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Stock Market Development and Firm Financing Choices

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Are banks and stock markets complements or substitutes? Results imply that initial improvements in the functioning of a developing stock market produce a higher debt-equity ratio for firms, and thus more business for banks.

Summary findings

Demirgüç-Kunt and Maksimovic empirically analyze the association between firm financing choices and the level of development of financial markets in 30 countries for the period 1980–91.

For the whole sample, there is a statistically significant negative correlation between stock market development, as measured by the ratio of market capitalization to gross domestic product, and the ratios of both long-term and short-term debt to firms' total equity.

For developed markets in the sample, further stock market development leads to a substitution of equity for debt financing.

In developing markets, by contrast, large firms become more leveraged as the stock market develops, whereas the smallest firms appear not to be significantly affected by market development.

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1 Introduction

Recent research in corporate finance has identified how asymmetries of information and imperfections in capital markets affect the firm's ability to raise funds and invest. While empirical evidence suggests that specific imperfections may significantly affect the firm's financial and investment policies, there has been little work on the effect of the level of development of the financial markets on the firm's policies. In this paper we explore this relationship by providing empirical evidence on the association between the financing choices of the firm and the level of development of financial markets in thirty developed and developing economies for the period 1980-1991.

The finance literature suggests that stock markets serve important functions even in those economies in which there already exists a well developed banking sector. This is because equity and debt financing are in general not perfect substitutes. Equity financing has a key role in managing the conflicts of interest that may arise between different stakeholders in the firm. Stock markets also provide entrepreneurs with liquidity and for opportunities to diversify their portfolios. Stock trading transmits information about firms' prospects to potential investors and creditors.[1] As a result of the different attributes of debt and equity, the development of markets that facilitate the issuance and trading in equity should be reflected in the financing decisions of individual firms.

While differences in financial systems have been noted in the literature, there have been few attempts to formally model the effects of financial market development on firms' financing choices or on their investment decisions. Notable exceptions are Pagano (1993) model of the effect of opportunities for diversification on entrepreneurs' portfolio choices, Bencivenga et al.'s (1994) analysis of financial

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[1] Allen (1993) contrasts the comparative advantages of stock markets and financial institutions in processing information about investment projects.

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liquidity on technology choice, and Boyd and Smith's (1995) framework analyzing complementarities of debt and equity financing for capital investments. The empirical work in this area is also sparse. There are empirical studies of firm debt-equity ratios by Titman and Wessels (1988) for the U.S., Ragan and Zingales (1994) for a sample of developed countries, and Demirguc-Kunt and Maksimovic (1994) for a sample of developing countries. Also, Mayer (1989) and Singh et al. (1992) have looked at corporate financing patters in developed and developing countries, respectively.

This is the first paper that empirically explores the effect of financial market development, particularly stock market development on firm financing choices. We compare the relationship between capital structure choice and financial market development in a sample of thirty developed and developing countries. We investigate the extent to which the variation in the aggregate debt-equity ratios within these countries can be explained by (a) the level of development of the country's financial markets, (b) macroeconomic factors, such as the growth rate and the rate of inflation, (c) the differences between the tax treatment of debt and equity securities and (d) the firm-specific factors that have been identified in the corporate finance literature as determining financial structure.

We find that in general there is a significant positive relationship between bank development and leverage and a negative but insignificant relationship between stock market development and leverage. However, when we break the full sample down into sub-samples and control for the other determinants of firm financing an interesting relationship between leverage and stock market development emerges. In already developed stock markets, further development leads to a substitution of equity for debt financing. By contrast, in developing stock markets, large firms become more levered as the stock market develops, whereas the smallest firms do not appear to be significantly affected by market development.

Our results have important implications. In many developing countries with emerging stock markets banks are fearful of stock market development, that stock markets will reduce the volume of their business. Instead, our results imply that initial improvements in the functioning of a developing stock market

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produce a higher debt equity ratio for firms, and thus more business for banks. These results also suggest that in countries with developing financial systems stock markets and banks play different, yet complementary roles. Thus, policies undertaken to develop stock markets need not affect existing banking systems adversely. Our results are also consistent with the conclusion of Demirguc-Kunt and Levine (1995) that stock market and financial intermediary development proceed simultaneously.

The rest of the paper is organized as follows. The predicted relationship between financial market development and debt-equity ratios is discussed in Section 2. The sample of countries is discussed and the data sources are described in Section 3. The statistical model is described in Section 4 and the results are reported in Section 5. The conclusions are stated in Section 6.

2. Framework for Analysis

Corporate finance theory suggests that corporations optimally structure financing packages to reduce the economic costs that result from taxes and from imperfections in the financial markets. As financial markets develop, the comparative significance of different imperfections is likely to change. As a consequence, the issuance of specific securities may become more or less advantageous for certain categories of firms. Thus, there may be a relationship between financial market development and financing choices.[2]

In this section we consider three classes of imperfections that may result from inadequately developed financial markets. First, insufficient opportunities for diversification of portfolios by investors and entrepreneurs. Second, the inability to enter into financing contracts appropriate for the firm's investment projects. Third, the asymmetries of information between investors and the firm that occur because stock

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[2] In this section we focus on equity market development, in part because it has been most evident during our period of analysis (for a discussion, see Demirguc-Kunt and Levine (1995)). However, it is important to bear in mind that there are important spillovers between development of the equity market and development of the banking system.

markets do not efficiently aggregate information. For each of these imperfections we identify the effect of financial market development on the firms' financing choices.

Diversification by entrepreneurs and stock market liquidity

In an economy in which equity markets are imperfect, entrepreneurs face costs of diversifying their portfolios. Outside investors may require a premium to acquire the stock of firm that is traded on an illiquid market. Moreover, as Pagano (1993) has emphasized, the benefits to the entrepreneur of exchanging the ownership of a stake of his or her firm for a portfolio of financial assets may be limited if the financial market on which these assets are traded does not provide opportunities for diversification. The costs of diversification may induce the entrepreneur to avoid the use of financial markets and, instead, to alter the firm's investment and product decisions so as to optimally balance his or her personal portfolio.[3]

There are several ways in which the firm's investment policies may be affected by the owners' inability to diversify optimally in financial markets. First, the firm may diversify into areas in which it does not have a comparative advantage. Second, the firm may invest less than it would if its shares were widely held. Third, it may choose less capital intensive production technologies that are subject to less long-term risk.

Optimal contracting and financial markets

There exist conflicts of interest between the firm and its customers and suppliers and between different classes of investors in the firm. These conflicts may induce the firm's owners, or managers who represent them, to harm the interests of the other parties. Because such opportunistic behavior can be anticipated, it may make it more difficult for the firm to obtain financing. However, by optimal structuring of the

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[3] This argument parallels the more familiar argument in finance that the firm's financial policies are chosen so as to take advantage of tax shields which the owners' cannot exploit on their personal accounts. Here, the argument is that the firm's investment policy may be chosen to achieve a risk-return trade-off that owners' cannot obtain by altering their portfolio investments.

contracts between the firm and outside investors, the owners' incentives to engage in opportunistic behavior can be mitigated.[4]

The corporate finance literature has identified several cases in which reliance on outside debt financing increases the incentives of the firm's owners to act opportunistically or to otherwise harm the creditors, customers and suppliers. Jensen and Meckling (1976) argue that highly levered firms may have an incentive to take on projects that have negative expected net present values and are risky, thereby harming creditors. Myers (1977) shows that firms with significant risky growth opportunities may forgo profitable projects if the resulting increases in value are captured by the firms creditors. Titman (1984) argues that as high leverage increases the probability of financial distress sufficiently, the firm will enter into contracts that it may be unable to execute. Maksimovic (1988) and Maksimovic and Titman (1991) argue that leverage increases the firm's incentive to renege on value enhancing implicit contracts with rival firms or with customers.

Because debt financing creates incentives to act opportunistically, a highly levered firm may not be able to obtain credit or to exploit fully opportunities for mutually beneficial contracting with customers, rivals or suppliers. In these cases, issuance of equity would mitigate the incentive problems created by debt financing.

Equity markets and information aggregation

In addition to their primary role of supplying capital to the economy, equity markets have an important informational role. Equity markets aggregate information about the prospects of the firms whose shares are traded (Grossman (1976)). This aggregated information becomes publicly observable by the firm's

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[4] There is a large literature on conflicts of interest between different classes of investors. The important references are Jensen and Meckling (1976), Myers (1977) and Myers and Majluf (1984). For an overview see Barnea, Haugen and Senbet (1985) and Harris and Raviv (1991).

creditors and investors. Markets thereby facilitate the monitoring of the firm by making it more profitable for them to contribute capital to the firm.[5]

In addition to aggregating information, financial markets provide incentives for information acquisition by investors. As markets for publicly traded equity increase in size, it becomes profitable for analysts to invest in acquiring information about firms.[6] The resulting increase in the quality of information further facilitates monitoring by creditors.

The effect of developing an equity market

To fix ideas, consider an entrepreneurial firm operating in an environment without a functioning equity market. The firm is financed by inside equity, trade credit and bank borrowing. Because we are assuming that there does not exist an effective equity market, the firm's initial debt-equity ratio will not be an economic optimum. Hence, once the market is opened we would expect the firm's owners to move away from the initial debt-equity ratio.

The initially limited access to equity markets suggests that such a firm is likely to have a sub-optimally high debt-equity ratio for its scale of operations. A possible secondary implication of limited access is that the firm may be suboptimally small: it may pass up growth opportunities which would be exploited if there existed a functioning equity market. This may occur for the reasons identified above. First, because expansion can only be financed using the entrepreneur's own capital or debt, investment in risky growth opportunities may increase the risks borne by the undiversified entrepreneur enough to make it unattractive. Second, certain projects are optimally financed with equity capital. Such projects may not be profitable if financed by debt. Third, in the absence of a public market aggregating information, informational asymmetries may make it too costly to raise capital from outside investors.

