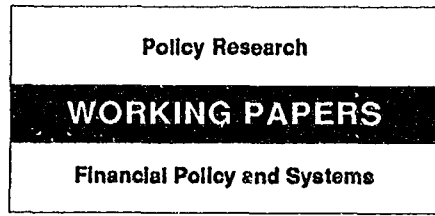


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Developing Country Capital Structures and Emerging Stock Markets

Aslı Demirgüç-Kunt

Are debt and equity finance complements or substitutes? Probably complements, which means that the existence of active stock markets should increase the volume of business for financial intermediaries.

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This paper — a product of the Financial Policy and Systems Division, Country Economics Department — is part of a larger effort in the department to understand the impact of emerging stock markets in developing countries. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Karin Waelti, room N9-043, extension 37664 (July 1992, 40 pages).

Demirgüç-Kunt investigates the relationship between stock market development and the financing patterns of corporations in developing countries. With an increasing number of stock markets emerging, the increased market activity could have an important impact on the capital structure of developing country corporations.

Demirgüç-Kunt poses the question: are debt and equity finance complements or substitutes? The answer also has a bearing on the banking systems in developing countries, as the bulk of debt financing is provided through financial intermediaries.

Whether financing in developing countries should be provided through capital markets or financial intermediaries is the subject of research addressing the optimal structure of financial contracts.

If debt and equity finance are substitutes, the cost of equity would decline with the emergence of an active securities market, and banks would face additional competition for their corporate customers. But debt and equity finance can also be complements since an equity market would allow the owner of a closely-held company to readily diversify risk by transferring some of the

equity to other individuals. Then the firm would be able to also increase its borrowing. Also from the lending side, an active stock market would increase the debt of firms, allowing them to borrow more by improving the quality of information available to the banks.

Demirgüç-Kunt tests which of these scenarios is more likely by analyzing the capital structures of corporations for a sample of countries with stock markets at different stages of development. Although the data used in this study are limited and the results are preliminary, a positive and very significant correlation exists between firm leverage and the extent of stock market development.

This result supports the view that equity and debt finance are complementary. Thus, equity markets and financial markets are also complementary — so the existence of active stock markets should increase the volume of business for financial intermediaries.

Further research is needed to determine if these results hold for individual countries over time. Such research would use firm-level data, additional explanatory variables, and different definitions of leverage.

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Table of Contents

I.	Introduction	2
II.	Debt versus Equity Contract	5
III.	Determinants of Capital Structure: The Corporate Financing Decision for a Firm	7
	Tax implications on optimal capital	8
	Agency-cost approach to optimal capital	9
	Asymmetric information approach to optimal capital	13
	Industrial organization approach to optimal capital	16
	Corporate takeover approach to optimal capital	17
	Empirical implications of capital structure theories	18
IV.	Capital Structure in Developing Countries	19
	A cursory look at the data	19
	Empirical evidence	21
V.	Conclusions	25
	References	27
	Tables	31
	Appendix	37

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I. Introduction

In the developing world financing patterns of enterprises vary greatly from what we observe in developed countries. In the poorest developing countries firms rely on mostly internal resources and informal credit markets for financing. Commercial banks are the main financial institutions. Their loan contracts are generally short-term and formal direct credit markets for long term debt or equity do not exist.

Only as development proceeds further do the financial markets become more sophisticated. In the recent years stock markets started emerging in a number of developing countries.¹ Although it is widely known that an increase in the variety and magnitude of financial institutions and services would improve the allocation of saving and investment, there is skepticism about the role these emerging markets play in developing countries. Often developing country stock markets are criticized for being purely speculative. In other words, it is claimed that the observed prices and their volatility cannot be explained by their underlying fundamentals, leading to adverse real effects for capital formation and welfare.² It is also argued that market discipline cannot be established in developing countries due to information disclosure problems, costly monitoring and enforcement mechanisms, and lack of sufficient number of informed investors, all of which exacerbate the usual asymmetric information and moral hazard problems. Another criticism is directed towards the stock markets' potential for destabilizing developing countries' financial system by allowing rapid inflows and outflows of capital, merely reflecting the perceptions of international investors.

¹ See IFC's Emerging Markets Data Base for a list of these countries.

² There is an extensive literature on excess volatility in stock prices in developed countries. See Dezhbakhsh and Demirguc-Kunt (1990) for references.

However the proponents of stock markets emphasize the importance of having an active stock market in enhancing the efficiency of investment. This is due to the control imposed on the investment behavior of companies through continuous adjustment of their share prices. In addition, growth of stock markets is also expected to lead to a lower cost of equity capital and hence stimulate investment and growth by spreading risks of long-term investment projects. Finally, stock markets can attract foreign portfolio capital and increase domestic resource mobilization, expanding the resources available for investment in developing countries.

This paper seeks to investigate the impact of emerging stock markets on the financing patterns of developing country corporations. The focus is to test whether equity markets and banking systems (which provide the bulk of the debt financing in developing countries) are complements or substitutes in providing financing to corporations. It is possible to answer this question by investigating capital structures of firms across a sample of countries with different levels of stock market development. If equity is substitute for debt financing one would expect countries with less developed stock markets to have higher leverage. However, if the opposite is true and there is complementarity between equity markets and banks, leverage would increase as stock markets become more developed.

Why should debt and equity financing be complements? For a borrower to diversify financing sources is important. A closely-held, levered firm may not want to increase its borrowing further even if it has expansion possibilities. However, an equity market would allow the owner to readily diversify risk by transferring some of the equity to other individuals. Then, the firm would be able to also increase its borrowing. Also from the lending side, an active stock market would increase the debt capacity of firms, allowing them to borrow more by improving the quality of information available to the banks. Although there is not a theoretical literature that

formalizes these arguments in a model, empirical implication of complementarity would be a positive correlation between leverage and the extent of development of stock markets.

However, debt and equity finance can also be substitutes. A widely publicized, popular reason for developing stock markets is the possibility that an active securities market may result in increased competition for the commercial banks in providing financing. The implicit assumption underlying this statement is that debt and equity finance are substitutes. Then as stock markets develop, cost of equity decreases and corporations switch from debt to equity financing. Therefore, if equity markets and banking systems are substitutes, empirically there should be a negative correlation between leverage and the extent of development of stock markets.

