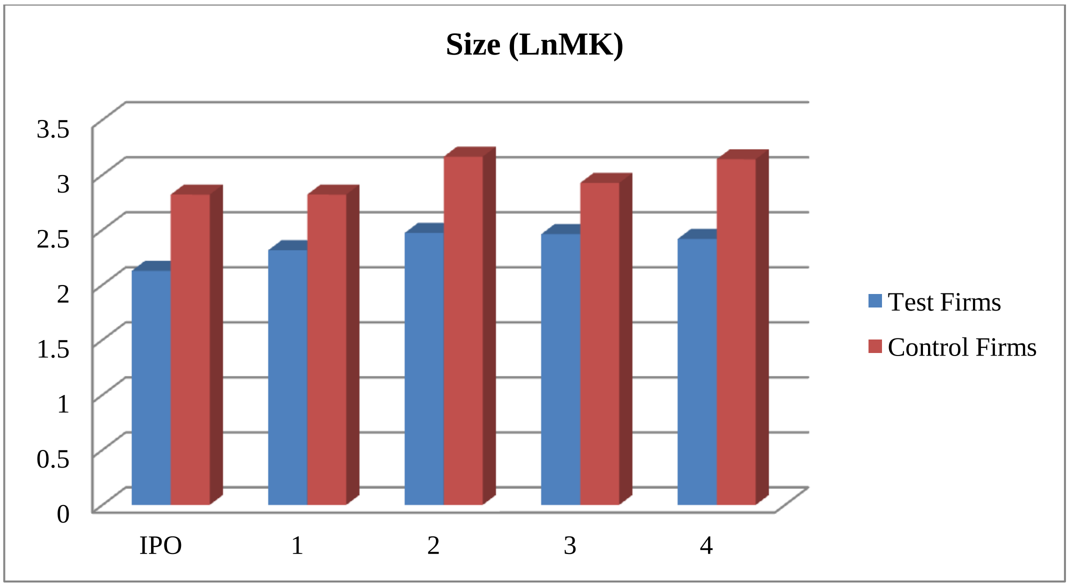
Panel (B)



Panel (C)



Panel (D)



Panel (A) shows Leverage, which is measured as total debt divided by total assets. Panel (B) shows Capex/Sales, which is the proportion of capital expenditures over total sales. Panel (C) illustrates MB, which is the market-to-book ratio. Panel (D) shows Cash Flow, which is the proportion of free cash flow over total assets. Size is measured as natural logarithm of market capitalisation. Test firms are those that decide to delist after 1995. The control firms are those firms that remained public for over the sample period.

Furthermore, I examine how firms' characteristics change over the IPO life cycle in Table 5-6. Following Bharath and Dittmare (2010), I present the data for the year following the IPO and the year prior to the delisting time. This table shows that firms have higher leverage at the time of the delisting suggesting that they have lower probability of raising capital and thus decide to delist. The results also report that firm have lower growth opportunities at the time of the delisting. It indicates that they may have less opportunity to invest and thus need less capital resulting in going out of trading. These results support the hypothesis related to the market access that firms with lower market access are more likely to delist. However, capital expenditure is not significant between the time of the IPO and the time of the delisting.

Table 5-6 also presents the results for the agency hypothesis indicating that the higher the conflict between managers and shareholders, the more likely the firms are to be delisted. I find that firms have greater insider ownership at the time of delisting. It shows that firms with more concentrated ownership are more likely to have the agency conflict between managers and shareholders. I also use the proportion of free cash flow over total assets and return on assets, as two alternative proxies for the free cash flow problem. I do not find that the free cash flow problem has a significant impact of the delisting decision. These results are not consistent with Lehn and Poulsen (1989), who study the going private companies argue that firms benefit from going private to reduce the probability of the agency conflict in the form of free cash flow problem.

With respect to the asymmetric information, my results show that firms are smaller and with higher intangible assets when they decide to delist. Finally, my results are not consistent with the liquidity hypothesis, but they show that firms have higher stock volatility when they delist.

Table 5-6: Delisted Firms' Characteristics at the IPO and Delisting Year

	Delisted Firms t=IPO Year	Delisted Firms t=Delisted Year	t-statistics (Wilcoxon-Mann-Whitney)
Market Access			
Leverage	0.14	0.21	-3.22***
	(0.08)	(0.14)	(2.03)**
Capex/Sales	0.37	0.38	0.14
	(0.05)	(0.04)	(0.12)
MB	2.37	2.08	2.87***
	(1.72)	(0.96)	(2.02)**
Agency Conflicts			
Free Cash Flow	-0.03	0.02	-0.56
	(0.02)	(0.04)	(0.40)
ROA	-0.12	-0.42	1.37
	(0.00)	(0.02)	(0.62)
Insider Ownership	0.45	0.36	3.84***
	(0.45)	(0.39)	(3.67)***
Asymmetric Information			
Intangibility	0.32	0.33	-0.19
	(0.11)	(0.13)	(3.10)***
LnMK	2.10	1.88	4.69***
	(2.77)	(1.15)	(3.63)***
Liquidity and Financial Visibility			
Stock Turnover	0.43	0.47	-0.65
	(0.22)	(0.23)	(0.40)
Log. Trade Volume	3.44	3.55	-0.88
	(3.92)	(3.95)	(0.74)
Stock Volatility	0.03	0.04	-3.92***
	(0.03)	(0.03)	1.56

This table presents means (medians) firms' characteristics for the delisted firms at the time of IPO and the time of delisting in column two and three respectively. Delisted firms are those that decide to delist between 1995 and 2009. The control firms are those firms that remained public for over the sample period. t-statistics for the differences in means and Wilcoxon-Mann-Whitney test of the differences in medians are reported in the last column. Leverage is measured as total debt divided by total assets. Capex/Sales is the proportion of capital expenditures over total sales. MB is the market-to-book ratio. Free Cash Flow is the proportion of free cash flow over total assets. ROA is measured as earnings before interest and tax over total assets. Insider Ownership is the ratio of holdings of common shares by all directors and officers as a group to total outstanding shares. Intangibility is the ratio of intangible assets over total assets. LnMK is the natural logarithm of market capitalisation as a proxy for size. Stock Turnover is a ratio of daily turnover the past 12-month period divided by number of ordinary shares. Log. Trade Volume is the log of daily shares traded over past 12 months. Stock Volatility is yearly standard deviation of a firm's stock return over last 12 month. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

5.4.2 Empirical Analysis

5.4.2.1 Logit Results

I use the data at the exact time of the IPO and estimate the logit regression in order to investigate whether the inherent characteristics of the firm at the time of the IPO could predict the ultimate delisting decision. The results are reported in Table 5-7, Panel A. I download all prospectuses in order to collect those data. However, I could only find the data related to leverage, return on assets, market capitalisation, insider ownership, and under-pricing. The dependent variable is a dummy set to one if a firm is delisted and zero otherwise. Panel A reports the results based on the hypotheses in four models, as models (1), (2), and (3) presents the results based on the access to market, agency conflicts, and asymmetric information hypotheses. The last model (4) includes the proxies for liquidity and financial visibility as well as other explanatory variables in the last three models.

I then take the delisting year as the event and re-estimate the logit regression for one year before the delisting year. I attempt to investigate whether firms' characteristics over the public life cycle are different between the delisted companies and the surviving companies. If so, would those characteristics predict the delisting decision? Panel B presents the results of the logit regression at the year prior to the delisting. Yet again, I report the results based on four main hypotheses as explained in Panel A. However, in each model, I try to use alternative proxies to have a robustness check.

Both panels also reports two goodness-of-fit tests: Hosmer and Lemeshow (1989) and Andrews (1988). The idea underlying these tests is to compare the fitted expected values to the actual values *by group*. If these differences are large, I reject the model as providing an insufficient fit to the data.

Interestingly, the results only support the market access hypothesis in Panel A., since leverage and market-to-book as a proxy for growth opportunities, are the only significant coefficients in all four models. Therefore, my results provide strong support for the importance of the market access hypothesis. This is consistent with Marosi and Massoud (2007) and Leuz et al. (2008), who find that delisted companies in the US have significantly higher leverage. However, the recent literature for going private firms report mixed evidence for the impact of leverage. Mehran and Peristiani (2009) suggest a positive and significant relationship between going private decision and leverage in contrast to Bharath and Dittmar (2010). In addition, the results are not consistent with Witmer (2005), who does not support the impact of leverage and growth opportunities on the voluntary cross-delisting decision. Alternatively, he suggests that size and stock turnover are the key determinants of cross-delisting as smaller firms with low stock turnover are more likely to delist. However, in contrast to their results, I show that firms with higher leverage and lower growth opportunities are more likely to delist. Perhaps the determinants of the voluntary delisting decision are different from the determinants of voluntary cross-delisting decision.

The results in model (2) do not provide any support for the agency conflicts as insider ownership and return on assets, as proxies for the agency conflict between shareholders and managers are not statistically significant. Models (3) and (4) test the asymmetric information and liquidity hypotheses, respectively. The results show that at the time of the IPO, these hypotheses cannot forecast the determinants of the delisting decision.

I also attempt to control for a foreign company listed on AIM by a dummy variable set to one if a firm is foreign company and zero otherwise. The results in Panel A of Table 5-7 do not report any significant effects of the overseas companies on the delisting decision. I also control for high-tech industries, venture capitalists, and underwater prestigious, which do not appear to have a significant impact on the delisting decision. Finally, the two goodness-of-fit tests (H-L and Andrews statistics) reported in Panel A, support that the observed values are very close to the expected value and thus this model is efficient. Accordingly, the results of Panel A show that only leverage and firms' growth opportunities could predict whether a company opts to go out of the market. [29]

In Panel B, I measure my variables one year prior to the delisting decision to assess whether fundamental factors can predict this decision. The results also support the market access hypothesis, as firms with lower growth opportunities and greater leverage are more likely to delist (model 1.1). Model (1.1) also shows that the coefficient on seasoned equity offerings (SEO) is negative and significant. In conjunction with the results from the market-to-book ratio and leverage, my findings suggest that companies that decide to delist do not have large investments and growth prospects, are unable to raise further equity capital, and thus rely more on debt. These results could suggest that the delisted firms may have come to the market without a clear growth strategy.

In model (1.2) of Panel B, I use the proportion of capital expenditure as an alternative proxy for growth opportunities. Consistent with the market-to-book ratio, I find that firms with greater capital expenditure need further capital and thus they are less likely to delist. However, the two goodness-of-fit tests show that model 1.2 is

[29] In order to overcome the restriction data, I use logit model at the year following the IPO, when the data available to collect and the results are reported in Appendix A-1.

not efficient and hence I exclude the proportion of capital expenditure in other models.

Moreover, I provide mixed evidence for the agency conflict between managers and shareholders. Models 2.1 and 2.2 show that free cash flow and return on assets as proxies for free cash flow problem are not significant. While the results present that closely held firms are more likely to delist. The results for ownership structure are complementary to those of Amihud et al. (1990), who find that firms controlled by major shareholders are reluctant to use equity. Therefore, as I expected, more closely held firms are less likely to issue equity and thus are have higher probability of delisting.

Model (3) controls for the asymmetric information and the results are not significant. Models (4.1) and (4.2) do control for all hypotheses including the impact of the liquidity and the financial visibility on the delisting decision in the year before the delisting. The results show that the last year CAAR is negative and significant, suggesting that delisted companies with higher cumulative abnormal returns are less likely to go out of trading.

My sample includes all delisted companies and those companies that transferred to the Main market. In order to check whether the determinants of delisting are different across these two sets of companies, I use the multinomial logit regression. The results are reported in Panel (C). In this model, I use surviving companies as a reference group. The model then controls for delisted companies that go private versus the reference group (surviving-matched companies) as well as the transferred companies (upgraded to the Main market) versus the surviving-matched companies. The results for delisted companies that go private are in line with results from the logit model in Panel A. In contrast, the results for transferred companies show that only return on assets and underpricing are highly significant. Increases in return on assets (ROA) result in an increase in the probability of upgrading to the Main market. These findings are inconsistent with the agency conflict in the form of free cash flow problem but in line with the argument of Arcot et al. (2007) that AIM companies are encouraged to join to the Main market when they demonstrate their profitability.[30] Moreover, I find that underpricing has a negative but insignificant effect on the delisting decision, whereas its effect is highly significant on the upgrading decision to the Main market. The results of underpricing for both delisted companies and those transferred to the Main market suggest that firms that had modest first day return are less vulnerable to asymmetric information, and, hence, their good performance during their IPO has lead them to upgrade their quotation from AIM to the Main market. The negative effect of underpricing on the upgrading decision is also consistent with Michaely and Shaw (1994), who argue that firms with higher degree of asymmetric information offer their share at a discount to their true market value to entice less informed investors. They find that firms that underprice more have weaker future performance and less likely to issue seasoned equity offerings. In line with these arguments, my results suggest that firms with positive initial returns have higher adverse selection problem and weaker future performance. As a result, they are less likely to transfer to the Main market.