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[5] This role of financial markets is sufficiently important that many investment funds and mutual funds are prohibited from investing in companies whose stock does not trade on a recognized exchange.

[6] For a formal model, see Grossman and Stiglitz (1980).

Now allow an equity market to begin functioning. There will be three direct effects of the firm's debt-equity ratio: first, a substitution effect as outside equity is substituted for outside debt by firms that had previously been constrained to issue only outside debt. This effect will decrease the firm's debt-equity ratio. Second, outside equity will be substituted for inside equity. This will not affect the firm's debt-equity ratio. Third, the entrepreneur's ability to diversify risks may make expansion more attractive. The effect of such expansion on the firm's debt-equity ratio is ambiguous and will depend on the optimal financial structure of the firm.

The development of an equity market may also have an indirect effect on the firm's leverage. Equity markets aggregate information investors possess about firms. This makes it less costly for investors and financial intermediaries to monitor firms. Thus, external equity and debt should become less risky. We would therefore expect to see an increase in external financing. It is, however, unclear whether external equity or debt would benefit more. To the extent that debt is provided by the product market and by banks, who are probably already well informed, we would expect to see a decrease in leverage as financial markets reduce the costs of monitoring to investors.

All of the above arguments are conditioned on the hypothesis that equity markets develop relative to the market for debt. If the debt market develops faster, then the effects may be reversed.

The net effect of above considerations is that the effect of equity market development on the debt-equity ratio is ambiguous. The question is investigated empirically below.

3. Description of Sample and Financial Market Indicators

Our sample consists of thirty developed and developing economies for the period 1980-91.[7] These economies were selected because they have a developed or emerging stock market and because data on individual firms' financial structures is available for a sufficiently large number of firms.[8]

Table 1 lists all the countries in the sample, together with several indicators of economic development of each country. As an inspection of the table reveals, the sample represents a wide range of economic development: the GDP per capita for 1991 ranges from $27,492 for Switzerland to $359 for Pakistan. With the exception of South Africa and Jordan, all the economies have experienced growth in per capita income during the sample period. Some economies, especially Brazil, Mexico and Turkey, have experienced high rates of inflation in this period.

Insert Table 1 here

In the absence of a theory of financial market development, we use empirical indicators to measure the level of development of the equity market and financial intermediaries in each country for each year of the sample. Our first three stock market indicators are the ratio of stock market capitalization to GDP (MCAP/GDP), the ratio of total volume of shares traded to GDP (TVT/GDP) and the ratio of the total value of shares traded to market capitalization (TOR). In our sample MCAP, TVT, TOR are drawn from IFC's emerging market data base.

Our indicators of stock market development have been used in previous studies, (e.g., Pagano (1993),

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[7] The economies in the sample are Austria, Australia, Belgium, Brazil, Canada, Finland, France, Germany, Hong Kong, India, Italy, Japan, Jordan, Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway, Pakistan, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States, Zimbabwe.

[8] To the best of our knowledge, the sample incorporates all the firm level financial data for developing countries currently available to researchers.

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Demirguc-Kunt and Levine (1995)) and provide intuitive summary statistics for the level of activity of the stock market and the significance of that activity for each of the economies in the sample. MCAP/GDP is measure of both the stock market's ability to allocate capital to investment projects and to provide significant opportunities for risk diversification for investors. TVT/GDP and TOR are indicators of market liquidity. The former measures the ability to trade economically significant positions on the stock market, whereas the latter is indicator of liquidity of assets traded on the market, not adjusted for the size of the market relative to the economy. We also combine the three indicators in an equally weighted index of market development (INDEX1). Table 2 lists the 1980-91 averages for the stock market development indicators for each economy.[9]

In ten of the economies the financial markets are classified as "emerging" by the International Finance Corporation.[10] These are Brazil, India, Jordan, Korea, Malaysia, Mexico, Pakistan, Thailand, Turkey and Zimbabwe. Interestingly, several emerging markets, such as Malaysia, Korea and Thailand have higher MCAP/GDP ratios than some developed economies, such as Canada, Germany and France. The correlation between MCAP/GDP and the GDP per capital is only 0.23. Similarly, the TVT/GDP and TOR ratios are only weakly correlated with GDP (correlation coefficients of 0.23 and 0.34, respectively).

Insert Table 2 here

The principal indicators we use are measures of activity, rather than measures of the institutional determinants of conditions under which securities are traded. This is in part due to the difficulty in quantifying differences in, say, the regulatory environment that may affect firms' decisions to issue equity or debt in the United States and Great Britain. However, differences in the institutions among the ten

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[9] The indicators in columns headed by INST and INDEX2 are discussed below.
[10] IFC Factbook.

emerging markets are large enough to be quantified. Several important institutional indicators in the emerging markets, drawn from various editions of IFC's Factbook, are detailed in Table 3.

Insert Table 3 here

As shown in the table, by the end of our sample period the institutions in Brazil, Mexico. Malaysia and Korea were more developed than those of, for example, Zimbabwe. The principal differences resulted from lower restrictions on dividend and capital repatriation and in higher quality of firm disclosures in the former group. An arithmetic average of the institutional indicators for emerging markets is listed in the INST column of Table 2.

For the same emerging markets we also report INDEX1 augmented by Korajczyk's indicator of securities mispricing (Korajczyk (1994)). This indicator measures the extent of mispricing of securities relative to a domestic CAPM for each country and is an indicator of extent of market efficiency.[11] The augmented index is reported as INDEX2 in Table 2.

We use three empirical indicators to measure the significance of the banking sector in each of the economies in our sample. Each indicator quantifies different components of banks' provision of funds to the private sector in each of the economies. M3/GDP measures the ratio of banks' liquid liabilities (M3) to GDP. It is an indicator of the size of the banking sector to the economy as a whole and has been used in several studies of the effect of the financial sector on the growth in the economy.[12] Our second indicator is the ratio of domestic credit to the private sector to the GDP, PRIV/GDP. This ratio measures the role of banks on the provision of longer term financing to private corporations. A third indicator is the ratio of

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[11] The indicator is similar to the indicator estimated in Korajczyk and Viallet (1989) and is described in that paper and Korajczyk (1995). We also used mispricing indicators obtained from international CAPM and APT models, however these are not reported since the results are not significantly different.

[12] Studies that have used this indicator include King and Levine. (1993), Levine and Renelt (1992) and Levine and Zervos (1994).

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deposit bank domestic assets to GDP, BANK/GDP. M3/GDP and PRIV/GDP are averaged to yield FINDEX1. The data on M3, PRIV, BANK and GDP are drawn from International Financial Statistics, published by the International Monetary Fund.

Whereas in many developing countries banks are the only significant financial intermediaries, in developed economies there also exist significant insurance companies, pension funds and other intermediaries. To gauge the importance of financial intermediaries in general on provision of credit we also take the ratio of assets held by deposit banks, non-bank private financial assets and assets of private insurance and pension companies to GDP (FINDEX 2).

Insert Table 4 here

Data on individual firms in Korea, India, Mexico, Jordan, Brazil, Turkey, Pakistan and Zimbabwe come from the IFC's corporate finance database. It consists of financial data on the hundred largest firms trading on the stock exchanges of these countries. For some markets the data is only available for a sub-period, as noted in Table 1 in the Appendix. Data on firms in the remaining countries in Table 1 comes from Global Vantage database. The number of firms available for the Global Vantage sample is also noted in Table 1 in the Appendix.

Insert Table 5 here

Research in the United States shows that financial policies are in part determined by firm size. There are economies of scale in issuing securities (Ritter (1987)). Larger firms may have more access to financial markets and be followed by a larger number of analysts. To aid in the interpretation of the results, Table 5 provides information on the size distribution of firms in each market. In each market, firms were ranked

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according to the average size, measured by total assets, over the sample period. The average of each quartile of firm size is reported in the table.

As revealed by inspection of Table 5, firm sizes differ materially across economies. The average asset value of the largest quartile of Italian firms is approximately $4.5 billion, whereas it is approximately $65m in Thailand and Zimbabwe. The differences are equally marked in the smallest quartile: the average firm in the lowest quartile in Sweden is seventy seven times larger than the average firm in the same quartile in the Thailand.

Equally significant, there are major differences in firm size within each country. In fourteen of the markets, the average firm in the smallest quartile has assets under $10m. In some countries the differences in size between the largest and smallest firms are very large. Thus, in Belgium the average firm in the largest quartile is approximately three hundred times larger than the average firm in the smallest quartile. The large differences in firm sizes in the sample suggest that the development of markets may have different effects on large and small firms in the same market.

4. Determinants of Financial Structure

In order to isolate the contribution of financial market development on the firm's choice of financial structure we control for other variables that may affect the firm's financing choices. We control for three categories of variables: individual firm characteristics, the tax levels in each of the economies in our sample and macroeconomic-factors.

As discussed above, the firm's optimal financing mix will depend on the owners' ability to engage in opportunistic behavior at the expense of creditors and other parties. This, in turn will in part depend on the composition of the firm's assets. We control for asset composition by measuring the firm's net fixed assets

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to total assets (NFATA) and net sales to net fixed assets (NSNFA). Firms with high NFATA and low NSNFA are predicted to have high long-term and short-term leverage respectively.[13]

We use two variables as proxies the firm's requirement for debt financing: the ratio of earnings to total assets (PROFIT) and the ratio of dividends to total assets (DIVTA). PROFIT is included because several studies have found an inverse relationship between profitability and leverage. The DIVTA variable is included because cash-constrained firms are unlikely to pay out large dividends.

Our last two firm characteristics measure the firms non-debt tax shields (NDTS) and its size relative to the economy (TA/GDP). All other factors being equal, a firm with significant non-debt tax shields is less able to exploit tax shields obtained from debt financing than a firm with smaller insignificant non-debt tax shields. TA/GDP is included as a measure of the firm's access to the financial markets. The sample means for each of these variable for each country is reported in Table 6.

