Why Have Debt Ratios Increased for Firms in Emerging Markets?

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The Role of Debt Financing in Emerging Markets

- Good: The availability of debt financing promotes growth
  - King and Levine (1993), Levine and Zervos (1998), Rajan and Zingales (1998), Demirgüç-Kunt and Maksimovic (1998), Beck, Levine, and Loayza (2000), Wurgler (2000)
- Bad: Debt financing may lead to instability or crises
  - Harvey and Roper (1999), Krugman (1999), Claessens, Djankov, and Xu (2000), Bris and Koskinen (2002)
- Prior evidence on emerging market capital structures
  - Capital structure determinants are similar to those in developed markets (Booth, Aivazian, Demirgüç-Kunt, and Maksimovic, 2001)
  - Debt may mitigate agency problems (Harvey, Lins, and Roper, 2004)

Goals of this Paper

- Document long-term trends in emerging market capital structures
- Understand why debt ratios have increased for emerging market firms
  - What is the impact of fundamental firm-level factors that affect the demand for debt financing?
  - What is the impact of country-level factors that affect the supply of debt financing?

Firm-level Data

- 25 years of Worldscope data
  - Active and inactive firms
- 11,850 firms from 34 emerging markets
  - Latin America, Asia (excl. Japan), Africa, Middle East, Eastern Europe
- Primary measures of leverage
  - Book-value debt ratio
    - Total debt/Total assets
  - Market-value debt ratio
    - Total debt/(Total assets - book equity + market capitalization)

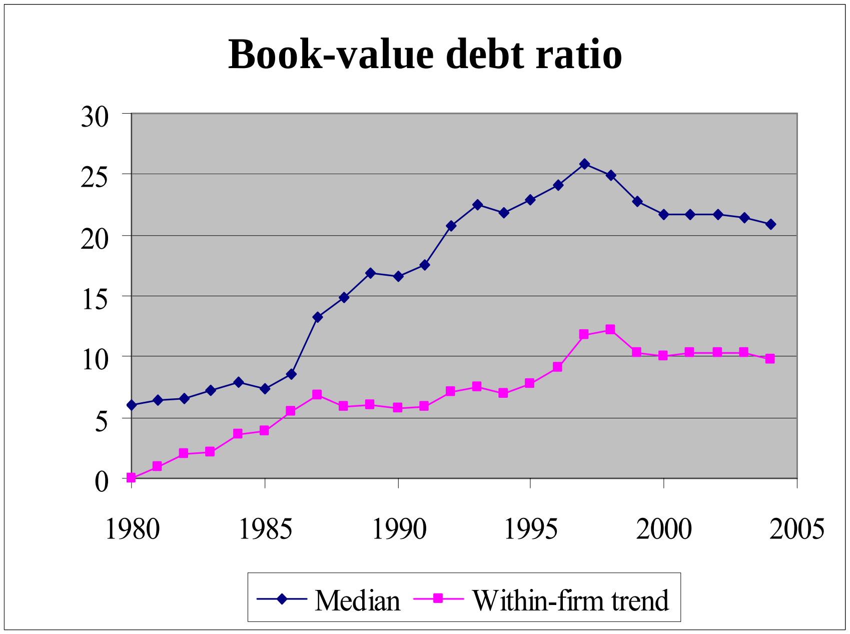
Addressing Problems with the Data

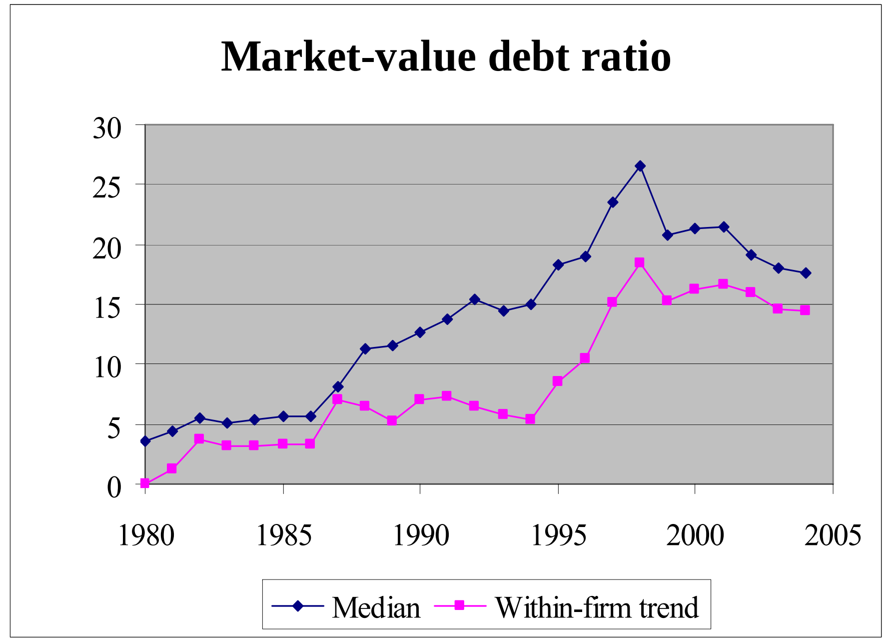
1. Variation in data availability
   - Fewer than 500 observations/year in early 1980s, but more than 9,000 observations/year in early 2000s
   - Do apparent trends reflect real changes within firms or just changes in sample composition?
   - Solution: Find within-firm trends using coefficients on year dummies in firm-fixed effects regressions

$$\text{FirmCharacteristic}_{it} = \alpha + \text{Firm}_i + \text{Year}_t + \varepsilon_{it}$$

2. Lack of comparability across countries
   - Accounting standards and reporting requirements differ
   - Are debt ratios comparable across countries?
   - Solution: Avoid cross-country comparisons; emphasis is on within-firm trends over time

Trends in Emerging Market Leverage Over a Quarter Century



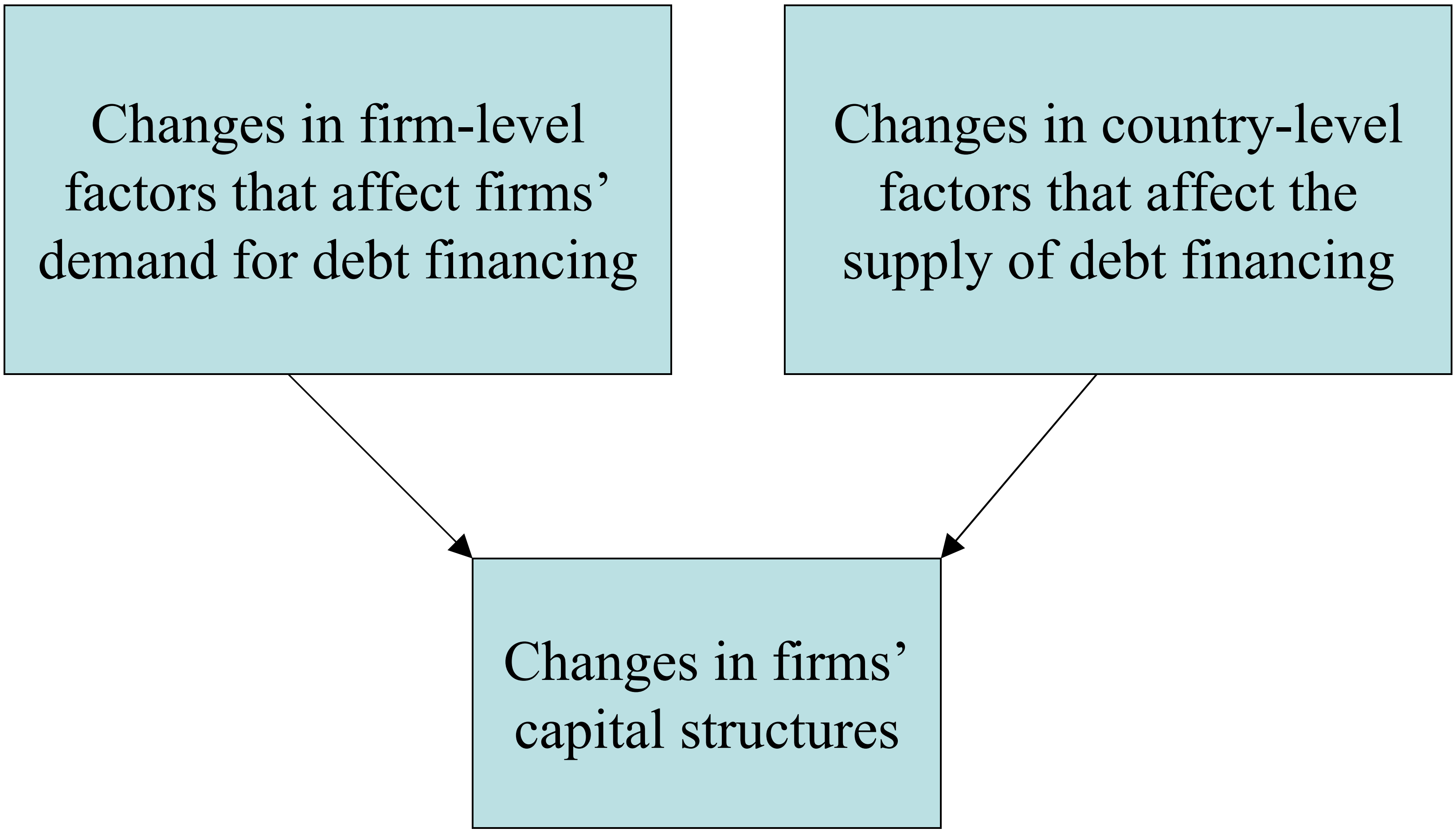


- Median and within-firm trend are across all 11,850 firms in the sample
- Outliers (outside 99th/1st percentiles) are excluded when calculating within-firm trend

Other Descriptive Trends in the Data

1. Similar increases shown in other measures of leverage, except for total liabilities/total assets
   - Does interest-bearing debt replace trade credit over time? (Fisman and Love, 2003)
2. Increase in leverage primarily reflects an increase in short-term debt
   - See Demirgüç-Kunt and Maksimovic (1999), Broner, Lorenzoni, and Schmukler (2005)
3. Developed markets also experienced an increase in leverage over this period (though less pronounced)
   - Based on 18,834 Worldscope firms from 24 developed markets

Why Have Emerging Market Debt Ratios Increased?



Firm-level Demand Factors

- As firms' characteristics change, their optimal level of debt should also change
- Fundamental determinants of capital structure

Fundamental Factor	Expected Sign	Measure
Size	Positive	Log of real $US sales
Profitability	Negative	EBITDA/Total assets
Asset Tangibility	Positive	Gross fixed assets/Total assets
Growth Opportunities	Negative	Market-to-book ratio

- Estimate the following equation:

$$DebtRatio_{it} = \alpha + Firm_i + Fundamentals_{it} + Year_t + \varepsilon_{it}$$

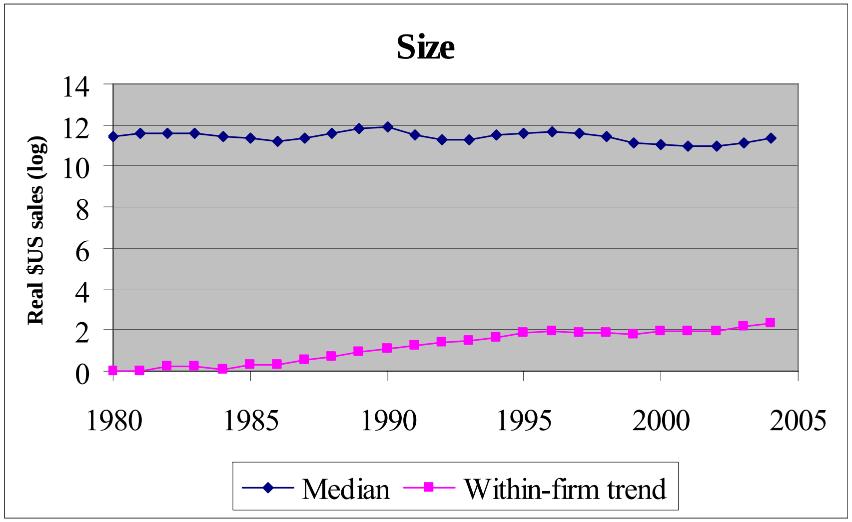
Regression Results: Firm-level Demand Factors

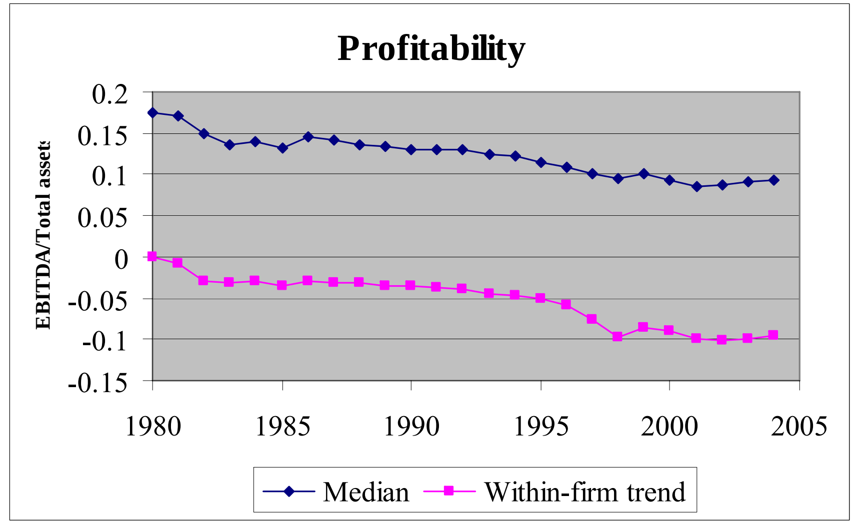
Table 3 (Excerpt)
Firm-level fundamentals and changes in capital structure

