

The Composite Effect of Stock Markets, Bank Stability, and Country-Level Institutional Factors, on Leverage

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Abstract

This paper analyses the relation between firms' leverage, financial development, and firm-level characteristics namely, firm size, investment, accounting standards, tangibility of assets, and profitability. The paper finds that there is a negative correlation between financial development, measured as stock market turnover ratio or stock market capitalisation and firm's leverage, while there is a positive correlation between financial development, measured as the stability of a country's commercial banking system and firm's leverage. As stock markets become more developed, leverage decreases. This decrease is more pronounced for smaller firms, compared to larger firms. As banks become more stable, leverage increases, and this increase is more pronounced for larger firms, compared to smaller firms. The paper also finds that leverage is lower for firms in politically unstable and more corrupt countries. Conversely, firms are more levered in countries with stronger protection of creditor rights. A higher restrictiveness on foreign direct investment significantly increases leverage ratios of firms.

Keywords: Leverage, Financial Development

Introduction

The relation between development, and economic growth is well documented in the literature; however, the effect of financial development on capital structure is still ambiguous. Functioning financial systems ease external financing constraints, which impede firm and industry expansion. This paper investigates leverage ratios of firms as a transmission mechanism between financial development, firm-level characteristics, and capital structure choices across 13 global economies. Intuitively, institutional differences among countries should be an important factor in determining how firms choose to finance their investments. To this end, the paper investigates how firms' leverage ratios differ

across countries, by accounting for firm characteristics and country-level political, legal, and developmental characteristics.

Data from COMPUSTAT North America, COMPUSTAT Global, and The World Bank are analysed. Although large, listed companies have easier access to international financial markets, and their financing decisions may be less subject to the institutional constraints imposed by domestic markets, there exists significant differences in their leverage across countries. The paper shows that these differences are associated with the development of financial institutions, as well as differences in firm size and characteristics. This paper analyses the simultaneous effect of the level of stock market development and the stability of the commercial banking system on leverage. Two proxies are used for the level of stock market development: stock market turnover ratio proxies for the efficiency of the stock market, while stock market capitalisation as a percentage of GDP proxies for the size of the stock market. Bank z-score is used as a proxy for the stability of a country's commercial banking system as an approximation of its resilience to stress.

The results suggest that firms operating in countries with a higher stock market turnover ratio tend to have lower leverage ratios. The same holds for firms operating in countries with a higher stock market capitalisation as a percentage of GDP. At the same time, it is found that firms operating in countries with a more stable commercial banking system have higher leverage ratios. The analysis suggest that the relation between financial development and corporate capital structure is deeper than what meets the eye. It seems almost obvious that firms in countries with less developed stock markets will rely more heavily on debt to finance investment, and that firms in countries with an unstable commercial banking system will rely

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more heavily on equity. Although these individual relations between stock market development and leverage, and the level of development of the debt market and leverage, are well documented in the literature, the relation between financial development and leverage is not obvious, since countries with a less developed stock market also have a less developed debt market.

This paper belongs to the literature documenting the importance of legal rules and investor protection rights as important determinants of firms' capital structure choices (La Porta et al., 1997, 1998). The paper first focusses on country-specific financial development determinants of firm leverage ratios. The research paper builds on previous literature by using firm-level data as well as country-level development proxies, as opposed to using aggregate firm data for cross-country comparisons (Mayer, 1988; Demirgüç-Kunt and Maksimovic, 1998; Booth et al., 2001). Ordinary Least Squares (OLS) technique is employed to identify a relation between country-level stock market development and stability of the commercial banking system, and firm-level capital structure. Although several papers have attempted to understand the relation between stock market development and firms' financing decisions, few have studied the simultaneous effect of both the stock market and the banking system on firms' leverage. Broadly, the literature documents that economies with developing stock markets seem to dominate the higher end of the leverage spectrum, while economies with developed stock markets dominate the lower end of the leverage spectrum. This is not necessarily the case, as economies with developed stock markets are also the economies with a developed banking system, which can potentially make borrowing more lucrative than issuing equity.

Giannetti (2003) limits her sample to private firms to reduce the possibility of spurious correlations as well as bias related to firm size. If large companies bias the results, then the leverage across countries should not be significantly affected by the level of development. However, this is not supported by the data. This paper extends Giannetti's work, in that data from a sample of large, listed companies is analysed. The paper controls for firm size by estimating quartile regressions, where the data is divided into four quartiles based on firm size within each country in the sample. The regression estimates across quartiles are qualitatively similar to the full sample estimates. Fixed effects are also employed in the

regressions. The firm fixed effects control for unobserved, time invariant heterogeneity across firms, and therefore reduce the possibility of spurious correlations.

In studying the simultaneous effect of the development of stock markets and banking system on leverage, the paper finds that an active stock market, measured as the stock market turnover ratio, is a first order determinant of the firms' financing choices. The literature focusses on the country-level effect by aggregating the firm-level characteristics at the country-level. In this analysis, firm-level data is retained. The paper then looks at the effect of firm-level characteristics, together with country-level political, legal, and developmental controls, on leverage.

Literature Review

Prior literature in empirical corporate finance shows corporate capital structure decisions depend on various firm attributes, such as availability of collateral (Titman & Wessels, 1988; Barclay & Smith, 1995), which proxy for agency problems and asymmetric information. However, these studies focus primarily on US companies, and therefore fail to capture the effect of institutional differences on capital structure decisions. There is also wide literature on cross-country comparisons of capital structure that use aggregate data on firm and country characteristics (Mayer, 1988). These studies do not account for the influence of firm characteristics on capital structure decisions in different institutional environments. A notable exception is Rajan and Zingales (1995), who use balance sheet data from listed companies in G7 economies to show that factors identified previously as determinants of firm leverage in the US are similarly correlated in these countries. In a related paper, Booth et al. (2001) use aggregate firm data to show debt ratios in developing countries are generally affected in the same way, and by the same characteristics, as developed countries. Although the signs on the explanatory variables are mostly as expected, they differ across countries and the overall impact of their model is low.

Firm fixed-effects is used in the leverage equations to study the interaction between firm- and country-level characteristics and their impact on leverage for firms operating in different institutional environments. The simultaneous effect of stock market development and bank stability, together with firm-level controls that have been identified in the corporate finance literature

as determinants of firms' financial structure and other country-level political and legal controls, are analysed. Demirç-Kunt et al. (2012) show that financial systems become more market-oriented as economies develop. They show that banks and securities markets increase in size relative to the economy. This paper follows Demirç-Kunt et al. (2012) in studying the importance of banks and securities markets around the world and extends this literature by analysing the simultaneous effect of the level of development of banks and securities markets on firms' leverage across countries. Firms operating in countries with less developed stock markets experience higher leverage, while those in countries with an unstable commercial banking system have lower leverage ratios. These two aspects of financial development have opposing effects on leverage, thereby making the overall impact of financial development on leverage more complicated than what it may seem.

There is also extensive literature examining the relation between developmental economics and financial development. Prior work in this area argues that better functioning financial systems ease the external financing constraints that impede firm and industrial expansion. Demirç-Kunt and Levine (2008) show that companies in countries with better developed financial systems have better access to external financing. Much of the developmental economics and financial development literature uses the log of GDP as a proxy for economic growth and studies the effect of financial sector development on GDP, attributing a causal relation between financial development and economic growth. The paper focusses on studying the effect of financial development on firms' financing choices. To this end, firms' leverage is used as a transmission mechanism to study the relation between financial development and capital structure decisions.

Giannetti (2003) documents the fact that firms are more levered in countries with less developed stock markets. She further claims that large, listed companies have easier access to international financial markets, and hence, their corporate finance decisions are less subject to institutional constraints imposed by domestic markets. Building on this, this paper shows that institutional constraints, together with firm-level characteristics, are in fact an important determinant of corporate capital structure decisions, even for large, listed companies.