The World Bank and especially the International Finance Corporation are actively supporting the emerging stock markets in developing countries. Therefore it is important to understand how the financing patterns of corporations in developing countries would be affected with increased stock market activity. Especially the interactions between stock markets and banking systems need further investigation to determine whether they would be competing or actually complementing each other.

The structure of the paper is as follows. The next section discusses key properties of debt and equity contracts in financing decisions. Section III reviews the literature on capital structure to identify relevant factors, other than stock market development, that may affect the financing pattern of corporations. Section IV presents preliminary empirical findings and identifies directions for further research. Section V summarizes and concludes.

II. Debt versus Equity Contract

Individuals design financial relationships to minimize potential losses in the value of investment due to existing informational and enforcement problems. Different contracts and financial structures emerge depending on the nature of these problems. This section reviews important properties of debt and equity contracts to highlight their differences.

One of the most important distinguishing characteristics of the debt contract is that it implies little risk sharing between lenders and the borrower, from an ex-ante point of view.³ Under a debt contract the borrower commits to paying a fixed amount contingent on not defaulting. This makes the value of debt relatively insensitive to firm performance. Ex-ante, debt is a low-cost contract that allows a large degree of control by the borrower, and provides little incentive to the lender for selecting and monitoring projects ultimately financed. This property of the debt contract allows debt to be priced more accurately than equity in situations involving asymmetric information. The equity contract on the other hand is much better structured for risk-sharing, ex-ante. Equity can act as a cushion against unanticipated risks, since dividend payments can be lowered or raised based on business conditions.

Bankruptcy is another characteristic of the debt contract. Creditors act in a cohesive manner, and under certain conditions debt can provide for a costly takeover of the firm. These bankruptcy costs limit the amount of debt financing. The interdependence among capital providers, however, is considerably different as they are stand alone obligations from both sides.

³ From an ex-post view point risk sharing with a debt contract is possible through reschedulings.

Finally, debt financing has benefits/costs that mitigate/worsen the conflicts of interest between different parties. These conflicts of interest, which are referred to as the agency costs exist mainly due to two reasons: (i) cash flow to equity is a convex function of returns to the firm, leading the equity holders to take unnecessary risks; and (ii) leverage increases manager's equity ownership share, making the manager's payoff to be more sensitive to firm performance, i.e., debt disciplines management. The first one of these is referred to as the "cost" of debt financing whereas the second one is the "benefit."⁴

In developing countries, government intervention in the financial system generally creates a bias in favor of debt financing. Especially interest subsidies of directed credit programs, ceilings on interest rates, bailouts of troubled corporations keep cost of debt below its market level. The tax deductibility of interest expenses at the corporate level also reinforces this advantage. The importance of commercial bank debt also implies a concentration of risks within a small group of financial institutions, which may pose a serious threat to the stability of the financial system.

Using the above properties of debt contract it is possible to build models explaining capital structure decisions of firms. The next section reviews the literature on determinants of capital structure. A related literature is concerned with deriving debt as an optimal contract.⁵ These are models of asymmetric information where investors are unable to observe income, a situation that leads to moral hazard problems. Under these circumstances debt emerges as an optimal contract since the debt contract mitigates the incentive problem by making the borrower the residual claimant for his investment.

⁴ Theories using agency cost approach to derive optimal capital structure are discussed in the next section.

⁵ See Townsend (1979), Diamond (1984) and Hart and Moore (1989).

However, as Gertler and Rose (1991) note, although it is necessary for the borrower to bear (at least a large portion of) specific risks for incentive considerations, it is not clear why the borrower should also bear general or systemic risks. They argue that if business cycle risks affect the outcome of an investment, it is not optimal to punish the borrower since this condition is obviously beyond his control. Therefore, the optimal contract is a mixture of debt and equity, where equity acts as a cushion against the business cycle.

Seward (1990) also examines the optimal structure of financial contracts in an economy subject to moral hazard problems. He shows that economic efficiency is enhanced if the financial structure of the economy consists of both direct and intermediated financial contract markets. His results demonstrate a motivation for the complementarity between capital markets and depository financial institutions.

This paper examines whether debt and equity financing are complements or substitutes in developing countries. To answer this question the correlation between capital structures and the extent of stock market development is analyzed for a cross-section of countries. Other factors that also need to be taken into consideration in this analysis are identified based on the theoretical literature on determinants of capital structure, reviewed in the next section.

III. Determinants of Capital Structure: The Corporate Financing Decision for a Firm

In the absence of bankruptcy costs, corporate income taxation, or other market imperfections, Modigliani and Miller (1958) have shown that in competitive capital markets the value of a firm is independent of its financial structure. This argument is quite intuitive in that since firm value depends on real asset value, purely financial transactions should not be expected to change the overall value of the firm. In other words, financial assets on the right hand side of

the balance sheet have value only because of the real assets, including intangibles and growth opportunities, on the left. Therefore, if markets are doing their job, it should not be possible to create value by shuffling the paper claims on the firm's real assets.

However, of course there could be an effect on firm value if there are market imperfections. To name a few, if financial transactions are costly, if there is an effect on the firm's tax liability, or if there are information asymmetries or agency costs, capital structure would matter. Only if we leave all imperfections aside can we conclude that firm value should not depend on capital structure. Ironically, the theory of capital structure starts with the Modigliani and Miller paper, since by showing under what conditions capital structure is irrelevant they actually identify directions for the development of such theories.

The literature on capital structure is vast. The following subsections review the more recent literature and summarize its empirical implications.⁶ The earliest issue discussed to justify existence of optimal capital is taxes. Besides tax issues, there are mainly four approaches used to determine capital structure in the theoretical literature: The agency-cost approach, the asymmetric information approach, the industrial organization approach, and the corporate takeover approach.

Tax implications on optimal capital

In the U.S. tax laws discriminate between debt and equity payments at the corporate level. Interest payments are tax deductible while dividend payments to equity holders are not. Tax laws give debt a tax advantage assuming that personal income is tax exempt (Miller, 1977). However

⁶ This survey is not comprehensive but aims to highlight the most common approaches and their general implications. For greater number of papers and more detailed information on individual papers refer to Taggart (1985), Masulis (1988) and Harris and Raviv (1991).

both dividend and interest payments are taxable at a personal level but capital gains tax can be deferred. Therefore, at a personal level equity income is taxed at a lower rate (due to this option of deferred payment) than debt income. If the investors of a firm are in the same marginal tax bracket as the corporation, then the tax deductibility advantage of debt at the corporate level can be exactly offset by its taxability disadvantage at the personal level, leaving the individual firms indifferent (Miller, 1977).⁷ However, this equilibrium breaks down when there are other imperfections in the market.