. In order to have a robustness check, I re-estimate the regression by adding the explanatory variables and the results are consistent across all four models. Therefore, I report the marginal effect of variables only for Model (4), which includes all explanatory variables. The results show that among significant variables,

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[30] Arcot, S., Black, J. and Owen, G., (2007), From local to global: the rise of AIM as a stock market for growing companies, Report commissioned by London Stock Exchange from The London School of Economics and Political Science.

a unit increase in leverage will increase the probability of delisting by 1.40, which is higher than the marginal effect of growth opportunities (0.96), but leverage and growth opportunities do not determine the upgrading decision.

Panel D shows the results of multinomial logit model one year before delisting. Given the survive-matched companies as the reference category, the findings show that the determinants of delisting are relatively different across the other two categories (delisted companies and upgraded to the Main market companies). Increases in leverage and decreases in growth opportunities result in an increases in the probability of delisting. However, leverage and growth opportunities measured by both the market-to-book ratio and the ratio of capital expenditures have not significant effects on moving to the Main market. I find that larger firms with more profitability are more likely to move to the Main market than survive in AIM, suggesting that they might be able to meet the Main listing requirements. Moreover, the results show that those companies that generate positive abnormal returns are more likely to upgrade to the Main market than survive in AIM. While, companies with negative abnormal returns are more likely to delist than survive in AIM. The results show that companies with higher liquidity and lower risk measured by stock volatility and beta are more likely to transfer to the Main market than stay in AIM. In contrast with the results for upgraded companies, increases in issuing seasoned equity offerings and operating in high-tech industries decrease the probability of delisting. These results are confirmed, as the reported Deviance statistics support the goodness-fit of all models.

Table 5-7: Logit Analysis for the Determinants of the Delisting Decision

Panel A (t= the IPO date)	Model (1)	Model (2)	Model (3)	Model (4)
Marker Access				
Leverage	0.32***	0.33***	0.32***	0.31***
	(2.74)	(2.76)	(2.70)	(2.62)
MB	-0.03*	-0.03*	-0.04*	-0.04*
	(-1.74)	(-1.68)	(-1.73)	(-1.77)
Agency Conflicts				
Insider Ownership		0.44	0.50	0.52
		(0.99)	(1.10)	(1.15)
ROA		0.02	0.02	0.02
		(0.78)	(0.74)	(0.75)
Asymmetric Information				
LnMV			-0.10	-0.11
			(-0.95)	(-1.08)
Liquidity and Financial Visibility				
Under-pricing				-0.00
				(-0.77)
Other Control Considerations				
Dummy. Foreign IPOs	0.42	0.42	0.42	0.49
	(0.79)	(0.79)	(0.87)	(0.90)
Dummy. VC backing	0.26	0.29	0.30	0.32
	(0.96)	(1.06)	(1.08)	(1.17)
Dummy. High-tech industries	-0.15	-0.16	-0.17	-0.186
	(-0.59)	(-0.62)	(-0.66)	(-0.72)
Dummy. Prestigious underwriters	0.43	0.42	0.37	0.35
	(1.13)	(1.12)	(0.95)	(0.91)
C	-0.75	-0.72	-1.03	-1.06
	(-1.32)	(-1.27)	(-1.57)	(-1.62)
McFadden R-squared	2.60%	2.70%	2.89%	3.47%
H-L Statistic	7.62	6.69	6.76	10.38
	(0.464)	(0.378)	(0.562)	(0.245)
Andrews Statistic	11.09	13.651	14.50	14.36
	(0.350)	(0.189)	(0.151)	(0.166)

Table (5-7 continued)

Panel B (t=the year prior to the delisting)	Model (1.1)	Model (1.2)	Model (2.1)	Model (2.2)	Model (3)	Model (4.1)	Model (4.2)
Market Access							
Leverage	1.28***	1.53	1.33**	1.23*	1.30*	1.32*	1.34*
	(2.12)	(2.39)	(2.04)	(1.86)	(1.93)	(1.94)	(1.95)
MB	-0.01*		-0.01*	-0.01*	-0.02*	-0.02*	-0.02*
	(-1.75)		(-1.73)	(-1.80)	(-1.93)	(-1.89)	(-1.90)
Capex/Sales		-0.11**					
		(-1.98)					
Agency Conflicts							
Free Cash Flow			-0.39				
			(-1.30)				
ROA				0.56	-0.68	-0.66	-0.68
				(1.00)	(-1.09)	(-0.93)	(-0.95)
Insider Ownership			0.00*	0.00**	0.00**	0.00**	0.00**
			(1.76)	(1.95)	(2.01)	(2.21)	(2.06)
Asymmetric Information							
Intangibility					0.30	0.32	0.30
					(0.79)	(0.84)	(0.75)
LnMK					-0.15	-0.14	-0.17
					(-1.50)	(-1.32)	(-1.57)
Liquidity and Financial Visibility							
Stock Turnover						-0.11*	
						(-1.78)	
Log. Trade Volume							-0.10
							(-0.56)
$CAAR_{[-365,0]}$						-0.09***	-0.11**
						(-2.59)	(-2.51)
Stock Volatility						-2.52	-2.30
						(-0.54)	(-1.59)
Other Controls							
SEO Dummy	-0.48**	-0.38	-0.37	-0.38	-0.45	-0.44	-0.46
	(-2.04)	(-1.50)	(-1.45)	(-1.47)	(-1.71)	(-1.66)	(-1.69)
Dummy. High-tech industries	-0.33	-0.52*	-0.33	-0.32	-0.31	-0.28	-0.39
	(-1.18)	(-1.77)	(-1.09)	(-1.08)	(-1.02)	(-0.92)	(-1.25)
IPO Life	0.02	0.01	0.05	0.05	0.08	0.07	0.09
	(0.39)	(0.21)	(0.97)	(0.86)	(1.35)	(1.26)	(1.50)
C	0.01	0.09	-0.21	-0.29	-0.98*	-0.98	-0.58
	(0.04)	(0.28)	(-0.50)	(-0.70)	(-1.73)	(-1.63)	(-0.64)
H-L Statistic	4.98	10.54	10.83	5.93	10.11	10.72	10.49
	(0.76)	(0.23)	(0.21)	(0.66)	(0.26)	(0.22)	(0.23)
Andrews Statistic	10.54	10.83*	5.93	10.11	10.72	10.49	0.00
	(0.84)	(0.07)	(0.28)	(0.77)	(0.38)	(0.17)	(0.22)

Table (5-7 continued)

	Delisted Companies					Transferred to the Main Market				
Panel C (t= the IPO date)	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**		**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	
	Coeff	**Coeff**	**Coeff**	**Coeff**	**Marginal effect**	**Coeff**	**Coeff**	**Coeff**	**Coeff**	**Marginal effect**
Marker Access										
Leverage	0.35***	0.33***	0.34***	0.33***	1.40	0.20	0.21	0.18	0.13	1.14
	(0.004)	(0.005)	(0.005)	(0.007)		(0.344)	(0.352)	(0.773)	(0.586)	
MB	-0.03*	-0.04*	-0.04*	-0.04*	0.96	-0.01	-0.01	-0.03	-0.03	0.96
	(0.088)	(0.089)	(0.090)	(0.092)		(0.725)	(0.755)	(0.566)	(0.968)	
Agency Conflicts										
Insider Ownership		0.55	0.54	0.57	1.72		-0.25	0.22	0.20	1.21
		(0.237)	(0.243)	(0.222)			(0.773	(0.953)	(0.834)	
ROA		0.02	0.02	0.02	1.01		0.55*	0.46	0.47	1.59
		(0.438)	(0.439)	(0.437)			(0.070)	(0.137)	(0.142)	
Asymmetric Information										
LnMV			-0.15	-0.20	1.02			0.58	0.65	1.92
			(0.961)	(0.946)				(0.235)	(0.220)	
Liquidity and Financial Visibility										
Under-pricing				-0.00	0.99				-0.23**	0.09
				(0.446)					(0.048)	
Other Control Considerations										
Dummy. Foreign IPOs	0.42	0.42	0.42	0.46	1.59	0.26	0.43	0.46	0.58	1.78
	(0.467)	(0.429)	(0.432)	(0.409)		(0.856)	(0.902)	(0.852)	(0.609)	
Dummy. VC backing	0.30	0.29	0.33	0.41	1.51	-0.34	-0.26	0.27	0.41	0.82
	(0.270)	(0.168)	(0.168)	(0.147)		(0.554)	(0.665)	(0.238)	(0.751)	

Dummy. High-tech industries	-0.30	-0.31	-0.33	-0.33	0.71	0.62	0.60	-0.63	-0.33	1.77
	(0.264)	(0.249)	(0.255)	(0.228)		(0.203)	(0.183)	(0.285)	(0.254)	
Dummy. Prestigious underwriters	0.35	0.36	0.37	0.33	1.39	0.75	0.32	0.37	0.35	1.41
	(0.371)	(0.371)	(0.395)	(0.410)		(0.226)	(0.187)	(0.395)	(0.227)	
C	-0.75	-0.91	-1.03	-0.96		-0.25***	-0.22**	-0.44***	-0.45***	
	(0.212)	(0.124)	(0.156)	(0.156)		(0.023)	(0.052)	(0.002)	(0.002)	
Deviance Statistics/ McFadden R-squared										
Model (1)						0.856/ (4.01%)				
Model (2)						0.887/ (4.05%)				
Model (3)						0.999/ (5.01%)				
Model (4)						0.999/ (5.01%)				

Table (5-7 continued)

	Delisted Companies (Category 1)							Transferred to the Main Market (Category 2)						
Panel D (t= 1 year bfore)	**Model (1.1)**	**Model (1.2)**	**Model (2.1)**	**Model (2.2)**	**Model (3)**	**Model (4.1)**	**Model (4.2)**	**Model (1.1)**	**Model (1.2)**	**Model (2.1)**	**Model (2.2)**	**Model (3)**	**Model (4.1)**	**Model (4.2)**
Market Access														
Leverage	1.52**	1.91**	1.53**	1.65**	1.58**	1.70**	1.70**	-0.40	-0.72	-0.83	-1.04	-1.89	-1.27	-1.27
	(0.016)	(0.025)	(0.032)	(0.018)	(0.028)	(0.023)	(0.022)	(0.777)	(0.638)	(0.621)	(0.540)	(0.350)	(0.598)	(0.587)
MB	-0.01*		-0.01**	-0.01**	-0.01**	-0.02**	-0.02*	-0.02		-0.03	-0.03	00.17	-0.15	-0.21)
	(0.055)		(0.042)	(0.047)	(0.045)	(0.047)	(0.067)	(0.684)		(0.757)	(0.751)	(0.159)	(0.361)	(0.258)
Capex/Sales		-0.14*							-0.02					
		(0.099)							(0.694)					
Agency Conflicts														
Free Cash Flow			0.72							2.44**				
			(0.310)							(0.017)				
ROA				-0.89	-0.81	-0.66	-0.65				0.89**	0.81**	0.75**	0.84**
				(0.989)	(0.240)	(0.750)	(0.750)				(0.015)	(0.024)	(0.035)	(0.039)
Insider Ownership			0.00*	0.00*	0.00*	0.00*	0.00*			-0.01	-0.01	-0.00	-0.02	-0.01
			(0.098)	(0.079)	(0.075)	(0.080)	(0.085)			(0.173)	(0.240)	(0.974)	(0.258)	(0.624)
Asymmetric Information														
Intangibility					0.37	0.35	0.38					0.14	0.42	0.27
					(0.335)	(0.370)	(0.346)					(0.850)	(0.668)	(0.782)
LnMK					-0.03	-0.02	-0.18					1.21***	1.21***	1.63***
					(0.798)	(0.858)	(0.882)					(0.000)	(0.002)	(0.000)
Liquidity and Financial Visibility														
Stock Turnover						-0.04							0.49**	
						(0.772)							(0.039)	

Log. Trade Volume							-0.00							0.71
							(0.973)							(0.212)
CAAR$_{[-365,0]}$						-0.34**	-0.34**						2.00***	2.23***
						(0.046)	(0.048)						(0.002)	(0.001)
Stock Volatility						2.45	2.70						-4.33*	-3.49**
						(0.606)	(0.583)						(0.061)	(0.049)
Beta						0.23	0.297						-2.12*	-2.12*
						(0.962)	(0.625)						(0.069)	(0.080)
Other Controls														
SEO Dummy	-0.69***	-0.63**	-0.63**	-0.63**	-0.65**	-0.58**	-0.58**	0.76	0.89*	1.07*	1.15*	1.02	0.06	0.02
	(0.005)	(0.019)	(0.021)	(0.021)	(0.021)	(0.045)	(0.045)	(0.153)	(0.100)	(0.082)	(0.068)	(0.138)	(0.939)	(0.978)
DummyHigh-tech	-0.54*	-0.75**	-0.67*	-0.66*	-0.66*	-0.71*	-0.70*	0.46	0.17	0.667	0.70	1.08	1.11	0.40
	(0.077)	(0.023)	(0.057)	(0.057)	(0.060)	(0.051)	(0.052)	(0.336)	(0.719)	(0.191)	(0.166)	(0.064)	(0.129)	(0.597)
IPO Life	0.048	0.04	0.07	0.08	0.09	0.11	0.11	0.165	0.18	0.12	0.12	0.10	0.07	0.17
	(0.367)	(0.430)	(0.170)	(0.128)	(0.120)	(0.165)	(0.168)	(0.198)	(0.157)	(0.354)	(0.352)	(0.530)	(0.670)	(.279)
C	-0.16	0.11	-0.63	-0.54	-0.70	-0.81	-0.86	-1.98*	1.75**	-1.86*	-2.12**	-1.08**	-0.06**	0.06**
	(0.574)	(0.715)	(0.154)	(0.255)	(0.236)	(0.210)	(0.392)	(0.053)	(0.040)	(0.057)	(0.028)	(0.020)	(0.030)	(0.032)
Deviance Statistics/ McFadden R-squared														
Model (1.1)								0.976/ 5.08%						
Model (1.2)								0.999/ 7.10%						
Model (2.1)								0.998/ 10.50%						
Model (2.2)								1.000/ 8.20%						
Model (3)								1.000/ 15.50%						
Model (4.1)								1.000/ 22.01%						
Model (4.2)								1.000/ 21.70%						

