

# Why Have Debt Ratios Increased for Firms in Emerging Markets?

Todd Mitton

Brigham Young University

MARRIOTT SCHOOL  
BRIGHAM YOUNG UNIVERSITY

## 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)
- **Evidence on emerging market capital structures**
  - Demirgüç-Kunt and Maksimovic (1996, 1999), Booth et al. (2001), Allayannis, Brown, and Klapper (2003), Harvey, Lins, and Roper (2004), Desai, Foley and Hines (2004, 2006), Schmukler and Vesperoni (2006), and others

## Goals of this Project

- 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
- 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

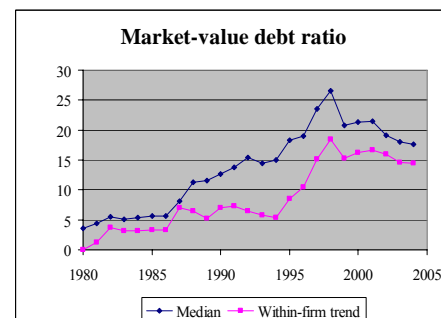
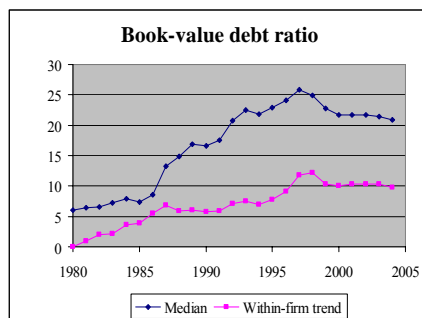
- Fewer than 500 observations/year in early 1980s, but more than 9,000 observations/year in early 2000s
- Do apparent trends reflect real changes within firms or just changes in sample composition?
- Solution: Find within-firm trends using coefficients on year dummies in firm-fixed effects regressions

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

### 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

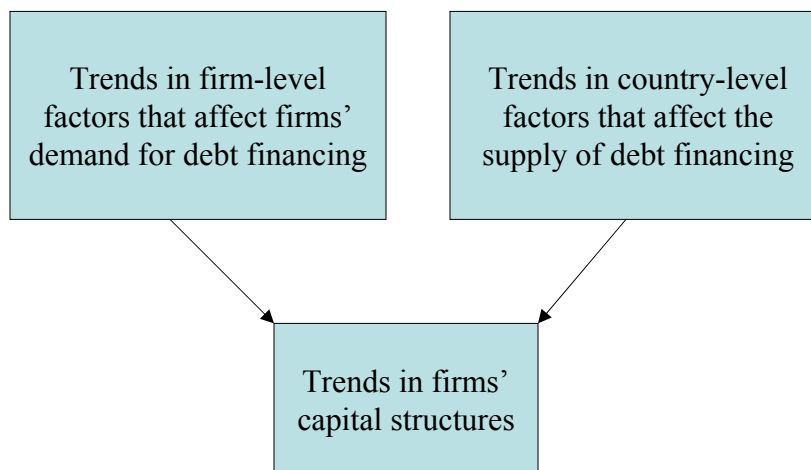


- Median and within-firm trend are across all 11,850 firms in the sample
- Outliers (outside 99<sup>th</sup>/1<sup>st</sup> percentiles) are excluded when calculating within-firm trend

## 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), Schmukler and Vesperoni (2006)
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
  - (e.g., Rajan and Zingales, 1995; Frank and Goyal, 2003)

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

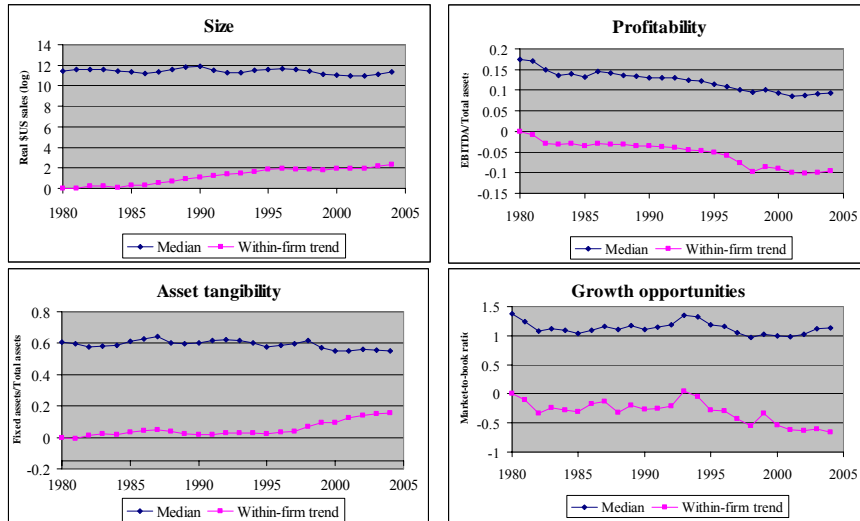
- Estimate the following equation:

$$\text{DebtRatio}_{it} = \alpha + \text{Firm}_i + \beta \text{Fundamentals}_{it} + \text{Year}_t + \varepsilon_{it}$$

## Regression Results: Firm-level Demand Factors

Table 3 (Excerpt)					
Firm-level fundamentals and debt ratios					
<i>Panel A: Dependent variable is the book-value debt ratio</i>					
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
<i>Book-value debt ratio</i>			
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
<i>Market-value debt ratio</i>			
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

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

- Estimate the following equation:

$$\text{DebtRatio}_{it} = \alpha + \text{Firm}_i + \beta \text{CountryFactors}_{ct} + \gamma \text{GDPPC}_{ct} + \text{Year}_t + \varepsilon_{it}$$

## Regression Results: Country-level Supply Factors

<i>Panel A: Dependent variable is the book-value debt ratio</i>				
Credit market development	2.61 (2.26)			4.02 * (2.44)
Stock market development		-0.88 ** (0.42)		-1.30 *** (0.47)
Openness			6.74 *** (1.86)	8.93 *** (1.98)
Log GDP per capita	4.94 ** (2.35)	2.63 (4.01)	3.92 (2.71)	-3.42 (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
<i>Book-value debt ratio</i>			
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
<i>Market-value debt ratio</i>			
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