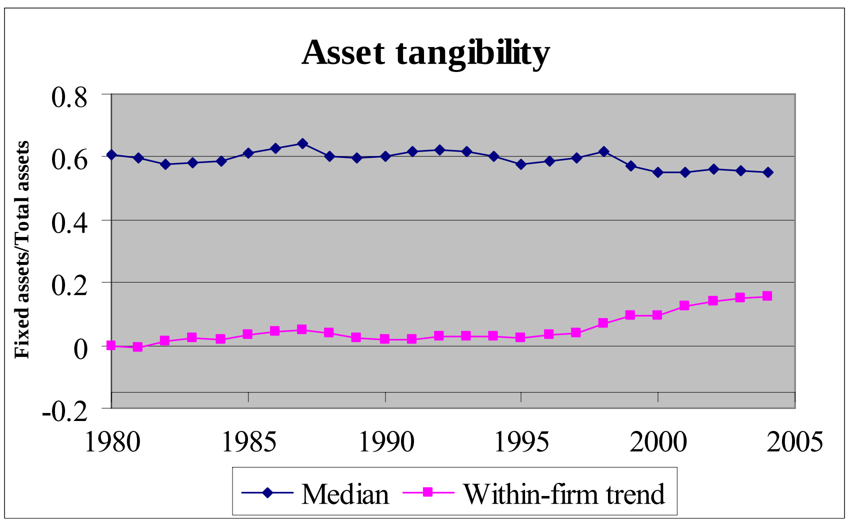
Panel A: Dependent variable is the book-value debt ratio					
Size	0.34 ***				1.55 ***
	(0.10)				(0.16)
Profitability		-26.87 ***			-32.80 ***
		(0.75)			(0.99)
Asset tangibility			6.46 ***		4.08 ***
			(0.48)		(0.54)
Growth opportunities				-1.19 ***	-0.78 ***
				(0.09)	(0.11)
R-squared	0.72	0.73	0.73	0.74	0.77
N	78,903	72,188	61,973	68,426	50,328

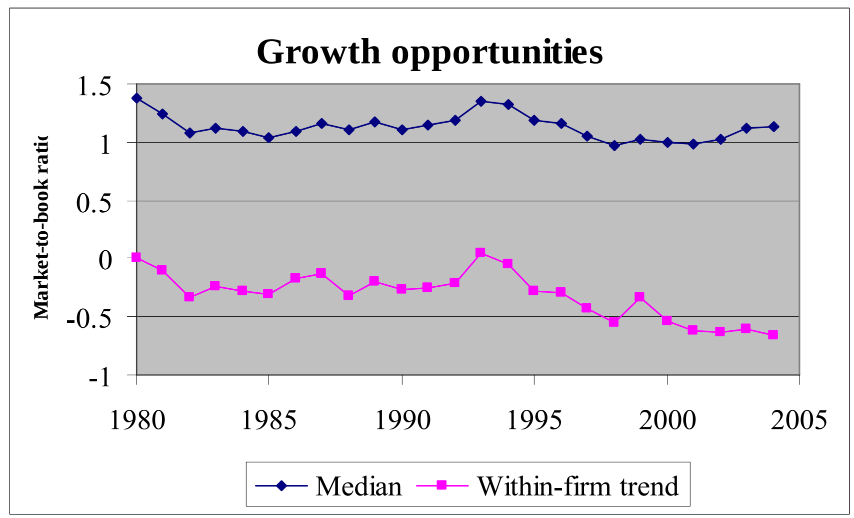
Notes:
Firm-fixed effects and year dummies included
Robust standard errors in parentheses

Trends in Firm-level Fundamentals









Estimates of Economic Significance

Firm-level fundamental	Regression coefficient	Within-firm trend 1980-2004	Estimated impact on debt ratio
Book-value debt ratio			
Size	1.55	2.36	3.66
Profitability	-32.80	-0.10	3.28
Asset tangibility	4.08	0.15	0.61
Growth opportunities	-0.78	-0.66	0.51
Total			8.07
Market-value debt ratio			
Size	1.26	2.36	2.96
Profitability	-29.15	-0.10	2.92
Asset tangibility	6.42	0.15	0.96
Growth opportunities	-5.69	-0.66	3.75
Total			10.59

- Overall trends in debt ratios are +9.79 (book value) and +14.51 (market value)
- Effects appear large enough to explain a large portion of the increase in leverage

Other Firm-level Capital Structure Determinants

1. Tax-related factors
   - Higher tax rates are significantly correlated with higher debt ratios, but size of effect is relatively small
   - Effect of non-debt tax shields is not robust
2. Stock volatility
   - Negatively correlated with debt ratios, but effect is not robust
3. R&D spending
   - Negatively correlated with debt ratios, but effect is not robust

Country-level Supply Factors

- The availability of financing at the country level should influence the degree to which firms take on debt
- Country-level factors

Variable	Expected Sign	Measure
Credit market development	Positive	Domestic credit/GDP
Stock market development	Negative	Market cap/GDP
Openness	Positive	Trade/GDP

- Estimate the following equation:

$$DebtRatio_{it} = \alpha + Firm_i + CountryFactors_{ct} + GDPPC_{ct} + Year_t + \varepsilon_{it}$$

Regression Results: Country-level Supply Factors

Table 6 (Excerpt)

Country-level factors and changes in capital structure

Panel A: Dependent variable is the book-value debt ratio				
Credit market development	2.61			4.02 *
	(2.26)			(2.44)
Stock market development		-0.88 **		-1.30 ***
		(0.42)		(0.47)
Openness			6.74 ***	8.93 ***
			(1.86)	(1.98)
Log GDP per capita	4.94 **	2.63	3.92	-3.42
	(2.35)	(4.01)	(2.71)	(3.56)
R-squared	0.72	0.72	0.73	0.73
N	71,412	70,934	61,973	62,611

Notes:

Firm-fixed effects and year dummies included

Robust standard errors, adjusted for clustering, in parentheses

Estimates of Economic Significance

Country-level factor	Regression coefficient	Within-country trend 1980-2004	Estimated impact on debt ratio
Book-value debt ratio			
Credit market development	4.02	0.17	0.68
Stock market development	-1.30	0.62	-0.81
Openness	8.93	0.25	2.23
Total			2.11
Market-value debt ratio			
Credit market development	3.91	0.17	0.66
Stock market development	-3.08	0.62	-1.91
Openness	9.77	0.25	2.44
Total			1.20

- Overall trends in debt ratios are +9.79 (book value) and +14.51 (market value)
- Effects appear to be large (especially for openness), though not as large as the estimated effects of the firm-level factors

Conclusions

- Emerging market debt ratios show substantial increases over the past quarter century
- Most of the rise appears to be attributable to changes in firm-level characteristics over this period; as firms change, their optimal capital structure changes
- Country-level supply factors also play a (smaller) role in the increase in debt, but openness to foreign markets is more important than domestic financial development
- Generally speaking, the picture is not one of firms haphazardly taking on excessive levels of debt; rather, firms appear to rationally increase leverage in response to changes in their environment

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March 1, 2006

Abstract

I study trends in capital structure between 1980 and 2004 in a sample of over 11,000 firms from 34 emerging markets. The average firm's book-value debt ratio rose by 10 percentage points over this quarter century; market-value debt ratios rose by 15 percentage points. I study how this rise in leverage was influenced by the firm-level demand for and the country-level supply of debt financing. The central finding is that the increase in debt ratios can largely be attributed to changes in the characteristics of emerging market firms over this period. For the average firm, the most prominent determinants of capital structure – size, profitability, asset tangibility, and growth opportunities – all shifted in the direction implying a higher optimal level of debt. Changes in the supply of financing at the country level also appear to have played a role in the increase in debt, though financial development within the country is less important than the opening of the country to foreign markets.

JEL classification: G32; G15

Keywords: Emerging markets; Capital structure; Financial development

1 Introduction

Debt financing has played the role of both hero and villain in emerging markets in recent decades. As the hero, debt financing has been viewed as an engine for growth that enables firms to undertake profitable investments that otherwise might not have been financed.[1] As the villain, debt financing has been viewed as a vehicle for firms to take excessive risks that have led to instability in emerging markets.[2] Although the relative costs and benefits of debt financing may be in question, it is at least clear that debt financing has played an increasingly important part in emerging markets finance over the past quarter century. The goal of this paper is to document long-term trends in emerging market capital structures and then to shed light on why debt ratios have increased for emerging market firms. I study emerging market capital structures over the period 1980 to 2004, using data from over 11,000 firms from 34 emerging markets. This comprehensive dataset provides insights on how and why the role of debt financing in developing nations has changed over time.

At the outset, analysis of the dataset presents two problems, both of which are pervasive in studies using financial statement data from emerging markets. The first problem is that data availability varies greatly over the time period covered; data is relatively scarce in the early 1980s and relatively abundant in the early 2000s. This leads to the concern that apparent trends in debt ratios or other variables may result simply from changes in sample composition, not from real changes within firms. To address this problem, I use firm-fixed effects regressions throughout the analysis in order to put the focus on within-firm changes in leverage and other variables. The second problem is that accounting standards and reporting requirements vary widely across countries, so debt ratios and other variables may not be comparable across countries. In this paper, I largely avoid this problem simply by not making cross-country comparisons. My focus is on within-firm trends over time, and by using firm-fixed effects I effectively control for inherent differences across firms, including those stemming from differences in reporting across countries.

[1]For example, a number of papers demonstrate a link between credit market development and economic growth, including King and Levine (1993), Levine and Zervos (1998), Rajan and Zingales (1998), Demirgüç-Kunt and Maksimovic (1998), Beck, Levine, and Loayza (2000), and Wurgler (2000).

[2]For example, many have cited excessive corporate leverage as a cause of emerging market financial crises. See, e.g., Harvey and Roper (1999), Krugman (1999), Claessens, Djankov, and Xu (2000), Bris and Koskinen (2002).

With these methodological issues addressed, I first document the degree to which debt ratios have increased in emerging markets. Across all emerging market firms, median book-value debt ratios increased from 6% in 1980 to 21% in 2004, a rise of 15 percentage points. However, as discussed above, some of this rise is attributable to changing sample composition. Within-firm changes in book-value debt ratios, which I calculate from coefficients on year dummies in a firm-fixed effects regression, show an average rise of 10 percentage points over this period. For market-value debt ratios, the average within-firm rise is 15 percentage points. In terms of descriptive statistics, three other regularities stand out in capital structure trends. First, the increase in leverage is evident primarily as an increase in interest-bearing debt, not in other liabilities. While most standard debt ratios show significant increases over this period, ratios of *total liabilities* to total assets do not, possibly demonstrating that, over time, emerging market firms replace trade credit with interest-bearing debt (see Fisman and Love, 2003). Second, the increase in debt consists primarily of an increase in short-term debt rather than long-term debt (see Demirgüç-Kunt and Maksimovic, 1999; Broner, Lorenzoni, and Schmukler, 2005; Schmukler and Vesperoni, 2006). Third, the increase in debt in emerging markets mirrors an increase in debt in developed markets during the same period, though the rise is more pronounced in emerging markets.

I then focus on the question of why debt ratios increased in emerging markets over this period. I consider factors related to the demand for and the supply of debt financing. On the demand side, theory suggests, and prior empirical evidence affirms, that fundamental firm-level characteristics influence the degree to which firms take on debt. Although numerous potential firm-level determinants of capital structure have been tested, the variables that have most consistently survived empirical tests are firm size, profitability, asset tangibility, and growth opportunities (see, e.g., Rajan and Zingales, 1995; Frank and Goyal, 2003). I find that within-firm trends in each of these four variables are significantly correlated with within-firm trends in debt ratios. In each case, the correlation is in the direction consistent with previous literature: larger size, lower profitability, higher asset tangibility, and lower growth opportunities are all associated with higher levels of debt. Moreover, the trend in each of these four variables over this period was in the direction that would imply an increase in leverage. On average, emerging market firms experienced increases in size, decreases in profitability, increases in asset tangibility, and decreases in growth opportunities between 1980 and 2004. Estimates of economic significance suggest that changes in these firm-level fundamentals can explain the majority of the increase in emerging market debt over this period. A primary finding of the paper, then, is that debt ratios have increased in emerging markets in large part because firms have changed in such a way that their optimal level of debt has increased.

The increase in debt ratios may also depend on supply factors, or in other words, the ability of firms in emerging markets to obtain external financing. If firms are financially constrained, then increases in credit market development may lead to higher debt ratios. Increases in stock market development (which allow firms to substitute equity for debt) may lead to decreases in debt ratios (Booth et al., 2001; Demirgüç-Kunt and Maksimovic, 1996; Gianetti, 2003). I find that credit market development, which increased in emerging markets over this period, is associated with higher levels of debt, but that its impact is relatively small. In fact, any increased leverage associated with credit market development seems to be outweighed by the effect of stock market development, which also increased over this period and which was associated with a significant decrease in debt ratios. On balance, financial development within the country seems to have played only a limited role in the increase in debt ratios between 1980 and 2004. On the other hand, I also study the impact of openness to foreign markets on leverage, and find that the degree to which emerging markets open up to foreign markets appears to have a strong positive correlation with levels of debt. This suggests that, on the supply side, the ability to obtain debt financing from foreign sources was a larger contributor to the increase in leverage than was the ability to obtain domestic financing.