This table presents the results for the logit regression for the factors affecting the delisting decision. Panel A shows the results using the explanatory variables at the exact time of the IPO. Panel B presents the results using the explanatory variables at the year prior to the delisting. In both Panels A and B, the independent variable is a dummy equal to one for delisted companies and zero for size and IPO date matched control firms that remained listed. Panel C and D shows the results for multinomial logit regression, in which the dependent variable is categorises as 0, 1, and 2at the time of the IPO and one year before delisting, respectively. Surviving companies, voluntary delisted companies that go private, and those companies that transferred to the Main market are categorises as 0, 1, and 2, respectively. The reference category is 0 representing the surviving companies. The dependent variables are: Leverage, which is measured as total debt divided by total assets. MB is the market-to-book ratio. Capex/Sales is the proportion of capital expenditures over total sales. Free Cash Flow is the proportion of free cash flow over total assets. ROA is measured as earnings before interest and tax over total assets. Insider Ownership is the ratio of holdings of common shares by all directors and officers as a group to total outstanding shares. Intangibility is the ratio of intangible assets over total assets. LnMK is the natural logarithm of market capitalisation. Stock Turnover is a ratio of daily turnover of the past 12-month period divided by number of ordinary shares. Stock Volatility is yearly standard deviation of a firm's stock return over last 12 month. Log. Trade Volume is the log of daily shares traded over past 12 months. SEO Dummy is a dummy variable equal to one if the company raised capital and zero otherwise. Under-pricing is 1st price day minus price offer over price offer. $CAAR_{[-365,0]}$ is cumulated average abnormal returns for one year before the event (event is one year before delisting). Beta is collected from Bloomberg. Dummy.Foreign IPOs is a dummy variable equals to one if the AIM firm is foreign. Dummy VC backing is a dummy variable set to one for a venture capitalist. Dummy high-tech industry is a dummy variable set to one if a firm is in computer manufacturing, electronic equipment, computer and data processing services, and optical, medical, and scientific equipment. Dummy prestigious underwriters are a dummy set to one if a global underwriter defined in Derrien and Kesckes (2007) underwrites the IPO. IPO life controls for the firm's public life. Finally, Panel A and B of this table reports two goodness-of-fit tests, H-L Statistic and Andrews Statistics. They show the discrepancy between observed values and the values expected in the logit model. If these differences are large, I reject the model as providing an insufficient fit to the data. Panel C and D report Deviance Statistics shows the goodness-of-fit of the model. Its significance shows that the model does not fit the data. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively. In Panel A and B, t-statistics are reported in parentheses while in Panel C and D, p-values are reported in parentheses.

5.4.2.2. Hazard Regression Results

In this section, I use the Cox proportional hazard model to investigate the factors that contribute to the delisting decision. Panel A in Table 5-8 presents the results of the hazard model for all companies, including both delisted companies and those companies that transferred to the Main market after controlling for the surviving-matched firms. I match the surviving firms with the test sample based on the IPO date and the size at the time of the IPO in order to compare the companies with the same characteristics. These companies are publicly listed at the same time with the same size. The results are presented based on the hypotheses in four main models. I repeat each specification in each subsequent model to check the robustness of the results. Panel B show the results for delisted companies compared to the matched surviving companies. Panel C reports the results for the upgraded companies compared to their matched surviving companies. The hazard ratios of model (4.2) are also reported in all panels.

Panel A of Table 5-8 shows that firms have a higher hazard rate of delisting if they have greater leverage and lower growth opportunities measured by the market-to-book ratio. These results are in line with the market access prediction (model 1.1). For robustness check, in Panel A, I replace MB by the proportion of capital expenditures over total sales as an additional proxy for growth opportunities (model 1.2). Consistent with the market hypotheses, I find that firms with greater capital expenditures are less likely to delist. Regarding the agency hypothesis, I use the proportion of free cash flow over total assets, which is not statistically significant (model 2.1). Similarly, the coefficient on return on assets as an alternative proxy for the free cash flow problem is not significant (model 2.2). This is in contrast with the prediction of the agency conflict as firms with larger free cash flow are more likely to delist. The regression results present a positive and significant relationship between insider ownership and the probability of delisting, thus supporting the agency conflict hypothesis, suggesting that the delisting decision is smoother for firms that are more closely held. Firms also have a greater hazard rate of delisting if they are smaller with higher intangible assets, supporting the asymmetric information hypothesis. These results are robust across all models.

Model (4.1) includes stock volatility and stock turnover following by Mehran and Peristiani (2009). However, I provide mixed evidence for the liquidity and financial visibility predictions. The results show that the impact of stock turnover on the delisting decision is not significant. In model (4.2), I use the log of trade volume as an additional proxy for liquidity and similar to the stock turnover evidence, the result is not significant. Moreover, in contrast with my hypotheses, the relationship between stock volatility and the probability of the delisting decision is statistically negative. Mehran and Peristiani (2009) also find the negative coefficient of stock volatility. They suggest that firms with higher probability of failure are less likely to go private supporting the financial distress notion.

I control for seasoned equity offerings and high-tech industries in all specifications and the results are robust. The effect of the firms' ability to conduct a seasoned equity offering is statistically significant indicating that the hazard rates of delisting decrease as firms have a greater market access to issue equity. In addition, firms that operate in high-tech industries are less likely to delist. The hazard ratio of model (4.2) is reported in Panel A. The results are robust across all models in Panel A, therefore I report the hazard ratio only for model (4.2). For continuous explanatory variables, the hazard ratio measures the marginal effect of a unit increase in the independent variable. For discrete explanatory variables, the hazard ratio indicates the marginal effect when the event occurs. A hazard ratio greater than one means that the reference category (here 1) has a shorter time to event and otherwise. If the hazard ratio in equal to one, it indicates that there is no difference between the two groups of firms. As Panel A shows, leverage has the highest marginal effect on the delisting decision of about 1.49, indicating that the hazard rate of the delisting increases about 1.49 times for a unit increase in leverage.

Panel B and Panel C show the results for voluntary delisted companies that go private and companies that transferred to the Main market, respectively. The results of Panel B are consistent with those of reported in Panel A indicating that voluntary delisted companies have higher leverage and lower growth opportunities measured by both the market-to-book ratio and the proportion of capital expenditures over total sales. The coefficient on insider ownership is positive and significant, further supporting the agency conflict between shareholders and managers, as more closely held firms are more likely to opt out of the market. While the results of Panel C show that the coefficient on insider ownership is negative and significant indicating that more closely held firms are less likely to transfer to the Main market. Consistent with the asymmetric information hypothesis, the results of Panel B show that smaller companies with lower tangible assets are more likely to delist voluntarily, suggesting that companies with higher asymmetric information problems have greater hazard rates of delisting. The results of the upgrading decision in Panel C show that tangibility has not a significant effect on the decision to join the Main market but size has a positive and significant effect on such a decision, indicating that firms with greater market capitalisations are more likely to join the Main market. In contrast with the results of delisted companies in Panel B, the impact of leverage is not significant on the upgrading decision to the Main market. The coefficient on the market-to-book ratio is negative and significant, suggesting that high growth companies are more likely to stay in AIM than upgrade to the Main market. The results also show that firms are more likely to upgrade to the Main market if they have higher liquidity measured by the logarithm of trade volume. I control for seasoned equity offerings and the results show that conducting seasoned equity offerings has a negative and significant effect on the probability of voluntary delisting, while it has an insignificant effect on the probability of upgrading to the Main market. Finally, operating in high-tech industries has a negative and significant impact on both the voluntary delisting and upgrading decision to the Main market.

Table 5-8: Cox Proportional Hazard Model for the Delisting Decision

Panel A	Test sample against matched surviving companies							Hazard Ratio
	Model (1.1)	**Model (1.2)**	**Model (2.1)**	**Model (2.2)**	**Model (3)**	**Model (4.1)**	**Model (4.2)**	**Model (4.2)**
Market Access								
Leverage	0.37***	0.43***	0.38***	0.29***	0.36***	0.39***	0.40***	1.488
	(0.000)	(0.000)	(0.002)	(0.009)	(0.005)	(0.002)	(0.003)	
MB	-0.03***		-0.03***	-0.03***	-0.03***	-0.03***	-0.03***	0.968
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Capex/Sales		-0.03***						
		(0.003)						
Agency Conflicts								
Free Cash Flow			0.08		0.11	0.07	0.05	1.069
			(0.203)		(0.155)	(0.410)	(0.309)	
ROA				-0.31				
				(0.398)				
Insider Ownership			0.01***	0.01***	0.01***	0.01***	0.01***	1.013
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Asymmetric Information								
Intangibility					0.10**	0.10**	0.12***	1.106
					(0.013)	(0.011)	(0.000)	
LnMK					-0.06**	-0.08***	-0.07**	0.923
					(0.041)	(0.004)	(0.016)	
Liquidity and Financial Visibility								
Stock Turnover						-0.04		
						(0.856)		

Log. Trade Volume							-0.07	0.855
							(0.119)	
Stock Volatility						-0.29***	-0.34***	0.000
						(0.000)	(0.000)	
Beta						-0.40	-0.38	1.053
						(0.102)	(1.110)	
Other Control Considerations								
SEO Dummy	-0.64***	-0.66***	-0.60***	-0.65***	-0.60***	-0.61***	-0.62***	0.545
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Dummy. High-tech industries	-0.21***	-0.40***	-0.22***	-0.24***	-0.20**	-0.19**	-0.20**	0.830
	(0.005)	(0.000)	(0.008)	(0.004)	(0.020)	(0.028)	(0.023)	
Delisted Firms	184	184	184	184	184	184	184	
Control Firms	184	184	184	184	184	184	184	
Likelihood Ratio Test	1169.228***	10477.158***	1162.228***	1159.803***	1079.240***	1072.190***	9994.204***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

(Table 5-8 continued)

Panel B	Delisted companies against matched surviving companies							Hazard Ratio
	Model (1.1)	**Model (1.2)**	**Model (2.1)**	**Model (2.2)**	**Model (3)**	**Model (4.1)**	**Model (4.2)**	**Model (4.2)**
Market Access								
Leverage	0.23**	0.40***	0.26**	0.22*	0.21***	0.27**	0.28**	1.320
	(0.050)	(0.000)	(0.042)	(0.057)	(0.015)	(0.042)	(0.043)	
MB	-0.03***		-0.03***	-0.03***	-0.02***	-0.03***	-0.02***	0.974
	(0.000)		(0.000)	(0.000)	(0.007)	(0.008)	(0.014)	
Capex/Sales		-0.01***						
		(0.025)						
Agency Conflicts								
Free Cash Flow			0.00		0.02	0.02	0.01	1.012
			(0.977)		(0.671)	(0.626)	(0.764)	
ROA				-0.09				
				(0.352)				
Insider Ownership			0.01***	0.01***	0.01***	0.01***	0.01***	1.010
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Asymmetric Information								
Intangibility					0.14***	0.14***	0.15***	1.161
					(0.000)	(0.000)	(0.000)	
LnMK					-0.18***	-0.19***	-0.19***	0.821
					(0.000)	(0.000)	(0.000)	
Liquidity and Financial Visibility								
Stock Turnover						-0.11		

						(0.248)		
Log. Trade Volume							-0.03	0.970
							(0.543)	
Stock Volatility						-0.96***	-0.64***	0.000
						(0.003)	(0.002)	
Beta						-0.42	-0.37	0.842
						(0.895)	(0.608)	
Other Control Considerations								
SEO Dummy	-0.88***	-0.89***	-0.84***	-0.85***	-0.81***	-0.76***	-0.77***	0.459
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Dummy. High-tech industries	-0.52***	-0.73***	-0.52***	-0.52***	-0.50***	-0.49***	-0.46***	0.627
	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	
Delisted Firms	158	158	158	158	158	158	158	
Control Firms	158	158	158	158	158	158	158	
Likelihood Ratio Test	8263.194***	7268.59***	7930.271***	7917.671***	7602.798***	7444.050***	6935.808***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

(Table 5-8 continued)