Agency-cost approach to optimal capital

Agency costs refer to costs created due to conflicts of interest. Jensen and Meckling (1976) pioneered the work in developing models in which capital structure is determined by agency costs. Conflicts are possible between shareholders and managers, as well as between shareholders and debtholders.

Conflicts between shareholders and managers arise because managers do not capture the full return of their profit making activities. Thus they may be able to transfer firm's resources to themselves by indulging in personal benefits (corporate cars, jets, representation allowances, residences etc.) relative to the level that would maximize the firm value. This tendency is reduced the larger is the portion of the firm's equity owned by the manager. Given the manager's level of investment in the firm, increases in the firm's debt to equity ratio would increase the manager's share of the equity, decreasing the inefficiencies resulting from the conflict of interest between the manager and shareholders. In addition, with more debt the firm commits to making larger cash payments, decreasing the amount of idle or "free" cash available for wasteful expenditures by

⁷ Also see DeAngelo and Masulis (1980) and Modigliani (1982).

the managers (Jensen, 1986).⁸ Thus, debt financing has the benefit of decreasing conflicts between managers and shareholders.

Conflicts between shareholders and debtholders arise due to two main distortions: (i) the underinvestment incentive and (ii) the risk shifting incentive. A levered firm would invest suboptimally relative to an all-equity firm when the firm is managed in the best interest of shareholders. Once debt is issued investments are undertaken to maximize equity value rather than firm value, because the projects are evaluated on the basis of cash flows in non-bankrupt states. When firms are likely to go bankrupt in the near future, shareholders may have no incentive to invest, even in value-increasing projects. The reason is that shareholders bear the full cost of investment, but the returns from the investment are mainly captured by the debtholders. Thus, larger debt levels lead to the rejection of more value-increasing projects, i.e., underinvestment. Another way of analyzing the situation is to model equity as a call option to buy the firm at an exercise price equal to the debt obligation. Thus debt distorts the risk-taking incentives of shareholders since they can increase the value of their equity call option by increasing the risk of the underlying assets of the firm. This happens since equityholders capture most of the gain if an investment yields large returns above the face value of the debt. However, if the investment fails debtholders bear the consequences, due to limited liability. Therefore, a levered firm will be run in an excessively risky fashion, relative to an all equity firm. These excess risks constitute the cost of debt financing.

Jensen and Meckling argue that an optimal capital structure is the result of a trade-off between the benefit (discipline of management) and cost (excess risk-taking by shareholders) of

⁸ This is especially true for industries with large cash flows but without good investment opportunities. According to Jensen (1989) these are the characteristics of steel, chemicals, brewing, tobacco, television and radio broadcasting, and wood and paper products industries today.

debt financing. There are a number of implications of the Jensen-Meckling model. First, bond contracts are expected to include covenants to prevent excess risk taking by the shareholders. Second, industries with limited opportunities for risk taking, i.e., regulated industries such as public utilities and banks, are expected to have higher debt levels. Third, firms for which slow or even negative growth is optimal and firms that have large cash inflows from operations should have more debt.

More recent models based on agency costs focus on the two conflicts identified by Jensen and Meckling (1976) to derive an optimal capital structure. In Harris and Raviv (1990) and Stulz (1990) conflicts between managers and investors exist due to disagreements over an operating decision. Harris and Raviv assume that managers always want to continue the firm's operations even if liquidation of the firm is preferred by the investors (debtholders). Stulz assumes managers always want to invest all available funds even if paying out cash is better for investors. In either case debt mitigates these problems.

In the Harris and Raviv model, debt gives its holders the option to force liquidation if cash flows are poor. The takeover of control by debtholders through bankruptcy entails investigation costs to produce information (cost), yet this information is used to make an improved liquidation decision (benefit). Thus the optimal capital structure trades off improved liquidation decisions versus higher investigation costs. This model predicts that firms with higher liquidation value, e.g., those with tangible assets, and with lower investigation costs will have more debt and higher default probability. It also predicts that higher leverage can be expected to be associated with larger firm value, higher debt level relative to expected income, and lower probability of reorganization following default.

In Stulz, debt payments reduce free cash flow (as in Jensen, 1986). The cost of debt in this model is that debt payments may end up being excessive in that they may exhaust more than

the free cash, leading to a reduction in funds available for profitable investment. Again, the tradeoff between costs and benefits of debt leads to capital structure. The model predicts that firms with an abundance of good investment opportunities (growth firms) can be expected to have low debt levels relative to firms in mature, slow-growth, cash-rich industries.

Diamond (1989) and Hirshleifer and Thakor (1989) show how reputation considerations may offset the incentive of levered equityholders to choose excessively risky investments. In Diamond's model investors cannot distinguish between firms that make risky investments and those that make safe investments ex ante. Therefore, they charge an initial lending rate that reflects their beliefs about the projects chosen by firms on average.⁹ Only after firms build a credit history, their lending rate is adjusted. However, if the firm can convince its lenders it only makes safe investments, it can enjoy a lower than average lending rate. Since lenders can only observe a firm's default history, it is possible for the firm to build a good reputation by not defaulting.¹⁰ The longer this history, the better the reputation, and the lower the borrowing costs. Thus, the model predicts that older, more established firms find it optimal to choose safer projects not to lose a hard-earned reputation. Young firms with no reputation can take risks initially, switching to safer projects eventually, if they survive without default. Therefore, well-established firms have lower default rates and lower costs of debt than younger firms. Although debt level is fixed in Diamond's model, its extension yields the result that keeping everything else constant, younger firms have less debt than older ones.

Hirshleifer and Thakor (1989) focus on the manager's reputation as an incentive to pursue relatively safe projects. Out of concern for his own reputation, a manager may prefer safer

⁹ The reason for this can be understood in the context of Akerlof's (1969) paper on "lemons" problem. Stiglitz and Weiss' (1981) credit rationing paper is also based on this lemons problem.

¹⁰ This point is also emphasized in Bernanke and Gertler (1987).

projects to maximize probability of success, whereas shareholders would like to maximize the value of their equity. This behavior of managers reduces the agency cost of debt. Thus the model predicts that if managers value their reputation, the firm would be expected to have more debt than otherwise. Hirshleifer and Thakor argue that the value of reputation would be greater for managers of firms that are more likely to be takeover targets.