Together, the magnitude of the estimated effects of supply and demand factors appears large enough to account for most or all of the long-term trend in emerging market debt ratios. The picture that emerges from the analysis is generally not one of emerging market firms haphazardly taking on higher levels of debt and accompanying risks.[3] Rather, the picture that emerges is one of emerging market firms increasing levels of debt in response to changes in their own firm-level characteristics and in response to changes in the availability of external finance. The results add to our understanding of how emerging market firms have financed themselves over the past 25 years. The

[3] This analysis speaks primarily to financial risk arising from a firm's aggregate level of debt. The composition of the debt – e.g., its maturity or its currency denomination (see Allayannis, Brown, and Klapper, 2003) – could carry additional risks.

paper builds on the work of others, including Booth et al. (2001), who study firms in 10 emerging markets and find determinants of capital structure similar to those found in developed countries. Harvey, Lins, and Roper (2004) study emerging market capital structures with a focus on the mitigation of agency problems. Also related to this paper are other cross-country studies of capital structure (not necessarily specific to emerging markets) such as Rajan and Zingales (1995), Demirgüç-Kunt and Maksimovic (1996), Desai, Foley, and Hines (2004), and Fan, Titman, and Twite (2004). These prior studies tend to focus on cross-country comparisons more than trends over time. A number of other papers address changes in firms' capital structures around the Asian financial crisis of 1997-98 (e.g., Harvey and Roper, 1999; Claessens, Djankov, and Xu, 2000; Bris, Koskinen, and Pons, 2004). In this study, I avoid separate analysis of short-term trends surrounding the Asian crisis or any other subperiod, instead maintaining a focus on long-term trends in finance in emerging markets as they have developed over the past quarter century.

The paper proceeds as follows. Section 2 discusses the data used in the study and describes the trends in emerging market leverage between 1980 and 2004. Section 3 analyzes how changes in firm-level characteristics are associated with changes in leverage, and Section 4 analyzes the effect of country-level factors. Section 5 discusses some robustness tests, and Section 6 concludes.

2 Data and Descriptive Statistics

Firm-level data for the study comes from the Worldscope database. The primary sample consists of all firms from emerging markets that have data available in Worldscope between the years 1980 and 2004. I define emerging markets as all nations in Latin America, Asia (excluding Japan), Africa, the Middle East, and Eastern Europe. A few of these nations (for example, Hong Kong or Singapore) may rightly be regarded as having entered the ranks of developed markets, but because my sample period extends back 25 years, I define these ambiguous cases as emerging markets. All emerging market firms in Worldscope, whether currently active or inactive, are included in the sample.

Table 1 reports the composition of the sample by country. The number of firms available varies greatly across countries, with China having the most firms (1,501) and Ghana having the fewest (1). The total sample consists of 11,850 firms. Also reported in Table 1 are the years in which data are first available for each country. Six of the countries in the sample have data beginning in 1980, and the number of countries with available data increases steadily until 2000, the first year available for Ghana and Slovenia.

Table 2 reports summary statistics of firm-level variables used in the study by year. Column 1 reports the number of observations available by year, which increases dramatically over time. Because of this increasing sample size, the concern arises that if I simply compare averages or medians of variables over time, those changes will reflect changes in sample composition more than real changes within firms. Consequently, my focus in the paper will be on within-firm trends in the variables of interest. Throughout the paper, I calculate the within-firm trend of firm-level variables by estimating the following regression equation:

$$FirmCharacteristic_{it} = \alpha + Firm_i + Year_t + \varepsilon_{it}, \tag{1}$$

where $FirmCharacteristic_{it}$ is the firm-level variable of interest (such as a debt ratio) for firm i in year t, $Firm_i$ represents firm-fixed effects, and $Year_t$ represents a full set of year-specific dummy variables (with the dummy for 1980 omitted). To avoid undue influence from outliers, in these regressions I omit observations of the dependent variable above the 99th percentile and below the 1st percentile. From this regression I define the within-firm trend as the estimated coefficients on the set of year dummies, which represent the average incremental increase or decrease in debt ratios attributable to each year. Because the regression also includes firm-fixed effects, the regression controls for average levels of the firm characteristics, and thus the coefficients on the year dummies reflect only within-firm trends in leverage, and not trends resulting from changes in sample composition.

Columns 2 through 5 of Table 2 report year-by-year statistics for my two primary measures of leverage. The first measure is the book-value debt ratio, defined as the ratio of total debt to total assets. The second measure is the market-value debt ratio, defined as the ratio of total debt to the total market value of assets, where market assets are defined as total book assets less book equity plus market capitalization. Throughout the paper, debt ratios are expressed in whole percentages. For both measures, Table 2 reports the median value across all firms in the sample for each year, as well as the within-firm trend, calculated from the coefficients on year dummies from equation (1).

Table 2 also reports year-by-year statistics for firm fundamentals and firm-level tax variables. These variables will be discussed in Section 3.

2.1 Descriptive Trends in Emerging Market Leverage

In this section I use a series of figures to show descriptive trends in emerging market capital structures over time. Figure 1 plots the trend in debt ratios between 1980 and 2004. Panel A of Figure 1 plots the median and within-firm trend for the book-value debt ratio. The median value of the book-value debt ratio rises from 6.1% in 1980 to 20.8% in 2004 (after peaking at 25.9% in 1997), an overall rise of 14.7 percentage points. This demonstrates a substantial increase in leverage for emerging markets, but as discussed previously, the median could be somewhat misleading because it may be influenced by changing sample composition over time. Accordingly, Panel A of Figure 1 also plots the within-firm trend of book-value debt ratios. Panel A of Figure 1 shows that the within-firm trend reflects an average increase of 9.8 percentage points in debt ratios of emerging market firms. Roughly speaking, two-thirds of the increase shown in medians reflects real within-firm changes, while the other third is accounted for by changes in sample composition.[4]

Panel B of Figure 1 reports trends in the market-value debt ratio. The median debt ratio rises from 3.6% in 1980 to 17.7% in 2004 (after peaking at 26.5% in 1998), a rise of 14.1 percentage points. In this case, the within-firm trend demonstrates a similar increase, as it shows an average increase of 14.5 percentage points between 1980 and 2004. (Columns 2 through 5 of Table 2 report the numbers used in the construction of Figure 1.) In summary, Figure 1 demonstrates, across a large sample of emerging markets, that debt ratios demonstrated a substantial within-firm increase over the past quarter century.

2.1.1 Alternative Measures of Leverage

Figure 2 reports similar charts for alternative measures of leverage. The alternative measures reported are, first, total debt to total capital (where total capital is book

[4]Sample composition changes for two reasons – because Worldscope improves its coverage over time, and because the emerging economies generate new firms over time. From an empirical standpoint, bias resulting from the former effect is the greater concern, but the within-firm estimates conservatively control for both effects.

equity plus interest-bearing debt), second, total debt to total market capital (where market capital is market capitalization plus interest-bearing debt), third, total liabilities to total assets, and fourth, total debt to net assets (where net assets equal total assets minus current liabilities). Plots for these measures are shown in Panels A through D of Figure 2. Panels A, B, and D show trends similar to those already reported, with increasing leverage both in medians and within-firm trends. However, in Panel C, the ratio of total liabilities to total assets shows almost no trend over the 25-year period. Because the difference in the measure of leverage in Panel C is that total liabilities, and not just debt, are included in the numerator, this result indicates that the increase in debt ratios reported for emerging markets is primarily a phenomenon associated with interest-bearing debt, and not with other liabilities. One possible explanation for this is that in underdeveloped nations firms rely heavily on trade credit, but as financial development improves, firms replace trade credit with interest-bearing debt (see Fisman and Love, 2003).[5]

2.1.2 Maturity of Debt

In Figure 3, I examine trends in the use of debt of differing maturities. I compare trends in the ratio of short-term debt (defined as having maturity of a year or less) to total assets and long-term debt to total assets. Panel A reports trends in median values of these ratios when total assets are in book values. Panel A shows that the use of short-term debt has increased greatly in emerging markets over the 25-year period. The median short-term debt ratio rose from 0.9 in 1980 to 9.6 in 2004. In contrast, the use of long-term debt has remained relatively stable and even fallen slightly, from 6.2 in 1980 to 3.9 in 2004. Panel B shows a similar trend using market-value debt ratios. Panels C and D report the within-firm trends. Again, these panels show that the use of short-term debt has increased much more than the use of long-term debt, although the difference is less pronounced in Panel D. The trend toward short-term debt shown in Figure 3 is consistent with previous literature. For example, Demirgüç-Kunt and Maksimovic (1999) demonstrate the prevalent use of short-term debt in emerging markets, Schmukler and Vesperoni (2006) show that financial liberalization is associated

[5] It is difficult to fully assess the impact of trade credit, because the Worldscope data for the 1980s often does not report accounts payable as a separate line item.

with a shift toward short-term debt (though accessing international financial markets has the opposite effect), and Broner, Lorenzoni, and Schmukler (2005) offer a theoretical explanation for the trend.

2.1.3 Comparison with Developed Markets

In Figure 4, I compare capital structure trends in emerging markets to trends in developed markets. From the Worldscope database I construct a sample of firms from 24 developed markets. The sample consists of 18,834 firms, which is all firms available in all developed markets outside the U.S. in Worldscope. I calculate comparable debt ratios and within-firm trends for firms in the developed markets sample. In Figure 4, median values are reported in Panels A and B, and within-firm trends are shown in Panels C and D. Panel A shows that median book-value debt ratios increased much more in emerging markets between 1980 and 2004. Whereas emerging markets increased by 15 percentage points (from 6% to 21%), developed markets increased by only 3 percentage points (from 13% to 16%) over the same period. While some of this greater increase may be attributed to emerging markets "catching up" with debt ratios in developed markets, median debt ratios in emerging markets exceed those in developed markets in every year after 1994. Panel B shows a similar story for market-value debt ratios.

Panels C and D, however, suggest that the differences in trends may not be that large. Panel C shows that, although the paths are often divergent, over the entire 25-year period, the within-firm changes in book-value debt ratios averaged about 10 percentage points in both emerging and developed markets. Panel D shows that there is still a marked difference in market-value debt ratios, as within-firm increases in emerging markets exceed increases in developed markets by almost 5 percentage points. On balance, the picture that emerges from Figure 4 is that the increase in leverage has been greater in emerging markets, but that to some extent, emerging markets have followed a pattern that is manifest in developed markets during the same period.

3 Firm-Level Factors

Having presented descriptive trends in capital structures over the past 25 years, I now turn to the question of why debt ratios have increased in emerging markets. In this section I consider how trends in emerging market leverage are affected by the demand for debt financing. A firm's requirement for debt financing should change as characteristics of the firm change over time. I consider here whether changes within emerging market firms can explain the increases in debt ratios documented in the previous section.

3.1 Fundamental Determinants of Capital Structure

I first consider changes in firm-level fundamentals that would be expected to have an impact on capital structure. Following Rajan and Zingales (1995) and Frank and Goyal (2003), I focus on four factors that stand out as consistently demonstrating a correlation with capital structure: firm size, profitability, asset tangibility, and growth opportunities.

Size is expected to be positively correlated with leverage, given that larger firms have a lower probability of bankruptcy and lower costs (relative to firm value) in the event of bankruptcy. A positive relationship between size and debt has been demonstrated in Marsh (1982), Rajan and Zingales (1995), and Frank and Goyal (2003). I measure size as the log of annual sales in real $U.S.[6]

Profitability is generally expected to be negatively correlated with leverage, following primarily from the asymmetric-information argument of Myers and Majluf (1984) that firms will turn to debt financing when internal equity is insufficient. This negative relationship has been shown in a number of studies, including Titman and Wessels (1988), Rajan and Zingales (1995), Fama and French (2002), and Frank and Goyal (2003). I measure profitability as the ratio of EBITDA (earnings before interest, taxes, depreciation, and amortization) to total assets.

Because tangible assets serve as collateral, a larger proportion of tangible assets is generally expected to be associated with a higher degree of leverage (Scott, 1977; Harris and Raviv, 1990). A positive correlation between asset tangibility and debt has been shown in numerous studies including Marsh (1982), Friend and Lang (1988), Rajan and Zingales (1995), and Frank and Goyal (2003). I define asset tangibility as the ratio of gross fixed assets to total assets.

Firms with greater growth opportunities should maintain lower leverage, following the reasoning of Myers (1977) that excessive leverage may force firms to pass up profitable investment opportunities (see also Stulz, 1990). The negative correlation between growth opportunities and leverage has been documented by Rajan and Zingales (1995),

[6]Results are very similar if sales are measured in real local currency.

Fama and French (2002), and Frank and Goyal (2003). I measure growth opportunities as the market-to-book ratio, defined as total assets less book equity plus market capitalization all over total assets.[7]

3.1.1 Trends in the Firm-Level Fundamentals

Figure 5 plots trends in these firm fundamentals over time. For each panel of Figure 5 I report the median and the within-firm trend for the reported variable. To find the within-firm trend, I estimate the coefficients on year dummies in equation (1), with the firm fundamental as the dependent variable. (As before, the dependent variable is truncated at the 1st and 99th percentiles.) Panel A shows that the median size of emerging market firms in the sample changed very little between 1980 and 2004. However, the within-firm trend in Panel A tells a different story, demonstrating a large increase in firm size over this period. The difference between the median and the within-firm trend reflects the effect of changing sample selection on the median. As more (likely smaller) firms are added to the Worldscope database over time, and as more (likely smaller) firms get listed on emerging market stock exchanges over time, the median size in the sample remains low, even though, naturally, the average firm in these developing economies is growing over time. The increasing within-firm trend will be more relevant to subsequent analysis exploring within-firm changes in debt ratios.

Panel B of Figure 5 shows that firms from emerging markets have experienced declining profitability over the past quarter century. The decline in profitability over this period is substantial. Median profitability fell from 17.4% in 1980 to 9.4% in 2004, and the within-firm trend shows a decline of 9.6 percentage points. Panel C of Figure 5 shows that median asset tangibility declined slightly between 1980 and 2004, from 60.7% to 55.1%. However, this decline in medians appears to be attributable to the changing composition of the sample over time, not to actual changes in asset tangibility within firms. Panel C shows that the within-firm trend in asset tangibility actually demonstrates a large increase of 15 percentage points over this period.[8] Finally, Panel

[7]Previous literature is not unanimous in its view of the relationships of these four factors with captial structure. For example, Jensen (1986) or Stulz (1990) might predict a positive relationship between debt and profitability if debt is used as a device for reducing free cash flow, and Titman and Wessels (1988) present evidence of a negative relationship between size and leverage.