Demirç-Kunt and Maksimovic (1995) primarily look at the effect of stock market development on firm's financing choices. They control for the importance of financial intermediaries using three empirical indicators. This paper extends their work by not only analysing the effect of stock market development on leverage, but also controlling for the stability of the commercial banking sector and other country-specific legal and political controls.

Fan et al. (2002) examine capital structure and debt maturity choices of firms in a cross-section of 47 countries. They focus on a country's legal system, public governance, taxation, and market participation. Their analysis is at the country level. They document that countries with a developing stock market dominate the higher leverage range, while countries with a well-developed stock market tend to be at the lowest range. This is not true in the data. Firms in countries with the most developed stock markets have some of the highest leverage ratios, while firms in countries with lesser developed stock markets have lower levels of leverage.

This paper argues that the relation between the level of development of stock markets and leverage is not as simple as the literature suggests. The banking and securities markets increase in size relative to the economy. Hence, countries with a well-developed stock market also have a well-developed banking sector. This results in a more competitive debt market, where interest rates are low, and hence, firms find it more lucrative to increase their debt position, thereby increasing leverage.

This paper extends literature by focussing on firm-level data and carrying out the analysis across the full sample, as well as various sample splits, to identify the combined effect of the level of development of the stock market, as well as the stability of the banking system, on firm's financing decisions. Proxies for institutional differences, emphasising the role of political stability and the strength of legal rights, as well as foreign direct investment regulations in firms' financing choices, is also included.

Discussion of Data and Hypotheses Development

The analysis is limited to a group of 13 global economies, in which data for enough firms are available. My sample consists of four high-income OECD economies (Australia,

Canada, New Zealand, and the United States), six upper-middle-income economies (Argentina, Brazil, Mexico, Malaysia, Peru, and South Africa), and three lower-middle-income economies (Egypt, Indonesia, and India), as classified by the World Bank. The final sample consists of countries with data on 20 or more firms spanning at least five years. A mix of different income level economies are analysed; sufficient data is required in creating the final sample, to compare leverage ratios across different levels of institutional development, as well as to make sure that the sample is representative of each country.

The firm characteristics include leverage ratio, firm size, investments, accounting standards, tangibility of assets and profitability. Several alternative definitions of leverage are used in prior literature. The primary difference is whether book or market measures are used. As noted by Frank and Goyal (2009), book ratios are conceptually different from market ratios. Market values are forward looking, while book values are backward looking. Since the study attempts to document leverage ratios, and hence firm financing decisions based on relative claims of firm value using debt and the level of development of financial institutions, the focus is on leverage measures based on book debt values.

Some of the leverage ratio measures also differ based on whether all debt or only long-term debt is considered. The primary specification of the model calculates leverage as the ratio of total debt to book assets. Total debt as the sum of long-term debt and debt in current liabilities is calculated. Booth et al. (2001) use leverage defined as the ratio of total liabilities to book assets, as well as the ratio of total liabilities less current liabilities to book assets less current liabilities. A firm's total liabilities include liabilities that are not limited to long-term debt and debt in current liabilities. Since this paper looks at how leverage, and therefore, debt issuance, differs across countries, a measure of leverage as defined by Booth et al. (2001) is not very informative for the purpose of the analysis.

Firm size is calculated as the log of book assets. Interpreting size to be an inverse proxy for the probability for bankruptcy, firm size is anticipated to have a positive influence on the supply of debt. Investment is calculated as the sum of capital expenditures, and increase in

investments and acquisitions less sale of property, plant, and equipment. Interpreting investment as a proxy for growth opportunity, firms expecting high future growth would rather raise new capital for investment using debt over equity. This is because profits are associated with growth opportunities and had the firm issued equity, this profit would have to be shared with the buyers of the new stocks. Thus, increased investment is anticipated to be associated with increased leverage.

The accounting standard measure, IFRS, is an indicator variable for firms that follow domestic accounting standards, generally in accordance with or fully compliant with the International Financial Reporting Standards (IFRS). Around 10,159 firms in the sample are IFRS compliant. To distinguish between the IFRS and the US GAAP compliant firms, another indicator variable, GAAP, is included. This variable takes a value of one if the firm operates in the US, follows US accounting standards, or follows domestic standards generally in accordance with US GAAP. Around 39,972 firms in the full sample are US GAAP compliant. These variables are included in the regression specification as proxies for information asymmetry. The IFRS and GAAP outline a set of principles that companies are required to follow in preparing their financial statements. These statements are a critical source of information for the company's shareholders and creditors, as they aid in understanding the company's financial performance and the handling of the company's resources. Firms that are IFRS and GAAP compliant are more transparent in their financial reporting, thereby making equity a preferred choice for financing investment; therefore, a negative relation is anticipated between leverage and the IFRS and GAAP variables.

Tangibility is calculated as the ratio of total PP&E to book assets. Assets serve as collateral, thereby diminishing the risk of the lender suffering the agency costs of debt. This implies that the greater the proportion of tangible assets, the more willing the lenders should be to issue debt. Therefore, the relation between tangibility and leverage should be positive. Profitability is calculated as the ratio of EBITDA to total book assets. The relation between profitability and leverage is ambiguous. Myers and Majluf (1984) predict a negative relation, because more profitable firms will prefer to finance investment with

internal funds, rather than debt. On the other hand, Jensen (1986) predicts a positive relation between profitability and leverage, conditional on the fact that the market for corporate control is effective. In the case of an ineffective market for corporate control, managers prefer to avoid the disciplinary role of debt, which would lead to a negative relation between profitability and debt.

The final sample consists of firms for which all these data are available. For some firms, COMPUSTAT lists multiple data points per year. Since the entries for each variable are not identical, this is interpreted as a data error and these firms are excluded from the final sample. Firms that are listed on multiple exchanges are also excluded from the data set. The final sample is an unbalanced panel of 106,182 observations, ranging from 2002 to 2011.

Data on the development of financial institutions are from the World Bank's Global Financial Development Database (GFDD). This paper looks primarily at three different dimensions of financial development. Stock market turnover ratio is defined as the total value of shares traded during a given period divided by the average market capitalisation for that period. Average market capitalisation is calculated as the average of the end-of-period values for the current period and the previous period. This is essentially a liquidity measure. Liquid capital markets are markets where it is relatively inexpensive to trade financial instruments, and where there is relatively little uncertainty regarding the timing and settlement of those trades. Therefore, liquid markets improve the allocation of capital and enhance prospects for long-term economic growth. Thus, for firms operating in countries with a greater stock market turnover ratio, the leverage ratio should be smaller. Stock market capitalisation is calculated as the share price times the number of shares outstanding. Market size is positively correlated with the ability to mobilise capital and diversify risk. Therefore, a negative relation between leverage and stock market capitalisation as a percentage of GDP is anticipated. Finally, bank z-score explicitly compares capitalisation and returns with the volatility of returns to measure a bank's solvency risk. A higher z-score implies a lower probability of insolvency, and hence a more stable commercial banking system. Therefore, for firms operating in countries with a higher bank z-score, leverage should be higher.

Data for country-level government controls, such as political stability and control of corruption, are taken from the World Bank's Worldwide Governance Indicators database (WGI). Estimates for these measures give the country's score on the aggregate indicator, in units of a standard normal distribution ranging from -2.5 to 2.5 . The WGI data are available by country for the period 2002 to 2011, which limits the final sample to this time period.

The WGI defines political stability to capture perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means. For firms operating in politically unstable economies, structural change is more likely, and this creates uncertainty about the post-change regime (Pastor & Veronesi, 2013). Under political uncertainty, stock prices are more volatile and more highly correlated (Bittlingmayer, 1998; Voth, 2002; Santa-Clara & Valkanov, 2003), making equity more sensitive to political uncertainty. If firms in politically unstable economies raise finance through equity issuance, they are forced to issue equity at a lower price to afford sufficient risk premium to provide protection against the risk associated with political instability. These firms would then choose to finance investment via debt, as this would be less mispriced compared to equity. Firms in more politically unstable economies should have higher leverage ratios.