Asymmetric information approach to optimal capital

In theories of capital structure that make use of asymmetric information as the driving force, firm managers or insiders are assumed to possess private information about the firm's expected return or investment opportunities.

Research initiated by Ross (1977) view the firm's capital structure choice as signalling inside information to outside investors. In this model, the true distribution of firm returns is known to the managers but not to the investors. Managers benefit if the firm's securities are valued highly by the market but are penalized if the firm goes bankrupt. High debt levels signal good firm quality since only if the bankruptcy costs are low enough can the managers issue debt and commit to high cash outflows (if the promised payments are not made managers suffer a penalty). Since lower quality firms have higher expected bankruptcy costs at any debt level, managers of low quality firms cannot imitate higher quality firms by issuing more debt. Thus firm value (or profitability) and the debt equity ratio are positively related. Also increases in the bankruptcy penalty, other things equal, decrease the debt level and the probability of bankruptcy.¹¹

¹¹ Also see Heinkel (1982), John (1987), and Potevin (1989).

Myers and Majluf (1984) argue capital structure is designed to offset inefficiencies in the firm's investment decisions that are caused by information asymmetries. They show that if investors are not as well informed as the insiders, then equity may be mispriced by the market.¹² If firms are required to finance new projects by issuing equity, underpricing may be so severe that new investors capture more than the net present value (NPV) of the new project, resulting in a loss to the existing shareholders. In this case positive NPV projects will be rejected. This underinvestment problem is avoided if the firm can finance the new project by securities that are not as severely undervalued by the market. Internal funds or riskless debt, that have no undervaluation are preferred to equity. Since even risky debt will have undervaluation to a lesser degree, it is also preferred to equity. This is Myers'(1984) "pecking order" theory of financing which states that capital structure is driven by firm's desire to finance new investments, first internally, then with low-risk debt, and finally if all fails, with equity.¹³ The most important empirical implication of the theory is that announcement of an equity issue will lead to a decline in the market value of firm's existing shares. Another implication is that new projects will tend to be financed mainly from internal sources or proceeds of low-risk debt issues. Finally, Myers and Majluf (1984) implies that leverage increases with the extent of the informational asymmetry.

Brennan and Kraus (1987), Noe (1988), and Constantinides and Grundy (1989) criticize the pecking order theory. They show that firms do not necessarily have a preference for issuing straight debt over equity if a richer set of financing options are available. In Brennan and Kraus firms can avoid the underinvestment problem by signalling through issuing equity and using part of the proceeds to repurchase debt simultaneously (whereas issuing equity only is a negative

¹² Greenwald, Stiglitz and Weiss (1984) also discuss this issue, emphasizing the analogy between "equity rationing" and credit rationing.

¹³ See Krasker (1986), Narayanan (1988), and Heinkel and Zechner (1990) for extensions.

signal). Thus in their model equity increasing exchanges can have a positive stock price reaction. Noe and Constantinides and Grundy also show that allowing firms a wider range of financing choices can invalidate Myers-Majluf results in some cases. Constantinides and Grundy predict a positive stock price reaction to debt increasing exchanges. Noe also shows that the average quality of firms issuing debt is higher in equilibrium than that of firms issuing equity, predicting a positive price effect of a debt issue.

Gertler and Rose (1991) also distinguish between internal (retained earnings) and external (debt and new equity) funds. In their model the borrower has to pay a premium for external funds. This wedge arises due to limited information and limited ability to enforce contracts. The magnitude of the premium depends inversely on the borrower net worth. If the net worth is sufficiently low the required premium for external finance may be prohibitive. They predict that this premium would decline with the improved financial health of the borrowers, the development of a liquid secondary market, improved auditing and enforcement technologies, the efficiency of financial intermediation, and growth of the economy.

Another approach is to exploit managerial risk aversion to obtain a signalling equilibrium in which capital structure is determined. Increases in firm leverage leaves managers with a larger fraction of equity. Due to manager's risk aversion, a larger share of risky equity reduces managerial welfare. However, this decrease in welfare is greater for managers of lower quality firms. Thus managers of higher quality firms can signal their quality by having more debt in equilibrium, which predicts a positive correlation between leverage and value keeping everything else constant. Leland and Pyle (1977) formalize this argument.

A related literature developed by Townsend (1979), Diamond (1984), and Gale and Hellwig (1985), is concerned with deriving debt as an optimal contract. In these models since investors are unable to observe income (or at least a verification cost is paid to observe it),

managers can appropriate any income not paid out to themselves. These models do not allow for outside equity, default without liquidation, or the evolution of debt payments over time.

Extending Townsend's model, Chang (1987) allows investors to observe a noisy estimate of income, which makes outside equity possible. Within an agency model Chang obtains the result that firm leverage and profitability are inversely correlated. Finally, Hart and Moore (1989) provide a dynamic model of debt in which they examine the implications of the ability of creditors to seize assets when debtors default for the form of debt contract and the efficiency of debtor-creditor relationship.

Industrial organization approach to optimal capital

Capital structure models based on product and input market interactions are relatively recent. One group of studies uses the relationship between a firm's capital structure and its competition strategy in the product market to determine optimal capital. These models assume managers have incentives to maximize equity value as opposed to profits or total value. Leverage changes the payoffs to equity inducing equityholders and managers, to pursue riskier strategies. Oligopolists increase risk by a more aggressive output policy. Therefore, choosing positive debt levels is committing to pursue more aggressive output policies (see for example Brander and Lewis, 1986). These models show that oligopolists will tend to have more debt than monopolists or firms in competitive industries. Maksimovic (1988) also shows that debt capacity increases with the elasticity of demand and decreases with the discount rate.

A second group of studies focusses on the relationship between a firm's capital structure and the characteristics of its product or inputs. These models focus on the effect of capital structure on the future availability of products, parts and service, product quality, and the

bargaining game between management and input suppliers. Titman (1984) observes that customers or suppliers of firms suffer liquidation costs such as inability to obtain the product, parts or service. Customers/producers transfer these costs to the stockholders of these firms in the form of lower prices for the firm's output. Thus, it is optimal for stockholders to commit to liquidate only in those states in which the net gains to liquidation exceed the costs imposed on customers. However, when the firm's debtholders make a liquidation decision they ignore these costs. Thus capital structure is arranged to ensure an optimal liquidation policy by mixing debt and equity. Since in bankruptcy states the stockholders never wish to liquidate and bondholders always wish to liquidate, the optimal capital structure is one that would allow liquidation of the firm only when net gain to liquidation exceeds the cost to customers. It is shown that firms with high liquidation costs to customers/producers, such as firms that produce unique products or products that require service or parts (e.g., computer and automobile companies) and firms for which a reputation for producing high quality products is important, will have less debt other things kept constant (Maksimovic and Titman, forthcoming).