[8]One possible explanation for the difference between the median and the within-firm trend in asset tangibility is that, over time, the sectoral composition of developing economies shifts more toward

D of Figure 5 shows that growth opportunities have decreased for emerging market firms over time. Median market-to-book ratios declined from 1.4 in 1980 to 1.1 in 2004. The downward within-firm trend is even more pronounced, showing an average decline of 0.65 in market-to-book ratios over this period. (The numbers used in the construction of Figure 5 are shown in Table 2.)

In summary, Figure 5 shows that firms in emerging markets have experienced shifts in all of the primary firm-level factors associated with differences in capital structure. In each case, the magnitude of the shift in these fundamentals over the 25-year period is quite large. Furthermore, each of these shifts occurs in the direction that would imply an increase in leverage. If these firms follow standard capital structure predictions, then increases in leverage would be expected due to increasing size, declining profitability, rising asset tangibility, and declining growth opportunities.

3.1.2 Firm-Level Fundamentals and Debt Ratios

In Table 3, I use regression analysis to assess how trends in these firm-level fundamentals are associated with trends in capital structure over time. I estimate the following regression equation:

$$DebtRatio_{it} = \alpha + Firm_i + Year_t + \beta Fundamentals_{it} + \varepsilon_{it}, \tag{2}$$

where $DebtRatio_{it}$ is the debt ratio for firm i in year t, $Firm_i$ represents firm-fixed effects, $Year_t$ represents a full set of year-specific dummy variables, and $Fundamentals_{it}$ indicates one or more of the firm-level fundamentals discussed above for firm i in year t. Debt ratios and fundamentals are truncated at the 1st and 99th percentiles. The firm-fixed effects are critical for my purposes in these regressions. My intent is to assess factors that are associated with *within-firm* changes in leverage. The firm-fixed effects control for cross-sectional differences in firm characteristics, including industry-specific and country-specific factors which may have an effect on levels of debt. At the same time, the firm-fixed effects specification removes the effect of changes in leverage that are due simply to changes in sample composition over time.

Panel A of Table 3 reports estimates of equation (2) with the book-value debt ratio as the dependent variable. Standard errors, adjusted for heteroskedasticity as in White

service industries (with low tangible assets), but that within a given firm, the stock of tangible assets tends to rise over time.

(1980), are in parentheses below coefficient estimates. Column 1 shows that larger firm size is associated with higher debt ratios. Column 2 shows that lower profitability is associated with higher levels of debt. Column 3 shows that higher asset tangibility is associated with higher debt ratios. Finally, Column 4 shows that fewer growth opportunities (i.e., lower market-to-book ratios) are associated with higher levels of debt. In each of the four columns, the sign of the coefficient is as expected and consistent with previous literature. In addition, in each of the four columns, the estimated coefficient is statistically significant, with all four coefficients demonstrating significance at the 1% level. Column 5 shows that all four coefficients retain significance at the 1% level when included simultaneously.

While statistical significance of the results is high, I also assess the economic significance of the results. To do so, I consider how average changes in the firm-level fundamentals between 1980 and 2004 would be expected to impact debt ratios given the regression results. For example, within-firm changes in size (as shown in Table 2 and Figure 5) show that, on average, the log of sales increased by 2.36 between 1980 and 2004. The regression coefficient on size (Table 3, Column 5) of 1.55 thus indicates that this average increase in size would be associated with an average debt ratio increase of 3.7 percentage points. Similar calculations for profitability (again, using the coefficient in Column 5) indicate that the decline in profitability of 0.10 between 1980 and 2004 would be associated with an average debt ratio increase of 3.3 percentage points. The increase in asset tangibility would be associated with an average debt ratio increase of 0.6 percentage points, and the decrease in market-to-book ratios would be associated with an average debt ratio increase of 0.5 percentage points. Thus, while all four firm-level fundamentals demonstrate strong statistical significance, the effects of size and profitability appear to be the most economically significant. Together, the average change in these four factors between 1980 and 2004 would imply an increased book-value debt ratio of 8.1 percentage points, which is large relative to the 9.8 percentage point increase in book-value debt ratios observed over this period.

Panel B of Table 3 reports similar results for market-value debt ratios. Again, all four firm-level fundamentals have statistically significant (at the 1% level) correlations with debt ratios. The economic significance of the results again appears to be large. A similar analysis as that conducted above for book-value debt ratios implies that the increase in size would be associated with an average market-value debt ratio increase of

3.0 percentage points, profitability with a 2.9 percentage-point increase, asset tangibility with a 1.0 percentage-point increase, and growth opportunities with a 3.8 percentage-point increase. The largest difference, compared to book-value debt ratios, is that in this case, the decrease in growth opportunities appears to play a larger role in the increase in market-value debt ratios. Together, the change in all four fundamentals between 1980 and 2004 implies an increased market-value debt ratio of 10.7 percentage points, which is large relative to the 14.5 percentage point increase in market-value debt ratios over this period.

The results in Table 3 strongly suggest that trends in basic firm-level fundamentals are large enough to explain most of the increase in debt ratios in emerging markets over the past quarter century. The calculations above suggest that shifts in these four fundamentals could account for three-quarters (i.e., 10.7/14.5) or more (i.e., 8.1/9.8) of the increase in debt ratios over this period. To a great degree, debt ratios increased in emerging markets because the nature of emerging market firms changed. The result suggests that, as opposed to reflecting an undisciplined rush for expansion, the rise in leverage reflects a rational response to changing conditions at the firm level.

In unreported tests, I perform additional regressions to assess the impact of other firm-level factors on debt ratios. Although size, profitability, asset tangibility, and growth opportunities are the variables most consistently found to be associated with capital structure, many other firm-level capital structure determinants have been proposed and tested in the literature. One other variable that I test is the volatility of the firm's stock. Following Bradley, Jarrell, and Kim (1984), Titman and Wessels (1988), and others, volatility should be negatively correlated with levels of debt. I take the measure of volatility from Worldscope, where volatility is measured as the average annual price movement, in percentage terms, to the stock's high and low price from its mean price in each year. I find that higher volatility is associated with lower levels of debt, but that the result is statistically significant for only one of the measures of debt. I also test for the effect of research and development spending, which, following Bradley, Jarrell, and Kim (1984), should also be negatively correlated with levels of debt. I also find that higher R&D spending (measured by R&D spending over sales) is associated with lower levels of debt, although again this result is significant for only one of the measures of debt.

3.2 Tax-Related Factors

In addition to the fundamental firm-level factors discussed above, changes in capital structure within firms could also be driven by tax-related factors. I am interested in studying how changes in tax-related factors over time may have contributed to the rise in debt ratios in emerging markets, and Worldscope provides sufficient firm-level year-by-year data to perform some basic tests on the effects of tax-related factors on leverage.

The first factor I study is the average tax rate paid by each firm in each year. This variable is calculated as the ratio of income tax to pre-tax income.[9] All else equal, an increase in a firm's tax rate should be associated with an increase in its use of interest-bearing debt.[10] For example, Desai, Foley, and Hines (2004) document that higher local tax rates are associated with higher debt ratios in multinational firms. The second factor I study is the availability of non-debt tax shields within each firm. I measure non-debt tax shields as the ratio of depreciation, depletion, and amortization to total assets. Although a negative relationship between the presence of non-debt tax shields and interest-bearing debt might be expected (because, following DeAngelo and Masulis, 1980, the two may be substitutes), empirical tests on the relationship between the two variables have had mixed results (see Harris and Raviv, 1991; Bradley, Jarrell, and Kim, 1984; MacKie-Mason, 1990).

Table 4 presents the results of regressions of debt ratios on these tax-related factors. In Panel A the dependent variable, as before, is the book-value debt ratio. Column 1 reports a positive coefficient on the firm's tax rate, with the coefficient being significant at the 1% level. The positive coefficient is as expected, and indicates that when firms faced higher average tax rates, they tended to have higher levels of debt. Column 2 shows that non-debt tax shields are also positively correlated with debt ratios, and that the correlation is statistically significant. However, in Column 3, when both factors are included in the regression, non-debt tax shields no longer have a significant correlation with debt ratios. In Column 4, I consider the interactive effect of the two tax-related

[9] Lack of data availability prevents the use of more sophisticated measures of marginal tax rates such as those in Graham (1996).

[10] While some (e.g., Myers, 1984) question the empirical importance of interest tax deductibility for capital structure decisions, the evidence in Graham and Harvey (2001) affirms its importance in the minds of U.S. managers, and a number of studies document significant effects. See Graham (2003) for a review of the literature.

variables. I include a variable interacting the tax rate and non-debt tax shields (with both variables de-meaned). A negative and significant interaction effect is reported. One interpretation of this result is that firms increase their levels of debt when faced with higher tax rates, but that they are less likely to increase levels of debt in response to higher tax rates if they are protected by having non-debt tax shields in place. Similar results are reported in Panel B for the market-value debt ratio.

In addition to the statistical significance of the correlation between tax rates and debt ratios, I also consider the economic significance of the impact of tax rates. Over the period 1980 to 2004, the within-firm trend in tax rates shows a decline of .034 (See Table 2). Combined with the regression coefficient, this change in tax rates would suggest a small decline in debt ratios over this period of 0.1 percentage point. Therefore, changes in tax rates between 1980 and 2004 do not appear to explain much of the rise in debt ratios over this period. In contrast to the fundamental factors discussed above, the economic significance of tax rates appears to be relatively small, and if anything, the change in tax rates would predict a decline in the use of debt rather than an increase.

4 Country-Level Factors

The results of the previous section show that changes in firm-level fundamentals appear to explain a large portion of the increase in debt ratios between 1980 and 2004. The results suggest that firms had a greater demand for debt because of changes in fundamentals over that period. In this section, I consider whether changes in the supply of debt (i.e., in the availability of debt financing within the country) also played a role in the rise in leverage.

The availability of debt financing for a firm could come from within the country or from foreign sources. To assess the availability of debt financing within the country, I consider changes in financial development within the country over this period. The development of the credit market within a country would be expected to be positively correlated with debt ratios, particularly if firms face financial constraints (Booth et al., 2001). I measure credit market development as the ratio of domestic credit provided to the private sector over GDP. This measure comes from the World Bank and has widely been used as a measure of credit market development in other studies (e.g., Rajan and Zingales, 1998). In contrast to credit market development, stock market development would be expected to be negatively correlated with debt ratios, as the availability of equity finance should act as a substitute for debt finance (Booth et al., 2001).[11] I measure development of the equity market as the ratio of the market capitalization of listed companies over GDP. This is another widely used measure of financial development, which is taken from World Bank data and available only after 1987.

Finally, external financing could also come available from foreign markets, including from markets with a high-degree of financial development. I proxy for the availability of foreign financing with the level of openness of the country, measured as the ratio of trade to GDP. Although openness does not precisely measure the availability of foreign financing, I expect the degree to which countries participate in foreign product markets to be related to their participation in foreign capital markets. In theory, openness to foreign markets could have an impact on the availability of debt, equity, or both, and so the expected effect of openness on debt ratios is ambiguous.

Year-by-year summary statistics for all of these measures, as well as for per-capita GDP (also from the World Bank and in PPP terms), are reported in Table 5. For the variables in Table 5, the "trend" reported is a within-country trend, which is calculated in analogous fashion to the within-firm trends discussed previously (see equation (1)), but on country-level data with country-fixed effects. As such, the within-country trend removes the effect of changes due to changes in the available sample of country-level data over time.

To assess the impact of these country-level factors on debt ratios, I estimate the following regression equation:

$$DebtRatio_{ict} = \alpha + Firm_i + Year_t + \beta CountryFactors_{ct} + \gamma GDPPC_{ct} + \varepsilon_{ict}, \quad (3)$$

where $DebtRatio_{ict}$ is the debt ratio for firm i in country c in year t, $Firm_i$ represents firm-fixed effects, $Year_t$ represents a full set of year-specific dummy variables, $CountryFactors_{ct}$ indicates one or more of the country-level measures discussed above for country c in year t, and $GDPPC_{ct}$ is the log of GDP per capita for country c in year t. Per-capita GDP is included as a control variable to ensure that the measures of financial development are not just proxying for other unrelated changes in development

[11]Gianetti (2003) also finds a negative association between stock market development and debt ratios, although Demirgüç-Kunt and Maksimovic (1996) find that stock market development is associated with lower debt ratios in developed markets but not emerging markets.

in the country. Again, the firm-fixed effects are important in these regressions. Here they ensure that I am estimating how trends in country factors over time are correlated with within-firm trends in debt ratios. In these regressions, because the explanatory variables of interest vary only at the country level in any given year, the standard errors are adjusted for clustering within country/year pairs.

Panel A of Table 6 reports estimates of equation (3) with the book-value debt ratio as the dependent variable. Column 1 reports a positive correlation between credit market development and leverage. While the positive coefficient is as expected, it is not statistically significant. Although the coefficient is significant at the 10% level in Column 4 when all variables are included, the role of credit market development, statistically speaking, appears to be small. Column 2 reports a negative correlation between stock market development and leverage. If equity finance is a substitute for debt finance, then the sign of the coefficient is as expected, and it is significant at the 5% level. Column 3 shows that openness is positively associated with debt, possibly indicating that the availability of foreign financing increases the use of leverage. This coefficient is significant at the 1% level.