The measure for control of corruption captures the strength and the effectiveness of a country's policy and institutional framework to prevent and combat corruption. Thus, a lower number for this index implies a higher rate of corruption. It is tougher for firms operating in more corrupt countries to seek external financing via debt, due to corruption in the bank supervisory policies.

Data on the strength of legal rights, taken from the World Bank's Global Financial Development Database, measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders, thereby facilitating lending. The index ranges from zero to ten, with higher scores indicating that these laws are better designed to expand access to credit. The strength of legal rights data is available for the period 2004-2011 and is constant over time for nine of the 13 countries. Hence, a time series model has been fitted to this data, and from

this model the index measure for years 2002 and 2003 is extrapolated. The protection investors receive will determine their readiness to finance firms' investments. For firms in countries with stronger protection of creditor rights debt issuance is higher than for firms in countries with weaker protection of creditor rights.

The foreign direct investment restrictiveness index, FDIRR, measures statutory restrictions on foreign direct investment. This index gauges the restrictiveness of a country's Foreign Direct Investment (FDI) policy by looking at foreign equity limitations, restrictions on the employment of foreigners, screening or approval mechanisms, and restrictions on branching and on capital repatriation. Smaller values for FDIRR imply fewer restrictions on foreign direct investment. More restrictions on foreign direct investment imply that firms are more reliant on either their domestic stock market for equity or on domestic creditors for debt. The relation between leverage and FDIRR is ambiguous. Countries with greater

restrictions on foreign direct investment are also countries with a less developed stock market and a more unstable commercial banking system. This variable is included in the regression specification to control for the possibility of firms raising capital in foreign markets through foreign investors and foreign subsidiaries. This data is available on the OECD website.

Debt is tax deductible, while equity is not. Hence, for firms in countries with a high corporate tax rate, debt should be a preferred choice for financing investment. Given this logic, the corporate tax rate for the countries in the sample are also included in the regression specification. The corporate tax rate data is made available by KPMG International through their Corporate and Indirect Tax Survey.

Financial and utility firms are excluded from the sample. The summary statistics for the firm-level controls for the full sample are given in Table 1.

Table 1: Firm-Level Summary Statistics (Full Sample)

Variable	N	Mean	Standard Deviation
Leverage	106,182	0.243	0.278
Firm Size	106,182	1.699	1.028
Investment	106,182	61.499	442.008
Tangibility	106,182	0.300	0.250
Profitability	106,182	-0.062	0.433

The table shows summary statistics of the firm-level characteristics for the whole sample. *Leverage* is calculated as the ratio of total debt to book assets. *Firm size* is calculated as the log of book assets. *Investment* is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant and equipment. *Tangibility* is calculated as the ratio of total property, plant and equipment to book assets while *Profitability* is defined as the ratio of EBITDA to total book assets.

The summary statistics for the firm-level controls by country of incorporation are listed in Table 2.

The summary statistics for the country-level controls are listed in Table 3.

Table 2: Firm-Level Summary Statistics (by Country)

Country	N	Summary Statistic	Total Debt Book Assets	Firm Size	Investment	Tangibility	Profitability
Argentina	499	Mean:	0.196	2.141	89.639	0.382	0.142
		Standard Deviation:	0.183	0.835	280.853	0.217	0.100
Australia	13,338	Mean:	0.130	1.297	49.037	0.320	-0.154
		Standard Deviation:	0.176	0.967	542.904	0.287	0.392
Brazil	2,395	Mean:	0.316	2.463	257.628	0.325	0.099
		Standard Deviation:	0.269	0.947	1,703.328	0.211	0.108
Canada	11,883	Mean:	0.167	1.828	112.047	0.433	-0.100
		Standard Deviation:	0.199	1.086	525.524	0.313	0.365
Egypt	420	Mean:	0.214	2.448	96.974	0.403	0.134
		Standard Deviation:	0.183	0.678	316.998	0.196	0.095
Indonesia	2,591	Mean:	0.304	1.988	42.819	0.393	0.106
		Standard Deviation:	0.243	0.766	169.129	0.226	0.095
India	22,401	Mean:	0.283	1.481	38.739	0.329	0.101
		Standard Deviation:	0.205	0.878	302.143	0.205	0.080
Mexico	922	Mean:	0.222	3.006	410.086	0.440	0.121
		Standard Deviation:	0.163	0.737	1,513.722	0.198	0.068
Malaysia	7,807	Mean:	0.216	1.825	20.321	0.340	0.072
		Standard Deviation:	0.184	0.660	113.339	0.205	0.087
New Zealand	896	Mean:	0.235	1.800	35.524	0.354	0.076
		Standard Deviation:	0.185	0.899	121.028	0.275	0.188
Peru	684	Mean:	0.209	2.180	33.332	0.479	0.147
		Standard Deviation:	0.150	0.621	80.761	0.213	0.102
U.S.A	39,972	Mean:	0.283	1.750	51.217	0.215	-0.185
		Standard Deviation:	0.363	1.128	202.655	0.223	0.595
South Africa	2,374	Mean:	0.169	2.106	94.583	0.273	0.138
		Standard Deviation:	0.149	0.934	321.031	0.225	0.112

The table shows summary statistics of the firm-level characteristics by country for the whole sample. Leverage is calculated as the ratio of total debt to book assets. *Firm size* is calculated as the log of book assets. *Investment* is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant and equipment. *Tangibility* is calculated as the ratio of total property, plant and equipment to book assets while *Profitability* is defined as the ratio of EBITDA to total book assets.

Table 3: Country Level Summary Statistics

Country	t	Summary Statistic	Stock Market Turnover Ratio	Stock Market Capitalization	Bank z-score	Political Stability	Strength of Legal Rights	Control of Corruption	FDIRR	Corporate Tax Rate
Argentina	10	Mean:	10.74	32.78	4.05	-0.19	4	-0.45	0.03	35
		Standard Deviation:	8.95	22.61	1.55	0.32	0	0.05	0.003	0
Australia	10	Mean:	83.69	115.20	10.84	0.92	9.01	2.01	0.15	30
		Standard Deviation:	11.22	16.15	2.71	0.08	0.29	0.10	0.001	0
Brazil	10	Mean:	50.82	52.86	22.73	-0.11	3	-0.02	0.09	34
		Standard Deviation:	16.99	15.76	1.50	0.22	0	0.11	0.006	0
Canada	10	Mean:	74.94	112.92	20.38	0.98	7	1.99	0.20	34.54
		Standard Deviation:	16.27	17.83	2.25	0.11	0	0.09	0.006	3.08
Egypt	10	Mean:	37.70	52.26	35.61	-0.75	3	-0.55	0.08	20
		Standard Deviation:	17.89	23.86	3.35	0.28	0	0.13	0.01	0
Indonesia	10	Mean:	53.12	29.33	2.52	-1.32	5	-0.80	0.33	28.8
		Standard Deviation:	16.49	9.91	0.31	0.47	0	0.17	0.01	2.10
India	10	Mean:	102.74	65.15	37.34	-1.21	7.05	-0.44	0.32	34.78
		Standard Deviation:	31.73	26.62	3.42	0.15	0.68	0.08	0.02	1.31
Mexico	10	Mean:	27.64	27.80	25.66	-0.52	5.04	-0.27	0.22	30.5
		Standard Deviation:	3.63	8.57	4.67	0.27	0.38	0.07	0.006	2.59
Malaysia	10	Mean:	32.32	131.52	28.70	0.24	10	0.20	0.31	26.8
		Standard Deviation:	7.98	13.29	2.06	0.20	0	0.15	0.04	1.39
New Zealand	9	Mean:	43.64	37.72	20.60	1.22	10	2.36	0.20	31.6
		Standard Deviation:	18.65	6.99	8.05	0.12	0	0.07	0.03	1.89
Peru	10	Mean:	6.65	46.31	12.75	-0.96	5.42	-0.26	0.092	31.2
		Standard Deviation:	1.72	19.05	0.87	0.16	1.17	0.08	0	2.78
U.S.A	10	Mean:	208.89	121.14	24.82	0.29	9	1.50	0.08	35
		Standard Deviation:	91.84	14.32	1.73	0.28	0	0.28	0.003	6.67
South Africa	10	Mean:	51.10	196.59	11.11	-0.07	7	0.29	0.07	34.78
		Standard Deviation:	9.53	42.46	6.18	0.17	0	0.18	0.001	3.12

The table shows summary statistics of the country-level characteristics for the whole sample. *t* represents the number of years for which the country-specific data is available. *Stock Market Turnover Ratio* is defined as the total value of shares traded during a given period divided by the average market capitalization for that period. *Stock Market Capitalization* is defined as the total value of all listed shares in a stock market as a percentage of GDP. *Bank z-score* captures the probability of default of a country's commercial banking system. A higher *z-score* implies a lower probability of insolvency and hence a more stable commercial banking system. *Political Stability* captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. *Strength of Legal Rights* measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. *Control of Corruption* captures the strength and the effectiveness of a country's policy and institutional framework to prevent and combat corruption. *FDIRR* is the foreign direct investment regulatory restrictiveness index which measures statutory restrictions on foreign direct investment. *Corporate Tax Rate* is the corporate tax rate for each country.