Insert Table 6 here

The firm's choice of debt level will depend on part on the tax-treatment of interest income relative to income derived from dividends and capital gains. For each economy and each year we have calculated the relative tax advantage of debt and equity using data drawn from the annual editions of Coopers & Lybrand, International Tax Summaries during our sample period. This data is reported in Table 2 of the Appendix.

Finally, we also control for two macro-economic variables: the inflation rate (INFL) and the growth rate of the GDP (GROWTH). Because debt contracts are typically written in nominal dollars, the rate of inflation may affect the riskiness, in real terms, of debt financing. Growth is included as a measure of the growth opportunities available to firms in the economy. Finance theory suggests that growth options should not be

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[13] For a more comprehensive discussion of the relationship between leverage and firm specific characteristics see Demirguc-Kunt and Maksimovic (1994).

financed by debt. Thus, we would expect debt financing to be inversely related to GROWTH.

Our control model for financial structure is

$$y_i = \alpha_i + \sum \beta_{ij} x_{ijt} + \sum \gamma_{ij} m_{ijt} + \sum \delta_{ij} t_{ijt} + \sum \lambda_{ij} d_{ijt}$$

where y is a measure of leverage, x are the firm specific characteristics (NFATA, PROFIT, NSNFA, NDTS, DIVTA,TA/GDP), m are the macro-economic factors (GROWTH, INFL), t are the tax variables and d are the time and country dummies. Below, this equation is augmented by financial institution and stock market indicators.

5 Results

In this section we present our analysis of the effects of financial market development on firms' financing choices. First, we discuss the correlations between firms' capital structures and indicators of financial market development. Second, we characterize the relationship between financial structures and financial market indicators in developing and developed financial markets when determinants of firms' capital structures identified in the corporate finance literature are taken into account.

Simple correlations

Our primary focus is on the effect of financial market development on the use of equity and debt financing in each of the economies under consideration. To this end, we use the average ratio of debt to equity in each economy in each year as the dependent variable.[14] Specifically, for each economy, for each year,

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[14] By using aggregated data we avoid problems posed for empirical testing by the observed heterogeneity of capital structures adopted by seemingly identical firms (Myers (1984)). Such heterogeneity is predicted but theories that focus on macro-economic (Miller (1977)) or industry-level (Maksimovic and Zechner (1991)) determinants of financial structure.

we calculate the average ratio of short-term debt to total equity for the firms in our sample (STDTE), long-term to total equity (LTDTE) and total debt to total equity (TDTE). The simple correlations of LTDTE, STDTE and TDTE for each country and each year with each other and with indicators of stock market and financial institution development are shown in Table 7.

As revealed in the table, the use of short-term and long-term debt by firms in an economy is positively correlated. LTDTE is negatively correlated with the size of the stock market (MCAP/GDP), positively correlated with the size of the banking sector (BANK/GDP) and positively correlated with the real per capita income (GDP/CAP). The results for STDTE are similar. Thus, a large stock market is associated with reductions in both long-term and short-term debt financing. Interestingly, the level of activity of the stock market (as measured by TOR or TVT/GDP) is not correlated with LTDTE or STDTE. This suggests that an active secondary market for stocks is not a first order determinant of firms' financing choices. Similarly, the M3/GDP, which has been used as a measure of the size of the banking sector is not correlated with financing choices of firms.

Insert Table 7 here

Financial market development as a determinant of firm capital structure

While the simple correlations between debt and the level of the stock market and the banking sector suggest that equity is a substitute for both short-term and long-term debt financing, they do not take into account other determinants of firms' financing choices identified in the previous section. Thus, for example, the observed correlations may be the result of differences in industry composition, in tax regimes and growth rates and macro-factors. To investigate these issues further we perform an OLS regression of the firms' financing variable on firm characteristics (NFATA, PROFIT, NSNFA, NDTS, DIVTA, TA/GDP), macro-economic factors (GROWTH, INFL), tax variables, time and country dummies as well as financial intermediary and stock market indicators. By controlling for the determinants identified in the

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literature, this regression is a more conservative test of the relationship between financing choices and market development indicators than the simple correlations reported above. Furthermore, it is likely that some of the time and country dummies may be picking up unmeasured differences in financial markets between countries and over time.

Table 8 reports R^2 of each regression and the significance levels of the F-tests testing the joint hypothesis that coefficients of specific groups of determinants firms' financing choices are zero.

Insert Table 8 here

As reported in table, this specification explains approximately eighty percent of the variation in STDTE, LTDTE and TDTE. Among the newly added control variables, firm characteristics and country dummies have highly significant explanatory power. This is consistent with the results of firm level regressions in Demirguc-Kunt and Maksimovic (1994), where these variables are discussed in detail. Consistent with corporate finance theory, tax variables are significant in the LTDTE regression. Macro variables, growth and inflation, jointly have a negative and significant effect on short-term debt and total debt but not on long term debt. Growth variable itself has a negative and significant sign in all three equations, indicating that debt financing is indeed inversely related to growth as predicted by theory.

Turning to the variables of primary interest, as before, BANK/GDP is positively related to firms' debt levels. As shown in the table, this relationship is significant at the 5% level in the case of long term debt and 10% in the case of short term debt. A stronger association with long-term debt is expected because financial intermediaries are likely to have a comparative advantage in making long-term loans, whereas short term financing may be available through trade credit.

The stock market indicator INDEX1 is negative but is not significant in these regressions. This indicates that the a simple variable measuring the development of the market does not help explain firms' choices

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of financial structure once the development of the banking sector and the other control variables are taken into account.

We have explored this finding in unreported regressions. It is robust for alternative specifications of stock market and financial intermediary indicators. Thus, alternative stock indicators, such as MCAP/GDP, TVT/GDP and TOR, in conjunction with each of the financial intermediary indicators M3/GDP, FINDEX1 and FINDEX2 consistently yield negative, but insignificant, coefficients for the stock market indicator in equations explaining STD/TE, LTD/TE and TD/TE. This pattern suggests that there does exist a relationship between firm financing choices but that this pattern may not be captured with the simple linear specification. We next explore this finding further, and attempt to characterize more fully the interactions between stock market development and financing choices.

Stock market development and firm capital structure: developed vs. developing markets

Pagano (1993) and others argue that stock markets may play different roles in financing enterprises in economies where they are small and in economies where they are well developed. To investigate the possibility that stock markets may have different effects on firms' financing choices as the level of market development varies. we split the sample into sub-samples and estimate the effect of stock market development separately in each. We use INDEX1 scores to split the sample into those markets which are "developed" markets and those which are "developing" markets. Top 15 markets in Table 2 are classified as "developed," and the remaining markets are classified as "developing."

Consistent with the findings of Demirguc-Kunt and Levine (1995), in this split well-developed stock markets of developing countries such as Korea, Malaysia and Thailand belong to the developed group, whereas the relatively underdeveloped markets in some European countries, such as in Austria, Italy and Finland fall into the "developing" category. This grouping is superior to a split based on developed vs. developing countries, since it takes into account the fact that some markets classified as emerging may

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already have a significant role in the financing of their national private corporate sector as the established markets in developed countries. The average MCAP/GDP in the two sub-samples over the sample period is shown in Figure 1. The difference among the two groups is evident and appears to be constant through time.

We examine the effect of stock market development on firm financing in the developing and developed market sub-samples separately. Table 9 shows the coefficients of the stock market development indicator in our equation explaining firms' choice of STDTE, LTDTE and TDTE in the two sub-samples. As financial variables, the basic equation was estimated separately on each sub-sample with one indicator for stock market development (MCAP/GDP, TVT/GDP, TOR, INDEX1 and INDEX2) and one indicator for the development of the financial intermediary sector (M3/GDP, BANK/GDP, FINDEX1 and FINDEX2).

Insert Table 9 here

Inspection of Table 9 shows an interesting contrast between the "developed" market and "developing" market sub-samples. The coefficients of the stock market indicator in the developed market subsample are uniformly negative, whereas the coefficients in the developing market subsample are all positive with one exception. [15] These patterns suggest that in economies with more developed stock markets, further development of the market leads to a substitution of equity financing for debt financing. This is seen most clearly in the case of long-term debt, where the coefficients are predominantly statistically significant. By contrast, in those economies in which the stock market is developing, further development of the market leads to opportunities for risk sharing and for aggregation of information that allow firms to increase their borrowing.

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[15] The probabilities of these patterns occurring by chance are 0.5^{12} and 9×0.5^{12} respectively. That is the probability that all the coefficients of the LTD, STD and TD equations for all the four stock market indicators for which we have data indeveloping and developed markets take the value they do if there is no relationship and the regression is constructed from independent draws from a data distribution. Because for each stock market indicator and each equation we have estimated four relationships using different financial institutions indicators, we only count the sign once per specification.

Differences between large vs. small firms

It is likely that the effect of stock market development may be different for large and small firms. In particular, the information aggregation role of the market is likely to be more significant for large firms that trade often and are followed by many analysts. To test this hypothesis, we formed portfolios consisting of the largest and smallest quartiles of firms in each country based on their asset size. Our basic regression equation was then estimated on four sub-samples: the largest quartile of firms in developed and developing stock markets and the smallest quartile of firms in the developed and developing stock markets.

Insert Table 10 here

Table 10 reports the results of the splits according to size. The coefficients of the stock market variable for large firms in the developed stock markets sample are uniformly negative and for LTDTE statistically significant at the 5% level when MCAP/GDP is used as an indicator of market development. By contrast, the coefficients of the stock market variable for large firms in the developing stock markets sample are uniformly positive and for the most part statistically significant at the 5% for STDTE, LTDTE and TDTE.[16]

These findings suggest that for large firms in developed stock markets, further market development acts to enhance opportunities for substitution of equity for debt financing. By contrast, large firms in developing stock markets take advantage of further development to increase their borrowing.