Panel C	Transferred companies against matched surviving companies							Hazard Ratio
	Model (1.1)	Model (1.2)	Model (2.1)	Model (2.2)	Model (3)	Model (4.1)	Model (4.2)	Model (4.2)
Market Access								
Leverage	0.67	0.88	0.30	0.72	0.21	0.11	0.10	1.116
	(0.250)	(0.320)	(0.438)	(0.160)	(0.642)	(0.794)	(0.806)	
MB	-0.04***		-0.03	-0.02	-0.08***	-0.09***	-0.09***	0.916
	(0.000)		(0.120)	(0.124)	(0.002)	(0.002)	(0.002)	
Capex/Sales		-0.02						
		(0.138)						
Agency Conflicts								
Free Cash Flow			2.15***		1.46***	1.47***	1.47***	4.161
			(0.000)		(0.000)	(0.000)	(0.000)	
ROA				0.68***				
				(0.003)				
Insider Ownership			-0.01**	-0.00	-0.01**	-0.01**	-0.01**	1.004
			(0.039)	(0.167)	(0.020)	(0.015)	(0.021)	
Asymmetric Information								
Intangibility					-0.17	-0.14	-0.12	0.946
					(0.335)	(0.465)	(0.501)	
LnMK					0.56***	0.53***	0.53***	1.686
					(0.000)	(0.000)	(0.000)	
Liquidity and Financial Visibility								
Stock Turnover						0.01		
						(0.596)		
Log. Trade Volume							0.28***	0.754

							(0.000)	
Stock Volatility						-0.93*	-0.89*	0.001
						(0.063)	(0.075)	
Beta						-0.44**	-0.45**	1.660
						(0.047)	(0.032)	
Other Control Considerations								
SEO Dummy	-0.24	-0.27	-0.313	-0.11	-0.20	-0.26	-0.30	0.763
	(0.148)	(0.113)	(0.861)	(0.519)	(0.256)	(0.163)	(0.103)	
Dummy. High-tech industries	0.17***	0.07	0.14***	0.33**	0.25***	0.32***	0.26***	3.531
	(0.230)	(0.624)	(0.001)	(0.027)	(0.000)	(0.000)	(0.000)	
Delisted Firms	26	26	26	26	26	26	26	
Control Firms	26	26	26	26	26	26	26	
Likelihood Ratio Test	2312.095***	2281.695***	2161.190***	2141.846***	1976.489***	1919.974***	1920.814***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Panel A of this table presents the results based on the Cox proportional hazard model for the whole sample including delisted companies as well as those companies that transferred to the Main market. The dependent variable is a dummy one if a company is delisted or transferred to the Main market and zero otherwise. This model also controls for the public life of the IPO companies. The sample includes all firms that went public after 1995. Panel B shows the results for voluntary delisted companies that go private compared to the matched-surviving companies. Panel C reports the results for those companies that transferred to the Main market compared to the matched-surviving companies. Leverage is measured as total debt divided by total assets. MB is market-to-book ratio. Free Cash Flow is the proportion of free cash flow over total assets. Insider Ownership is the ratio of holdings of common shares by all directors and officers as a group to total outstanding shares. Intangibility is the ratio of intangible assets over total assets. LnMK is natural logarithm of market capitalisation. Stock Turnover is a ratio of daily turnover of the past 12-month period divided by number of ordinary shares. Stock Volatility is yearly standard deviation of a firm's stock return over last 12 month. Log. SEO Dummy is a dummy variable equal to one if the company raised capital and zero otherwise. Dummy high-tech industry is a dummy variable set to one if a firm is in computer manufacturing, electronic equipment, computer and data processing services, and optical, medical, and scientific equipment. The hazard ratios of Model (4.2), which includes all explanatory variables, are also reported in all Panels. For continuous explanatory variables, the hazard ratio measures the marginal effect of a unit increase in independent variable. For discrete explanatory variables, the hazard ratio indicates the marginal effect when the event occurs. The hazard ratio greater than one means that the reference category (here 1) have a shorter time to event and otherwise. If the hazard ratio in equal to one, it indicates that there is no difference between groups. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively. Numbers in parentheses represent the p-values.

5.4.2.3 Analysis of the Ex Post Market Access

In conjunction with the results from Panel B of Table 5-7, I provide strong support for the market access hypothesis, indicating that leverage has a positive and significant effect on the voluntary delisting decision to go private. Therefore, I attempt to investigate further consequences of leverage and debt-equity financing over the IPO life cycle of the voluntary delisted companies. I find that leverage is significantly greater for delisted companies than for remained public companies. The results suggest that delisted companies would not able to issue equity and thus they are more likely to delist. To investigate this expectation, I follow Pegano et al.'s (1998) methodology of how leverage of the voluntary delisted and the remained public companies evolve over the IPO life cycle (Equation 5.9). I use this alternative specification in order to compare the ex post performance of the voluntary delisted companies relative to those companies that remained public.

$$y_{it}=\alpha+\sum_{j=0}^{4} \beta_j \, IPO_{t\text{-}j}+\beta_5 IPO_{t\text{-}n}+u_i+d_t+e_{it} \qquad (5.9)$$

Where u_i, and d_t are a firm specific and calendar year specific effect, respectively. IPO_{t-j} are dummy variables equal to one if year t-j was the IPO year, and IPO_{t-n} is a dummy variable set to one if the IPO took place more than 5 years before. This estimation is based on the fixed-effects model, which controls for the effect of the IPO and the four subsequent years by dummy variables.

Table 5-9 shows that the remained public companies deleverage after the IPO. This finding is in line with Pagano et al. (1998) and Aslan and Kumar (2011), who find that leverage decreases in the post-IPO period due to substantial equity issued. Table 9 shows that for remained public companies, there is significant equity issuance over three years after the IPO, but debt issuance is not significant for those companies. My results for remained public companies are consistent with those of

Pagano et al. (1998), who find that equity issuance increases significantly over three years after the IPO. However, Table 9 shows that these results are not consistent with the voluntary delisted companies as leverage increases in the second year after the IPO, suggesting that delisted companies may not raise equity capital over their IPO life cycle This argument is supported in Table 5-9 which shows that for delisted companies, debt financing increases following the first year after the IPO, while there is no considerable change in the equity financing except the second and the fourth year after the IPO, which shows that the equity financing declines significantly for those companies that delist voluntarily.

Table 5-9: Leverage and Debt-Equity Financing over the IPO Life Cycle

	Sample	Year 0	Year +1	Year +2	Year +3	Year +4	Year >4	F-test
Leverage	Whole sample	-0.018	-0.045	-0.027	-0.033	-0.029	-0.010	0.000***
		(-0.25)	(-0.62)	(-0.36)	(-0.43)	(-0.36)	(-0.10)	
	Delisted	0.027	0.028	0.035**	0.039***	0.049***	0.073***	0.000***
		(0.24)	(0.60)	(2.32)	(2.85)	(2.71)	(2.63)	
	Remained Public	-0.015*	-0.051**	-0.052**	-0.060	-0.056***	-0.042	0.000***
		(-1.89)	(-2.05)	(-1.98)	(-0.89)	(-2.66)	(-0.98)	
Debt Financing	Whole sample	0.047	0.056	0.059	0.079	-0.018	0.052	0.169
		(0.83)	(0.93)	(0.92)	(0.88)	(-0.47)	(0.95)	
	Delisted	0.067	0.086**	0.080*	0.150*	-0.175	0.074	0.000***
		(1.02)	(2.00)	(1.89)	(1.69)	(-0.55)	(0.746)	
	Remained Public	0.000	0.000	0.000	0.000	0.001	0.002	0.653
		(0.83)	(1.18)	(1.02)	(1.14)	(1.33)	(1.46)	
Equity Financing	Whole sample	-0.007	-0.017	-0.022	-0.024	-0.030	-0.058	0.000***
		(-0.60)	(-1.06)	(-1.02)	(-0.34)	(-0.30)	(-0.99)	
	Delisted	0.004	-0.007	-0.005**	-0.001	-0.010*	-0.009	0.000***
		(0.83)	(-1.41)	(-2.50)	(-0.25)	(-1.87)	(-1.50)	
	Remained Public	0.002***	0.008*	0.005**	0.004**	0.005	-0.003	0.000***
		(2.68)	(1.76)	(2.30)	(2.07)	(0.47)	(-0.22)	

This table presents the results of. $y_{it} = \alpha + \sum_{j=0}^{4} \beta_j \, IPO_{t-j} + \beta_5 \, IPO_{t-n} + u_i + d_t + e_{it}$Here u_i, and d_t are a firm specific and calendar year specific effect. IPO_{t-j} are dummy variables equal to one if year *t-j* was the IPO year, IPO_{t-n} is a dummy variable set to one if the IPO took place more than 4 years before. However, this table reports the coefficients on the IPO and the post IPO periods. Y refers to leverage, debt financing, and equity financing. Leverage is total debt divided by total assets. Debt financing is debt issued divided by total capital employed. Equity Financing is equity issued divided by total capital employed. t-statistics are reported in parentheses. The last column reports the p-value of f-test of the hypothesis that the sum of the coefficients of all the post-IPO dummies is equal to zero. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

5.2.3. Market Reaction

In this section, I attempt to investigate the market reaction to the delisting decision. I collect stock prices from the DataStream for the period from January 1994 to December 2010. I then use the investegate.co.uk website, which offers a large archive for announcements to find delisting announcements. In addition, I use the Factiva database and hand-collect delisting announcements for the firms that are not provided by investegate.co.uk. I analyse three different windows, [0, 1], [0, 2], and [0, 5]. The event day (0) is the delisting announcements and the numbers in brackets show the staring and closing date of each window. I attempt to find the instantaneous market reaction to the delisting announcements by computing the first window,
[0, 1].

There is the possibility for voluntary delisted firms to transfer to other listing markets. If so, I exclude 26 firms that delist in order to trade in the Main market. Panel A. of Table 5-10 reports the market reaction for all delisted companies while Panel B shows the result for the voluntary delisted firms excluding those firms that transferred to the Main market. Panel C shows the market reaction for the delisted companies which switch to the Main market.

Panel A of Table 5-10 shows that the cumulative abnormal return is -7% for the [0, 1] and [0, 2] windows and -8% for the [0, 5] window. The results are very similar to the US study of Leuz et al. (2008), who report -7.5% and -9% market reaction for the [0, 1] and [0, 2] windows, respectively. Similarly, Marosi and Massoud (2007) find about -12% market reaction for the [0, 1] and [0, 5] windows presenting a larger market reaction. In addition, Liu (2005) finds that foreign companies that delist from the US stock exchange markets because of involuntary reasons experience abnormal return of about -4.5%. His result is different from

Sanger and Peter (1990), who report market reaction of about -8.5% for domestic delisted companies in the US. The results also support the differences between the companies who delist voluntarily and those which go private trough leveraged buyouts (LBO, MBO, IBO). The studies based on going private transactions find positive accumulative returns around various event dates. Renneboog et al. (2007) report 11% for the [-5, 5] window in the UK consistent with Leuz et al. (2008), who find 14% for both the [0, 1] and [0, 2] windows in the US.

Interestingly, when I study the delisted firms that transferred to the Main market, I find different results. Panel C. shows cumulative abnormal returns are 0%, 1%, and 1% for the [0, 1], [0, 2], and [0, 5] windows, respectively, on the announcement of delisting in order to switch to the Main market. The significant positive returns indicate that market distinguishes between the voluntary delisting decision and the delisting decision associated with transferring to the Main market. It suggests that switching to the Main market delivers good news to the market. My findings are consistent with Jenkinson and Ramadorai (2008), who find that the announcement of a switch from AIM to the Main market generates a significant positive return of about 5%. However, the sample size of this study is considerably smaller than their sample size and perhaps it makes the magnitude of accumulated average returns of my sample to be different from their sample. Jenkinson and Ramadorai (2008) also find that companies that transferred to the Main market experience a significant increase in performance, suggesting that switching to the Main market is associated with good news and thus the market responds positively.

Table 5-10: Market Reaction to the Delisting Announcement

Event Window	Observations	CAAR	Positive: Negative	P-value (Z-test)
Panel A: CAAR for the test companies				
[0,1]	184	-7%	82:90	(0.000)***
[0,2]	184	-7%	82:90	(0.000)***
[0,5]	184	-8%	84:89	(0.001)***
Panel B: CAAR for all delisted companies excluding those transferred companies to the Main market				
[0,1]	158	-8%	67:81	(0.000)***
[0,2]	158	-9%	66:82	(0.000)***
[0,5]	158	-9%	69:80	(0.000)***
Panel C: CAAR for all delisted companies that transferred to the Main market				
[0,1]	26	0%	15:9	(0.000)***
[0,2]	26	1%	16:8	(0.000)***
[0,5]	26	1%	15:9	(0.000)***

This table presents the results of an event study investigating the market reaction of delisting announcement. I use the market model: $R_{i,t}= \alpha_i+ \beta_i R_{M,t} + \varepsilon_{i,t}$, Where $R_{i,t}$ is the return on the common stock of the *i*th company in my sample at time *t*, $R_{M,t}$ is the value-weighted market index, which is FTSE all share at time *t*, and $\varepsilon_{i,t}$ is the error term. Panel A reports the cumulated average abnormal returns (CAAR) for the all delisted companies. Panel B shows the results for those delisted companies excluding those firms, which switch to the Main market and Panel C presents the result for those companies that transfer to the Main market. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

The results of Table 5-10 do not control for firm characteristics while my focus is to investigate the leverage effects of the delisting decision, I distinguish between the delisted firms that experience an increased leverage in the year prior to the delisting decision and those with a decrease in leverage. The results are reported in Table 5-11, where Panel A shows CAARs for the delisted companies with an increased leverage in the prior year of the delisting. Panel B presents the results for those companies with a decreased leverage in the year before the delisting.