Methods

COMPUSTAT Global reports data in the local currency. Therefore, foreign exchange rate data from the Federal Reserve Board has been used, to convert all data to US dollars, by averaging daily exchange rates on an annual basis. The firm-level data from COMPUSTAT and the country-level data from the World Bank, OECD, and KPMG International are merged based on country and year. Due to the existence of outliers in the firm-level characteristics, the data are winsorized at the 1% and 99% levels for firms in each country. A modest goal of this paper is to study the comparative capital structure decisions, where the units are firms in a country. For each firm, the annual data on a variety of firm-specific variables, as well as country-specific government, legal, and development controls, are observed. Firm fixed effects are accounted for by de-meaning the variables at the firm level. To control for year fixed effects, a dummy variable for each year has been included in the regression specification. Since the final sample does not include firms listed on multiple exchanges, dummy variables for the countries have not been included in the sample. The firm and year fixed effects will absorb any country invariant heterogeneity. An OLS regression model is estimated first, as follows:

$$\begin{aligned} \text{Leverage}_{i,j,t} = & \beta_0 + \beta_1(\text{Financial Development Proxy})_{j,t} + \beta_2(\text{Firm Size})_{i,t} \\ & + \beta_3(\text{Investment})_{i,t} + \beta_4(\text{IFRS})_{i,t} + \beta_5(\text{GAAP})_{i,t} + \beta_6(\text{Tangibility})_{i,t} \\ & + \beta_7(\text{Profitability})_{i,t} + \beta_8(\text{Political Stability})_{j,t} \\ & + \beta_9(\text{Strength of Legal Rights})_{j,t} + \beta_{10}(\text{Control of Corruption})_{j,t} \\ & + \beta_{11}(\text{FDIRR})_{j,t} + \beta_{12}(\text{Corporate Tax Rate})_{j,t} + \gamma(\text{Year Dummies}) \\ & + \epsilon_{i,j,t} \end{aligned}$$

Here, $\text{Leverage}_{i,j,t}$ represents the leverage of firm i in country j at time t . In this equation, the Financial Development Proxy variable is specified to be either the Stock Market Turnover Ratio, the Stock Market Capitalisation as a percentage of GDP, or the Bank z-score. The regression estimates suggest that the coefficient on the Financial Development Proxy variable is statistically insignificant for all three specifications of this variable. This seems counterintuitive, as institutional differences among countries should be an important factor in determining how firms choose to finance their investments. In each of the three specifications of the Financial Development Proxy variable, either the development of the stock market or the stability of the commercial banking system is accounted for each time. However, one cannot ignore the fact that both banking systems and stock markets simultaneously

affect firms' financing decisions. In countries with lesser developed stock markets, the banking system is also more unstable, thereby making it harder for firms to seek loans from banks. Therefore, controlling for stock market development and ignoring the stability of the banking system and vice versa biases the OLS results.

To control for the simultaneous effect of stock market development and stability of the commercial banking system on firms' leverage, two separate OLS regressions are estimated, one including the Stock Market Turnover Ratio and the Bank z-score as explanatory variables, and another including the Stock Market Capitalisation and the Bank z-score as explanatory variables:

$$\begin{aligned} \text{Leverage}_{i,j,t} = & \alpha_0 + \alpha_1(\text{Stock Market Development Proxy})_{j,t} + \alpha_2(\text{Bank z-score})_{j,t} \\ & + \alpha_3(\text{Firm Size})_{i,t} + \alpha_4(\text{Investment})_{i,t} + \alpha_5(\text{IFRS})_{i,t} + \alpha_6(\text{GAAP})_{i,t} \\ & + \alpha_7(\text{Tangibility})_{i,t} + \alpha_8(\text{Profitability})_{i,t} + \alpha_9(\text{Political Stability})_{j,t} \\ & + \alpha_{10}(\text{Strength of Legal Rights})_{j,t} + \alpha_{11}(\text{Control of Corruption})_{j,t} \\ & + \alpha_{12}(\text{FDIRR})_{j,t} + \alpha_{13}(\text{Corporate Tax Rate})_{j,t} + \delta(\text{Year Dummies}) \\ & + v_{i,j,t} \end{aligned}$$

Here, Stock Market Development Proxy $_{j,t}$ is specified to be either the stock market turnover ratio or the stock market capitalisation of country j at time t . Controlling for the stock market turnover ratio or stock market capitalisation and the bank z-score simultaneously results in the statistically significant coefficients for both these variables. There is a significant negative correlation between leverage and both specifications of the variables. Ceteris paribus, there is a significant positive relation between leverage and bank z-score. The F-statistic for joint significance of Stock Market Turnover Ratio and Bank z-score is 18.23, while that for the joint significance of Stock Market Capitalisation and Bank z-score is 25.87. The standard errors are clustered by the firm, to control for the possibility that residuals of the estimates are correlated across firms.

Since all the data in the sample are of large, listed companies, one concern is that firm size, as opposed to stock market development and bank stability, drives the main result. It is therefore possible that the presented model specification fails to account for this subsidiary effect, which may likely exist for larger listed companies. To tackle this problem, the data for each country is divided into quartiles, based on firm size within each country and then the previously specified OLS regression for each quartile is estimated. The estimates for each quartile are qualitatively similar to those for the full sample. The firm-level summary statistics by quartile are listed in Table 4.

Table 4: Firm-Level Summary Statistics (by Quartile)

Variable	Summary Statistic	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
Firm Size	Mean:	0.622	1.408	1.917	2.716
	Standard Deviation:	0.991	0.531	0.506	0.636
<u>Total Debt</u> <u>Assets</u>	Mean:	0.283	0.197	0.211	0.278
	Standard Deviation:	0.383	0.234	0.231	0.231
Investment	Mean:	9.780	13.073	22.196	188.198
	Standard Deviation:	142.458	259.496	120.107	783.282
Tangibility	Mean:	0.252	0.293	0.312	0.340
	Standard Deviation:	0.253	0.250	0.248	0.243
Profitability	Mean:	-0.384	-0.060	0.050	0.116
	Standard Deviation:	0.686	0.336	0.194	0.104
IFRS Compliant		2,552	2,570	2,419	2,634
U.S. GAAP Compliant		8,631	9,471	10,031	11,839
N		25,116	26,146	26,514	28,406

The table shows the summary statistics for the firm-level characteristics for each quartile. Leverage is calculated as the ratio of total debt to book assets. Firm size is calculated as the log of book assets. Investment is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant and equipment. Tangibility is calculated as the ratio of total property, plant and equipment to book assets while Profitability is defined as the ratio of EBITDA to total book assets.

Results

To understand the relation between financial development and capital structure by analysing the effect of stock

market turnover ratio, stock market capitalisation, and bank z-score on firm leverage, various specifications of the OLS regression model outlined above for the full sample have been estimated. The regression estimates are presented in Table 5.