To assess the economic significance of these country-level factors, I calculate how changes in the country-level factors between 1980 and 2004 may have impacted average debt ratios over this period based on the estimated regression coefficients from Table 6. The within-country increase in credit market development between 1980 and 2004 was 0.17 (see Table 5). In conjunction with the estimated coefficient on credit market development (Panel A of Table 6, Column 4), the increase in credit market development implies an increase in average debt ratios of 0.7 percentage points. The increase in stock market development of 0.62 (see Table 5) implies a decrease in average debt ratios of 0.8 percentage points. Thus, the net effect of financial development within the country implies little change in average debt ratios, with the effect of equity market development slightly outweighing the effect of credit market development.

In contrast, the economic significance of openness is somewhat larger. The within-country increase in openness over the 25-year period was 0.25 (see Table 5). The coefficient on openness of 8.93 thus implies an increase in average debt ratios of 2.2 percentage points. While this is just a rough estimate of the economic significance, it implies that openness to foreign markets can account for a substantial proportion of the 9.8 percentage point increase in debt ratios between 1980 and 2004.

The results in Panel B of Table 6, using the market-value debt ratio, are fairly similar. Credit market development does not show statistical significance, but stock market development and openness are both significant at the 1% level. In terms of economic significance, the coefficient on credit market development would again suggest an increase in average debt ratios of 0.7 percentage points. But in this case, this effect is greatly outweighed by the effect of stock market development, as the coefficient of -3.08 on stock market development would imply a decrease in average debt ratios of 1.9 percentage points between 1980 and 2004. The effect of openness would be estimated at a 2.4 percentage point increase, which can be compared to the overall increase in market-value debt ratios of 14.5 percentage points over this period.

In summary, country-level supply factors appear to have had an impact on the increase in debt ratios in emerging markets, with openness to foreign markets having a larger effect than within-country financial development. Still, the economic significance of these effects suggests that they may be of secondary importance compared to firm-level demand factors.

5 Robustness Tests

I perform a number of additional tests to check the robustness of the results presented in the previous sections. Table 7 presents the results of some of these tests. The dependent variable in Table 7 is the book-value debt ratio; for brevity the results for the market-value debt ratio (which are similar) are excluded. In these regressions, because some of the variables of interest vary only at the country level in a given year, I adjust standard errors for clustering within country/year pairs. Column 1 reports results of a regression combining the firm-level fundamentals from Table 3 and the country-level factors from Table 6. The purpose of this test is to assess if results are similar when demand factors and supply factors are included in the same model. A caveat with these results is that when all explanatory variables are included at once, the sample size drops considerably because each variable has different missing observations. Column 1 shows that the results with both sets of variables included are similar to the separate results presented in Tables 3 and 6. The exception is that the coefficient on growth opportunities is no longer significant at standard levels. Otherwise, the magnitude of each coefficient is similar to those reported previously. (The largest other change is for per-capita GDP, which, in comparison with Table 6, is now strongly negative.)

Column 2 of Table 7 reports results of a similar regression but with financial firms (those with primary SIC codes between 6000 and 6999) excluded. The purpose of excluding financial firms is that financial statement information (including debt ratios) may not be comparable between financial firms and other firms. Because I use firm-fixed effects throughout the analysis, this lack of comparability is not a large concern in this paper. Nevertheless, I present this robustness test for consistency with other capital structure studies that exclude financial firms. The results with financial firms excluded are very similar to the results in Column 1. The sample size does not drop by much when financial firms are excluded because many of them are already naturally excluded when other firm-level variables (e.g., asset tangibility) are included in the model.

Column 3 of Table 7 reports regression results excluding firms that have only a few observations. The goal is to assess if results are driven by firms that appear in the dataset for only a few years, or if the results hold including only firms with longer histories. In Column 3 I require that firms have at least 5 firm-year observations on debt ratios. The results are similar to those shown in Column 1. In other tests not reported, I require firms to have ten, 15, and 20 observations respectively. The results for each of these are similar to those shown in Column 3, with the following exceptions: when ten or 15 observations are required, asset tangibility loses significance, and when 20 are required, asset tangibility regains significance, but stock market development loses significance.

In Column 4 of Table 7 I exclude from the regression firms from countries that are wealthy enough that they may not be considered emerging markets. I exclude countries that attained log GDP per capita of 10.0 or greater by the end of the sample period. This cutoff excludes Israel, Hong Kong, and Singapore. The reported coefficients in Column 4 show that the results are not driven by these more-developed nations, as the results are similar to those reported in Column 1.

In other robustness tests not tabulated, I perform similar regressions with alternative debt ratios as the dependent variable. The results are similar using the market-value debt ratio. In addition, I test other debt ratios including total debt to total book capital, total debt to total market capital, and total debt to net assets. In each case the results are similar, with the key significant variables shown in Column 1 all retaining significance. In general, the findings of the paper appear to be robust to many alternative methodologies and specifications.

6 Conclusion

A firm's need for debt financing is likely to change as it goes through different phases of its life cycle. As firms mature, it is not unusual for them to experience fundamental changes such as increases in size, decreases in profitability, and a loss of growth opportunities. This paper shows that, on average, these fundamental changes have occurred in emerging market firms over recent decades. And it is these fundamental firm-level changes that can largely explain the increase in debt ratios in emerging markets over the past quarter century. As firms have changed, their optimal level of debt has changed.

Of course, an increase in a firm's optimal level of debt will not result in a higher debt ratio if no supply of debt financing is available. Accordingly, this paper also shows that the supply of debt appears to play a role in the increase in emerging markets leverage. The results suggest that financial development within the country plays a smaller role than the opening of the country to foreign markets. Perhaps this is because the amount of financing provided by incremental improvements in the domestic supply of debt capital in a developing economy is dwarfed by the amount of financing that comes available when a developing economy opens up to the already-developed capital markets of the wealthiest nations.

On balance, then, the evidence does not seem to suggest that the increased use of debt in emerging markets has somehow been haphazard, excessively risky, or undisciplined. Nevertheless, the analysis deals with overall trends in emerging markets, and thus does not rule out the possibility that some firms may have taken on excessive debt. In addition, the analysis deals with long-term trends, and thus does not rule out that temporary increases in leverage (such as that preceding the Asian crisis in 1997) may have been at odds with fundamental factors. But when the past quarter century is taken as a whole, the overall increase in debt financing in emerging markets is consistent with firms responding rationally to changes in their environments.

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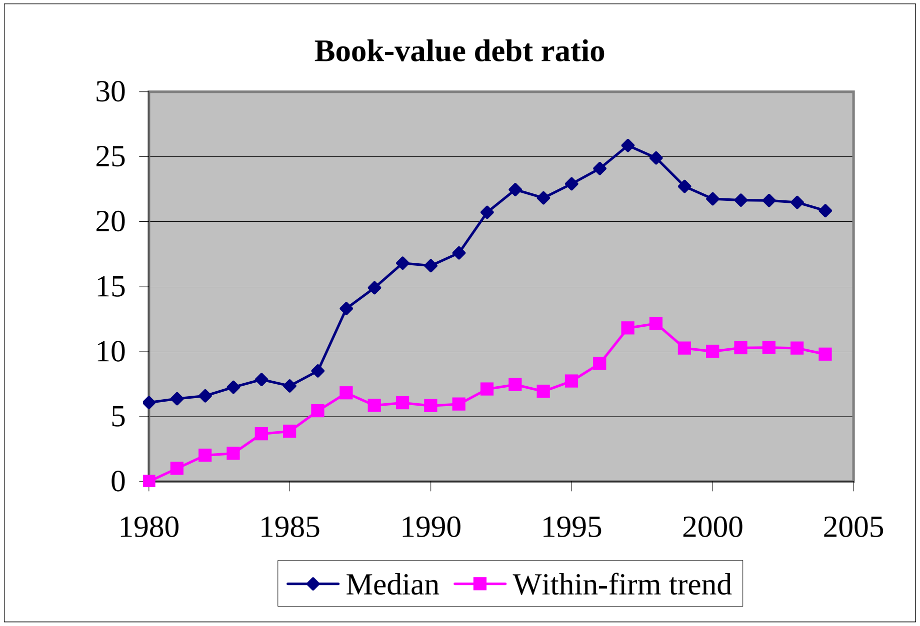
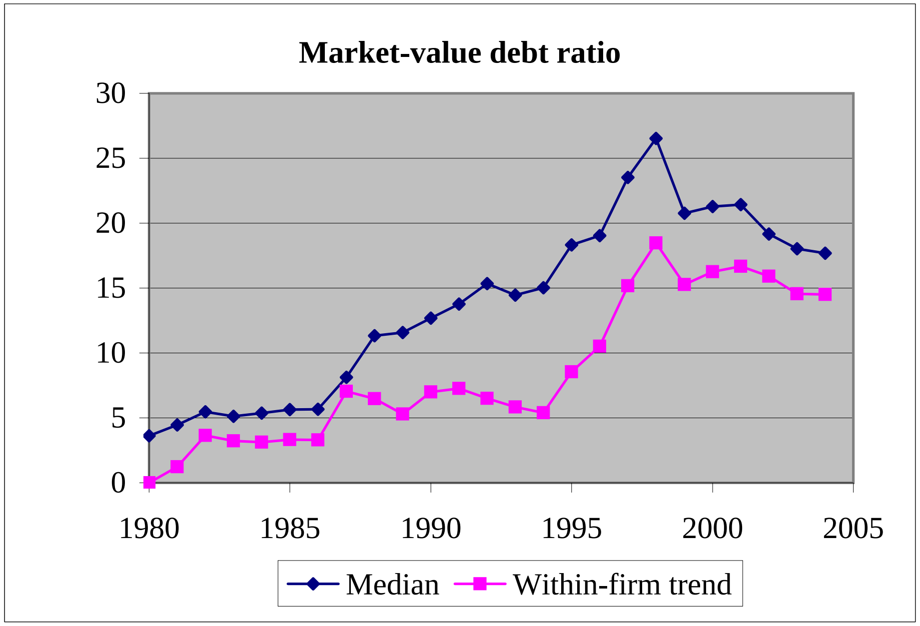
Figure 1
Trends in debt ratios for emerging market firms

The figures present trends in debt ratios in a sample of over 11,000 firms from 34 emerging markets over the period 1980 to 2004. The median is the median for the given year across all emerging market firms in the sample for that year. The within-firm trend is calculated from coefficients in a firm-fixed effects regression of debt ratios on year dummy variables. In Panel A, the debt ratio is total debt over total book assets, and in Panel B, the debt ratio is total debt over total market-value assets.



Panel A

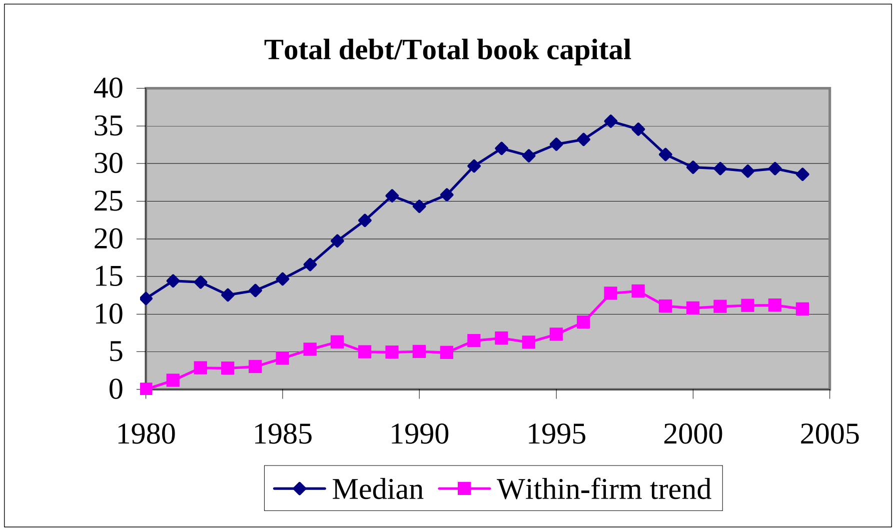


Panel B

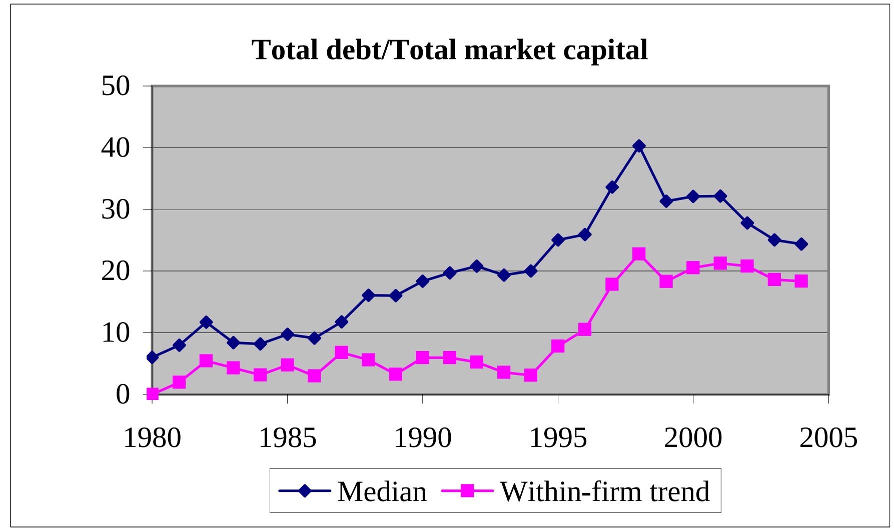
Figure 2

Trends in alternative measures of debt for emerging market firms

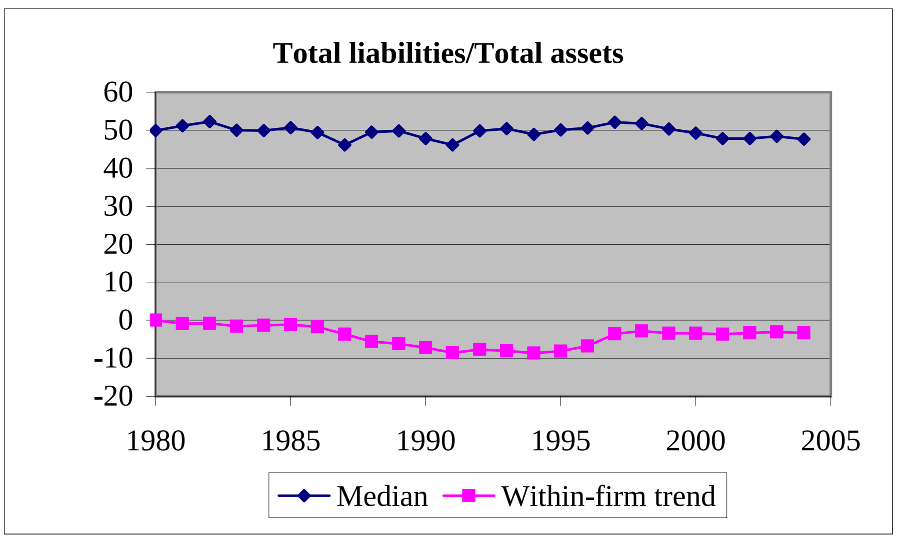
The figures present trends in debt ratios in a sample of over 11,000 firms from 34 emerging markets over the period 1980 to 2004. The median is the median for the given year across all emerging market firms in the sample for that year. The within-firm trend is calculated from coefficients in a firm-fixed effects regression of debt ratios on year dummy variables. In Panel A, the debt ratio is total debt over total book capital, in Panel B, the debt ratio is total debt over total market-value capital, in Panel C, the debt ratio is total liabilities over total assets, and in Panel D, the debt ratio is total debt over net assets.