The coefficients of the stock market indicator for small firms in developed stock markets are negative. This accords with the results for large firms in the same markets and suggests that small firms are also taking advantage of market development by substituting debt for equity financing. Interestingly, the coefficients

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[16] The probability of these patterns of signs occurring by chance are 0.5^9 for the developed markets sample and 0.5^9 for the developing markets sample.

of small firms in developing markets are also predominantly negative, although not statistically significant.[17]

To place these results in context, Table 11 presents F-tests of the joint hypothesis that certain categories of coefficients are zero estimating a basic regression on each of the sub-samples. In these regressions the stock market development indicator is INDEX1 and the financial intermediary development indicator is BANK/GDP. Panel I shows the split between developed and developing markets. As inspection of the stock market indicator column reveals, stock market development, as measured by INDEX1, most significantly affects the financing choices of firms in developed markets. Stock market development induces firms in these markets to substitute equity for debt. The corresponding results for developing markets are not significant. In Panel II we further analyze the largest and smallest quartiles of firms in each market and see that stock market development significantly affects the financing choices of large firms in developing markets, inducing them to increase their leverage. Inspection of Panel II also reveals that we are better able to explain financial structures of large firms than small firms in all markets.

Insert Table 11 here

To obtain a visual representation of the interaction between financing choices and stock market development, following Barro (1991) we subtract from the dependent variables of the first two regressions reported in Panel II of Table 11 (LTDTE and STDTE), all the dependent variables multiplied by their estimated coefficients with the exception of the stock market indicator. For the two subsamples of developed and developing markets, Figure 2 shows the unexplained residuals of STD/TE and LTD/TE plotted against INDEX 1 at the sample means of each variable during the sample period for each economy.

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[17] The probability of this pattern of signs occurring by chance in the developed markets sample is 0.5^9. The probability of obtaining seven or more negative coefficients in the nine equations of the developing markets sample in the absence of a relationship is 45×0.5^9. The probability is obtained using the Binomial formula $0.5^9 \times (1 + 9!/8! + 9!/(7!2!))$.

The visual evidence is striking. It suggests that for economies with developing stock markets debt-equity ratios of large firms increase with the development of the stock market. For large firms in economies with more developed markets, further development is associated with lower debt to equity ratios.

Taken together, the results suggest that further development of stock markets may affect firms differently in economies where the markets already play a significant role than in those where they do not. If stock markets are already significant, further development leads to a substitution of equity financing for debt. However, in economies where stock markets are too small to have a significant role in the economy, as measured by our indicators, development permits large firms to increase their leverage.

6. Conclusion

This is the first paper in literature that empirically explores the effect of financial market development, particularly stock market development, on firm financing choices. We use aggregated firm level data for a sample of thirty countries for the period 1980-91. We measure stock market development by the ratio of market capitalization to gross domestic product, total value traded to gross domestic product and the annual turnover ratio.

Taking all the countries in the sample together, we find that there is a statistically significant negative correlation between stock market development, as measured by market capitalization to gross domestic product, and the ratios of both long-term and short-term debt to total equity of firms. There is also a statistically significant positive relationship between the size of the banking sector and leverage. Interestingly, there is no correlation between the level of activity of a stock market, as measured by the turnover ratio or the ratio of total value traded to GDP, and firm leverage.

The negative linear relationship between leverage and stock market development loses statistical significance when we control for variables that have been identified in the corporate finance literature as

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determining firms' financial structures. However, when we break the full sample down into sub-samples an interesting pattern emerges. In developed markets, further development leads to a substitution of equity for debt financing, especially for long term debt. In developing markets, large firms become more levered as the stock market develops, whereas the smallest firms do not appear to be significantly affected by market development.

These findings suggest that the development of a stock market initially affects directly the financial policies of only the largest firms. This may be because diversification of ownership and the aggregation of information provided by the development of stock markets initially benefits the larger firms more, due to the need to spread fixed issuance costs and traders' costs of information acquisition. Moreover, these firms increase leverage. Thus, initially at least, an important role of the stock market is to aggregate information and thereby induce lenders to extend credit to firms whose stock is traded.

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Table 1. Economic Development Indicators

	GDP/CAP (US $)	Growth 80-91 (percent)	Inflation 80-91 (percent)	Life expectancy (years)
Switzerland	27,492	1.7	3.8	78
Japan	23,584	3.9	1.5	79
Norway	19,664	1.7	5.2	77
Sweden	19,649	1.6	7.4	78
United States	18,972	1.9	4.2	76
Finland	18,046	1.6	6.6	76
France	17,365	1.8	5.7	77
Austria	17,288	2.2	3.6	76
Netherlands	16,479	2.3	1.8	77
Germany	16,439	1.8	2.8	76
Canada	16,098	2.0	4.3	77
Belgium	16,051	2.2	4.2	76
Italy	14,570	2.5	9.5	77
Australia	13,095	1.6	7.0	77
United Kingdom	12,585	2.3	5.8	75
New Zealand	10,643	1.0	10.3	76
Singapore	10,294	4.9	1.9	74
Hong Kong	9,820	5.8	7.5	78
Spain	8,752	3.3	8.9	77
Korea	4,259	6.8	5.6	70
Malaysia	2,465	3.6	1.7	71
South Africa	2,198	-1.0	14.4	63
Brazil	2,073	2.1	327.6	66
Mexico	1,801	1.0	66.5	70
Turkey	1,375	3.1	44.7	67
Jordan	1,372	-2.1	1.6	69
Thailand	1,362	7.0	3.7	69
Zimbabwe	630	1.7	12.5	60
India	375	3.3	8.2	60
Pakistan	359	3.9	7.0	59

GDP/CAP is the real GDP per capita in US$ in 1991. Growth rate is the average annual growth rate in GDP/CAP for the period 1980-91. Average annual inflation is given for the period 1980-91. Life expectancy at birth is for year 1991.

Table 2. Stock Market Development Indicators					
	MCAP/GDP	TVT/GDP	TOR	INST	INDEX 1	INDEX 2
Hong Kong	1.26	0.51	0.41		0.73	
Japan	0.98	0.53	0.51		0.67	
Germany	0.24	0.29	1.23		0.59	
United Kingdom	0.86	0.35	0.39		0.53	
United States	0.61	0.36	0.58		0.52	
Singapore	0.95	0.31	0.31		0.52	
Switzerland	0.75	0.31	0.39		0.49	
South Africa	1.35	0.07	0.05		0.49	
Malaysia	0.88	0.16	0.16	1.61	0.40	-0.07
Korea	0.22	0.17	0.69	1.49	0.36	-0.21
Thailand	0.21	0.18	0.67	1.35	0.35	-0.22
Netherlands	0.46	0.19	0.39		0.35	
Australia	0.49	0.15	0.30		0.31	
Canada	0.46	0.13	0.29		0.29	
Sweden	0.43	0.10	0.25		0.26	
Mexico	0.10	0.05	0.69	1.57	0.28	-0.63
Jordan	0.48	0.07	0.14	1.12	0.23	-0.24
India	0.07	0.04	0.59	1.29	0.23	-0.26
Norway	0.18	0.08	0.42		0.23	
Austria	0.08	0.05	0.51		0.22	
Brazil	0.11	0.05	0.48	1.48	0.21	-0.97
France	0.23	0.08	0.32		0.21	
Spain	0.21	0.07	0.31		0.20	
New Zealand	0.38	0.06	0.16		0.20	
Belgium	0.31	0.04	0.12		0.15	
Italy	0.15	0.04	0.23		0.14	
Finland	0.17	0.04	0.18		0.13	
Zimbabwe	0.10	0.01	0.08	0.62	0.06	-0.71
Pakistan	0.04	0.01	0.11	0.86	0.06	-0.20
Turkey	0.05	0.01	0.08	0.96	0.05	-0.31

MCAP/GDP is the ratio of stock market capitalization to GDP. TVT/GDP is the total value of traded shares divided by GDP. TOR is the turnover given by total value traded divided by market capitalization. INST is the aggregate institutional indicator given by the average of institutional factors in Table 3. Index 1 is the average of MCAP/GDP, TVT/GDP, and TOR. Index 2 averages the indicators in index 1 and a pricing indicator estimated using a domestic CAPM model for developing countries. Values are 1980-91 averages.

Table 3. Institutional Indicators - 1992 Figures							
	2	3	4	5		6		7
	Regular	Accounting	Quality of	Securities	Restrictions on			Average
	publication	standards	investor	exchange	Dividend	Capital	Entry	Institutional
	of p/e yield		protection	commission	repat.	repat.		Indicator
Brazil	1	2	2	1	2	2	2	1.71
Mexico	1	2	2	1	2	2	2	1.71
Malaysia	1	2	2	1	2	2	2	1.71
Korea	1	2	2	1	2	2	2	1.71
Thailand	1	1	1	1	2	2	2	1.43
Turkey	1	1	1	1	2	2	2	1.43
Pakistan	0	1	1	1	2	2	2	1.29
India	1	2	2	1	1	1	1	1.29
Jordan	0	1	1	1	2	2	2	1.29
Zimbabwe	0	1	1	1	0	0	1	0.57
Column (2) 0=published, 1=comprehensive and published internationally								
Columns (3) and (4), 0=poor, 1=adequate, 2=good, of internationally acceptable quality								
Column (5) 1=functioning securities exchange commission or similar government agency, 0=no agency								
Column (6) 0=restricted, 1=some restrictions, 2=free								
Column (7) average of columns (2)-(6).								
All data are as of end-1992. The table is based on the information provided in the IFC's Factbook.								