Table 5: OLS Regression (Full Sample): Total Debt to Assets-Financial Development Proxies

Variable	(1)	(2)	(3)	(4)	(5)
Stock market turnover ratio	0.00007 (0.09)			-0.001*** (-4.43)	
Stock market capitalization		0.00005 (0.85)			-0.001*** (-4.44)
Bank z-score			0.0006 (1.61)	0.002*** (6.04)	0.002*** (6.22)
Firm Size	0.038*** (13.91)	0.038*** (13.89)	0.043*** (15.06)	0.043*** (15.05)	0.043*** (15.08)
Investment	-0.00009 (-1.90)	-0.00009 (-1.95)	0.00002 (0.44)	0.00002 (0.39)	0.00002 (0.47)
IFRS	-0.018 (-1.30)	-0.001 (-0.09)	-0.011 (-0.80)	-0.013 (-0.90)	-0.007 (-0.52)
GAAP	0.100*** (5.92)	0.102*** (8.26)	0.075*** (5.83)	0.082*** (4.80)	0.077*** (6.01)
Tangibility	0.205*** (23.96)	0.205*** (24.00)	0.203*** (23.74)	0.203*** (23.70)	0.203*** (23.76)
Profitability	-0.241*** (-42.05)	-0.241*** (42.02)	-0.248*** (-42.50)	-0.248*** (-42.47)	-0.248*** (-42.48)
Political Stability	-0.018* (-2.01)	-0.031*** (-3.29)	-0.021* (-2.41)	-0.019* (-2.17)	-0.034*** (-3.72)
Strength of Legal Rights	0.007** (3.14)	0.011*** (4.37)	0.006** (2.94)	0.007** (2.88)	0.011*** (4.31)
Control of Corruption	0.066*** (9.35)	0.074*** (10.53)	0.058*** (8.45)	0.056*** (7.76)	0.066*** (9.22)
FDIRR	-0.009 (-0.16)	-0.036 (-0.62)	-0.166** (-2.64)	0.164** (2.61)	0.200** (3.16)
Corporate Tax Rate	0.005*** (6.20)	0.006*** (6.94)	0.004*** (3.82)	0.004*** (3.75)	0.004*** (4.62)
Firm Fixed-effects	Yes	Yes	Yes	Yes	Yes
Year Fixed-effects	Yes	Yes	Yes	Yes	Yes
N	106,182	106,182	106,182	106,182	106,182
F-statistic	-	-	-	18.23	25.87
R ²	20.24%	20.30%	20.41%	20.42%	20.49%

This table shows the results of the OLS regressions of Leverage measured as the ratio of total debt to assets on various combinations of the proxies for financial development – stock market turnover ratio, stock market capitalization as well as bank z-score – together with other firm- and country-level controls. Stock Market Turnover Ratio is ratio of the total value of shares traded during a given period to the average market capitalization for that period. Stock Market Capitalization is defined as the total value of all listed shares in a stock market as a percentage of GDP. Bank z-score captures the probability of default of a country's commercial banking system. Firm size is calculated as the log of book assets. Investment is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant, equipment. IFRS is an indicator for firms that follow IFRS compliant accounting standards while GAAP is an indicator for firms that follow U.S. GAAP compliant accounting standards. Tangibility is the ratio of total property, plant and equipment to book assets. Profitability is the ratio of EBITDA to total book assets. Political Stability captures the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. Strength of Legal Rights measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. Control of Corruption captures the strength and the effectiveness of a country's policy and institutional framework to prevent and combat corruption. FDIRR is the foreign direct investment regulatory restrictiveness index which measures statutory restrictions on foreign direct investment. Corporate Tax Rate is the corporate tax rate for each country. t-statistics are reported in parentheses. *, ** and *** indicate significance at the 5%, 1% and 0.1% levels respectively.

The coefficient on the Financial Development Proxy variable is statistically insignificant in the first three specifications of the OLS regression, where either Stock Market Turnover Ratio, Stock Market Capitalisation, or Bank z-score are controlled. Controlling for stock market development and ignoring the stability of the banking system and vice versa biases the OLS results. Two additional specifications, (4) and (5), are estimated, where control is established for the level of development of the stock market and the commercial banking system simultaneously. Stock Market Turnover Ratio and Stock Market Capitalisation as a percentage of GDP are proxies for the level of development of the stock market, while Bank z-score is a proxy for the stability of the commercial banking system.

The regression estimates for the full sample suggest ceteris paribus, for a 1% increase in Stock Market Turnover Ratio, firms' Leverage decreases by 0.1%. In terms of economic significance of the estimates, this translates to the fact that in going from the 25th to the 75th percentile of stock market turnover ratio, there is approximately a 4.9% decrease in leverage. The mean leverage for the whole sample is approximately 25%. Therefore, an increase in stock market turnover ratio explains approximately a 20% decrease in leverage relative to the mean. The results are identical for Stock Market Capitalisation.

Ceteris Paribus, for a one unit increase in the Bank z-score, firms' leverage increases by 0.2%. As the activity of stock markets or the size of stock markets increase relative to the stability of the commercial banking system, leverage decreases as firms can increase their equity position more easily. The reverse is true when the commercial banking system becomes more stable relative to the size and activity of the stock market. However, in terms of the economic significance of the influence of the commercial banking system on firms' leverage, the evidence is not as strong. In going from the 25th to the 75th percentile of bank z-score, there is approximately a 1.1% increase in leverage. Relative to the mean leverage for the sample, this only explains approximately 4.4% of the increase in leverage.

In contrast to Demirgüç-Kunt and Maksimovic (1995), this paper finds a significant negative relation between Stock Market Turnover Ratio and Leverage. This suggests that an active stock market is a first order determinant of firms' financing choice. A negative linear relation between Stock Market Turnover Ratio and Leverage, Stock Market Capitalisation and Leverage, and a positive linear relation between Bank z-score and Leverage has been documented; this remains statistically significant for the full sample, even in the presence of firm-level controls that have been previously identified in the corporate finance literature as determinants of firms' financial structure. Demirgüç-Kunt and Maksimovic find these relations to hold only in various sub-samples of their analysis.

Table 6: OLS Regression (Quartile): Total Debt to Assets-Stock Market Turnover Ratio

Variable	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
Stock market turnover ratio	-0.003*** (-5.45)	-0.001*** (-6.56)	-0.001*** (-4.68)	-0.001** (-3.00)
Bank z-score	0.001* (2.20)	0.001*** (3.47)	0.003*** (3.81)	0.002* (2.36)
Firm Size	0.086*** (5.69)	0.047*** (6.48)	0.041*** (3.39)	0.049*** (5.38)
Investment	0.0006 (0.66)	0.0004 (1.37)	0.00006 (0.32)	-0.0002 (-1.62)
IFRS	-0.015 (-0.45)	-0.002 (-0.06)	-0.003 (-0.12)	-0.059 (-1.87)
GAAP	0.783*** (8.32)	0.231*** (3.38)	0.074 (1.49)	0.151*** (3.55)
Tangibility	0.161*** (7.24)	0.165*** (10.80)	0.078*** (10.37)	0.162*** (11.26)
Profitability	-0.224*** (-21.39)	-0.241*** (-32.17)	-0.198*** (-34.90)	-0.155*** (-14.54)
Political Stability	-0.044*** (-5.99)	-0.037*** (-4.56)	-0.049*** (-2.66)	-0.089*** (-4.63)
Strength of Legal Rights	0.030*** (4.99)	0.031*** (9.68)	0.011*** (5.59)	0.006* (2.33)
Control of Corruption	0.131*** (6.76)	0.182*** (7.90)	0.120*** (3.61)	0.017* (2.04)
FDIRR	0.769*** (4.21)	0.394** (2.74)	0.145*** (3.36)	0.411* (2.66)
Corporate Tax Rate	0.005* (2.28)	0.004** (2.61)	0.002** (2.44)	0.003*** (3.62)
Firm Fixed-effects	Yes	Yes	Yes	Yes
Year Fixed-effects	Yes	Yes	Yes	Yes
N	25,116	26,146	26,514	28,406
F-statistic	18.87	37.60	27.42	20.32
R ²	19.15%	13.39%	17.06%	13.41%