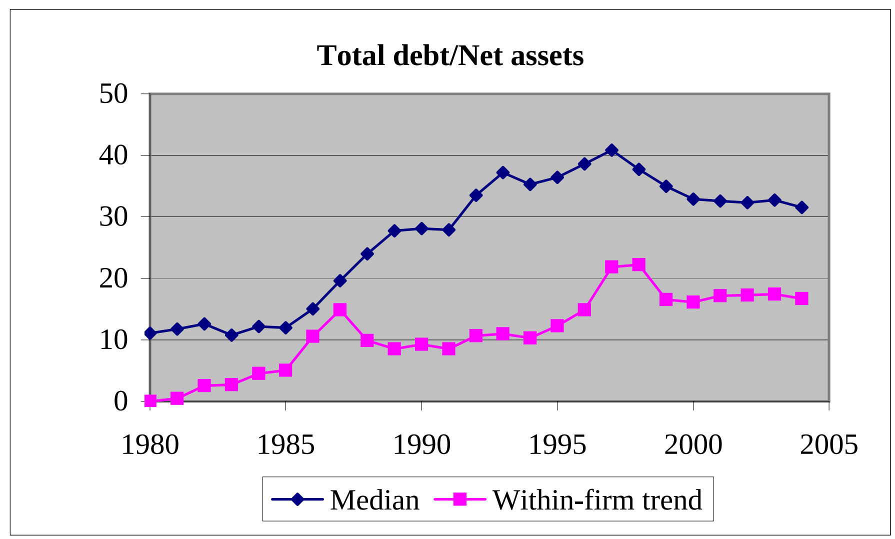
Panel A



Panel B



Panel C

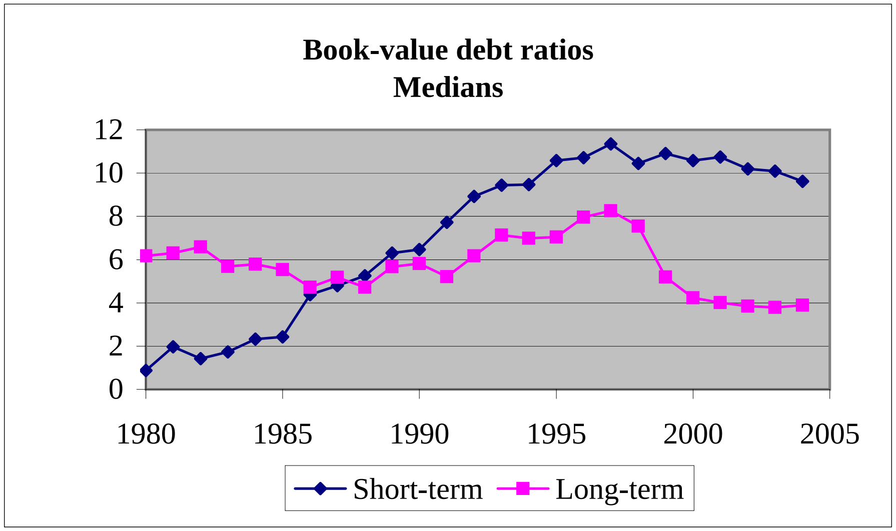


Panel D

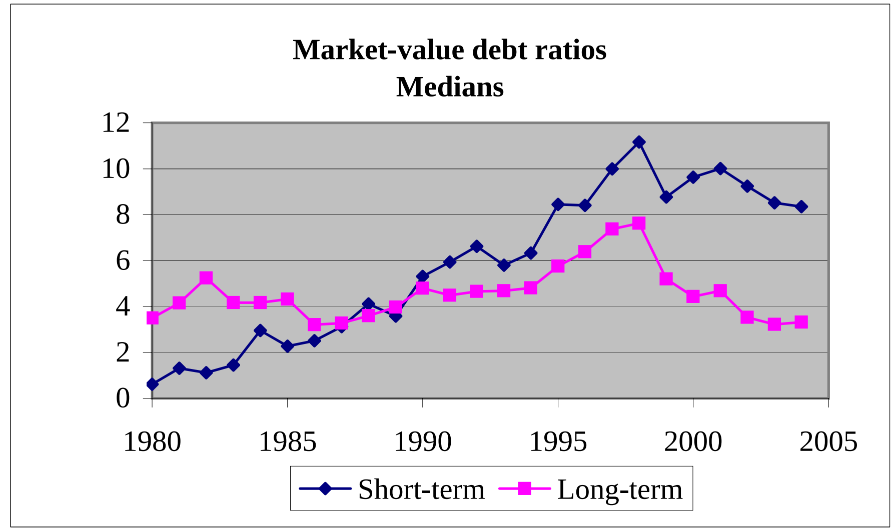
Figure 3

Trends in short-term debt compared to long-term debt

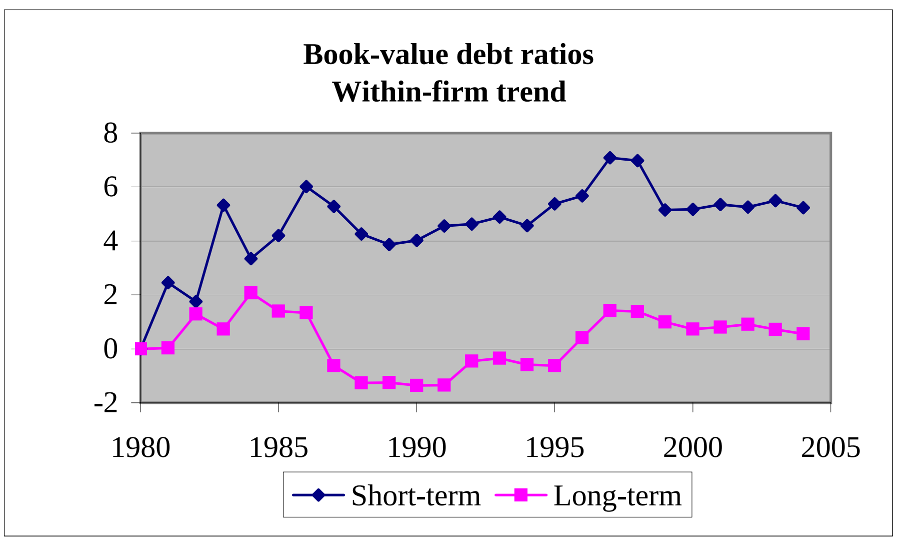
The figures present trends in short-term vs. long-term debt ratios in a sample of over 11,000 firms from 34 emerging markets over the period 1980 to 2004. Short-term is debt with maturity of one year or less. The median (Panels A and B) is the median for the given year across all emerging market firms in the sample for that year. The within-firm trend (Panels C and D) is calculated from coefficients in a firm-fixed effects regression of debt ratios on year dummy variables. In Panels A and C, debt is scaled by total book assets, and in Panels B and D, debt is scaled by total market-value assets.



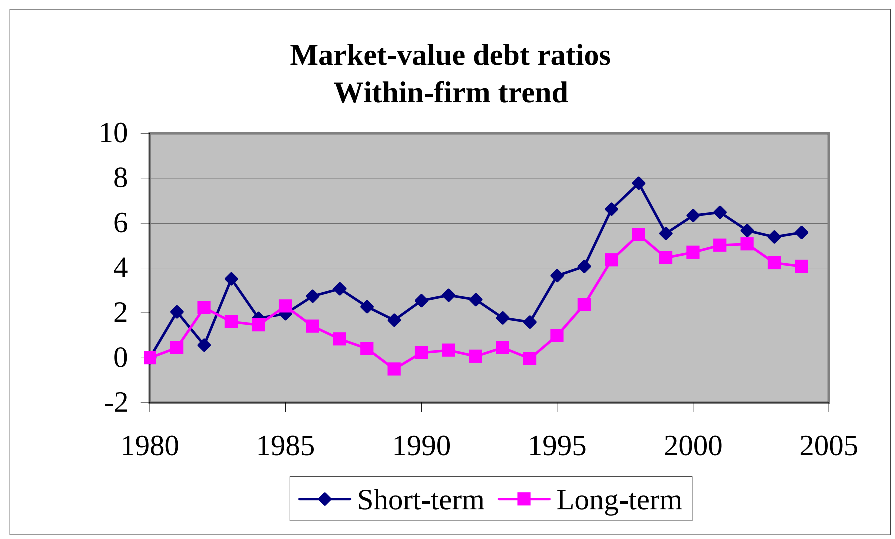
Panel A



Panel B



Panel C

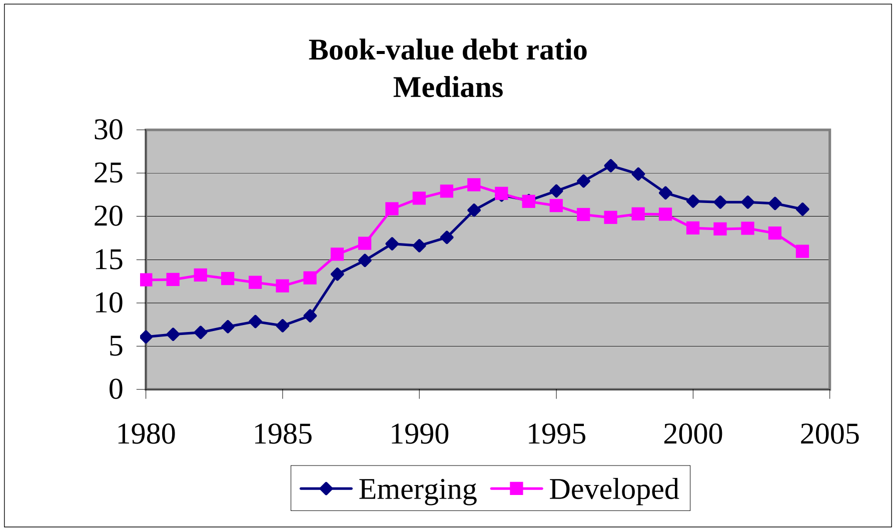


Panel D

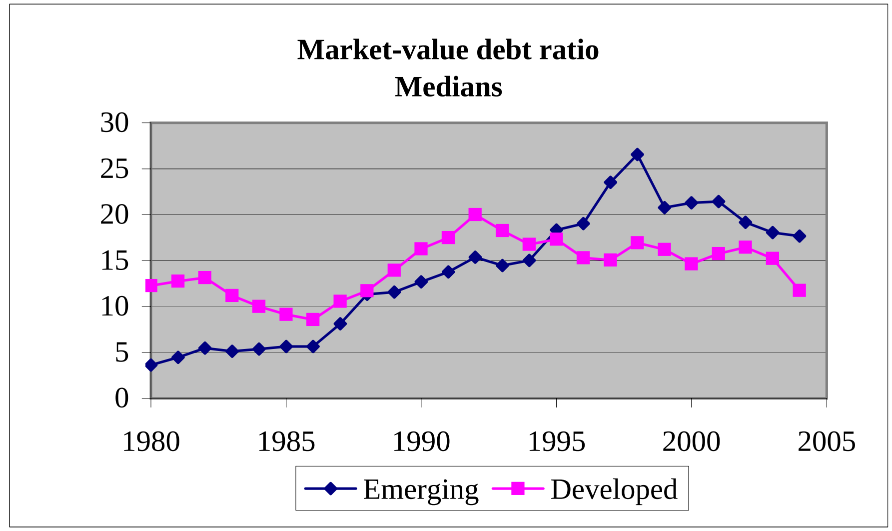
Figure 4

Trends in debt ratios of emerging markets compared to developed markets

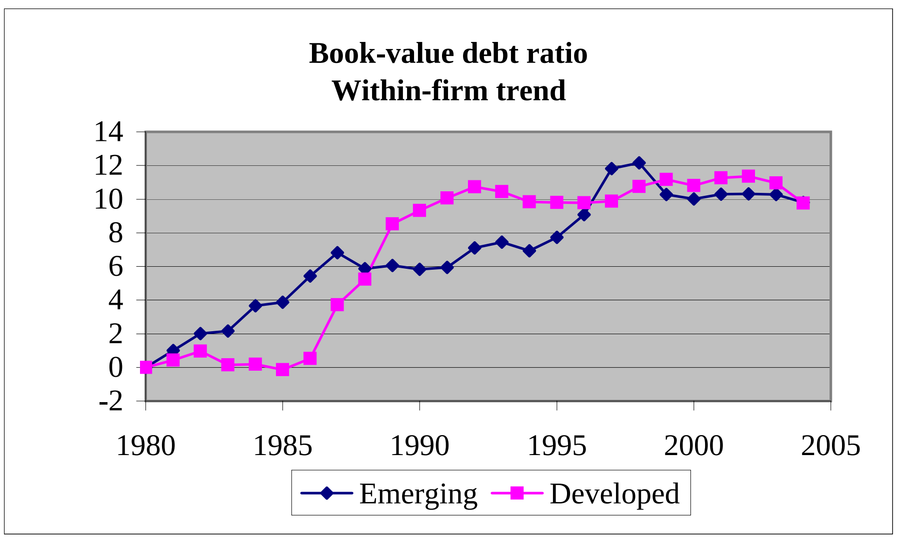
The figures present trends in debt ratios for emerging markets compared to developed markets over the period 1980 to 2004. The emerging markets sample consists of over 11,000 firms from 34 countries, the developed markets sample consists of over 18,000 firms from 24 countries. The median (Panels A and B) is the median for the given year across all firms in the sample for that year. The within-firm trend (Panels C and D) is calculated from coefficients in a firm-fixed effects regression of debt ratios on year dummy variables. In Panels A and C, debt is scaled by total book assets, and in Panels B and D, debt is scaled by total market-value assets.