Corporate takeover approach to optimal capital

These models explore the linkage between the market for corporate control and capital structure. They focus on the fact that common stock carries voting rights while debt does not. Harris and Raviv (1988) and Stulz (1988) focus on the ability of a firm manager to manipulate the probability of success of a takeover attempt by changing the fraction of the equity he owns. In the model there is an incumbent manager of a firm, a potential rival, and a large number of passive investors. Since the incumbent and the rival have different managerial talents, whether the attempt succeeds or not affects the firm's value. The manager's fraction of equity determines

whether (i) he stays as manager, (ii) the rival takes over, or (iii) a decision is made by the rest of the investors who always pick the best person for the job. The incumbent manager determines his optimal ownership share by trading off capital gains on his stake against the loss of personal benefits from being in control. Since the firm's capital structure indirectly determines the manager's share, this tradeoff also determines the optimal capital. One implication of these models is that on average takeover targets increase their debt levels and that the success of the attempt is negatively related to leverage. However these theories explain short-term changes in capital rather than the long-term capital structure of firms.

Empirical implications of capital structure theories

Table 1 presents a summary of empirical implications of different capital structure theories discussed above. Since these theories are developed to model capital structure determinants in developed countries, they are mostly silent as to how an emerging stock market would impact on the financing pattern of corporations. Corporate takeover approach to optimal capital structure comes closest to exploring this relationship by predicting a higher leverage for corporations that are takeover targets, since the more debt the corporation has, the less likely it is for a takeover attempt to succeed. However, in most developing countries emerging stock markets are far from the stage where they would be able to establish a takeover discipline. Therefore, corporate control theories do not predict much about the impact of an emerging stock market on financing patterns of corporations in developing countries.

Nevertheless, capital structure theories determine the key factors that need to be controlled in exploring the relationship between capital structure and stock market development. Although not completely, the empirical analysis of the next section includes some of these factors.

In addition to stock market development, the empirical analysis incorporates effects related to size, growth, profitability, change in profitability (as a proxy of risk), and stock market valuation of firms.

IV. Capital Structure in Developing Countries

This section analyzes capital structure data for a sample of developing countries in the light of the theoretical discussion above. The data used are compiled by the IFC and obtained from tables published in Singh et al. (1992). The sample covers Thailand, Korea, India, Turkey, Pakistan, Mexico, Jordan, Zimbabwe, and Malaysia. Aggregate values are based on the top 50 manufacturing companies quoted on the stock market of each country. Table 2 summarizes the data for each country over the corresponding sample period. Definitions of variables and a finer breakdown of these values based on the size of the corporations are given in the appendix Tables A1 and A2.

A cursory look at the data

The second column of Table 2, which reports the capital structure variable (long-term debt to equity ratio), shows wide variations among countries. Leverage varies from 8.7 percent for Malaysia to 163.5 percent for Thailand. The next three columns report the breakdown of financing to internal and external (equity and debt) finance. The results are surprising because developing countries appear to be relying on external finance to a much greater extent than developed countries. In developed countries corporate growth is mostly financed internally

through retained earnings, following the pecking order theory of capital structure.¹⁴ However, according to the reported figures equity finance seems to play a very important role in developing countries. Especially in Turkey, Mexico, and Jordan, a median company appears to have financed 60, 76, and 84 percent of its growth from equity issues, respectively. However, these figures may be misleading due to the problems in distinguishing between internal and external equity.¹⁵

The rest of the variables in the table are the net asset growth, profitability as measured by the ratio of before-tax earnings to net assets, change in profitability, price earnings ratio and valuation ratio (Tobin's Q) as measures of stock market performance. The correlations between these ratios and leverage are also of interest to investigate whether theories of capital structure formulated for developed countries also hold for developing countries.

Table 3 reports data on developing country capital structures and emerging stock markets. To characterize emerging stock markets, data on number of listed companies, total market capitalization, trading value, and turnover ratio are used. All these measures have shortcomings. Number of listed companies or market capitalization do not indicate how developed, or at least active the stock market is. As in the case of many countries, companies may list their stock on the exchange merely to benefit from the tax advantages provided. Trading value may be due to continuous trading of only a small portion of the total listed stock in the exchange. Also, trading value is more relevant as a proportion of total market capitalization, which is given by the turnover ratio. In relative terms, turnover ratio provides the best statistic for ranking stock markets in terms of exchange activity. Since more developed stock markets are usually the ones

¹⁴ See Taggart (1985) and Mayer (1989).

¹⁵ It may be the case that these companies have increased wealth internally during this period by raising additional capital, but this is not equivalent to going to the equity market for new issues. Therefore, these figures, at least for Turkey, do not represent external equity in the true sense.

with greater exchange activity, the analysis here assumes that stock markets with higher turnover ratio are the relatively more developed ones.

From Table 3 an interesting pattern emerges. It appears that countries with more active stock markets have greater leverage. This observation is consistent with the complementarity of stock markets and banking systems. From the borrower's point of view, a closely-held levered firm with expansion possibilities may not want to increase its leverage further due to costs of debt financing mentioned in section III. However, the existence of an active stock market would allow the firm to diversify its financing. Once additional equity is issued, or a portion of existing equity is publicly owned, the firm having diversified its financing, would be able to increase its leverage further. From the lender's point of view, the amount of reliable information on corporations also increases with an active stock market, allowing the banks to make better credit assessments, possibly increasing the borrowing ability of listed companies. Both effects would indicate a positive correlation between leverage and development of stock markets. However, it is important to check whether this simple correlation reported in Table 3 holds up in a multivariate analysis once other relevant characteristics identified by the theory are controlled for.

Empirical evidence

The purpose of this section is to further analyze the correlation between stock market development and aggregate leverage, holding other relevant factors constant as much as possible with the available data. To do this, leverage regressions including stock market characteristics and other explanatory variables are estimated. In estimating leverage regressions the purpose is not to specify causality, but rather to observe correlations between leverage and included variables.