The table shows the results of the regression of various firm- and country-specific characteristics on the ratio of total debt to assets for each of the four quartiles. *Stock Market Turnover Ratio* is defined as the total value of shares traded during a given period divided by the average market capitalization for that period. *Bank z - score* captures the probability of default of a country's commercial banking system. *Firm size* is calculated as the log of book assets. *Investment* is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant, equipment. *IFRS* is an indicator for firms that follow IFRS compliant accounting standards while *GAAP* is an indicator for firms that follow U.S. GAAP compliant accounting standards. *Tangibility* is the ratio of total property, plant and equipment to book assets while *Profitability* is the ratio of EBITDA to total book assets. *Political Stability* captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. *Strength of Legal Rights* measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. *Control of Corruption* captures the strength and the effectiveness of a country's policy and institutional framework to prevent and combat corruption. *FDIRR* is the foreign direct investment regulatory restrictiveness index which measures statutory restrictions on foreign direct investment. *Corporate Tax Rate* is the corporate tax rate for each country. *t*-statistics are reported in parentheses. *, ** and *** indicate significance at the 5%, 1% and 0.1% levels respectively.

Table 7: OLS Regression (Quartile): Total Debt to Assets-Stock Market Capitalization

Variable	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
Stock market capitalization	-0.002*** (-5.48)	-0.002*** (-6.51)	-0.002*** (-8.02)	-0.001** (-3.01)
Bank z-score	0.001*** (5.80)	0.001*** (4.00)	0.003*** (4.15)	0.002** (2.87)
Firm Size	0.046*** (3.96)	0.013*** (4.06)	0.051*** (4.25)	0.094*** (9.28)
Investment	0.0007 (0.77)	0.0002 (1.75)	0.0001 (0.85)	-0.0001 (-1.58)

Variable	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
Stock market capitalization	-0.002*** (-5.48)	-0.002*** (-6.51)	-0.002*** (-8.02)	-0.001** (-3.01)
Bank z-score	0.001*** (5.80)	0.001*** (4.00)	0.003*** (4.15)	0.002** (2.87)
Firm Size	0.046*** (3.96)	0.013*** (4.06)	0.051*** (4.25)	0.094*** (9.28)
Investment	0.0007 (0.77)	0.0002 (1.75)	0.0001 (0.85)	-0.0001 (-1.58)
IFRS	-0.160*** (-4.24)	-0.028*** (-3.36)	-0.042 (-1.49)	-0.019 (-0.57)
GAAP	0.326*** (9.93)	0.077*** (9.76)	0.113*** (11.67)	0.095*** (3.38)
Tangibility	0.180*** (8.20)	0.186*** (17.95)	0.216*** (14.78)	0.225*** (13.97)
Profitability	-0.229*** (-22.41)	-0.247*** (-33.00)	0.155*** (-14.54)	-0.225*** (-24.88)
Political Stability	-0.168*** (-6.95)	-0.111*** (-9.86)	-0.039*** (-4.22)	-0.046*** (-6.57)
Strength of Legal Rights	0.063*** (10.38)	0.041*** (10.25)	0.038*** (9.39)	0.068*** (9.44)
Control of Corruption	0.215*** (10.88)	0.231*** (10.08)	0.126*** (10.80)	0.188*** (11.65)
FDIRR	0.215 (1.34)	0.142** (2.28)	0.191 (1.45)	0.421** (2.67)
Corporate Tax Rate	0.007*** (7.95)	0.008*** (9.43)	0.008*** (4.37)	0.005*** (4.58)
Firm Fixed-effects	Yes	Yes	Yes	Yes
Year Fixed-effects	Yes	Yes	Yes	Yes
N	25,116	26,146	26,514	28,406
F-statistic	15.97	37.62	31.48	22.06
R ²	19.08%	14.19%	17.35%	13.51%

The table shows the results of the regression of various firm- and country-specific characteristics on the ratio of total debt to assets for each of the four quartiles. *Stock Market Capitalization* is defined as the total value of all listed shares in a stock market as a percentage of GDP. *Bank z-score* captures the probability of default of a country's commercial banking system. *Firm size* is calculated as the log of book assets. *Investment* is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant, equipment. *IFRS* is an indicator for firms that follow IFRS compliant accounting standards while *GAAP* is an indicator for firms that follow U.S. GAAP compliant accounting standards. *Tangibility* is the ratio of total property, plant and equipment to book assets while *Profitability* is the ratio of EBITDA to total book assets. *Political Stability* captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. *Strength of Legal Rights* measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. *Control of Corruption* captures the strength and the effectiveness of a country's policy and institutional framework to prevent and combat corruption. *FDIRR* is the foreign direct investment regulatory restrictiveness index which measures statutory restrictions on foreign direct investment. *Corporate Tax Rate* is the corporate tax rate for each country. *t*-statistics are reported in parentheses. *, ** and *** indicate significance at the 5%, 1% and 0.1% levels respectively.

Tables 6 and 7 present the estimates of the quartile regressions when the Stock Market Development Proxy

variables are specified to be the Stock Market Turnover Ratio and Stock Market Capitalisation, respectively. The

OLS regression estimates for the quartile regressions are qualitatively similar to those of the full sample. The regression results in Tables 6 and 7 allow for a better understanding of the simultaneous effect of stock market development and bank stability on leverage. Looking at the regression estimates for quartiles 1 and 2, as security markets become more developed, smaller firms are more likely to move away from debt financing towards equity financing. As stock markets develop, a larger number of smaller firms have easier access to the stock markets, in terms of making equity offerings. Small firms can increase their equity position more easily by means of seasoned equity offerings, thereby reducing leverage. Therefore, holding bank z-score constant, as stock markets develop, the leverage of small firms decrease significantly, compared to that of larger firms. On the other hand, the regression estimates of the 3rd and 4th quartile provide suggestive evidence that as banks become more stable, larger firms are more likely to move away from equity financing towards debt financing. With a more stable commercial banking system in place, larger firms find debt financing more lucrative, compared to issuing equity as the debt market becomes more competitive, thereby reducing interest rates. Larger firms are thus able to increase leverage by issuing debt. Holding stock market development constant, as banks become more stable, the leverage of larger firms increases significantly, compared to that of smaller firms. The economic significance of stock market development, measured as stock market turnover ratio and stock market capitalisation, is decreasing across quartiles based on firm size, while that of bank stability is increasing across quartiles based on firm size. The economic significance across quartiles remains qualitatively similar to the estimates for the full sample.

A difference of means test suggests that stock market development is indeed more beneficial to smaller firms, compared to larger firms. Although the quartile regressions provide some suggestive evidence that bank stability is likely to benefit larger firms more than smaller firms, the difference in means test does not capture this effect. This is possibly because the bank z-score fails to capture accurately the debt that firms issue. To be able to study the relation between bank development and leverage, it becomes imminent to account for the different kinds of debt that the firm issues.

Consistent with Rajan and Zingales (1995) and Booth et al. (2001), this paper finds that leverage ratios for firms in developing countries are affected by the same variables

as firms in developed countries. Among firm-level characteristics, firm size, tangibility, and profitability have a statistically significant impact on leverage. As mentioned earlier, if we think of firm size as an inverse proxy for bankruptcy, the effect of firm size on equilibrium leverage should be positive, irrespective of how leverage is defined. This is true in the data. Tangible assets serve as collateral for debt, thereby allowing firms to lever up by issuing debt to raise funds for the purpose of investment. Firms with a larger fraction of tangible assets are more levered, compared to firms with a smaller fraction of tangible assets.

The regression estimates suggest a negative relation between profitability and leverage. This agrees with Myers and Majluf (1984). This results in more profitable firms having lower leverage, compared to less profitable firms. It is worth noting that this result does not sit well with the static trade-off theory, which predicts that highly profitable firms issue more debt to lower their tax bill.