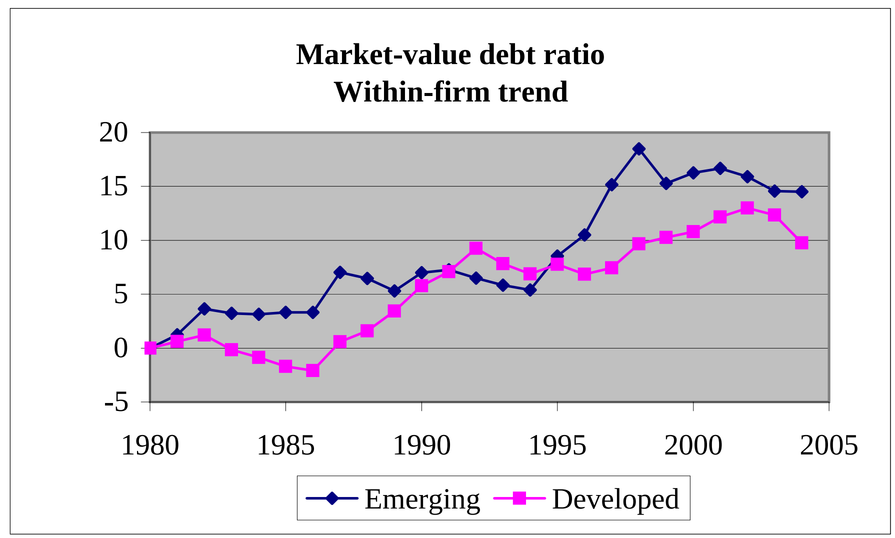
Panel A



Panel B



Panel C

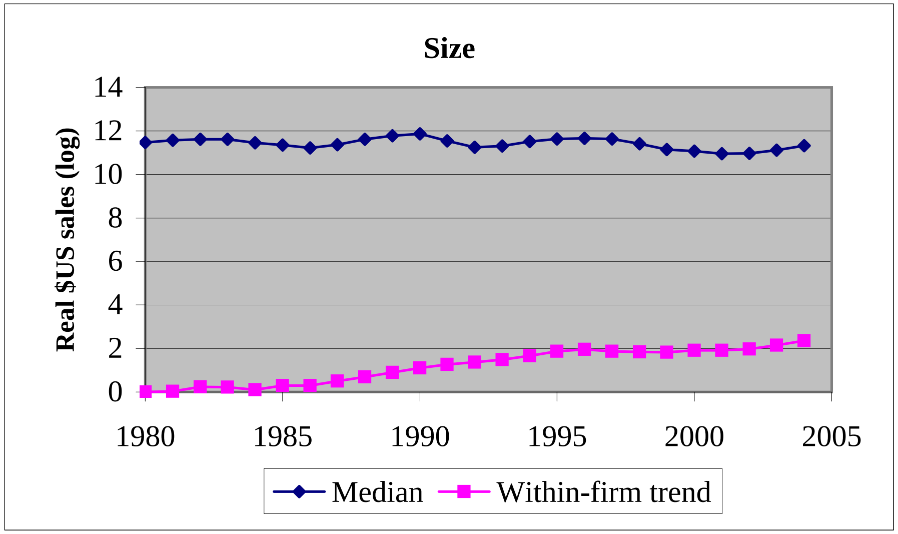


Panel D

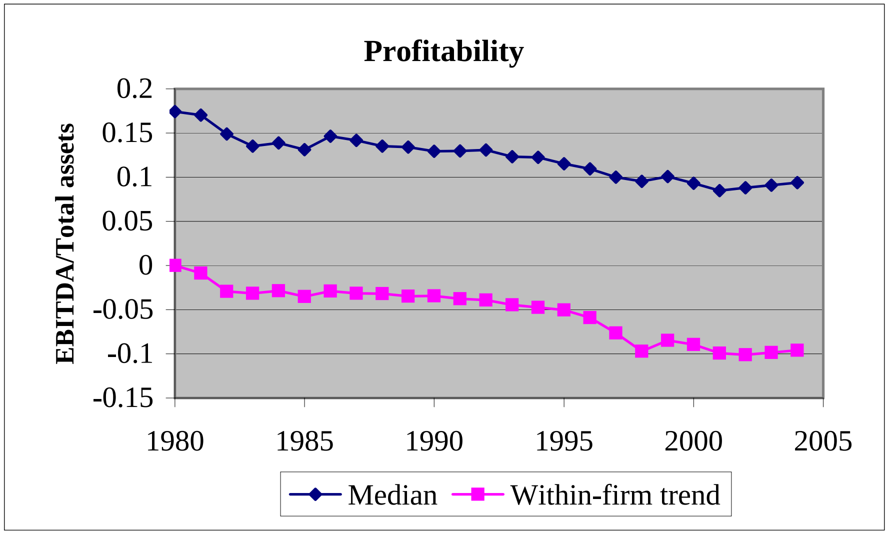
Figure 5

Trends in firm fundamentals for emerging markets firms

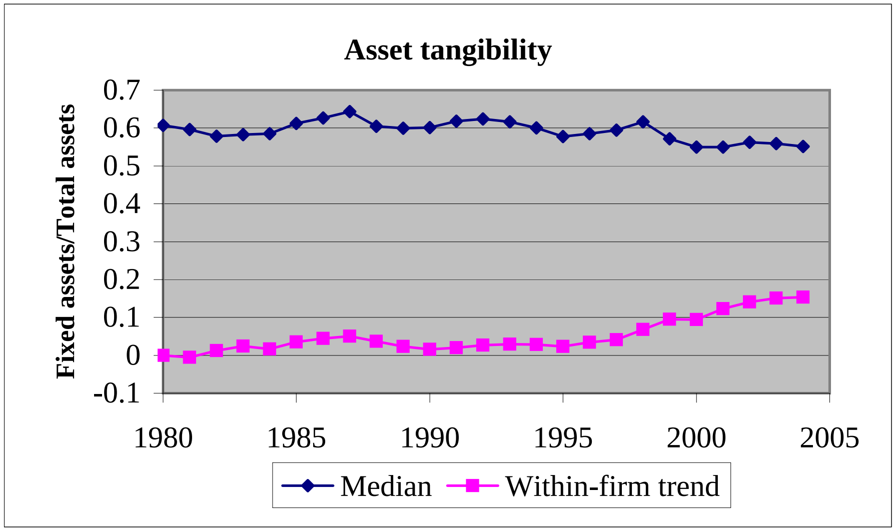
The figures present trends in firm-level fundamentals for emerging markets over the period 1980 to 2004. The sample consists of over 11,000 firms from 34 countries. The median is the median for the given year across all firms in the sample for that year. The within-firm trend is calculated from coefficients in a firm-fixed effects regression of the firm-level variables on year dummy variables. Size (Panel A) is the log of annual sales in real $US, profitability (Panel B) is EBITDA over total assets, asset tangibility (Panel C) is the ratio of fixed assets to total assets, and the market-to-book ratio (Panel D) is total assets minus book equity plus market capitalization all over total assets.



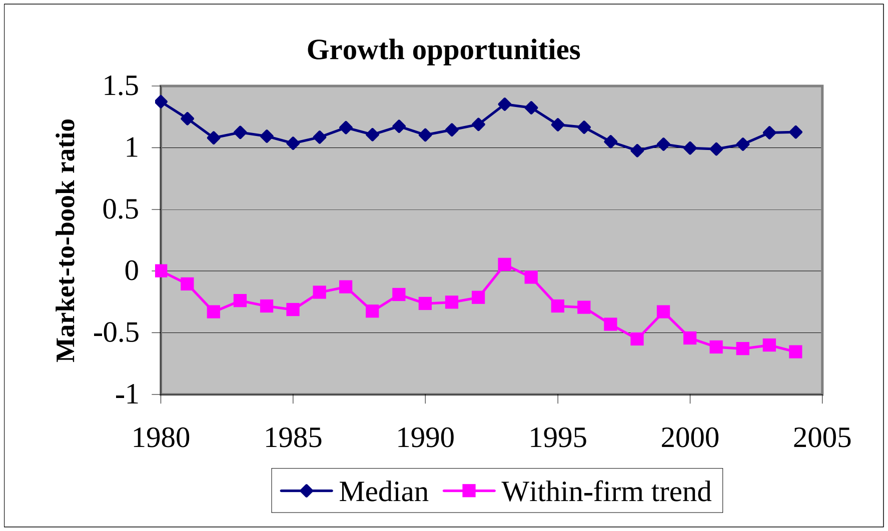
Panel A



Panel B



Panel C



Panel D

Table 1

Sample composition by country

The table presents the composition of the sample by country. Column 1 reports the number of firms included in the sample for each emerging market. Column 2 reports the earliest year for which data is available in the country.

	(1)	(2)		(1)	(2)
	Number of firms	Earliest year in data		Number of firms (continued)	Earliest year in data (continued)
Argentina	106	1986	Mexico	198	1980
Brazil	484	1987	Morocco	20	1997
Chile	216	1985	Pakistan	131	1988
China	1,501	1989	Peru	99	1987
Colombia	49	1987	Philippines	246	1988
Czech Republic	75	1995	Poland	126	1992
Egypt	26	1997	Russia	64	1995
Ghana	1	2000	Singapore	675	1980
Greece	374	1984	Slovakia	22	1996
Hong Kong	1,095	1980	Slovenia	8	2000
Hungary	45	1992	South Africa	761	1980
India	543	1989	Sri Lanka	27	1993
Indonesia	366	1989	Taiwan	1,485	1988
Israel	169	1992	Thailand	558	1987
Jordan	20	1997	Turkey	234	1987
Korea	979	1980	Venezuela	46	1987
Malaysia	1,084	1980	Zimbabwe	17	1993
			All	11,850	1980