These results are at best very preliminary considering the sample size and the aggregate nature of the data. The data set used is given in the appendix, Table A2.

Table 4 reports simple correlations between stock market characteristics. All three variables, trading value, market capitalization, and turnover ratio are very highly correlated. The results of the leverage regressions are reported in Table 5. Besides stock market characteristics these regressions include a size dummy ranging from 1 to 4, representing 4 quartiles of firms in each country classified based on their asset sizes. For each size group, median values of net asset growth, profitability, and price earnings ratio are also included. The resulting sample consists of these variables for four size groups for each country. All values are medians averaged over the corresponding time period for each country's size group.

Four specifications of leverage equation are estimated. The first three specifications include stock market characteristics, and the last one only includes firm characteristics. Stock market variables are entered separately due to the high correlation among them. All three characteristics develop very significant and positive coefficients. The specification without stock market variables has an R^2 of 45 percent. However the statistical fit of the regression improves substantially with the introduction of stock market variables. The preferred specification which includes the turnover ratio, the best proxy capturing the extent of stock market development, has an R^2 of 80 percent. Trading value and market capitalization variables also improve the fit of the regression but not to the extent of the turnover ratio.

Income per capita is also included in the regressions to test whether the significant coefficients of stock market variables are merely reflecting the existence of different income level countries in the sample. However, holding income constant does not change the results significantly. In fact, the variable develops a negative and insignificant coefficient in three out of

four specifications. Finally, deflating the trading value and market capitalization by income to account for the size of the economy does not improve the results. These results are not reported.

These preliminary results indicate that debt and equity finance are complements. In other words, as discussed above, the existence of an active stock market also increases the debt capacity of firms. This result is also consistent with the observation that leverage ratios of developed countries are generally much higher than those of the developing countries. Then, as stock markets develop, leverage ratios in developing countries can be expected to go up.

Although the paper focuses on the relationship between corporate financing structure and development of stock markets, the coefficients of the control variables are also reported for completeness. Consistent with the empirical findings in developed countries, the coefficient of the size dummy is positive in three specifications although it is insignificant. A positive sign indicates that larger firms are more leveraged. Usually this difference of leverage between small and large companies is explained by differential access to debt financing.¹⁶ Smaller firms represent a higher credit risk and smaller loans are more costly to monitor. Also to the extent smaller firms are also younger, less established ones, a positive sign for the size variable is consistent with the prediction of the agency cost theories.

The coefficient of net asset growth variable, which is expected to proxy growth opportunities available to the firm, gives mixed results. In the preferred specification the sign is negative and significant which is consistent with the implication of capital structure theories that predict mature, low-growth industries to have higher leverage and firms with good investment opportunities to have lower leverage. A negative sign indicates that an increase in growth opportunities decreases leverage.

¹⁶ The smallest firms may not have any access to equity markets. However, here the sample consists of listed firms, and "small" is used in a relative sense.

The profitability measure develops mixed results and is not significant except in one specification. The theory is also conflicted on the issue of correlation between firm profitability and leverage, although majority of the theories predict a positive correlation (see Table 1).

Price earnings ratio produces negative and significant coefficients. This variable is included as a measure of stock market valuation. Replacing this ratio with the valuation ratio results in positive and significant coefficients. This result is more consistent with theory, which predicts a positive correlation between stock market valuation and leverage. With this specification the coefficient of turnover ratio remains positive and very significant although trading value and market capitalization develop positive yet insignificant coefficients. These results are not reported.

These variables do not control for all relevant factors completely. However, due to data limitations, other proxies are not included. In addition, averaging data over the sample period and taking the median values may be blurring the results. It would be interesting to analyze firm level data and include additional control variables. The preliminary results of this paper indicate positive correlation between leverage and stock market development across countries. Time series data on each country can be analyzed to investigate whether this correlation holds for individual countries through time, as their stock markets develop. Also, regulatory restrictions and different types of banking systems (universal vs. other) should be controlled for in explaining cross country differences in leverage. Finally, leverage in this analysis only includes long term debt. It would be interesting to analyze changes in the short term debt to equity ratio as well. These extensions are left for future research.

V. Conclusions

This paper investigates the relationship between stock market development and financing pattern of corporations in developing countries. With an increasing number of emerging stock markets the possible impact of increased market activity on the capital structure of developing country corporations gains importance. The question posed is whether debt and equity finance are complements or substitutes. The answer to this question also has bearing upon the banking systems in developing countries since the bulk of debt financing is provided through financial intermediaries. Whether financing in developing countries should be provided through capital markets or financial intermediaries is the subject of research addressing optimal structure of financial contracts.

If debt and equity finance are substitutes, then with the emergence of an active securities market cost of equity would decline and banks would face additional competition for their corporate customers. However, if debt and equity finance are complements, borrowing capacity of firms increase with the availability of equity financing, and given the improved quality of information provided by stock markets banks may be able to assess creditworthiness more accurately, increasing their lending.

This paper tests which one of these scenarios is more likely by analyzing capital structures of corporations for a sample of countries with stock markets at different stages of development. Although the data used in this study are limited and the results are preliminary, a positive and very significant correlation exists between firm leverage and extent of stock market development.

This result supports the view that equity and debt finance are complementary. Thus, equity markets and financial intermediaries are also complementary, with existence of active stock markets resulting in an increased volume of business for the financial intermediaries.

Further research is necessary to determine if these results would hold for individual countries through time, employing additional explanatory variables and different definitions of leverage and using firm level data.

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Table 1. Empirical Implications of Capital Structure Theories

Theoretical Paper	Empirical Implication on Leverage
Tax Implications	
Modigliani and Miller (1958)	Leverage increases with interest tax shields.
Miller (1977)	Leverage not affected by interest tax shields if the tax deductibility advantage at the corporate level is exactly offset at the personal level.
Agency Cost Theories	
Jensen and Meckling (1976)	Leverage increases with the extent of regulation. Mature, low-growth, cash-rich industries have higher leverage.
Jensen (1986) Stultz (1990)	Leverage increases with large cash flows, and lack of good investment opportunities.
Harris and Raviv (1990)	Leverage increases with: higher liquidation value (the more the firm has tangible assets), lower investigation costs, larger firm value, higher debt to expected income ratio, higher probability of liquidation after default higher default probability.
Diamond (1989)	Leverage is higher the more established the firm is. Younger firms have less debt.
Hirshleifer and Thakor (1989)	Leverage is higher the more the managers care about their reputation. This is more likely if the firm is a takeover target.
Asymmetric Information Theories	
Ross (1977)	Leverage increases with firm value and profitability, and it decreases with an increase in bankruptcy penalty.
Myers and Majluf (1984)	Leverage increases with the extent of informational asymmetry. New investments will be financed first internally, then with low-risk debt, and finally with equity.
Leland and Pyle (1977)	Leverage increases with firm value.