Table 5-11 shows that companies with an increased leverage experience greater negative abnormal returns in all three windows than those with a decreased leverage. The results suggest that those companies with greater leverage are more likely to have financial risk and thus inflate the market reaction.

Table 5-11: Market Reaction to Delisting Announcements Controlling for Leverage

Event Window	Observations	CAAR	P-value (Z-test)
Panel A: CAAR for delisted companies with an increased leverage			
[0,1]	40	-9.12%	(0.023)**
[0,2]	40	-8%	(0.014)**
[0,5]	40	-9.20%	(0.014)**
Panel B: CAAR for delisted companies with a decreased leverage			
[0,1]	80	-4%	(0.020)**
[0,2]	80	-6%	(0.033)**
[0,5]	80	-5%	(0.046)**

This table presents the results of an event study investigating the market reaction of delisting announcement. I use the market model: $R_{i,t}= \alpha_i+ \beta_i R_{M,t} + \varepsilon_{i,t}$, Where $R_{i,t}$ is the return on the common stock of the *i*th company in my sample at time t, $R_{M,t}$ is the value-weighted market index, which is FTSE all share at time t, and $\varepsilon_{i,t}$ is the error term. Panel A reports the cumulated average abnormal returns (CAAR) for the delisted companies with increased leverage in the year prior to the delisting decision. Panel B shows the results for those delisted companies with decreased leverage in the year prior to the delisting decision. ***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.

5.5 Conclusions

This chapter presents evidence of the determinants of the delisting decision in AIM, particularly the effects of debt-equity financing. Recently, the US literature distinguishes between the going private decision, which happens mainly through leverage buyout and the voluntary delisting decision (Leuz et al., 2008; and Marosi and Massoud, 2007). To the best of my knowledge, there have been no previous studies investigating the determinants and the consequences of the voluntary delisting decision in the UK, especially in AIM. In particular, I attempt to focus on the effects of leverage on the delisting decision, as previous studies suggest that access to capital markets is the main motivation for the going-public decision. Going public in order to raise further capital would affect firms' capital structure and thus I expect a significant impact of leverage on the delisting decision. Probably, firms that would fail to raise further equity capital are more likely to delist.

To investigate the choice of being a public company or deciding to delist, I match the delisted companies with the remained public companies based on two criteria, the date of the IPO and the firm's size at the time of the IPO. I find that the delisted companies are substantially different from the public remained companies. The delisted companies are those with lower growth companies, greater leverage and capital expenditures.

To forecast the determinants of the delisting decision, I use the logit estimation at the exact time of the IPO. The results of the logit regression provide strong support for the market access hypothesis; delisting companies have higher leverage and lower growth opportunities compared to those that remained public. I then use the Cox proportional hazard model, which examines how changes in firms' characteristics over the public life could result in delisting from the market. Similarly, consistent with the market access hypothesis, I find that firms with higher leverage and lower growth opportunities are more likely to delist. I also find support for the importance of the asymmetric information and liquidity hypotheses, but the results are not consistent with the agency conflict hypothesis. The results show that companies with higher asymmetric information measured by the proportion of intangible assets are more likely to delist. However, I do not provide any evidence consistent with the free cash flow problem associated with the agency hypothesis measuring by the excess cash flow. The agency conflict predicts that those companies with higher excess cash flows are more likely to delist but my results do not support such notions. Overall, I find strong support for the impact of leverage on the delisting decision. The Cox proportional hazard model shows that leverage has the highest marginal effect on such a decision.

In addition, when I investigate the ex-post performance of IPOs, I find that the inability to issue equity is a major motivation for the delisting decision. The results suggest that leverage has increased for the delisted firms in contrast to the publicly remained companies. This is followed by increasing the debt financing for the delisted companies.

I further investigate the market reaction of delisting announcements. I use the market model to compute abnormal returns around the announcement of delisting. I find that abnormal returns are negative for different windows. However, there is the possibility that the effect of delisting announcements due to transfer to the Main market would affect the market reaction. To account for this issue, I split my sample into two groups, the delisted companies excluding those that switched to the Main market and the delisted companies that transferred to the Main market. Interestingly, when I exclude those companies that switched to the Main market, I find that abnormal returns are negative. However, this is not the case for the switched companies. The market reaction is positive when companies announce their intention of transferring to the Main market. As far as I know, Jenkinson and Rmadorai (2008) is the only study, which investigates the market reaction of switching from AIM to the Main market. They report similar results as firms that transferred to the Main market experience positive abnormal returns. The results suggest that the market would distinguish between the delisted companies and those companies that delist in order to switch to the Main market. Transferring to the Main market may be considered as good news and thus the market reacts positively.

In order to control for the leverage, I re-estimate the market reaction for two groups, the delisted companies that experience an increased leverage in the year prior to the delisting decision and the delisted companies that experience a decreased leverage in the year prior to the delisting decision. The results suggest that companies with an increased leverage experience substantial negative abnormal returns compared to those with a decreased leverage.

The contribution of my study is to shed light on the voluntary delisted companies in AIM as this issue has not been investigated. Recently, the delisting event attracts the attention of the literature and so far two studies examine the delisting decision in the US (Marosi and Massoud, 2007; and Leuz et al., 2008). However, the US delisting transaction is significantly different from the UK and thus I contribute to previous studies by considering the costs and the benefits of listing to explain why firms decide to delist voluntarily. Particularly, I am interested on the impact of leverage on such a decision in AIM.

However, my study may suffer from some limitations. Since AIM is a less regulated market, collecting data is relatively restricted. I do not have information related to the post-delisting period as I need those data in order to investigate the impact of the delisting decision on shareholders. Therefore, the extent to which other data will strengthen or alter my results is challenging for future research. In addition, I find that the stock price of the voluntary delisted companies decreases significantly on the announcement date and hence I expect an abnormal insider trading before the delisting. This stage is also subject to future research, particularly to analyse the trading activity of insiders and block holders, to assess whether these investors pre-empt or react to the announcement of the delisting decision.

Chapter 6 - Conclusions and Future Research

The main objective of this thesis is to investigate the determinants of capital and debt maturity structures, considering the specific characteristics of small companies as well as different institutional settings between the AIM and Main market. An additional purpose of this thesis is to assess the impact of financing opportunities on the delisting decision. For the purposes of this thesis, a number of hypotheses are tested in each chapter.

The aim of the first empirical chapter is to answer the following questions: *Do small firms have different capital structure compared to large companies because of their specific characteristics? Does the market of quotation also affect the capital structure across firms' sizes?* I use a large sample of companies quoted in both the Main market and AIM over the 1995-2008 period to answer these questions. Unlike previous studies that simply use size as a proxy for agency, bankruptcy, and asymmetric information costs, I test my hypothesis across firms' sizes to access whether and to what extend the specific characteristics of small companies would lead to differences in their financing decisions and their determinants. I find that the differences in firms' characteristics between small and large companies, relating to taxation, profitability, growth opportunities, asset structures, probabilities of bankruptcy, and agency costs, as predicted by the trade-off and the pecking order theories, affect the level of leverage across firms of different sizes. Therefore, consistent with my expectations, I find that small companies have lower leverage and the determinants of debt financing are size dependent. I provide mixed evidence on the prediction of tax and agency costs for small companies. Unlike large companies, small companies do not appear to consider the tax benefits when they set their leverage ratios, probably because of their lower profit margins. I find that in both the

Main market and AIM, taxation has a positive and significant effect on the level of leverage for large firms, but its effect is not significant for small companies. In both markets, small companies have financing difficulties and high level of asymmetric information, and thus inconsistent with the agency costs, the market-to-book ratio is positively related to leverage, while the relationship between leverage and market-to-book is negative for large companies, in line with the predictions of trade-off theory.

Moreover, I contribute to previous studies by analysing the two different markets in the UK, where companies have different debt maturity and leverage. Firms quoted in AIM have significantly lower leverage than those listed on the Main market, even after accounting for all other effects. Therefore, my results suggest that although small companies are risky and high growth, and thus have lower leverage, the market quotation affects the level of leverage significantly.

Finally, the first empirical chapter finds that firms appear to have target debt ratios, but they eliminate their deviation by different adjustment speeds depending on the market in which they are listed. In the Main market, my findings suggest that small companies adjust more rapidly than large ones. However, in AIM, large companies appear to adjust more quickly towards their target, while smaller companies are relatively sluggish. Previous studies show that leverage is mean reverting, but find different speeds of adjustments.[31] I show that this speed of adjustment is affected by size and market of quotation reflecting firm's ability to raise external capital.

The second empirical chapter attempts to assess whether *firms of different size have different drivers for their debt maturity, whether firm's debt maturity*

[31]See Frank and Goyal (2008) for a survey. For example, Fama and French (2002) find speed of adjustment 7%-18% per year, Lemmon and Roberts (2008) 25% per year for book leverage, Flannery and Rangan (2006) 35.5% per year using market leverage and 34.2% per year using book leverage, suggesting that it takes about 1.6 years for a firm to remove half of the effect of a shock on its leverage. Huang and Ritter (2009), using a more robust methodology find 3.7 years for book leverage

dependents on the market in which it is quoted, and *does the maturity structure change over the firm's life cycle.* I find that there are some differences in debt maturity structure between small and large companies in the two sets of market regulations. In the Main market, consistent with the signalling hypothesis, I find a negative relationship between abnormal earnings and debt maturity in contrast to AIM. The results show that high quality firms can signal their future prospects by using shorter maturity of debt. The evidence of the Main market is consistent with empirical studies of Barclay and Smith (1995) and Stohs and Mauer (1996), but inconsistent with Ozkan (2000) and Antoniou et al. (2006). I also find mixed evidence for the impact of leverage and foreign operations in the AIM and Main market. In the Main market, consistent with my expectations, companies with higher leverage and overseas operations use longer maturity of debt in contrast to AIM. In both markets, the results show that the effect of tax is significant for large companies in contrast to small companies. Moreover, irms quoted in AIM have significantly lower long-term debt than those listed on the Main market, even after accounting for all other effects. Considering firms' sizes in both markets, the results show that large companies increase their leverage and their debt maturity while for small companies both leverage and debt maturity do not change significantly. Therefore, my results suggest that although small companies are risky and high growth, thus have lower leverage and long-term debt, the market quotation affects the level of leverage and debt maturity significantly. In line with the first empirical study, I find that firms do have a target debt maturity and they move towards the target level relatively quickly, but the speed of adjustment depends on the size and the market of quotation.

The third empirical chapter addresses the following issues: *Why are so many companies delisting from the London Stock Exchange, particularly AIM? Can* *leverage explain such a decision?* I investigate how the costs and the benefits of listing would affect firms in order to delist from AIM. As AIM provides an ideal opportunity for small and growing companies to be quoted, I could study the characteristics of small companies. I compare a sample of delisted companies to their matched counterparts that remained public. The study of firms' characteristics evolution over time shows that firms are more likely to delist if they have higher leverage and lower growth. Consistently, I find that delisted companies rely on debt rather than equity financing in the post-IPO period, suggesting that those firms did not raise equity capital to either rebalance their capital structure or finance their growth opportunities. Last but not least, the delisting announcement does not deliver good news to the market and hence on the announcement date, the share price decreases dramatically for those companies.

My research is motivated by the desire to further understand whether size, a proxy variable used in previous studies for agency, bankruptcy, and asymmetric information costs, and markets in which companies are quoted explain more the leverage as well as the debt maturity decision. I find that small firms have different leverage and debt maturity structures because of their fundamental characteristics which are different from those of large firms. In addition, across size groups, I find that the fundamental determinants of leverage and debt maturity defined in previous studies do not explain fully these two decisions. For example, the positive relationship between taxation and leverage and the maturity of debt applies only to large companies, suggesting that the determinants of leverage and debt maturity are size dependent. These results suggest that small companies are risky and less likely to benefit from corporate tax shields. As a result, the costs of debt outweigh the benefits. In order to motivate such companies to grow and to prosper, policy makers need to facilitate their financing potentials.

In addition to size, I test my hypothesis across two markets in the UK with different institutional settings, unlike previous single country/market analyses where only firm fundamentals are considered, or cross-country studies where macro-economic variables, such as investor protection and tax systems, are used. While there is a substantial body of literature on AIM listing, supporting its attractiveness to small and young companies, there is no empirical research to investigate the level of leverage and maturity of debt across the Main market and AIM. I find that, compared to Main market companies, AIM companies rely more on short-term debt, suggesting that those companies still face difficulties in raising external financing. I also provide evidence on how the structure of debt maturity changes over the IPO-period. In particular, I find that the evolution of debt maturity is not similar across the two sets of markets, as, in contrast to companies listed on AIM, Main market firms change their debt maturity significantly. This change is also associated with the firm's size, suggesting that in the Main market large companies use longer maturity of debt.