Table 4. Financial Intermediary Development Indicators					
	M3/GDP	PRIV/GDP	BANK/GDP	FINDEX 1	FINDEX 2
Hong Kong	3.64				
Switzerland	2.82	3.01	3.12	2.91	3.12
Japan	3.41	2.13	2.45	2.77	1.42
Singapore	2.14	1.67	1.88	1.91	0.95
Jordan	2.00	1.13	1.34	1.56	1.34
Malaysia	1.87	1.24	1.54	1.56	0.67
Netherlands	1.63	1.47	1.89	1.55	1.89
France	1.40	1.67	1.91	1.53	0.77
Germany	1.30	1.72	2.07	1.51	1.19
Austria	1.66	1.34	2.26	1.50	2.26
United Kingdom	1.31	1.62	1.62	1.47	0.92
United States	1.32	1.41	0.96	1.37	0.67
Spain	1.37	1.27	1.80	1.32	0.70
Finland	1.02	1.42	1.41	1.22	0.77
Norway	1.20	1.16	1.50	1.18	1.50
Thailand	1.26	0.96	1.19	1.11	0.54
Italy	1.48	0.67	1.05	1.07	0.68
Canada	1.26	0.87	0.95	1.07	0.56
Australia	1.10	0.89	1.01	0.99	0.80
Sweden	0.97	0.92	1.37	0.94	0.93
South Africa	1.06	0.72	0.76	0.89	0.76
New Zealand	0.97	0.71	0.88	0.84	0.88
Korea	0.77	0.88	0.92	0.83	0.45
Belgium	0.92	0.58	1.14	0.75	1.14
Pakistan	0.79	0.52	0.66	0.66	0.24
India	0.81	0.48	0.63	0.65	0.32
Turkey	0.57	0.36	0.49	0.46	0.25
Zimbabwe	0.77	0.14	0.33	0.46	0.22
Mexico	0.42	0.23	0.41	0.32	0.16
Brazil	0.31	0.27	0.45	0.29	0.22
M3/GDP is the ratio of liquid liabilities (M3) to GDP. PRIV/GDP is the ratio of domestic credit to private sector to GDP.					
BANK/GDP is the ratio of deposit money bank domestic assets to GDP. FINDEX 1 averages M3/GDP and PRIV/GDP.					
FINDEX 2 averages BANK GDP, private non-bank assets to GDP, and assets of private insurance and pension companies					
to GDP. The last two terms are omitted when not available. Values are 1980-91 averages.					

Table 5. Average Firm Size
(in millions of US$)

	SMALL	MEDIUM	LARGE	VERY LARGE
Sweden	192,704.24	518,652.29	1,178,085.02	3,094,530.22
Japan	116,233.63	256,922.34	556,993.49	4,160,906.34
Italy	85,289.56	255,579.12	697,712.97	4,476,866.60
Korea	63,000.00	121,000.00	178,000.00	527,000.00
Finland	69,528.45	257,052.99	682,229.69	1,848,150.08
Spain	38,505.10	107,061.40	234,045.83	965,832.66
India	28,300.00	57,200.00	89,800.00	286,000.00
Norway	19,787.63	65,376.93	202,275.11	946,660.13
France	19,730.74	74,938.50	284,118.03	2,502,374.75
Switzerland	18,731.98	76,265.54	214,584.49	2,146,238.60
New Zealand	17,932.45	55,886.32	126,670.89	648,211.76
Germany	16,899.23	77,578.54	266,325.13	2,779,747.45
Netherlands	14,595.95	69,811.69	216,311.03	1,958,972.95
Hong Kong	13,549.41	39,890.70	83,067.67	607,074.62
United States	13,483.58	50,750.71	137,437.22	1,220,275.64
Austria	11,883.93	40,866.86	149,432.11	1,039,346.90
Brazil	9,900.00	17,800.00	30,800.00	93,900.00
United Kingdom	9,548.49	35,739.16	110,966.45	1,180,701.29
Turkey	7,800.00	17,600.00	29,200.00	81,400.00
Singapore	7,541.20	26,065.43	68,452.41	206,160.13
South Africa	6,530.17	40,299.70	140,792.68	827,443.38
Mexico	5,900.00	18,000.00	44,300.00	210,600.00
Zimbabwe	5,900.00	11,600.00	21,000.00	64,400.00
Pakistan	5,700.00	11,800.00	17,600.00	76,500.00
Canada	5,519.06	32,984.18	106,908.67	629,525.98
Malaysia	4,886.31	14,091.94	29,770.33	148,555.45
Jordan	4,100.00	9,600.00	17,300.00	177,800.00
Belgium	4,092.03	31,236.36	144,011.40	1,242,864.60
Australia	2,961.29	18,058.71	59,656.91	509,707.27
Thailand	2,532.44	7,744.35	16,840.92	65,729.57

The values are average total assets, for each quartile of firms classified by total assets, over the country's sample period.

Table 6. Firm Characteristics by Country

	LTDTE	STDTE	TDTE	NFATA	DEPTA	DIVTA	PROFIT	NSNFA	NDTS	TA/GDP
Australia	0.563	0.653	1.248	0.385	0.033	0.025	0.064	4.509	-0.008	0.0024
Austria	1.201	1.495	2.696	0.293	0.051	0.017	0.075	3.477	0.012	0.0046
Belgium	0.764	1.259	2.023	0.221	0.039	0.022	0.092	6.153	0.030	0.0087
Brazil	0.139	0.421	0.560	0.640		0.002	0.057	1.166	0.017	0.0033
Canada	0.990	0.539	1.600	0.479	0.045	0.014	0.064	3.674	-0.031	0.0018
Switzerland	0.878	0.872	1.750	0.304	0.043	0.016	0.073	5.463	-0.081	0.0090
Germany	1.479	1.188	2.732	0.321	0.070	0.013	0.087	7.209	-0.007	0.0018
Spain	1.086	1.649	2.746	0.446	0.040	0.016	0.095	3.613	0.017	0.0070
Finland	3.094	1.856	4.920	0.341	0.042	0.007	0.077	3.977	0.010	0.0154
France	1.417	2.108	3.613	0.234	0.043	0.014	0.094	7.727	0.010	0.0019
United Kingdom	0.387	1.065	1.480	0.336	0.032	0.025	0.108	6.447	0.009	0.0010
Hong Kong	0.309	0.967	1.322	0.344	0.017	0.057	0.121	6.676	0.020	0.0094
India	0.763	1.937	2.700	0.405	0.038	0.019	0.132	5.614	0.027	0.0006
Italy	1.114	1.954	3.068	0.327	0.041	0.014	0.080	3.287	0.000	0.0049
Jordan	0.266	0.915	1.181	0.459		0.033	0.073	2.979		0.0089
Japan	0.938	2.726	3.688	0.245	0.026	0.007	0.067	8.373	-0.016	0.0008
Korea	1.057	2.390	3.662	0.371	0.053	0.008	0.100	4.340	0.002	0.0023
Mexico	0.375	0.442	0.817	0.579			0.076	1.445	0.013	0.0021
Malaysia	0.284	0.639	0.935	0.405	0.021	0.026	0.087	3.264	0.010	0.0032
Netherlands	0.710	1.297	2.156	0.334	0.043	0.020	0.094	7.500	0.018	0.0089
Norway	3.495	1.880	5.375	0.433	0.049	0.009	0.092	2.703	-0.005	0.0143
New Zealand	0.752	0.776	1.527	0.401	0.030	0.025	0.106	5.067	0.022	0.0224
Pakistan	0.595	2.358	2.953	0.384	0.038	0.028	0.115	11.155	0.055	0.0012
Singapore	0.491	0.718	1.232	0.363	0.022	0.018	0.077	5.152	-0.004	0.0104
Sweden	2.879	2.321	5.552	0.342	0.036	0.011	0.100	4.398	0.021	0.0146
Thailand	0.518	1.769	2.215	0.380	0.030	0.029	0.129	5.710	0.007	0.0007
Turkey	0.485	1.511	1.996	0.414		0.068	0.239	4.240	0.011	0.0011
United States	1.054	0.679	1.791	0.370	0.045	0.016	0.091	6.943	-0.015	0.0003
South Africa	0.597	0.518	1.115	0.535	0.013	0.062	0.206	4.036	0.066	0.0120
Zimbabwe	0.187	0.615	0.801		0.031	0.028	0.131		0.033	0.0063

LTD/TE is the book value of long term debt divided by book value of equity. STD/TE and TD/TE are the book value of short term and total debt divided by book value of equity. NAFTA is the net fixed assets divided by total assets. DEPTA is depreciation divided by total assets. DIVTA is the dividends divided by total assets. PROFIT is the income before interest and taxes divided by total assets. NSNFA is the net sales divided by net fixed assets. NDTS is the non-debt tax shield which is earnings before taxes minus the ratio of corporate taxes paid to corporate tax rate, deflated by total assets. TA/GDP is total assets divided by the GDP of the country. The value of each item is calculated as the average of all firms for each country's sample period.

Table 7. Correlations of Leverage and Financial Indicators

	STDTE	TDTE	MCAP/GDP	TVT/GDP	TOR	INDEX 1	M3/GDP	BANK/GDP	FINDEX 1	FINDEX 2	GDP/CAP
LTDTE	0.531	0.890	-0.191	-0.094	0.054	-0.120	-0.106	0.194	0.066	0.162	0.471
	0.000	*0.000*	*0.002*	*0.141*	*0.398*	*0.060*	*0.088*	*0.002*	*0.294*	*0.010*	*0.000*
STDTE		0.846	-0.261	-0.007	0.076	-0.106	0.008	0.130	0.066	-0.036	0.087
		0.000	*0.000*	*0.910*	*0.231*	*0.097*	*0.902*	*0.038*	*0.295*	*0.571*	*0.153*
TDTE			-0.246	-0.051	0.079	-0.117	-0.065	0.191	0.074	0.083	0.344
			0.000	*0.421*	*0.215*	*0.066*	*0.293*	*0.002*	*0.239*	*0.188*	*0.000*
MCAP/GDP				0.664	0.051	0.782	0.555	0.365	0.500	0.268	0.228
				0.000	*0.277*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
TVT/GDP					0.523	0.894	0.592	0.470	0.594	0.311	0.334
					0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
TOR						0.648	0.178	0.249	0.270	0.239	0.198
						0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
INDEX 1							0.530	0.462	0.529	0.315	0.292
							0.000	*0.000*	*0.000*	*0.000*	*0.000*
M3/GDP								0.816	0.951	0.707	0.451
								0.000	*0.000*	*0.000*	*0.000*
BANK/GDP									0.905	0.868	0.645
									0.000	*0.000*	*0.000*
FINDEX 1										0.742	0.631
										0.000	*0.000*
FINDEX 2											0.578
											0.000

P-values are given in italics. Variable definitions are as given in Tables 1, 2, 4, and 7.