Table 1 (Cont.). Empirical Implications of Capital Structure Theories

Theoretical Paper	Empirical Implication on Leverage
Asymmetric Information Theories	
Chang (1987)	Leverage decreases with profitability.
Industrial Organization Theories	
Brander and Lewis (1986)	Leverage depends on market structure. Oligopolists have more debt than monopolists or firms in competitive industries.
Maximovic (1988)	Debt capacity increases with the elasticity of demand and decreases with the discount rate.
Titman (1984) Maximovic and Titman (forthcoming)	Leverage is higher the lower the liquidation cost is to customers/producers. Leverage is lower the more unique the firm's product is, and the more the firm cares about its reputation of producing high quality products.
Corporate Takeover Theories	
Harris and Raviv (1988) Stultz (1988)	Leverage is higher if the firm is a takeover target, in which case the success of the takeover attempt becomes less likely.

Note: The implied correlation between leverage and the above factors does not necessarily indicate causality.

Table 2. Capital Structure Across Developing Countries for Top 50 Listed Companies in Manufacturing

(in percent)

(1) Cntry (yrs)	(2) LTD/E	(3) Internal Finance	(4) Equity	(5) Debt	(6) Net Asset Growth	(7) Profita- bility EBT/ NA	(8) Change in (7)	(9) P/E	(10) MV /BV
Thai- land 83-87	163.5	17.3	NA	NA	7.5	5.7	3.6	12.3	2.14
Korea 80-87	116.7	12.8	40.3	45.4	15.7	5.5	3.1	8.1	0.59
India 80-88	46.1	36.1	11.0	45.6	23.5	11.8	-13.5	10.5	1.62
Turkey 82-87	26.6	18.1	60.5	15.5	44.7	34.7	5.4	9.9	2.80
Pakis- tan 80-86	24.5	58.3	12.3	16.1	13.8	20.1	-5.2	5.9	NA
Mexico 84-88	12.5	17.1	76.0	2.9	81.4	11.3	7.5	NA	NA
Jordan 80-87	12.3	5.8	84.1	16.4	7.8	7.8	-2.8	15.4	1.04
Zim- babwe 80-87	9.7	58.5	43.0	0.0	13.8	16.9	-2.1	3.7	0.49
Malay- sia 83-87	8.7	42.4	31.4	2.1	4.3	8.6	-2.8	29.1	1.65

Notes: These are the median values averaged over the sample period. Number of companies in Jordan is 35 and Turkey is 38. For Thailand earnings after tax are used in calculating profitability. Variable definitions are given in the appendix, Table A1. The source of the data is the Economics Department of International Finance Corporation, published in Singh et al. (1992).

Table 3. Capital Structure in Developing Countries and Emerging Stock Markets.

Country	LTD/E (in %)	Number of Listed Co.	Market Capitalization (in mil. of US \$)	Trading Value (in mil. of US \$)	Turnover Ratio (in %)
Thailand	163.5	214	23,896	4,334	18.5
Korea	116.7	669	110,594	22,664	22.2
India	46.1	2435	38,567	5,680	12.6
Turkey	26.6	100	19,065	1,531	6.7
Pakistan	24.5	487	2,850	58	2.0
Mexico	12.5	199	32,725	2,705	8.9
Jordan	12.3	105	2,001	37	1.8
Zimbabwe	9.7	57	2,395	15	0.7
Malaysia	8.7	282	48,611	1,798	4.1

Notes: Variable definitions are given in the appendix, Table A1. The leverage data are obtained from the Economics Department of International Finance Corporation, as published in Singh et al. (1992). Emerging stock market data are obtained from IFC's Emerging Markets Data Base and are as of 1990, Quarter IV.

Table 4. Stock Market Characteristics - Simple Correlations

	Trading Value	Turnover Ratio
Market Capitalization	0.931**	0.756**
Turnover Ratio	0.821**	

** indicates significant correlation at the one percent significance level. Variable definitions are given in the appendix, Table A1.

**Table 5. Leverage Regressions and Capital Market Characteristics:
Relative Explanatory Powers of Turnover Ratio, Trading Value, and Market
Capitalization.**

RHS variables	Alternative Specifications			
	(1)	(2)	(3)	(4)
constant	-11.04 (26.26)	24.57 (35.97)	-43.13 (75.87)	103.78** (33.04)
size dummy	2.91 (4.70)	-1.49 (6.67)	0.38 (7.43)	3.91 (7.70)
net asset growth	-2.09* (1.03)	-0.81 (1.49)	0.87 (1.52)	3.22** (1.10)
profitability EBT/NA	2.10 (1.52)	-1.56 (1.83)	-3.62 (1.87)	-6.38** (1.48)
P/E	-0.22 (0.60)	-2.60** (0.81)	-2.61** (0.95)	-1.76# (0.91)
Turnover ratio	7.64** (6.82)			
Trading value		15.55** (4.47)		
Market capitalization			17.40* (8.20)	
Summary statistics				
no. of obs.	32	32	32	32
R ²	.80	.62	.53	.45

Notes: The dependent variable is leverage (LTD/E). Standard errors are given in parantheses. Superscripts **, *, # indicate significance levels at one, five and ten percents respectively. The sample includes Thailand, Korea, India, Turkey, Pakistan, Jordan, Zimbabwe, and Malaysia. For each country, time series averages for four size groups are included. Variable definitions and data are given in the appendix, Tables A1 and A2.

APPENDIX

Table A1. Variable Definitions and Sources.