Although AIM is an ideal market for smaller and high growth companies, my results suggest that policy makers need to facilitate the financing of companies when they list on AIM, so that the benefits outweigh the costs of listings, and firms will not rush to voluntary delisting. They need to raise further equity capital to reduce their leverage and/or finance their growth opportunities. In addition, my analysis documents that firms with more concentrated ownership are more likely to delist, supporting the agency conflict between managers and shareholders. Since AIM companies are not required to have a public float and thus likely to have more concentrated ownership structure, the relatively high likelihood of delisting may be specific to the firms quoted in this market, and thus, the regulators may decrease this probability by increasing the public float requirement, but more importantly, by increasing the financing facilities of these small firms, such as reducing the transaction costs of raising capital through lower taxes.

Whilst this thesis attempts to fill some gaps in the literature, it is worth noting its limitations. First, I provide a comprehensive empirical assessment of the drivers of capital structure and debt maturity from different perspectives. However, I have not provided theoretical assumptions and models in this study, but relied on previously documented models, which would be considered as first limitation as small firms may be modelled differently. I, nevertheless, provided some results that may be used in theoretical research to develop further modelling of the financing decision of the small firms. In addition, this thesis is based on the UK data while it is suggested to study institutional differences across other countries, which might affect capital and debt maturity structures. Indeed, one of the findings of this research is that some determinants of leverage and debt maturity are dependent on the firm's size which may worth investigating in other countries.

In addition, I attempt to use the set of proxies that mainly used in previous studies to test the theoretical factors but I do not control for the supply-side factors as well as managerial incentives that may explain the determinants of leverage and debt maturity, as the access to data, in particular for AIM companies, is limited.[32]

Furthermore, I tested the dynamic model of leverage and debt maturity separately. I find that companies have target leverage and debt maturity structures, and they adjust towards their target leverage and debt maturity differently depending

[32] Recently, studies note that the supply-side factors play an important role in determining capital structure (e.g., Faulkender and Petersen, 2006). Some previous studies investigate the impact of corporate governance on leverage. For example, Florackis and Ozkan (2009) find the use of debt as an instrument for reducing the conflict between shareholders and managers are significant for firms with weak corporate governance.

on their size and market of quotation. However, this may raise further questions, such as, how companies adjust if they are away from both targets simultaneously. I expect that in the case of being away from both targets, the decision making process in adjusting towards both targets are likely to be dependent on the net effect of the liquidity risk and underinvestment problem. Dang (2011) argues that when liquidity is more important, firms are more likely to opt for low leverage strategy instead of a short-term debt strategy. Therefore, I expect firms with high liquidity risks to be away from both their target leverage and debt maturity; they are less likely to change their maturity structure of debt, and, thus, they will adjust towards their target leverage relatively more quickly. In contrast, the decision of firms with high underinvestment problem to adjust towards their target leverage or debt maturity will depend on whether debt maturity and leverage are substitutes, in which case, firms are expected to mitigate their underinvestment problem by either shortening their debt maturity or lowering their leverage. In this case, they will be indifferent when adjusting their leverage and/or their debt maturity. However, their ability to access different sources of external financing will affect such a decision. Keeping equity unchanged, firms with more internal financing may prefer a low leverage strategy, and, hence, adjusting towards their target leverage is more attractive. In contrast, firms that have more access to short-term debt may prefer a short-term debt strategy and, hence, they are expected to adjust towards their target debt maturity relatively more quickly. The results reported in Table 4-6, Panels A and B, show that the relationship between long-term debt and leverage is positive and significant for all companies in the Main market, suggesting that they use long-term debt to moderate their liquidity risk caused by high leverage. Therefore, if they are away from both targets, the decision to adjust towards their target leverage is preferred because of the significant liquidity risk. However, I find that on AIM leverage is negatively related to the structure of debt maturity. These results suggest that firms quoted in AIM use shorter debt maturity to mitigate their underinvestment problem, which is caused by their high leverage. Therefore, in the case of the substitution strategy, if they are away from both targets, their decision to move towards their targets depends on the cost of external financing. My empirical results are in line with previous studies (e.g., Flanney and Rangan, 2006; Antoniou et al., 2008; Ozkan, 2001 and 2002) who test the adjustment toward leverage and debt maturity separately. Further research will focus on the test of the simultaneous decision making process in adjusting towards leverage and debt maturity. Moreover, I control for the market of quotation which is limited to the UK, but the same comparison in the US (e.g., NASDAQ opposed to OTCQX) is a good contribution.

A further promising research is to investigate financial decisions of unquoted companies against quoted firms. However, collecting data for unlisted companies might be problematic; such an investigation could be beneficial to expand empirical as well as theoretical studies. Moreover, the last empirical paper is based on the delisted AIM companies, which is a lightly regulated market and thus the further potential limitation is the lack of available data for those companies. In particular, I do not have data for delisted companies over their private life in order to test further hypotheses. Future research could also examine other markets.

Overall, this thesis is subject to a number of limitations, which provides promising research ideas for future study. In particular, it is worth noting that the access to a more comprehensive data in order to investigate the extent to which such adjustments will strengthen or alter my results.

References

Adam, T.R. and Goyal, V.K. (2008) 'The investment opportunity set and its proxy variables'. *Journal of Financial Research* 31, pp. 41-63.

Adedeji, A. (1998) 'Does the pecking order hypothesis explain the dividend payout ratios of firms in the UK'. *Journal of Business Finance & Accounting*25, pp.1127-1155.

Allen, D.E. (1993)'The pecking order hypothesis: Australian evidence'. *Applied Financial Economics* 3, pp. 101-112.

Altman, E.I. (1984) 'A further empirical investigation of the bankruptcy cost question'. *Journal of Finance* 39, pp. 1067-1089.

Amihud, Y., Lev, B., and Travlos, N.G., (1990) 'Corporate control and the choice of investment financing: The case of corporate acquisitions'. *Journal of Finance* 45, pp. 603-616.

Andrade, G. and Kaplan, S. (1998) 'How costly is financial (not economic) distress? Evidence from highly leveraged transactions that become distressed. *Journal of Finance* 53, pp. 1443-1493.

Andrews, D.W.K. (1998) 'Inference in nonlinear econometric models with structural change'.*The Review of Economic Studies* 55, pp. 615-639.

Ang, J.S. (1976) 'The intertemporal behavior of corporate debt policy'. *The Journal of Financial and Quantitative Analysis* 11, pp. 555-566.

Ang, J.S, Chua, J.H., and McConnell, J. (1982) 'The administrative costs of bankruptcy: A note'. *Journal of Finance* 37, pp. 219-226.

Antoniou, A., Guney, Y. and Paudyal, K. (2006) 'The determinants of debt maturity structure: Evidence from France, Germany and the UK'. *European Financial Management* 12, pp. 161–194.

Antoniou, A., Yilmaz, G., and Krishna, P. (2008) 'The determinants of capital structure: Capital market-oriented versus bank-oriented institutions'. Journal of Financial and Quantitative Analysis 43, pp. 59-92.

Arcot, S., Black, J., and Owen, G. (2007) 'From local to global: the rise of AIM as a stock market for growing companies'. Report commissioned by London Stock Exchange from The London School of Economics and Political Science. Available at: http://eprints.lse.ac.uk/23110/.

Arellano, M. and Bond, S. (1991) 'Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations'. *Review of Economic Studies* 58, pp. 277-297.

Aslan, H. and Kumar, P. (2011) 'Lemons and cherries? Growth opportunities and market temptations in going public and private'. *Journal of Financial and Quantitative Analysis* 46, pp. 489-526.

Baker, M., Greenwood, R., and Wurgler, J. (2003) 'The maturity of debt issues and predictable variation in bond returns'. *Journal of Financial Economics* 70, pp. 261-291.

Baker, M., and Wurgler, J. (2002) 'Market timing and capital structure'. *Journal of Finance* 57, pp. 1-32.

Bancel, F. and Mittoo, U. (2008) 'Why European firms go public?'. Working Paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1034164.

Barclay, M.J. and Smith, C.W. (1995) 'The maturity structure of corporate debt'. J*ournal of Finance* 50, pp. 609-631.

Barclay, M.J., Leslie M.M., and Smith, Jr. (2003) 'The joint determination of leverage and maturity'. *Journal of Corporate Finance* 9, pp. 149-167.

Barnea, A., Haugen, R.A. and Senbet, L.W. (1980) ‘A Rationale for debt maturity structure and call provisions in the agency theoretic framework, *Journal of Finance* 35, pp. 1223-1243.

Barton, L., and Matthews,C.H.(1989) ‘Small firms financing: Implications form a strategic management perspective’. *Journal of Small Business Management* 18, pp. 1-7.

Baskin, J. (1989) ‘Empirical tests of capital structure theories’. *Financial Management* 18, pp. 26-35.

Bates, T.W, Kahle K.M, and Stulz, R.M. (2009) ‘Why do US firms hold so much more cash than they used to’.*The Journal of Finance* 64, pp. 1985-2021.

Beattie, V., Goodcre, A., and Thomson, J. (2006) ‘Corporate financing decisions: UK survey evidence’. *Journal of Business Finance and Accounting* 33, pp. 1402-1434.

Beck, T. and Demirguc-Kunt, A. (2006) ‘Small and medium-size enterprises: Access to finance as a growth constraint’. *Journal of Banking and Finance* 30, pp. 2931-2943.

Beck, T., Demirguc-Kunt, A., and Maksimovic, V. (2008) ‘Financing patterns around the world: Are small firms different?’.*Journal of Financial Economics* 89, pp. 467–487.

Berger, A.N. and Udell, G.F. (1998) ‘The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle’. *Journal of Banking and Finance* 22, pp. 613–673.

Berger, A.N. and Udell, G.F. (2006) ‘A more complete conceptual framework for SME finance. *Journal of Banking and Finance* 30, pp. 2945-2966.

Bharath, S.T. and Dittmar, A.K. (2006) 'To be or not to be (public).Using going private transactions to examine why firms go public.' Working paper Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=951710.

Bharath, S.T. and Dittmar. A.K. (2010) 'Why do firms use private equity to opt out of public markets?'.*The Review of Financial Studies* 23, pp. 1772-1818.

Binsberg, J.H., Graham, J.R., and Yang, J. (2011) 'Optimal capital structure.' Working paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1743203.

Blazenko, G.W. (1987) 'Managerial preference, asymmetric information, and financial structure'. *Journal of Finance* 42, pp. 839-862.

Blundell, R. and Bond, S. (1998) 'Initial conditions and moment restrictions in dynamic panel data models.'*Journal of Econometrics* 87, pp. 115-143.

Booth, L., Aivazian, V., Demirguc-Kunt, A., Maksimovic, V. (2001) 'Capital structure in developing countries'. *Journal of Finance* 56, pp. 87–130.

Bradley, D.J., Cooney, J.W. Dolvin S. D., and Jordan B.D. (2006) 'Penny stock IPOs'. *Financial Management* 35, pp. 5-29.

Brav, O. (2009) 'Access to capital, capital structure, and the funding of the firm'. *The Journal of Finance*64, pp. 263-308.

Brau, J. and Fawcett, S. (2006) 'Initial public offerings: an analysis of theory and practice'. *Journal of Finance* 61, pp. 399-436.

Brealey, R., Meyers, S., and Allen, F. (2008) Principles of corporate finance. New York, McGrawHill Irwin.

Brick I.E. and Ravid, S.A. (1985) 'On the relevance of debt maturity structure'.*Journal of Finance 40,* pp. 1423-1437.

Brick, I. and Palmon, O. (1992) ‘Interest rate fluctuations and the advantage of long-term debt financing: A note on the effect of the tax timing option’. *Financial Review 27,* pp. 467-474.

Brick, I.E., Frierman, M., and Kim, Y. (1998) ‘Asymmetric information concerning the variance of cash flows: The capital structure choice’. *International Economic Review* 39, pp. 745-761.

Cai, K., Fairchild, R, and Guney, Y. (2008) ‘Debt maturity structure of Chinese companies’. *Pac Basin Finance Journal* 16, pp. 268-97.

Campbell, K., and Tabner, I. (2010) ‘Do changes in listing status affect firm value?An analysis of migrations between AIM and the official list of the London stock exchange. Working paper, University of Stirling, 2010.

Carpenter, R.E., Petersen, B.C. (2002) ‘Is the growth of small firms constrained by internal finance?’.*The Review of Economics and Statistics* 84, pp. 298-309.

Carpentier, C and and Suret, J. (2011) ‘The survival and success of Canadian penny stock IPOs.’ *Small Business Economics* 36, pp. 101-121.

Cassar, G. and Holmes, S. (2003) ‘Capital structure and financing of SMEs: Australian evidence’. *Accounting and Finance* 43, pp. 123-147.

Chang, X. and Dasgupta, S. (2009) ‘Target behavior and financing: How conclusive is the evidence?’.*Journal of Finance* 64, pp. 1767-1796.

Chittenden, F., Hall, G. and Hutchinson, P. (1996) ‘Small firm growth, access to capital markets and financial structure: Review of issues and an empirical investigation’. *Small Business Economics* 8, pp. 59-67.

Cook, O.D. and Tang, T. (2010) ‘Macroeconomic conditions and capital structure adjustment speed’. *Journal of Corporate Finance* 16, pp. 78-87.

Cressy, R. and Olofsson, C. (1997) ‘The financial conditions for Swedish SMEs: Survey and research agenda’. *Small Business Economics* 9, pp. 179 – 194.