The effect of investment on leverage is neither statistically nor economically significant in either of the regression specifications. According to the regression estimates, although the sign on the IFRS variable is as anticipated, it does not have a significant effect on firms' leverage. However, US GAAP compliant firms have higher leverage, compared to firms that are not compliant with US GAAP. Firms that are more transparent in their financial reporting are levered up, compared to their less transparent counterparts.

Among country-level controls, firms in politically stable economies are less levered than those in politically unstable economies. It is beneficial for firms to finance investment via debt, as debt will be less mispriced compared to equity. There is evidence in the data that, for firms in countries with more secured creditor rights, leverage is higher than that of firms in countries where creditor rights are not as strongly protected. For firms in countries with a higher rate of corruption, leverage is lower than that of firms in countries with an effective policy and institutional framework to prevent and combat corruption.

As per the regression results, there exists a positive relation between FDIRR and leverage. This is interesting as the countries with greater restrictions on FDI are also the countries with a more unstable commercial banking system. To completely understand the relation between FDI regulations and leverage would require a deeper understanding of the debt market.

Finally, the sign of the coefficient on Corporate Tax Rate is as expected. The tax code for countries allows corporations to deduct interest payments as an expense, but dividend payments to stockholders are not deductible. This differential treatment encourages firms to issue debt over equity. Therefore, firms in countries with a high tax rate are more levered.

Robustness

As can be seen from the country-level summary statistics in Table 3, the stock market turnover ratio, stock market

capitalisation, and bank z-score measures have very large variation for some countries. To ensure that it is not the noise that is driving the relation between the level of development of the stock market and leverage, and bank stability and leverage, a time series of fitted values have been used for these measures. In unreported regressions, the previously specified OLS regression, including time-series fitted values for both the proxies for stock market development as well as bank z-score, together with other firm- and country-level controls, are estimated. The results remain qualitatively unchanged for the full sample, as well as the quartile regressions.

Table 8: OLS Regression (Full Sample): Long-Term Debt to Assets-Financial Development Proxies

Variable	(4)	(5)
Stock market turnover ratio	-0.002*** (-7.17)	
Stock market capitalization		-0.002*** (-7.19)
Bank z-score	0.003*** (5.26)	0.003*** (4.75)
Firm Size	0.036*** (7.64)	0.038*** (7.99)
Investment	0.000005 (0.06)	0.0001 (1.29)
IFRS	-0.109 (-4.39)	0.055* (2.05)
GAAP	0.448*** (10.43)	0.192*** (9.02)
Tangibility	0.116*** (8.22)	0.125*** (8.85)
Profitability	-0.661*** (-68.52)	-0.663*** (-68.95)
Political Stability	-0.066*** (-4.06)	-0.192*** (-11.11)
Strength of Legal Rights	0.012** (2.94)	0.015** (3.07)
Control of Corruption	0.139*** (10.04)	0.238*** (18.79)
FDIRR	0.437*** (4.20)	0.691*** (6.50)
Corporate Tax Rate	0.009*** (6.11)	0.010*** (9.71)
Firm Fixed-effects	Yes	Yes
Year Fixed-effects	Yes	Yes
N	106,182	106,182
F-statistic	13.60	16.93
R ²	39.27%	39.63%

The table shows the results of the regression of various firm- and country-specific characteristics on the ratio of long-term debt to book assets for the full sample. *Stock Market Turnover Ratio* is ratio of the total value of shares traded during a given period to the average market capitalization for that period. *Stock Market Capitalization* is defined as the total value of all listed shares in a stock market as a percentage of GDP. *Bank z - score* captures the probability of default of a country's commercial banking system. *Firm size* is calculated as the log of book assets. *Investment* is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant, equipment. *IFRS* is an indicator for firms that follow IFRS compliant accounting standards while *GAAP* is an indicator for firms that follow U.S. GAAP compliant accounting standards. *Tangibility* is the ratio of total property, plant and equipment to book assets. *Profitability* is the ratio of EBITDA to total book assets. *Political Stability* captures the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. *Strength of Legal Rights* measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. *Control of Corruption* captures the strength and the effectiveness of a country's policy and institutional framework to prevent and combat corruption. *FDIRR* is the foreign direct investment regulatory restrictiveness index which measures statutory restrictions on foreign direct investment. *Corporate Tax Rate* is the corporate tax rate for each country. *t*-statistics are reported in parentheses. *, ** and *** indicate significance at the 5%, 1% and 0.1% levels respectively.

Although most studies focus on a single measure of leverage, it is important to confirm that the crucial results are robust to alternate measures of leverage. Hence, as a check for robustness, the model has been estimated using the ratio of long-term debt to assets as a proxy for leverage. Table 8 presents the OLS estimates for the full

sample. The results are qualitatively similar to the main regression estimates.

Quartile regressions for this measure of leverage has also been estimated. The regression results are presented in Tables 9 and 10.

Table 9: OLS Regression (Quartile): Long-Term Debt to Assets-Stock Market Turnover Ratio

Variable	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
Stock market turnover ratio	-0.002* (-2.09)	-0.002* (-2.48)	-0.001** (-3.21)	-0.001** (-3.21)
Bank z-score	0.001*** (3.01)	0.002*** (5.82)	0.003*** (5.36)	0.002** (2.67)
Firm Size	0.024** (3.13)	0.028*** (3.71)	0.052*** (5.95)	0.053*** (7.27)
Investment	0.0002 (0.43)	0.0002 (0.36)	0.0002 (1.22)	0.00007 (1.15)
IFRS	-0.006 (-0.32)	-0.007 (-0.50)	-0.015 (-0.79)	-0.041* (-1.96)
GAAP	0.116* (2.48)	0.172* (2.46)	0.018 (0.50)	0.081* (2.39)
Tangibility	0.082*** (7.38)	0.166*** (10.64)	0.166*** (15.69)	0.157*** (13.56)
Profitability	-0.033*** (-6.40)	-0.029*** (-10.01)	-0.073*** (4.64)	0.030*** (-4.27)
Political Stability	-0.103* (-2.35)	-0.094*** (-3.28)	-0.058*** (-4.32)	-0.037* (-2.38)
Strength of Legal Rights	0.006*** (4.01)	0.004*** (3.46)	0.006*** (4.43)	0.006* (2.33)
Control of Corruption	0.012** (3.16)	0.014*** (5.06)	0.045*** (4.26)	0.051*** (3.96)
FDIRR	0.081* (2.23)	0.202*** (3.95)	0.349*** (3.76)	0.139* (2.50)
Corporate Tax Rate	0.003* (2.08)	0.003*** (3.32)	0.002** (2.79)	0.004*** (4.78)
Firm Fixed-effects	Yes	Yes	Yes	Yes
Year Fixed-effects	Yes	Yes	Yes	Yes
N	25,116	26,146	26,514	28,406
F-statistic	12.34	24.74	59.50	25.36
R ²	13.74%	13.99%	17.13%	17.25%

The table shows the results of the regression of various firm- and country-specific characteristics on the ratio of long-term debt to book assets for the full sample. *Stock Market Turnover Ratio* is ratio of the total value of shares traded during a given period to the average market capitalization for that period. *Bank z - score* captures the probability of default of a country's commercial banking system. *Firm size* is calculated as the log of book assets. *Investment* is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant, equipment. *IFRS* is an indicator for firms that follow IFRS compliant accounting standards while *GAAP* is an indicator for firms that follow U.S. GAAP compliant accounting standards. *Tangibility* is the ratio of total property, plant and equipment to book assets. *Profitability* is the ratio of EBITDA to total book assets. *Political Stability* is defined to capture the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. *Strength of Legal Rights* measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. *Control of Corruption* captures the strength and the effectiveness of a country's policy and institutional framework to prevent and combat corruption. *FDIRR* is the foreign direct investment regulatory restrictiveness index which measures statutory restrictions on foreign direct investment. *Corporate Tax Rate* captures the corporate tax rate for each country. *t*-statistics are reported in parentheses. *, ** and *** indicate significance at the 5%, 1% and 0.1% levels respectively.