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Table 8. Determinants of Capital Structure

	Firm Characteristics	Financial Variable	Stock Market Indicator	Macro Factors	Tax Variables	Time Dummies	Country Dummies	Adjusted R^2	Number of Observations
All countries									
std/te	3.39***	3.43*	.22	2.39*	1.80	1.11	15.98***	.80	211
ltd/te	3.25***	4.18**	2.40	1.84	2.62*	1.25	11.42**	.79	211
td/te	3.07***	8.09***	.99	2.73*	2.67*	.99	13.19***	.80	211

F-test are reported testing the joint hypothesis that specified variable coefficients are equal to zero. Coefficients are obtained by regressing STD/TE, LTD/TE, and TD/TE on firm characteristics (NFATA, PROFIT, NSNFA, NDTS, DIVTA, TA/GDP), macro factors (GROWTH, INFL), tax variables, stock market development indicator (index 1), financial intermediary variable (bank/gdp), time and country dummy variables. *, **, and *** indicate significance levels of 10, 5, and 1 percent respectively.

Table 9. Capital Structure and Stock Market Development- Developed and Developing Stock Markets

		mcap/gdp	tvt/gdp	tor	Index 1	Index 2
Countries with developed stock markets						
std/te	m3/gdp	-.23	-.36	-.04	-.27	-.14
	bank/gdp	-.07	-.48	-.06	-.24	-.16
	findex 1	-.04	-.47	-.07	-.23	-.16
	findex 2	-.06	-.48	-.07	-.23	-.17
ltd/te	m3/gdp	-.43	-.62*	-.34*	-.78**	-.43
	bank/gdp	-.50*	-.81**	-.37*	-.90***	-.53*
	findex 1	-.54*	-.82**	-.37*	-.94***	-.52*
	findex 2	-.49*	-.80**	-.37*	-.90***	-.53*
td/te	m3/gdp	-.49	-.93*	-.35	-.95*	-.52
	bank/gdp	-.47	-1.18**	-.38	-1.04**	-.60
	findex 1	-.42	-1.21**	-.40	-1.07**	-.62
	findex 2	-.44	-1.15**	-.38	-1.02*	-.61
Countries with developing stock markets						
std/te	m3/gdp	.10	.97	.06	.20	.74***
	bank/gdp	.16	.84	.05	.17	.69***
	findex 1	.15	.93	.07	.22	.74***
	findex 2	.29	1.21	.08	.31	.76***
ltd/te	m3/gdp	1.06	2.26	.03	.50	.99***
	bank/gdp	1.04	1.94	-.01	.39	.90**
	findex 1	1.03	2.10	.02	.47	.97***
	findex 2	1.27	2.52	.04	.59	.98**
td/te	m3/gdp	1.40	3.61	.16	.93	1.80***
	bank/gdp	1.39	3.09	.09	.76	1.65***
	findex 1	1.39	3.39	.16	.90	1.77***
	findex 2	1.79	4.06	.18	1.11	1.81***

Coefficient values are from regressions of STD/TE, LTD/TE, and TD/TE on firm characteristics (NFATA, PROFIT, NSNFA, NDTS, DIVTA, TA/GDP), macro factors (GROWTH, INFL), tax variables, stock market variables, financial intermediary variables, time and country dummy variables. The split between developed and developing stock markets is determined based on index1. Index 2 includes CAPM mis-pricing indicator when available. Each regression includes only the indicated stock market and financial intermediary variables.*, **, and *** indicate significance levels of 10, 5, and 1 percent respectively.

Table 10. Capital Structure and Stock Market Development - Developed and Developing Stock Markets, Large vs. Small firms

		Small Firms			Large Firms		
		mcap/gdp	index1	index 2	mcap/gdp	index1	index 2
Countries with developed stock markets							
std/te	m3/gdp	-.32	-.64	-.41	-.39	-.59	-.44
	bank/gdp	-.43	-.75	-.51	-.14	-.28	-.27
	findex 1	-.47	-.74	-.53	-.25	-.39	-.31
	findex 2	-.44	-.79*	-.56	-.17	-.26	-.26
ltd/te	m3/gdp	-.68	-1.28	-.84	-.39**	-.29	-.03
	bank/gdp	-.85	-1.72	-1.19	-.39**	-.28	-.03
	findex 1	-1.22	-1.92*	-1.25	-.45**	-.31	-.04
	findex 2	-.85	-1.67	-1.15	-.39**	-.28	-.03
td/te	m3/gdp	-.71	-2.17	-1.29	-.68	-.83	-.48
	bank/gdp	-1.03	-2.67*	-1.71	-.62	-.66	-.35
	findex 1	-1.44	-2.99**	-1.85	-.71	-.76	-.41
	findex 2	-1.02	-2.63*	-1.71	-.65	-.63	-.34
Countries with developing stock markets							
std/te	m3/gdp	-1.11	-1.02	-.22	.47	1.64**	1.23***
	bank/gdp	-1.07	-1.05	-.24	.02	1.49**	1.00***
	findex 1	-1.13	-1.06	-.24	.26	1.58**	1.18***
	findex 2	-1.17	-1.05	-.21	.74	1.77**	1.19***
ltd/te	m3/gdp	-.34	-.26	.23	2.85*	3.06**	2.17***
	bank/gdp	-.34	-.30	.19	1.80	2.70*	1.72**
	findex 1	-.39	-.30	.21	2.27	2.88*	2.05***
	findex 2	-.43	-.28	.25	3.10**	3.23**	2.16***
td/te	m3/gdp	-1.50	-1.26	.00	3.98*	4.92**	3.57***
	bank/gdp	-1.38	-1.31	-.06	2.13	4.30**	2.77***
	findex 1	-1.52	-1.32	-.04	3.10	4.65**	3.38***
	findex 2	-1.57	-1.28	.05	4.48**	5.24**	3.54***

Coefficient values are from regressions of STD/TE, LTD/TE, and TD/TE on firm characteristics (NFATA, PROFIT, NSNFA, NDTS, DIVTA, TA/GDP), macro factors (GROWTH, INFL), tax variables, stock market variables, financial intermediary variables, time and country dummy variables. The split between developed and developing stock markets is determined based on index1. Index2 includes CAPM mis-pricing indicator when available. Small and large firms are the firms that fall into the smallest and largest quartiles classified by total assets over each country's sample period. Each regression includes only the indicated stock market and financial intermediary variables.*, **, and *** indicate significance levels of 10, 5, and 1 percent respectively.

Table 11. Determinants of Capital Structure, Developed and Developing Stock Markets, Large vs. Small Firms

	Firm Characteristics	Financial Variable	Stock Market Indicator	Macro Factors	Tax Variables	Time Dummies	Country Dummies	Adjusted R^2	Number of Observations
I.									
Countries with developed stock markets									
std/te	5.47***	1.01	.63	.44	3.42**	.77	16.81***	.85	114
ltd/te	2.56**	.06	6.59**	1.55	.64	1.69*	4.01***	.70	114
td/te	3.21***	1.95	3.80*	1.64	1.46	1.37	8.20***	.82	114
Countries with developing stock markets									
std/te	1.22	4.91**	.10	3.53**	2.24*	.37	7.05***	.72	97
ltd/te	3.46***	5.03**	.21	6.40***	1.14	1.12	19.50***	.85	97
td/te	2.57**	6.52***	.37	7.10***	2.03	.74	15.88***	.81	97
II.									
Large Firms - Countries with developed stock markets									
std/te	6.58***	2.71*	.43	1.67	2.51*	2.10**	7.61***	.84	114
ltd/te	1.69	.66	1.20	3.31**	.37	2.41**	4.66***	.74	114
td/te	3.77***	4.55**	1.32	3.17**	1.84	2.22**	7.26***	.82	114
Large Firms - Countries with developing stock markets									
std/te	4.06***	11.35***	3.92**	6.80***	.34	1.97**	7.63***	.77	97
ltd/te	5.95***	10.05***	3.45*	6.22***	.90	3.11***	12.09***	.75	97
td/te	3.99***	15.65***	4.35**	7.43***	.51	2.90***	10.28***	.73	97
Small Firms - Countries with developed stock markets									
std/te	4.82***	1.34	2.60*	2.95*	7.98***	.42	9.22***	.75	114
ltd/te	2.17**	.11	2.55*	.32	2.23*	1.40	1.71*	.40	114
td/te	2.28*	.87	3.27*	.26	2.82*	1.19	2.13**	.51	114
Small Firms - Countries with developing stock markets									
std/te	2.35**	.11	1.96	.35	.14	1.24	3.68***	.71	93
ltd/te	.58	.16	.04	.54	.13	.54	5.22***	.57	93
td/te	.64	.20	.52	.61	.01	.75	5.48***	.64	93

F-test are reported testing the joint hypothesis that specified variable coefficients are equal to zero. Coefficients are obtained by regressing STD/TE, LTD/TE, and TD/TE on firm characteristics (NFATA, PROFIT, NSNFA, NDTS, DIVTA, TA/GDP), macro factors (GROWTH, INFL), tax variables, stock market development indicator (Index 1), financial intermediary variable (bank/gdp), time and country dummy variables. The split between developed and developing stock markets is determined based on Index1. Small and large firms are the firms that fall into the smallest and largest quartiles classified by total assets over each country's sample period. *, **, and *** indicate significance levels of 10, 5, and 1 percent respectively.