LDT/E	Leverage, the firm's long term debt to equity ratio.
Internal Finance	The proportion of the firm's growth of net assets which has been financed by retained earnings.
External Finance (equity)	The proportion of the firm's growth of net assets which has been financed by new equity issues.
External Finance (long term debt)	The proportion of the firm's growth of net assets which has been financed by long-term debt.
Growth	Growth rate of net assets.
Profitability EBT/NA	Earnings before tax to net asset ratio. This is the pre-tax rate of return on net assets.
Change in Profitability	Change in pre-tax rate of return on net assets measured from the beginning of the 1980s to the end of the 1980s.
P/E	Price-Earnings ratio calculated using year-end share prices.
MV/BV	The valuation ratio, or Tobin's Q, which expresses the stock market valuation of the firm's equity as a proportion of the book value of its assets.
Size	A dummy variable that takes the value 1 to 4, grouping firms in each country into four quartiles based on their size. Firms in the fourth quartile are the largest.
Market Capitalization	Market value of all listed companies. The market value of a company is the share price times the number of shares outstanding.
Trading Value	Total value of shares traded during the period.
Turnover Ratio	Trading value to market capitalization ratio.

Notes: All firm data are from Singh et al. (1992) and are compiled by the Economics Department of International Finance Corporation. For detailed definitions of the variables and their limitations see Singh et al. (1992). Emerging stock market data are obtained from IFC's Emerging Markets Data Base.

Table A2. Data on Top 50 Listed Companies in Manufacturing: Median Values for Each Indicator for Quartiles of Firms Classified By Opening Size.

(1) Size	(2) LTD/E	(3) Internal Finance	(4) Equity	(5) Debt	(6) Net Asset Growth	(7) Profita- bility EBT/ NA	(8) Change in (7)	(9) P/E	(10) MV/ BV
Thailand (1983-1987)									
Q1	148.3	16.1	NA	NA	14.5	5.8	2.4	14.2	2.1
Q2	170.5	26.9	NA	NA	16.5	6.7	2.4	13.2	1.8
Q3	150.5	32.0	NA	NA	4.4	6.8	6.5	9.5	2.5
Q4	216.0	11.4	NA	NA	4.0	4.6	3.5	12.7	2.7
Korea (1980-1987)									
Q1	104.8	19.2	32.2	49.2	21.8	9.9	1.3	7.4	0.72
Q2	95.0	17.3	42.1	30.8	17.0	6.2	1.5	6.4	0.58
Q3	124.2	12.0	41.0	47.7	13.0	4.3	2.8	8.8	0.59
Q4	144.1	9.8	41.3	45.4	14.5	5.1	4.2	9.4	0.62
India (1980-1988)									
Q1	44.8	49.2	9.9	35.4	27.4	20.2	-20.4	8.5	1.46
Q2	47.7	32.0	17.8	50.0	23.2	11.3	-13.6	10.9	1.58
Q3	46.5	36.1	9.3	50.7	21.1	11.6	-9.1	9.4	1.44
Q4	56.1	30.9	11.8	45.8	18.9	8.3	-6.4	11.5	1.49
Turkey (1982-1987)									
Q1	17.5	18.5	60.7	14.3	54.0	44.9	-14.1	10.0	3.05
Q2	46.0	17.5	61.3	24.1	44.6	33.7	11.9	9.9	2.60
Q3	24.7	18.9	60.3	14.4	44.8	36.4	6.8	9.5	3.40
Q4	37.1	24.5	54.7	14.9	40.5	25.1	20.3	7.9	2.60

Table A2. Data on Top 50 Listed Companies in Manufacturing: Median Values for Each Indicator for Quartiles of Firms Classified By Opening Size - Continued.

(1) Size	(2) LTD/E	(3) Internal Finance	(4) Equity	(5) Debt	(6) Net Asset Growth	(7) Profita- bility EBT/ NA	(8) Change in (7)	(9) P/E	(10) MV/ BV
Pakistan (1980-1986)									
Q1	38.1	49.6	7.8	43.6	22.8	24.6	-14.4	3.0	NA
Q2	15.1	60.5	16.6	19.7	15.8	21.5	-10.9	6.1	NA
Q3	18.6	72.3	14.1	4.0	9.9	18.5	-5.7	7.4	NA
Q4	25.9	61.1	7.6	13.9	8.4	18.2	2.5	5.1	NA
Mexico (1984-1988)									
Q1	12.2	26.1	67.0	0.0	84.5	21.3	6.4	NA	NA
Q2	9.0	17.7	81.0	3.2	77.6	14.6	10.3	NA	NA
Q3	11.1	15.4	77.5	4.6	68.4	9.5	2.3	NA	NA
Q4	14.1	16.1	76.3	4.0	80.5	10.8	8.5	NA	NA
Jordan (1980-1987)									
Q1	7.2	60.2	12.2	27.6	10.9	11.5	-11.2	15.8	1.03
Q2	9.4	3.7	95.1	9.9	8.7	6.5	5.3	19.1	1.17
Q3	11.0	-48.5	85.1	0.0	5.0	10.2	1.8	11.6	0.96
Q4	32.2	40.3	23.3	36.4	2.4	7.4	-13.4	15.4	1.22
Zimbabwe (1980-1987)									
Q1	6.2	63.5	27.5	0.0	15.6	17.9	-8.1	3.7	0.50
Q2	14.2	65.4	20.2	0.0	14.2	21.0	-5.3	3.8	0.55
Q3	6.1	53.5	46.3	0.0	13.7	14.1	-1.8	4.3	0.43
Q4	26.5	48.3	43.5	4.3	7.6	15.0	9.6	3.1	0.38

Table A2. Data on Top 50 Listed Companies in Manufacturing: Median Values for Each Indicator for Quartiles of Firms Classified By Opening Size - Continued.

(1) Size	(2) LTD/E	(3) Internal Finance	(4) Equity	(5) Debt	(6) Net Asset Growth	(7) Profita- bility EBT/ NA	(8) Change in (7)	(9) P/E	(10) MV/ BV
Malasia (1983-1987)									
Q1	18.2	26.1	55.6	32.9	9.2	5.1	-2.2	49.7	2.17
Q2	4.1	38.4	58.6	3.1	5.3	8.5	-3.0	31.4	1.76
Q3	7.9	66.0	0.1	0.0	3.3	8.7	-2.6	26.7	1.53
Q4	17.2	46.4	26.1	13.1	3.1	10.7	-7.0	28.4	2.16

Notes: These are the median values averaged over the sample period for firms in each quartile. Number of companies in Jordan is 35 and Turkey is 38. For Thailand earnings after tax are used in calculating profitability. Variable definitions and sources are given in the appendix, Table A1.

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