Table 10: OLS Regression (Quartile): Long-Term Debt to Assets-Stock Market Capitalization

Variable	1 st Quartile	2 nd Quartile	3 rd Quartile	4 th Quartile
Stock market capitalization	-0.002* (-2.11)	-0.002* (-2.50)	-0.002*** (-3.96)	-0.001** (-2.76)
Bank z-score	0.002*** (3.52)	0.002*** (5.90)	0.003*** (5.62)	0.002** (2.68)
Firm Size	0.028*** (4.90)	0.028*** (4.76)	0.057*** (6.67)	0.054*** (7.34)
Investment	0.0002 (0.45)	0.0003 (0.67)	0.0002 (1.68)	0.00005 (0.97)
IFRS	-0.011 (-0.58)	-0.009 (-0.55)	-0.009 (-0.49)	-0.027 (-1.17)
GAAP	0.064*** (3.91)	0.048 (1.91)	0.029 (1.61)	0.063** (3.14)
Tangibility	0.084*** (7.66)	0.121*** (13.55)	0.168*** (15.93)	0.158*** (13.65)
Profitability	-0.034*** (-6.64)	-0.027*** (-8.78)	-0.051*** (-9.39)	-0.032*** (-7.09)
Political Stability	-0.090*** (-5.40)	-0.039*** (-8.56)	-0.035** (-2.60)	-0.025** (-2.40)
Strength of Legal Rights	0.018*** (4.12)	0.005* (2.01)	0.022*** (4.91)	0.032*** (3.35)
Control of Corruption	0.036** (2.58)	0.062*** (4.36)	0.031*** (3.21)	0.017*** (3.22)
FDIRR	0.398*** (3.55)	0.212** (2.93)	0.420*** (4.42)	0.642*** (3.73)
Corporate Tax Rate	0.005** (3.24)	0.003** (3.24)	0.003** (2.45)	0.007** (2.88)
Firm Fixed-effects	Yes	Yes	Yes	Yes
Year Fixed-effects	Yes	Yes	Yes	Yes
N	25,116	26,146	26,514	28,406
F-statistic	13.95	23.81	43.74	33.15
R ²	14.91%	14.08%	17.75%	17.44%

The table shows the results of the regression of various firm- and country-specific characteristics on the ratio of long-term debt to book assets for the full sample. *Stock Market Capitalization* is defined as the total value of all listed shares in a stock market as a percentage of GDP. *Bank z-score* captures the probability of default of a country's commercial banking system. *Firm size* is calculated as the log of book assets. *Investment* is calculated as the sum of capital expenditures, increase in investments and acquisitions less sale of property, plant, equipment. *IFRS* is an indicator for firms that follow IFRS compliant accounting standards while *GAAP* is an indicator for firms that follow U.S. GAAP compliant accounting standards. *Tangibility* is the ratio of total property, plant and equipment to book assets. *Profitability* is the ratio of EBITDA to total book assets. *Political Stability* is defined to capture the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means. *Strength of Legal Rights* measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. *Control of Corruption* captures the strength and the effectiveness of a country's policy and institutional framework to prevent and combat corruption. *FDIRR* is the foreign direct investment regulatory restrictiveness index which measures statutory restrictions on foreign direct investment. *Corporate Tax Rate* captures the corporate tax rate for each country. *t*-statistics are reported in parentheses. *, ** and *** indicate significance at the 5%, 1% and 0.1% levels respectively.

In unreported regressions, alternate measures of tangibility, profitability, and strength of legal rights, as defined by La Porta et al. (1997), have been employed. The main results of the analysis remain qualitatively unchanged for these alternate specifications of the variables in question.

Hart (1995) shows that the defining feature of various securities is the rights they bring to their owners. Shareholders typically possess the right to vote for directors of companies, while bondholders possess the right to repossess collateral when companies fail to make

the promised payments. La Porta et al. (1998) show this view of securities being inherently characterised by some intrinsic rights to be incomplete. They argue that these rights depend on the legal rules of the jurisdictions in which they operate. Further, they show that countries with a legal system that originated from the British common law offer creditors stronger legal protections against managers, compared to those with a legal system that originated from the French, German, or Scandinavian civil law. Therefore, in an alternate specification of creditor rights, an indicator variable for countries whose legal system originated from the French, German, or Scandinavian civil law systems, have been included. Since the legal system is more favourable to investors in common law countries, leverage should be lower for firms in countries whose legal rules originated from the French, German, or Scandinavian civil law systems, compared to countries whose legal rules originated from the British common law system. Hence, the results are qualitatively similar to the main regression specification, where leverage is higher for firms in countries with stronger protection of creditor rights (common law countries).

Conclusion

This paper documents that leverage ratios are higher for firms operating in countries with less developed stock markets, while leverage ratios are lower for countries with an unstable commercial banking system. The papers shows that the level of development of financial institutions, together with firm characteristics and country-level political, legal, and developmental controls, play an important role in capital structure decisions. Using the OLS approach, it is shown that for firms operating in countries with a higher stock market turnover ratio, the leverage ratios are significantly lower than those operating in countries with a lower stock market turnover ratio. The results are qualitatively similar for firms in countries with a higher stock market capitalisation as a percentage of GDP, compared to firms in countries with a lower stock market capitalisation. At higher levels of financial development, domestic stock markets tend to become more active and efficient, relative to domestic banks, while at low levels of financial development, commercial banks tend to dominate the financial system, making debt issuance the viable choice for financing investment, thereby increasing leverage. The estimates also suggest that for firms in countries with a more stable

commercial banking system, leverage is on an average significantly higher than for firms in countries with an unstable commercial banking system.

Countries with more developed stock markets tend to rely less on debt for the purposes of financing investment. However, countries with more developed stock markets are also countries with a more stable commercial banking system, which makes debt financing a viable option. Although the negative linear relation between Stock Market Turnover Ratio and Leverage; Stock Market Capitalisation and Leverage; and the positive linear relation between Bank z-score and Leverage is consistent across quartiles and the full sample estimates, the quartile regressions highlight an interesting pattern. As stock markets develop, the leverage of small firms decreases significantly, compared to that of larger firms, as small firms move from debt-to-equity financing. A difference in means test confirms that stock market development benefits smaller firms more than it does larger firms. Although the quartile regressions provide suggestive evidence that as banks become more stable, the leverage of larger firms increases significantly, compared to that of smaller firms, the difference in means test does not confirm this result.

In addition, the paper shows that leverage is lower for politically stable countries. With an unstable political system comes an increased probability of structural change, making investors uncertain about future policy choice. Under political uncertainty, stock prices are more volatile and highly correlated, making equity more sensitive to this uncertainty. Under such circumstances, debt is less mispriced and hence is a preferred choice for financing investment, thereby increasing leverage. The data also supports the view that, for firms in countries with a better system in place to control and combat corruption, leverage is, on average, higher.

The results are consistent with prior literature, in that capital structure decisions in developing countries are affected by the same variables as in developed countries (Rajan & Zingales, 1995). The firm-level characteristics affect leverage in the same way as has been established in earlier literature (Booth et al., 2001). The protection investors receive will determine their readiness to finance firms' investments. Therefore, for firms in countries with stronger protection of creditor rights, debt issuance is higher than for firms in countries with weaker protection

of creditor rights (La Porta et al., 1997, 1998; Hart, 1995). It is also true that firms are more levered in countries with a less developed stock market (Giannetti, 2003).

To be able to completely understand the interaction of country-level political, legal, and developmental factors, and how they influence capital structure decisions, much needs to be done to account for the different types of debt that are being issued by firms around the world, and for the different factors of financial development that have opposing influences on leverage. Since firms issue different kinds of debt, and they issue debt from creditors other than just commercial banks, it is imminent to decompose the debt market and study the simultaneous effect of stock market development and debt market development on firms' leverage. This is beyond the scope of this paper.

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