Table 2

Firm-level summary statistics by year

The table presents summary statistics of debt ratios and other firm-level variables by year. Reported medians are across all firms in the sample for the year. "Trend" refers to the within-firm trend calculated from a firm-fixed effects regression of the variable on year dummies. Column 1 reports the number of firms available in each year; the number of observations for each variable may vary due to data availability. Size is the log of sales is real $US, profitability is EBITDA over total assets, asset tangibility is the ratio of (gross) fixed assets to total assets, the market-to-book ratio is total assets minus book equity plus market capitalization all over total assets. The tax rate is income tax over pretax income, and non-debt tax shields refers to depreciation, depletion, and amortization over total assets.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
		Debt ratios				Firm fundamentals								Tax-related factors			
Year	Number of obs.	Book-value debt ratio		Market-value debt ratio		Size		Profitability		Asset tangibility		Market-to-book ratio		Tax rate		Non-debt tax shields	
		Median	Trend	Median	Trend	Median	Trend	Median	Trend	Median	Trend	Median	Trend	Median	Trend	Median	Trend
1980	182	6.09	0.00	3.62	0.00	11.47	0.00	0.17	0.00	0.61	0.00	1.37	0.00	0.43	0.00	0.03	0.00
1981	223	6.37	1.00	4.46	1.24	11.57	0.03	0.17	-0.01	0.60	0.00	1.24	-0.11	0.44	-0.01	0.03	0.00
1982	235	6.60	2.01	5.46	3.65	11.62	0.24	0.15	-0.03	0.58	0.01	1.08	-0.33	0.44	-0.02	0.04	0.00
1983	249	7.26	2.16	5.12	3.22	11.62	0.22	0.14	-0.03	0.58	0.02	1.12	-0.24	0.44	-0.01	0.04	0.00
1984	279	7.85	3.66	5.36	3.14	11.45	0.10	0.14	-0.03	0.59	0.02	1.09	-0.28	0.44	0.02	0.04	0.00
1985	313	7.35	3.88	5.64	3.33	11.35	0.29	0.13	-0.04	0.61	0.04	1.04	-0.31	0.43	-0.02	0.04	0.00
1986	350	8.51	5.43	5.66	3.31	11.21	0.29	0.15	-0.03	0.63	0.04	1.09	-0.17	0.41	-0.03	0.04	0.00
1987	512	13.32	6.82	8.12	7.04	11.37	0.51	0.14	-0.03	0.64	0.05	1.16	-0.13	0.37	-0.06	0.03	0.00
1988	643	14.92	5.87	11.33	6.48	11.62	0.69	0.14	-0.03	0.60	0.04	1.11	-0.33	0.36	-0.06	0.03	0.00
1989	755	16.82	6.05	11.57	5.30	11.78	0.90	0.13	-0.03	0.60	0.02	1.17	-0.19	0.35	-0.05	0.03	0.00
1990	835	16.62	5.82	12.67	7.00	11.87	1.11	0.13	-0.03	0.60	0.02	1.10	-0.26	0.36	-0.03	0.03	0.00
1991	1,302	17.59	5.95	13.78	7.26	11.54	1.27	0.13	-0.04	0.62	0.02	1.15	-0.25	0.36	-0.06	0.03	0.00
1992	1,837	20.71	7.11	15.35	6.50	11.24	1.37	0.13	-0.04	0.62	0.03	1.19	-0.21	0.35	-0.05	0.04	0.00
1993	2,230	22.47	7.45	14.45	5.85	11.30	1.48	0.12	-0.04	0.62	0.03	1.35	0.05	0.34	-0.05	0.04	0.00
1994	2,492	21.82	6.94	15.01	5.39	11.51	1.67	0.12	-0.05	0.60	0.03	1.32	-0.05	0.33	-0.06	0.03	0.00
1995	3,211	22.92	7.74	18.32	8.54	11.63	1.86	0.12	-0.05	0.58	0.02	1.19	-0.29	0.32	-0.06	0.03	0.00
1996	3,781	24.09	9.08	19.03	10.51	11.66	1.96	0.11	-0.06	0.59	0.03	1.17	-0.30	0.32	-0.05	0.03	0.00
1997	4,160	25.86	11.81	23.53	15.17	11.63	1.87	0.10	-0.08	0.59	0.04	1.05	-0.43	0.32	-0.05	0.03	0.00
1998	4,768	24.91	12.15	26.54	18.48	11.42	1.84	0.10	-0.10	0.62	0.07	0.98	-0.55	0.32	-0.04	0.03	0.00
1999	6,980	22.72	10.27	20.77	15.28	11.15	1.83	0.10	-0.08	0.57	0.10	1.03	-0.33	0.30	-0.07	0.03	0.00
2000	8,208	21.76	10.01	21.28	16.25	11.08	1.91	0.09	-0.09	0.55	0.09	1.00	-0.54	0.30	-0.05	0.03	0.00
2001	9,424	21.65	10.29	21.44	16.69	10.96	1.91	0.08	-0.10	0.55	0.12	0.99	-0.62	0.30	-0.04	0.03	0.00
2002	9,815	21.63	10.32	19.17	15.91	10.97	1.98	0.09	-0.10	0.56	0.14	1.03	-0.63	0.30	-0.03	0.03	0.01
2003	9,944	21.49	10.27	18.04	14.56	11.12	2.14	0.09	-0.10	0.56	0.15	1.12	-0.60	0.29	-0.03	0.03	0.01
2004	9,513	20.84	9.79	17.68	14.51	11.32	2.36	0.09	-0.10	0.55	0.15	1.13	-0.66	0.29	-0.03	0.03	0.01

Table 3

Firm-level fundamentals and debt ratios

The table presents coefficient estimates from firm-fixed effects regressions of debt ratios on firm-level fundamentals. The sample includes all emerging market firms in Worldscope between 1980 and 2004. In Panel A the dependent variable is total debt over the book value of assets, and in Panel B the dependent variable is total debt over the market value of assets. Size is the log of sales is real $US, profitability is EBITDA over total assets, asset tangibility is the ratio of (gross) fixed assets to total assets, the market-to-book ratio is total assets minus book equity plus market capitalization all over total assets. Also included but not reported are a full set of year-specific dummy variables. Numbers in parentheses are heteroskedasticity-robust standard errors. Asterisks denote levels of significance, with *** indicating the 1% level of significance, ** the 5% level, and * the 10% level.

	(1)	(2)	(3)	(4)	(5)
Panel A: Dependent variable is the book-value debt ratio					
Size	0.34 ***				1.55 ***
	(0.10)				(0.16)
Profitability		-26.87 ***			-32.80 ***
		(0.75)			(0.99)
Asset tangibility			6.46 ***		4.08 ***
			(0.48)		(0.54)
Growth opportunities				-1.19 ***	-0.78 ***
				(0.09)	(0.11)
R-squared	0.72	0.73	0.73	0.74	0.77
N	78,903	72,188	61,973	68,426	50,328
Panel B: Dependent variable is the market-value debt ratio					
Size	0.62 ***				1.26 ***
	(0.12)				(0.16)
Profitability		-29.74 ***			-29.15 ***
		(0.81)			(0.90)
Asset tangibility			8.17 ***		6.42 ***
			(0.52)		(0.54)
Growth opportunities				-5.44 ***	-5.69 ***
				(0.10)	(0.12)
R-squared	0.72	0.73	0.73	0.75	0.78
N	69,222	63,580	53,905	68,896	50,310

Table 4

Firm-level tax-related factors and debt ratios

The table presents coefficient estimates from firm-fixed effects regressions of debt ratios on firm-level tax-related factors. The sample includes all emerging market firms in Worldscope between 1980 and 2004. In Panel A the dependent variable is total debt over the book value of assets, and in Panel B the dependent variable is total debt over the market value of assets. The tax rate is the ratio of income tax to pretax income, and non-debt tax shields are measured by the ratio of depreciation, depletion, and amortization to total assets. Also included but not reported are a full set of year-specific dummy variables. Numbers in parentheses are heteroskedasticity-robust standard errors. Asterisks denote levels of significance, with *** indicating the 1% level of significance, ** the 5% level, and * the 10% level.

	(1)	(2)	(3)	(4)
Panel A: Dependent variable is the book-value debt ratio				
Tax rate	2.34 ***		2.32 ***	2.06 ***
	(0.29)		(0.30)	(0.31)
Non-debt tax shields		45.92 ***	6.38	2.94
		(3.94)	(4.65)	(4.69)
Tax rate X Non-debt tax shields				-47.13 ***
				(11.28)
R-squared	0.75	0.72	0.75	0.75
N	57,712	72,547	51,688	51,688
Panel B: Dependent variable is the market-value debt ratio				
Tax rate	4.22 ***		4.42 ***	4.20 ***
	(0.36)		(0.39)	(0.38)
Non-debt tax shields		41.21 ***	3.51	0.58
		(4.21)	(5.33)	(5.35)
Tax rate X Non-debt tax shields				-41.41 ***
				(12.44)
R-squared	0.74	0.72	0.74	0.74
N	49,694	63,729	44,645	44,645

Table 5

Country-level summary statistics by year

The table presents summary statistics of country-level variables by year. Reported medians are across all countries in the sample for the year. "Trend" refers to the within-country trend calculated from a country-fixed effects regression of the variable on year dummies. Column 1 reports the number of countries available in each year. All country-level variables come from the World Bank. Credit market development is the ratio of domestic credit to GDP, stock market development is the ratio of stock market capitalization to GDP, and openness is the ratio of trade to GDP. The number of countries relfects the number of countries available for any of the measure; the actual number available for each measure in an given year varies.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Number of countries	Credit market development		Stock market development		Openness		Log GDP per capita	
		Median	Trend	Median	Trend	Median	Trend	Median	Trend
1980	28	0.36	0.00	NA	NA	0.51	0.00	8.40	0.00
1981	28	0.38	0.02	NA	NA	0.51	0.00	8.42	0.02
1982	28	0.39	0.08	NA	NA	0.47	-0.04	8.40	0.03
1983	28	0.44	0.08	NA	NA	0.45	-0.04	8.42	0.03
1984	29	0.37	0.08	NA	NA	0.48	-0.02	8.49	0.07
1985	29	0.36	0.07	NA	NA	0.46	-0.02	8.49	0.08
1986	29	0.37	0.06	NA	NA	0.46	-0.04	8.52	0.11
1987	29	0.33	0.06	NA	NA	0.47	-0.02	8.57	0.14
1988	29	0.34	0.07	0.08	0.00	0.49	0.01	8.58	0.17
1989	30	0.33	0.08	0.10	0.09	0.47	0.02	8.60	0.19
1990	31	0.32	0.09	0.13	0.08	0.50	0.03	8.66	0.20
1991	32	0.31	0.09	0.15	0.17	0.52	0.06	8.71	0.21
1992	33	0.32	0.10	0.12	0.18	0.56	0.10	8.75	0.23
1993	33	0.32	0.14	0.22	0.46	0.57	0.08	8.78	0.24
1994	33	0.36	0.14	0.25	0.40	0.54	0.09	8.79	0.27
1995	33	0.37	0.16	0.22	0.38	0.58	0.13	8.77	0.30
1996	33	0.36	0.17	0.24	0.42	0.59	0.13	8.83	0.34
1997	33	0.39	0.22	0.28	0.32	0.60	0.15	8.81	0.37
1998	33	0.39	0.22	0.23	0.30	0.62	0.18	8.78	0.36
1999	33	0.35	0.21	0.39	0.56	0.64	0.18	8.78	0.38
2000	33	0.36	0.20	0.32	0.42	0.66	0.25	8.87	0.41
2001	33	0.38	0.20	0.27	0.37	0.66	0.23	8.91	0.42
2002	33	0.37	0.20	0.27	0.39	0.64	0.22	8.94	0.44
2003	32	0.35	0.20	0.30	0.52	0.62	0.24	8.98	0.47
2004	32	0.35	0.17	0.36	0.62	0.55	0.25	9.03	0.52

Table 6
Country-level factors and debt ratios

The table presents coefficient estimates from firm-fixed-effects regressions of debt ratios on country-level factors. The sample includes all emerging market firms in Worldscope between 1980 and 2004. In Panel A the dependent variable is total debt over the book value of assets, and in Panel B the dependent variable is total debt over the market value of assets. All country level variables come from the World Bank. Credit market development is the ratio of domestic credit to GDP, stock market development is the ratio of stock market capitalization to GDP, and openness is the ratio of trade to GDP. Also included but not reported are a full set of year-specific dummy variables. Numbers in parentheses are heteroskedasticity-robust standard errors, adjusted for clustering within country/year pairs. Asterisks denote levels of significance, with *** indicating the 1% level of significance, ** the 5% level, and * the 10% level.

	(1)		(2)		(3)		(4)	
Panel A: Dependent variable is the book-value debt ratio								
Credit market development	2.61						4.02	*
	(2.26)						(2.44)	
Stock market development			-0.88	**			-1.30	***
			(0.42)				(0.47)	
Openness					6.74	***	8.93	***
					(1.86)		(1.98)	
Log GDP per capita	4.94	**	2.63		3.92		-3.42	
	(2.35)		(4.01)		(2.71)		(3.56)	
R-squared	0.72		0.72		0.72		0.73	
N	71,412		70,934		66,034		62,611	
Panel B: Dependent variable is the market-value debt ratio								
Credit market development	2.98						3.91	
	(2.68)						(3.00)	
Stock market development			-2.68	***			-3.08	***
			(0.77)				(0.67)	
Openness					7.01	***	9.77	***
					(2.06)		(2.48)	
Log GDP per capita	6.08	**	2.52		5.56	*	-3.43	
	(2.77)		(3.95)		(3.24)		(4.51)	
R-squared	0.72		0.72		0.72		0.73	
N	62,814		62,621		57,680		54,839	

Table 7
Robustness tests

The table presents coefficient estimates from firm-fixed effects regressions of debt ratios on firm-level fundamentals and country-level variables. The dependent variable is total debt over the book value of assets. Size is the log of sales is real $US, profitability is EBITDA over total assets, and asset tangibility is the ratio of (gross) fixed assets to total assets. All country level variables come from the World Bank. Credit market development is the ratio of domestic credit to GDP, stock market development is the ratio of stock market capitalization to GDP, and openness is the ratio of trade to GDP. Financial firms are those with primary SIC from 6000-6999, and the "wealthiest economies" are those with log GDP per capita above 10.0 in 2004. Also included but not reported are a full set of year-specific dummy variables. Numbers in parentheses are heteroskedasticity-robust standard errors, adjusted for clustering within country/year pairs. Asterisks denote levels of significance, with *** indicating the 1% level of significance, ** the 5% level, and * the 10% level.

Robustness test:	*All variables together*	*Financial firms excluded*	*Firms with <5 observations excluded*	*Wealthiest economies excluded*
	(1)	(2)	(3)	(4)
Size	1.51 ***	1.58 ***	1.56 ***	1.64 ***
	(0.29)	(0.32)	(0.30)	(0.35)
Profitability	-33.10 ***	-33.44 ***	-34.14 ***	-37.61 ***
	(2.55)	(2.63)	(2.36)	(2.18)
Asset tangibility	3.71 ***	3.90 ***	3.79 ***	3.05 ***
	(1.00)	(1.08)	(1.00)	(1.11)
Growth opportunities	-0.15	-0.08	-0.12	0.01
	(0.21)	(0.22)	(0.22)	(0.23)
Credit market development	3.46	3.21	3.45	2.59
	(2.90)	(2.94)	(2.88)	(3.10)
Stock market development	-1.52 ***	-1.54 ***	-1.54 ***	-1.91 **
	(0.44)	(0.45)	(0.45)	(0.88)
Openness	9.87 ***	9.86 ***	9.86 ***	10.94 ***
	(1.73)	(1.76)	(1.76)	(2.86)
Log GDP per capita	-9.53 **	-9.43 **	-9.54 **	-8.34 **
	(3.82)	(3.88)	(3.79)	(3.97)
R-squared	0.77	0.78	0.76	0.78
N	37,352	35,735	34,475	32,869