Daskalakis, N. and Psillaki, M. (2008) ‘Do country or firm factors explain capital structure? Evidence from SMEs in France and Greece’.*Applied Financial Economics* 18, pp. 87-97.

Daskalakis, N. and Psillaki, M. (2008) ‘Do country or firm factors explain capital structure?Evidence from SMEs in France and Greece’.*Applied Financial Economics* 18, pp. 87-97.

DeAngelo, H. and Masulis, R. (1980) ‘Optimal capital structure under corporate and personal taxation’. *Journal of Financial Economics* 8, pp. 3-29.

DeAngelo, H. and Roll, R. (2011) ‘How stable are corporate capital structures?’. Working paper’ Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1784204.

Demirgüc-Kunt, A. and Maksimovic V. (1999) ‘Institutions, financial markets, and debt maturity’. *Journal of Financial Economics* 54, pp. 295-336.

Dennis, S., Nandy, D. and Sharpe, I.G. (2000) ‘The determinants of contract terms in bank revolving credit agreements’. *Journal of Financial and Quantitative Analysis* 35, pp. 87-110.

Derrien, F. and Kecskes, A. (2007) ‘The initial public offering of listed firms’. *Journal of Finance* 62, pp. 447-479.

Diamond, D.W. (1991) ‘Debt maturity structure and liquidity risk’. *The Quarterly Journal of Economics* 106, pp. 709-737.

Diamond, D.W. (1993) ‘Seniority and maturity of debt contracts’. *Journal of Financial Economics* 33, pp. 341-368.

Donaldson, C. (1961) *Corporate debt capacity*. Harvard University.

Drobetz, W. and Wanzenried, G. (2006) ‘What determines the speed of adjustment to the target capital structure?’.*Applied Financial Economics* 16, pp. 941-958.

Eckbo , B.E. (2008) ‘Equity issues and disappearing rights offer phenomenon’. *Journal of Applied Corporate Finance* 207, pp. 2-85.

Espenlaub, S., Khurshed, A. and Mohamed, A. ‘IPO survival in a reputational market’. Forthcoming in *Journal of Business, Finance, and Accounting*.

Esperanca, J.P, Gama, A.M., and Gulamhussen, M.A. (2003) ‘Corporate debt policy of small firms: An empirical re-examination’. *Journal of Small Business and Enterprise Development* 10, pp. 62-80.

Estrella, A. and Hardouvelis, G. (1991) ‘The term structure as a predictor of real economic activity, *Journal of finance* 46, pp. 555-576.

Evans, D. S., (1987) ‘The relationship between firm growth, size and age: estimates for 100 manufacturing industries’. *Journal of Industrial Economics* 35, pp. 567-58.

Faccio, M. and Xu, J. (2011) ‘Taxes and capital structure’. Working paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1803633.

Fama, E. and French, K.R. (2002) ‘Testing trade-off and pecking order predictions about dividends and debt’. *Review of Financial Studies* 15, pp. 1-33.

Fama, F. and French, K. (2004) ‘New lists: Fundamentals and survival rates’.*Journal of Financial Economics* 73, pp. 229-269.

Fan, J.P.H., Titman, S., and Twite, G. ‘An international comparison of capital structure and debt maturity choices.’ Forthcoming *in Journal of Financial and Quantitative Analysis*.

Faulkender, M. and Petersen, M.A. (2006) ‘Does the source of capital affect capital structure’. *Review ofFinancial Studies* 19, pp.45-79.

Finley, L. (1984) 'Can your small company acquire resources as favorably as the large company? *American Journal of Small Business* 9, pp. 19-25.

Fischer, C. (2000) 'Why do companies go public? Empirical evidence from Germany's Neuer Market'. Working paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=229529

Flannery, M. (1986) 'Asymmetric information and risky debt maturity choice'. *Journal of Finance* 61, pp. 19-37.

Flannery, M. and Rangan, K. (2006) 'Partial adjustment towards target capital structures'. *Journal of Financial Economics* 79, pp. 469-506.

Florackis, C. and Ozkan, A. (2009) 'Managerial incentives and corporate leverage: Evidence from the United Kingdom'. Accounting and Finance 49, pp. 531-543.

Frank, M.Z. and Goyal V.K. (2003 a) 'Testing the pecking order theory of capital structure'. *Journal of Financial Economics* 67, pp. 217-248.

Frank, M.Z. and Goyal V.K. (2003 b) 'Capital structure decisions' Working paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=396020.

Frank, M.Z. and Goyal, V.K. (2004) 'The effect of market conditions on capital structure adjustment'. *Finance Research Letters* 1, pp. 47-55.

Frank, M.Z., Goyal, V.K. (2008) 'Trade off and pecking order theories of debt'. In: Eckbo, E. (2008) Handbook of corporate finance: Empirical corporate finance. Volume 2, Handbooks in finance series, Chapter 12, Elsevier.

Frank, M.Z. and Goyal, V.K. (2009) 'Capital structure decisions: Which factors are reliably important?'.*Financial Management* 38, pp. 1-37.

Franks, Julian R. and Torous, W.N. (1993) 'A comparison of the U.K. and U.S. bankruptcy codes'. *Continental Bank Journal of Applied Corporate Finance* 6, pp. 95-103.

Garcia-Teruel, P.J. and Martinez-Solano, P. (2007) 'Short-term debt in Spanish SMEs'. *International Small Business Journal 25, pp.* 579-602.

Gerakos, J., Lang, M. and Maffett, M. (2011) 'Listing choices and self-regulation: The experience of the AIM'. Working paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1739137.

Goyal, V.K., Lehn, K., and Racic, S. (2002) 'Growth opportunities and corporate debt policy: The case of the U.S. defence industry'. *Journal of Financial Economics* 64, pp. 35-59.

Graham, J.R. and Harvey, C. (2001) 'The theory and practice of corporate finance: evidence from the field'. *Journal of Financial Economics* 60, pp. 187-243.

Graham, J.R. and Leary, M.T. (2011) A Review of capital structure research and directions for the future'. Forthcoming in *Annual Review of Financial Economics* 3.

Guedes, J. and Opler, T. (1996) 'The determinants of the maturity of corporate debt issues'. *Journal of Finance* 51, pp. 1809-1833.

Guney, Y., Ozkan, A., and Yalciner, K. (2009) "Dynamic capital structure decisions: evidence from firms in an emerging economy". Working Paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1517120.

Hackbarth, D., Miao, J. and Morellec, E. (2006) 'Capital structure, credit risk, and macroeconomic conditions'. *Journal of Financial Economics* 82, pp. 519-550.

Hall, G.C., Hutchinson, J., and Michaelas, N. (2004) 'Determinants of the capital structures of European SMEs'. *Journal of Business Finance and Accounting* 31, pp. 711-723.

Halov, N. and Heider, F. (2005) 'Capital structure, risk and asymmetric information. Working paper, New York University and European Central Bank, Available at SSRN: http://ssrn.com/abstract=566443.

Hamilton, T. R. and Fox, A. M. (1998) 'The financing preferences of small firm owners'. *International Journal of Entrepreneurial Behaviour & Research* 4, pp. 239-248.

Harris, M. And Raviv, A. (1991) 'The theory of capital structure'. *Journal of Finance* 46, PP. 297-356.

Hensler, D., Rutherford, R. and Springer, T. (1997) 'The survival of initial public offerings in the aftermarket'. *Journal of Financial Research* 20, pp. 93-110.

Heyman, D., Deloof, M., and Ooghe, H. (2003) 'The debt maturity structure of small firms in a creditor- oriented environment'. Working Paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=407720.

Hosmer, D.W. and Lemeshow, S. (1989) Applied logistic regression. New York, John Wiley & Sons.

Hovakimian, A. (2006) 'Are observed capital structures determined by equity market timing'. *Journal of Financial and Quantitative Analysis* 41, pp. 221-243.

Hovakimian, A., Hovakimian, G., and Tehranian, H. (2004) 'Determinants of target capital structure: The case of combined debt and equity financing'. *Journal of Financial Economics* 71, pp. 517-540.

Hsiao, C. (1985) 'Benefits and limitation of panel data'. *Quarterly Journal of Econometrics* 106, pp. 33-60.

Huang, R. and Ritter, J.R. (2009) ‘Testing theories of capital structure and estimating the speed of adjustment’. *Journal of Financial and Quantitative Analysis* 44, pp. 237–271.

Hubbard, R. (1998) ‘Capital market imperfections and investment’. *Journal of Economic Literature* 36, pp. 193-225.

Hughes, J.R.T. (1986) ‘The vital few: American economic progress and Its protagonists. Oxford, Oxford University Press.

Hughes, J.S, Logue, D. E. and Sweeney, R.J. (1975) ‘Corporate international diversification and market assigned measures of risk and diversification’. *Journal of Financial and Quantitative Analysis* 10, pp. 627-637.

Jain, B. and Kini, O. (1999) ‘The life cycle of initial public offerings’. *Journal of Business Finance and Accounting* 26, pp. 1281-1307.

Jain, B. and Kini, O. (2000) ‘Does the presence of venture capitalists improve the survival profile of IPO firms?’.*Journal of Business Finance & Accounting* 27, pp. 1139-1176.

Jenkinson,T. and Ramadorai, T. (2008) ‘Does one size fit all? The consequences of switching markets with different regulatory standards’. Working paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=971699.

Jensen, M.C. (1986) ‘Agency costs of free cash flow, corporate finance, and takeovers’. *American Economic Review* 76, pp. 323-329.

Jensen, M.C. and Meckling, W.H. (1976) ‘Theory of the firm: managerial behavior, agency costs and ownership structure’. *Journal of Financial Economics* 3, pp. 305-360.

Jõeveer, K. (2005) 'What do we know about the capital structure of small firms?'. Working Paper, Available at SSRR: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1148201.

Jong, A., Rezaul, K., and Nguyen, T. (2008) 'Capital structure around the world: The roles of firm- and country-specific determinants'. *Journal of Banking and Finance* 32, pp. 1954-1969.

Jordan, J., Lowe, J., and Taylor, P. (1998) 'Strategy and financial policy in UK small firms'. *Journal of Business Finance and Accounting* 25, pp. 1-27.

Kane, A., Marcus, A.J., and McDonald, R.L. (1985) 'Debt policy and the rate of return premium to leverage'. *Journal of Financial and Quantitative Analysis 20,* pp. 479–99.

Kapil, S. (2011) Financial management. Pearson Education.

Kaplan, S. N. (1991) 'The staying power of leveraged buyouts'. *Journal of Financial Economics* 29, pp. 287-314.

Kim, W. and Weisbach, M. (2005) 'Do firms go public to raise capital?' Working paper, Available at SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=610988.

Kim, W. and Weisbach, M. (2005) 'Do firms go public to raise capital?'. Working paper, Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=610988.

Korajczyk, R., Lucas, D., and McDonald, R. (1991) 'The effects of information releases on the pricing and timing of equity issues'.*Review of Financial Studies* 4, pp. 685–708.

La Porta, R., Lopez-De-Silanes, F., Shileifer A., and Vishny, R.W. (1997) 'Legal determinants of external finance'. *The Journal of Finance* 3, pp. 1131-1150.

Lasfer, M.A. (1995) 'Agency costs, taxes and debt: The UK evidence'. *European Financial Management* 1, pp. 265-285.

Leary, M. T. and Michael R. R. (2005) "Do firms rebalance their capital structures?". *Journal of Finance* 60, pp. 2575 – 2619.

Lehn, K. and Poulsen, A. (1989) 'Free cash flow and stockholders gains in going private transactions'. *The Journal of Finance* 44, pp. 771-787.

Leland, H. and Toft, K. B. (1996) 'Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads'. *Journal of Finance* 51, pp. 987-1019.

Leland, H.E. and Pyle, D.H. (1977) 'Information asymmetries, financial structure, and financial intermediation'. *Journal of Finance* 32, pp. 371-378.

Lemmon, M.L. and Roberts, M.R. (2008) 'Back to the beginning: Persistence and the cross-section of corporate capital structure'. *Journal of Finance* 63, pp. 1575-1608.

Lemmon, M.L. and Zender, J.F. (2010) 'Debt capacity and tests of capital structure theories'.*Journal of Financial and Quantitative Analysis* 45, pp. 1161-1187.

Leuz, C., Triantis, A, and, Wang, T.Y. (2008) 'Why do firms go dark? Causes and economic consequences of voluntary SEC deregistration'. *Journal of Accounting and Economics* 45, pp. 181-28.

Lev, B. and Pekelman, D. (1975) 'A multiperiod adjustment model for the firm's capital structure'. *Journal of Finance* 30, pp. 75-91.

Lewis, C. (1990) 'A multiperiod theory of corporate financial policy under taxation'. *Journal of Financial and Quantitative Analysis 25,* pp. 25-43.

Liu, S. (2005) 'The impact of voluntary foreign delistings: An empirical analysis'. *Journal of Emerging Market*s 10, pp. 22-39.

Lööf, H. (2004) ‘Dynamic capital structure and technical change’. *Structural change and Economic Dynamics* 15, pp. 449-468.

Lopez-Gracia, J. and Sogorb-Mira, F. (2008) ‘Testing trade-off and pecking order theories financing SMEs’. *Small Business Economics* 31, pp. 117-136.