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Figure 1

Developing Markets vs. Developed Markets: Average MCAP/GDP
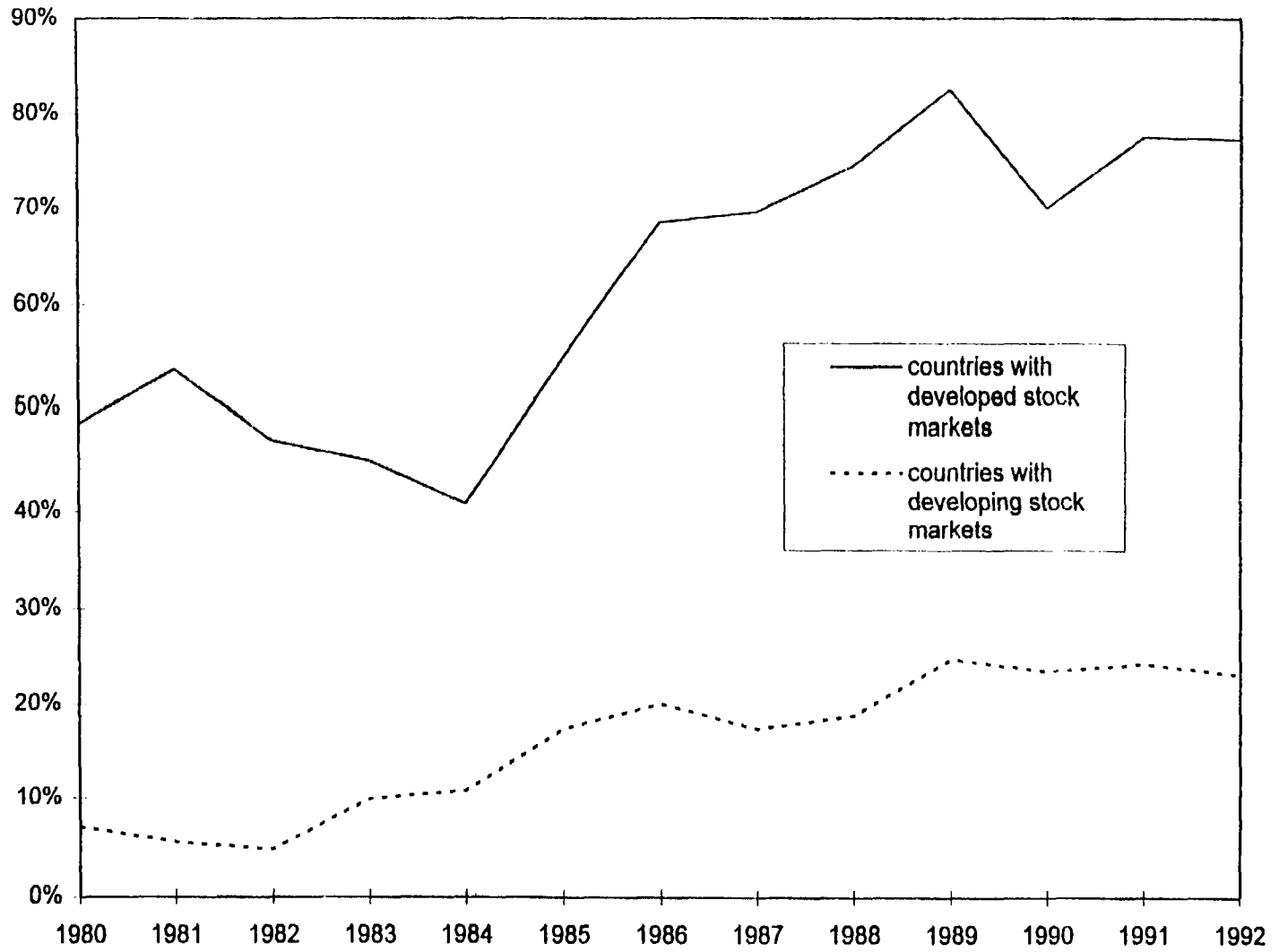
Figure 2

Leverage and Stock Market Development

STDTE, Developing Stock Markets

STDTE, Developed Stock Markets

LTDTE, Developing Stock Markets

LTDTE, Developed Stock Markets
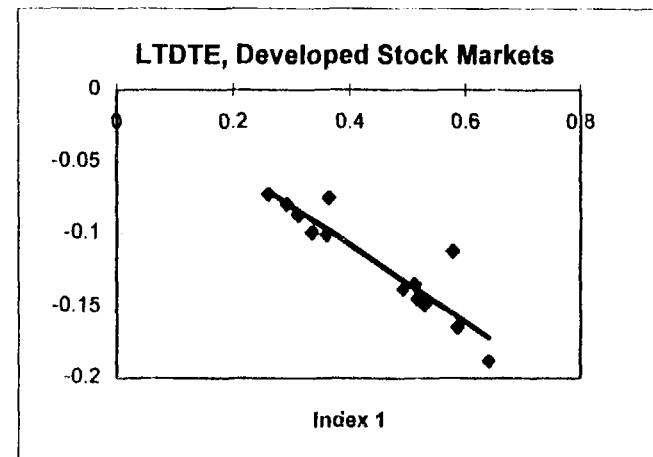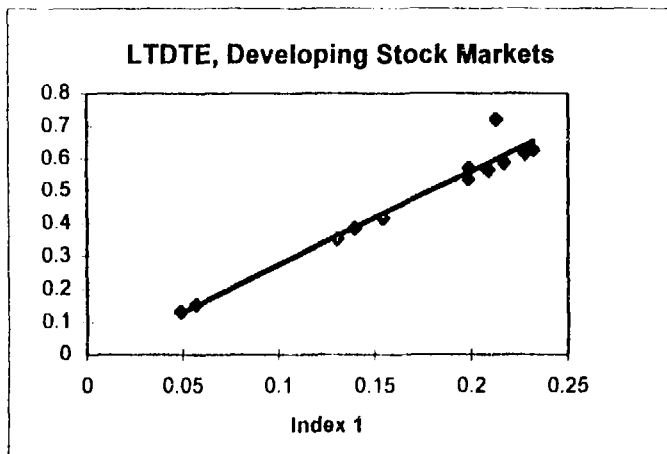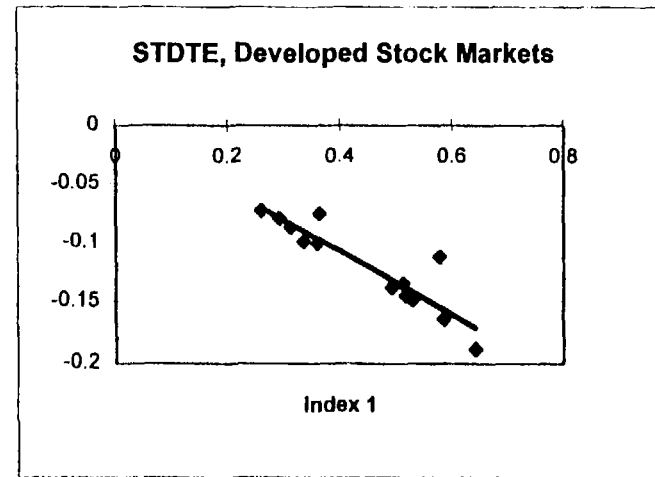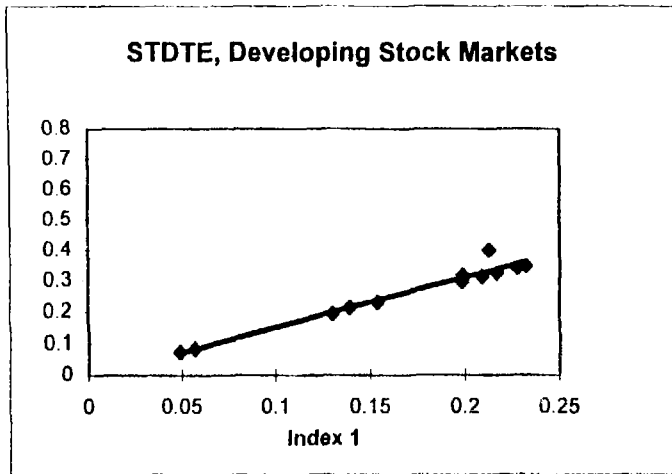
Appendix Table 1. Number of Firms and Sample Period

Country	No.of Firms	Time Period
Australia	401	1983-93
Austria	44	1983-93
Belgium	89	1983-94
Brazil	100	1985-91
Canada	494	1983-93
Switzerland	150	1983-93
Germany	359	1983-93
Spain	116	1983-93
Finland	55	1983-93
France	544	1983-93
United Kingdom	1275	1983-93
Hong Kong	173	1983-93
India	100	1980-90
Italy	81	1983-93
Jordan	38	1980-90
Japan	1104	1983-93
Korea	100	1980-90
Mexico	100	1984-91
Malaysia	143	1983-93
Netherlands	165	1983-93
Norway	52	1983-93
New Zealand	41	1983-93
Palistan	100	1980-88
Singapore	213	1983-93
Sweden	68	1983-93
Thailand	137	1983-93
Turkey	45	1982-90
United States	3247	1983-93
South Africa	67	1983-93
Zimbabwe	48	1980-88

Appendix Table 2. Tax Advantage of Debt with Respect to Dividend and Capital Gains										
COUNTRY	BRAZIL		INDIA		KOREA		MALAYSIA		MEXICO	
YEAR	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
corporate tax rate	0.400	0.400	0.591	0.525	0.420	0.375	0.500	0.390	0.420	0.360
local taxes:	0.000	0.050	0.000	0.000	0.032	0.028	0.000	0.000	0.000	0.000
corporate tax rate on distributed profits	0.400	0.400	0.591	0.525	0.420	0.375	0.500	0.390	0.420	0.360
high personal tax rate	0.550	0.400	0.720	0.525	0.744	0.600	0.550	0.400	0.550	0.350
local taxes:	0.000	0.050	0.000	0.000	0.056	0.045	0.000	0.000	0.000	0.000
personal capital gains tax	0.000	0.250	0.720	0.525	0.744	0.600	0.000	0.000	0.000	0.000
rate on interest income	0.550	0.250	0.720	0.525	0.744	0.600	0.550	0.400	0.550	0.210
rate on dividend income	0.550	0.080	0.720	0.525	0.744	0.600	0.400	0.350	0.550	0.350
rebate on dividends	0.000	0.000	0.000	0.000	0.150	0.120	0.400	0.350	0.000	0.000
net interest income per $1	0.450	0.750	0.280	0.475	0.256	0.400	0.450	0.600	0.450	0.790
net capital gain per $1	0.600	0.450	0.114	0.226	0.148	0.250	0.500	0.610	0.580	0.640
net dividends per $1	0.270	0.552	0.114	0.226	0.235	0.325	0.500	0.610	0.261	0.416
tax disadvantage: dividends	0.400	0.264	0.591	0.525	0.080	0.188	-0.111	-0.017	0.420	0.473
tax disadvantage: capital gains	-0.333	0.400	0.591	0.525	0.420	0.375	-0.111	-0.017	-0.289	0.190
COUNTRY	PAKISTAN		THAILAND		TURKEY		ZIMBABWE		AUSTRALIA	
YEAR	1981	1990	1980	1990	1982	1990	1980	1990	1980	1990
corporate tax rate	0.578	0.550	0.300	0.300	0.400	0.492	0.495	0.500	0.460	0.390
local taxes:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
corporate tax rate on distributed profits	0.578	0.550	0.300	0.300	0.400	0.492	0.495	0.500	0.460	0.390
high personal tax rate	0.660	0.495	0.650	0.550	0.650	0.500	0.495	0.600	0.611	0.470
local taxes:	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
personal capital gains tax	0.000	0.495	0.000	0.000	0.650	0.000	0.000	0.300	0.000	0.470
rate on interest income	0.660	0.495	0.650	0.150	0.650	0.500	0.495	0.600	0.611	0.470
rate on dividend income	0.660	0.495	0.650	0.150	0.650	0.500	0.200	0.200	0.611	0.470
rebate on dividends	0.000	0.000	0.000	0.000	0.330	0.000	0.000	0.000	0.000	0.000
net interest income per $1	0.340	0.505	0.350	0.850	0.350	0.500	0.505	0.400	0.389	0.530
net capital gain per $1	0.423	0.227	0.700	0.700	0.210	0.508	0.505	0.350	0.540	0.323
net dividends per $1	0.144	0.227	0.245	0.595	0.408	0.254	0.404	0.400	0.210	0.323
tax disadvantage: dividends	0.578	0.550	0.300	0.300	-0.166	0.492	0.200	0.000	0.460	0.390
tax disadvantage: capital gains	-0.243	0.550	-1.000	0.176	0.400	-0.016	0.000	0.125	-0.387	0.390

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Appendix Table 2 continued. Tax Advantage of Debt with Respect to Dividend and Capital Gains

COUNTRY	AUSTRIA		BELGIUM		CANADA		FINLAND		FRANCE	
YEAR	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
corporate tax rate	0.550	0.300	0.480	0.410	0.360	0.288	0.430	0.250	0.500	0.370
local taxes:	0.150	0.135	0.000	0.000	0.140	0.155	0.160	0.170	0.000	0.000
corporate tax rate on distributed profits	0.275	0.300	0.480	0.410	0.360	0.288	0.172	0.250	0.500	0.420
high personal tax rate	0.595	0.500	0.763	0.550	0.430	0.305	0.510	0.430	0.600	0.568
local taxes:	0.000	0.000	0.060	0.100	0.226	0.162	0.160	0.186	0.000	0.000
personal capital gains tax	0.000	0.000	0.175	0.165	0.022	0.203	0.510	0.430	0.600	0.160
rate on interest income	0.000	0.500	0.763	0.550	0.430	0.305	0.000	0.100	0.600	0.568
rate on dividend income	0.595	0.500	0.763	0.550	0.323	0.330	0.510	0.430	0.600	0.568
rebate on dividends	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.500
net interest income per $1	1.000	0.500	0.237	0.450	0.570	0.695	1.000	0.900	0.400	0.432
net capital gain per $1	0.450	0.700	0.429	0.493	0.626	0.567	0.279	0.428	0.200	0.529
net dividends per $1	0.294	0.350	0.123	0.266	0.434	0.477	0.406	0.428	0.450	0.541
tax disadvantage: dividends	0.706	0.300	0.480	0.410	0.239	0.314	0.594	0.525	-0.125	-0.251
tax disadvantage: capital gains	0.550	-0.400	-0.812	-0.095	-0.099	0.184	0.721	0.525	0.500	-0.225

COUNTRY	GERMANY		HONG KONG		ITALY		JAPAN		NETHERLANDS	
YEAR	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
corporate tax rate	0.560	0.500	0.170	0.165	0.250	0.360	0.400	0.375	0.480	0.400
local taxes:	0.200	0.250	0.000	0.000	0.150	0.162	0.191	0.187	0.000	0.000
corporate tax rate on distributed profits	0.360	0.360	0.170	0.165	0.250	0.360	0.300	0.375	0.480	0.400
high personal tax rate	0.560	0.530	0.150	0.150	0.720	0.500	0.750	0.500	0.720	0.600
local taxes:	0.050	0.048	0.000	0.000	0.150	0.162	0.050	0.150	0.000	0.000
personal capital gains tax	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.260	0.200	0.200
rate on interest income	0.560	0.530	0.000	0.000	0.720	0.500	0.750	0.200	0.720	0.600
rate on dividend income	0.560	0.530	0.000	0.000	0.720	0.500	0.750	0.200	0.720	0.600
rebate on dividends	0.000	0.000	0.000	0.000	0.333	0.563	0.000	0.000	0.000	0.000
net interest income per $1	0.440	0.470	1.000	1.000	0.280	0.500	0.250	0.800	0.280	0.400
net capital gain per $1	0.440	0.500	0.830	0.835	0.750	0.640	0.600	0.463	0.416	0.480
net dividends per $1	0.282	0.301	0.830	0.835	0.460	0.680	0.175	0.500	0.146	0.240
tax disadvantage: dividends	0.360	0.360	0.170	0.165	-0.642	-0.360	0.300	0.375	0.480	0.400
tax disadvantage: capital gains	0.000	-0.064	0.170	0.165	-1.679	-0.280	-1.400	0.422	-0.486	-0.200

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Appendix Table 2 continued. Tax Advantage of Debt with Respect to Dividend and Capital Gains										
COUNTRY	NEW ZEALAND		NORWAY		SINGAPORE		SOUTH AFRICA		SPAIN	
YEAR	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
corporate tax rate	0.450	0.380	0.278	0.278	0.400	0.310	0.473	0.545	0.330	0.350
local taxes:	0.000	0.000	0.230	0.230	0.000	0.000	0.000	0.000	0.000	0.015
corporate tax rate on distributed profits	0.450	0.380	0.278	0.278	0.400	0.310	0.473	0.545	0.330	0.350
high personal tax rate	0.600	0.330	0.480	0.184	0.550	0.330	0.500	0.440	0.655	0.560
local taxes:	0.000	0.000	0.230	0.250	0.000	0.000	0.000	0.000	0.000	0.000
personal capital gains tax	0.000	0.000	0.500	0.400	0.000	0.000	0.000	0.000	0.655	0.560
rate on interest income	0.600	0.330	0.480	0.184	0.550	0.330	0.500	0.440	0.655	0.560
rate on dividend income	0.600	0.330	0.480	0.184	0.550	0.330	0.167	0.150	0.655	0.560
rebate on dividends	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
net interest income per $1	0.400	0.670	0.520	0.816	0.450	0.670	0.500	0.560	0.345	0.440
net capital gain per $1	0.550	0.620	0.561	0.433	0.270	0.462	0.528	0.455	0.231	0.286
net dividends per $1	0.220	0.415	0.375	0.589	0.270	0.462	0.440	0.387	0.231	0.351
tax disadvantage: dividends	0.450	0.380	0.278	0.278	0.400	0.310	0.121	0.309	0.330	0.202
tax disadvantage: capital gains	-0.375	0.075	0.306	0.469	0.400	0.310	-0.055	0.188	0.330	0.350
COUNTRY	SWEDEN		SWITZERLAND		UNITED KINGDOM		UNITED STATES			
YEAR	1980	1990	1980	1990	1980	1990	1980	1990		
corporate tax rate	0.400	0.300	0.098	0.098	0.520	0.350	0.460	0.340		
local taxes:	0.280	0.000		0.314	0.000	0.000	0.120	0.120		
corporate tax rate on distributed profits	0.400	0.300	0.098	0.098	0.520	0.350	0.460	0.340		
high personal tax rate	0.580	0.510	0.115	0.115	0.600	0.400	0.700	0.330		
local taxes:	0.280	0.000		0.145	0.000	0.000	0.120	0.120		
personal capital gains tax	0.580	0.300	0.000	0.000	0.300	0.400	0.280	0.330		
rate on interest income	0.580	0.300	0.115	0.115	0.600	0.400	0.700	0.330		
rate on dividend income	0.580	0.300	0.115	0.115	0.600	0.400	0.700	0.330		
rebate on dividends	0.000	0.000	0.000	0.000	0.429	0.333	0.000	0.000		
net interest income per $1	0.420	0.700	0.885	0.885	0.400	0.600	0.300	0.670		
net capital gain per $1	0.252	0.490	0.902	0.902	0.336	0.390	0.389	0.442		
net dividends per $1	0.252	0.490	0.798	0.798	0.398	0.607	0.162	0.442		
tax disadvantage: dividends	0.400	0.300	0.098	0.098	0.006	-0.011	0.460	0.340		
tax disadvantage: capital gains	0.400	0.300	-0.019	-0.019	0.160	0.350	-0.296	0.340		

The tax rates used are the statutory ones. Data are obtained from various editions of Coopers & Lybrand, International Tax Summaries.

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