Macey, J., O’Hara, M., and Pompilio, D. (2008) ‘Down and out in the stock market: The law and economics of the delisting process’. *Journal of Law and Economics* 51, pp. 683-713.

Marosi, A. and Massoud, N. (2007) ‘Why do firms go dark?’.*Journal of Financial and Quantitative Analysis* 42, pp. 421-442.

Marsh, P. (1982) ‘The choice between equity and debt: An empirical study’. *Journal of Finance* 37, pp. 121-144.

Mauer, D. and Lewellen, W. (1987) ‘Debt management under corporate and personal taxation’. *Journal of Finance* 42, pp. 1275-1291.

Maupin, R., Bidwell, C. and Ortegren, A. (1984) ‘An empirical investigation of the characteristics of publicly held corporations that change to private ownership via management buy outs’. *Journal of Business Finance and Accounting* 11, pp. 435–50.

Mehran, H. (1992) ‘Executive incentive plans, corporate control, and capital structure’. *Journal of Financial and Quantitative Analysis*27, pp. 539–560.

Mehran, H. and Peristiani, S. (2010) ‘Financial visibility and the decision to go private’. *The Review of Financial Studies* 23, pp. 520-547.

Mghyereh, A. (2005) ‘Dynamic capital structure from the small developing country of Jordan’. *Journal of Economics and Management* 13, pp. 1-32.

Michaely, R. and Shaw, W.H. (1994) 'The pricing of initial public offerings: tests of adverse selection and signalling theories'. *Review of Financial Studies* 7, pp. 279-319.

Michaelas, N., Chittenden, F., and Poutziouris, P. (1999) 'Financial policy and capital structure choice in U.K. SMEs: Empirical evidence from company panel data'. *Small Business Economics* 12, pp. 113–130.

Miller, M.H. (1977) 'Debt and taxes'. *Journal of Finance* 23, pp. 261-275.

Modigliani, F. and Miller, M.H. (1963) 'Corporate income taxes and the cost of capital: A correction'. *American Economic Review* 53, pp. 433-443.

Modigliani, F., and Miller, M.H. (1958) 'The cost of capital, corporate finance and the theory of investment'. *American Economic Review* 48, pp. 261-297.more cash than they used to?'.*Journal of Finance* 64, pp. 1985-2021.

Morris J. R. (1976) 'On corporate debt maturity strategies'. *Journal of Finance* 31, pp. 29-37.

Morris J.R. (1992) 'Factors affecting the maturity structure of corporate debt'. Working paper, University of Colorado at Denver.

Myers S.C. (1977). 'Determinants of corporate borrowing'. *Journal of Financial Economics* 5, pp. 147-175.

Myers, S.C. (1984) 'The capital structure puzzle'. *Journal of Finance* 39, pp. 575-592.

Myers, S.C. (2000) 'Capital structure: Some legal and policy issues'. Presented at the OECD Conference on Company Law Reform, Stockholm, Sweden.Available at:http://www.oecd.org/dataoecd/21/29/1857283.pdf.

Myers, S.C. (2001) 'Capital structure'. *Journal of Economics Perspectives* 15, pp. 81-102.

Myers, S.C. and Majluf, N.S. (1984) 'Corporate financing and investment decisions when firms have information that investors do not have'. *Journal of Financial Economics* 13, pp. 187-221.

Norton, E. (1991) 'Capital structure and small growth firms'. *The Journal of Small Business Finance* 1, pp. 161-177.

Opler, T. and Titman, S. (1993) 'The determinants of leveraged buyout activity: Cash flow vs. financial distress costs, *The Journal of Finance* 48, pp. 1985-1999.

Ortiz-Molina, H. And Penas, M. (2008) 'Lending to small businesses: The role of loan maturity in addressing information problems'. *Small Business Economics*30, pp. 361-383.

Osteryoung, J.S., Pace, R.D., and Constand, R.L. (1995) 'An empirical investigation into size of small business'. *Journal of Small Business Finance* 4, pp. 75-86.

Ozkan, A. (2000) 'An empirical analysis of corporate debt maturity structure'. *European Financial Management* 6, pp. 197-212.

Ozkan, A. (2001) 'Determinants of capital structure and adjustment to long run target: Evidence from UK company panel data'. *Journal of Business Finance and Accounting* 28, pp. 175-198.

Ozkan, A. (2002) 'The determinants of corporate debt maturity: evidence from UK firms'. *Applied Financial Economics* 12, pp. 19-24.

Panno, A. (2003) 'An empirical investigating on the determinants of capital structure: The UK and Italian experience'. *Applied Financial Economics* 13, pp. 97-112.

Paul, S., Whittam, G., and Wyper, J. (2007) 'The pecking order hypothesis: does it apply to start-up firms?'.*Journal of Small Business and Enterprise Development* 14, pp. 8-21.

Paya, I., Matthews, K. and Peel, D. (2005) 'The term spread and real economic activity in the US inter-war period'. *Journal of Macroeconomics* 27, pp. 331-343.

Pagano, M., Panetta, F., and Zingales, L. (1998) 'Why do companies go public? An empirical analysis'. *The Journal of Finance* 53, pp. 27-64.

Pettit R. and Singer R. (1985) 'Small business finance: a research agenda'. *Financial Management* Autumn, pp. 47-60.

Rajan, R. and Zingales, L. (1995) 'What do we know about capital structure: Some evidence from international data'. *Journal of Finance* 50, pp. 1421-1460.

Reeb, D.M., Mansi, S.A. and Allee, J. M. (2001) 'Firm international diversification and the cost of debt financing: Evidence from non-provisional publicly traded debt'. *Journal of Financial and Quantitative Analysis,* 36, pp. 395-414.

Ritter, R. J. (1987) 'The Costs of Going Public'. *Journal of Financial Economics* 19, pp. 269-81.

Ross, S.A. (1977) 'The determination of financial structure: The incentive signalling approach'. *Bell Journal of Economics* 8, pp. 23-40.

Scherr F. C. and Hulbur, H. M. (2001) 'The debt maturity structure of small firms'. *Financial Management* Spring, pp. 8-111.

Schoubben, F. and Van Hulle, C. (2004) 'The determinants of leverage: Differences between quoted and non-quoted firms'. *Tridschrift voor Economie en Management* 4, pp. 589-620.

Shyam-Sunder, L. and Myers, S.C. (1999) ‘Testing static trade-off against pecking order models of capital structure’.*Journal of Financial Economics* 51, pp. 219-244.

Singh, M. and Nejadmalayeri, A. (2004) ‘International, capital structure, and cost of capital: Evidence from French corporations’. *Journal of Multinational FinancialManagement,* 14, pp.153-169.

Smith C.W. and Warner, J.B. (1979) ‘On financial contracting’.*Journal of Financial Economics* 7, pp. 117-161.

Stohs, M.H. and Mauer, D.C. (1996) ‘The determinants of corporate debt maturity Structure’.*Journal of Business* 69, pp. 279-312.

Stulz, R.M. (1990) ‘Managerial discretion and optimal financing policies’.*Journal of Financial Economics* 26, pp. 3–27

Stulz, R.M. and Johnson, H. (1985) ‘An analysis of secured debt’.*Journal of Financial Economics* 14, pp. 501-521.

Taggart, R. (1977) ‘A model of corporate financing decisions’.*Journal of Finance* 32, pp. 1467-1484.

Tamari, M. (1980) ‘The financial structure of the small firm: an international comparison of corporate accounts in the USA, France, UK, Israel and Japan’. *American Journal of SmallBusiness* 4, pp. 20-34.

Titman, S., and Wessels, R. (1988) ‘The determinants of capital structure choice’. *Journal of Finance* 43, pp. 1-21.

Tsyplakov, S. (2008) ‘Investment friction and leverage dynamics’. *Journal of Financial Economics* 89, pp. 423-443.

Van Auken, H.E. and Holman, T. (1995) ‘Financial strategies of small, public firms: A comparative analysis with small, private firms and large, public firms’. *Entrepreneurship: Theory & Practice* Fall, pp. 29-41.

Van der Wijst, N. and Thurik, R. (1993) ‘Determinants of small firm debt ratios: An analysis of retail panel data’. *Small Business Economics* 5, pp. 55-65.

Warner, J.B. (1977) ‘Bankruptcy costs: some evidence’. *Journal of Finance* 32, pp. 337-347.

Watson, R. and Wilson, N. (2002) ‘Small and medium size enterprise: A note on some of the implications of a pecking order’. *Journal of Business Finance and Accounting* 29, pp. 557-578.

Appendix A-1.

This section reports the logit analysis for the determinants of the delisting decision. Following Bharath and Dittmar (2010), I repeat the estimation of the logit model at the year following the IPO to have more data and the results are reported in Table 1. The results are relatively similar with those reported in Table 5-7, Panel A, as leverage is highly significant and positive, suggesting that firms with higher leverage are more likely to delist. Growth opportunities measured by both the market-to-book ratio and the proportion of capital expenditures over total sales are negative and significant, supporting the market access hypothesis. The results suggest that firms with higher growth opportunities wish to survive in the market, thus are less likely to delist. I do not have access to the data on intangible assets at the exact time of the IPO, while this data is collected at the year following the IPO. The results show that firms with higher intangible assets are more likely to delist, indicating that those firms tend to have higher asymmetric information and thus have more probability to delist. The additional data on stock turnover shows that firms that generate more stock turnovers are less likely to delist, suggesting that they have higher liquidity and financial visibility, and hence are less likely to delist.

TableA-1: Logit Analysis for the Determinants of the Delisting Decision

(t=the year following the IPO)	Model (1)	Model (2)	Model (3)	Model (4)
Market Access				
Leverage	2.03**	2.21**	2.42***	2.79***
	(2.47)	(2.41)	(2.62)	(2.83)
MB	-0.09**	-0.11**	-0.10**	-0.11**
	(-2.39)	(-2.30)	(-2.21)	(-2.26)
Capex/Sales	-0.12**	-0.13*	-0.12*	-0.11*
	(-1.99)	(-1.81)	(-1.79)	(-1.77)
Agency Conflicts				
Free Cash Flow		0.25	0.40	0.53
		(0.36)	(0.57)	(0.74)
ROA		-0.11	-0.27	-0.63
		(-0.18)	(-0.41)	(-0.90)
Insider Ownership		0.01	0.01	0.00
		(1.31)	(1.06)	(0.20)
Asymmetric Information				
Intangibility			0.76*	0.98*
			(1.91)	(1.87)
LnMK			-0.00	-0.00
			(-0.61)	(-0.57)
Liquidity and Financial Visibility				
Stock Turnover				-0.83**
				(-2.12)
Stock Volatility				-7.64
				(-0.82)
Log. Trade Volume				-0.00
				(-1.03)
Other Control Considerations				
SEO Dummy	-0.02	-0.05	-0.03	-0.09
	(-0.80)	(-1.17)	(-0.90)	(-0.31)
Dummy. Foreign IPOs	0.08	0.39	0.64	0.77
	(0.13)	(0.54)	(0.41)	(0.96)
Dummy. High-tech industries	-0.34	-0.10	-0.06	-0.02
	(-1.15)	(-0.31)	(-0.86)	(-0.05)
C	0.15	0.28	-0.05	-0.42
	(0.61)	(0.67)	(-0.91)	(-0.75)
McFadden R-squared	6.15%	6.74%	8.50%	11.70%
H-L Statistic	13.58*	5.57	4.20	5.25
	(0.09)	(0.70)	(0.84)	(0.73)
Andrews Statistic	19.45**	13.12	7.88	8.02
	(0.03)	(0.22)	(0.64)	(0.63)

This table presents the results for the logit regression for the factors affecting the delisting-decision at the year following the IPO. The independent variable is a dummy equal to one for delisted companies and zero for size and IPO date matched control firms that remained listed. The dependent variables are: Leverage, which is measured by total debt divided by total assets. MB is the market-to-book ratio.Capex/Sales isthe proportion of capital expenditures over total sales.Free Cash Flow is the proportion of free cash flow over total assets. ROA is measured by earnings before interest and tax over total assets. Insider Ownership is the ratio of holdings of common shares by all directors and officers as a group to total outstanding shares. Intangibility is the ratio of intangible assets over total assets. LnMK is the natural logarithm of market capitalisations. Stock Turnover is a ratio of daily turnover of the past 12-month period divided by number of ordinary shares. Stock Volatility is yearly standard deviation of a firm's stock return over last 12 month. Log. Trade Volume is the log of daily shares traded over past 12 months. SEO Dummy is a dummy variable equal to one if the company raised capital and zero otherwise. Dummy.Foreign IPOs is a dummy variable equals to one if the AIM firm is foreign. Dummy VC backing is a dummy variable sets to one for a venture capitalist. Dummy high-tech industry is a dummy variable sets to one if a firm is in computer manufacturing, electronic equipment, computer and data processing services, and optical, medical, and scientific equipment. Finally, this table reports two goodness-of-fit tests, H-L Statistic and Andrews Statistics. They show the discrepancy between observed values and the values expected in the logit model. If these differences are large, I reject the model as providing an insufficient fit to the data.***, **,* indicate that the estimate is significant at the 1 %, 5% and 10% level, respectively.