



# IMF Working Paper

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## Nonfinancial Firms in Latin America: A Source of Vulnerability?

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**IMF Working Paper**

Western Hemisphere Department

**Nonfinancial Firms in Latin America:**

**A Source of Vulnerability?**

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November 2012

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**Abstract**

We examine corporate sector vulnerabilities in Brazil, Chile, Colombia, Mexico and Peru. First, we identify stylized facts based on corporate financial indicators. Second, we assess vulnerability of individual firms to a sudden stop in financing through a probit model, using a panel of 18 countries in 2000-11. Results suggest that higher leverage and maturity exposures raise a firm's probability to become exposed to a funding shock, while a larger firm size and buffers reduce it. Further, greater exchange rate flexibility can help mitigate corporate vulnerability. Identification of firms at risk through the model suggests that some vulnerabilities may be building in Latin America led by leverage, currency exposures and moderating buffers. These effects are partially offset, however, by a significant reduction in maturity exposures.

JEL Classification Numbers: E30, F30, G30, G32, L1

Keywords: External Vulnerability, Corporate sector, Latin America, Global Shocks, Leverage, Debt Structure

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<sup>1</sup> This paper has benefited from comments from Gustavo Adler, Manuela Goretti, Dominique Guillaume, Dora Iakova, Herman Kamil, Charles Kramer, Leandro Medina, Daniel Rodriguez Delgado, Miguel Savastano, Hui Tong, Evridiki Tsounta, Yi Wu, Mercedes Garcia-Escribano, Shaun Roache, JaeBin Ahn, Luis Cubeddu, and seminar participants at the IMF. Anayo Osueke and Ben Sutton provided assistance in setting up the database. Any remaining errors are my own.

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## I. INTRODUCTION

Robust macroeconomic growth and easy financing conditions have characterized most emerging markets for much of the past decade, supporting the strong performance of the (non-financial) corporate sector. Particularly in Latin America and emerging Asia, firms have enjoyed a buoyant domestic demand, generally benign terms of trade and abundant domestic and foreign credit—which strong growth was only briefly interrupted during the Lehman crisis. In the so-called “LA5” countries (Brazil, Chile, Colombia, Mexico and Peru), favorable conditions have gone alongside strong corporate profitability and valuation, what would seem to be contained average leverage ratios at the regional level and low (and improving) maturity exposures, including vis-à-vis other emerging markets (Figure 1).

But how deeply seated is this seemingly strong corporate performance? Would firms in the LA5 countries resist a reversal in macroeconomic conditions if a tail event were to occur—as preempted by the Lehman crisis? Delving deeply into these questions is critical for at least two reasons:

- First, evidence shows that *boom* episodes can induce the buildup of vulnerabilities in the corporate sector—for instance, when firms’ assets become overvalued, they can take on excess domestic debt based on inflated collateral; likewise, abundant capital inflows can raise net foreign exposures in un-hedged firms, including in cases in which domestic credit is constrained (see, for instance, Bernanke and Gertler, 1995; Kiyotaki and Moore, 1997; Krugman, 1999; Bernanke et al, 1999; and Caballero and Krishnamurthy, 2003). Importantly, a cursory glance at corporate indicators can fail to detect such a buildup of risks, since they may be masked by asset overvaluation, high leverage or currency appreciation.<sup>2</sup>
- Second, a vulnerable corporate sector can transmit and/or magnify real or financial shocks, weakening a country’s overall macroeconomic resilience. That corporate sector vulnerabilities can heighten a country’s macroeconomic risks when adverse shocks arise has been well known to the economic literature for about two decades. The root of the problem lies on an over-leveraged corporate sector with high short-term liability exposures and narrow buffers (Jones and Karasulu, 2006). Firms in such conditions can serve either as a first channel of transmission of real or financial shocks into other sectors, or as a magnifier of shocks originating elsewhere in the economy, even in the presence of what would seem to be relatively robust macroeconomic fundamentals (Claessens et al, 2011a). Indeed, corporate vulnerabilities can severely impinge on the severity of a recession during crisis times through a variety of channels (Stone, 2000; Ivaschenko, 2003; Chen et al, 2010; and Claessens et al, 2011b), while corporate leverage, maturity exposures and buffers are important determining factors not only of the recovery of companies themselves

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<sup>2</sup> For instance, the debt-asset ratio may not signal an excessive buildup during booms as asset values trend up; a hike in foreign liabilities may not be fully reflected as a rise in leverage when the currency appreciates, and profitability measures—such as the return on equity (ROE) can be boosted by an increase in debt.

when a crisis strikes (Medina, 2012) but even for long-term macroeconomic growth more generally (Kennedy and Slok, 2005; Coricelli et al, 2010).

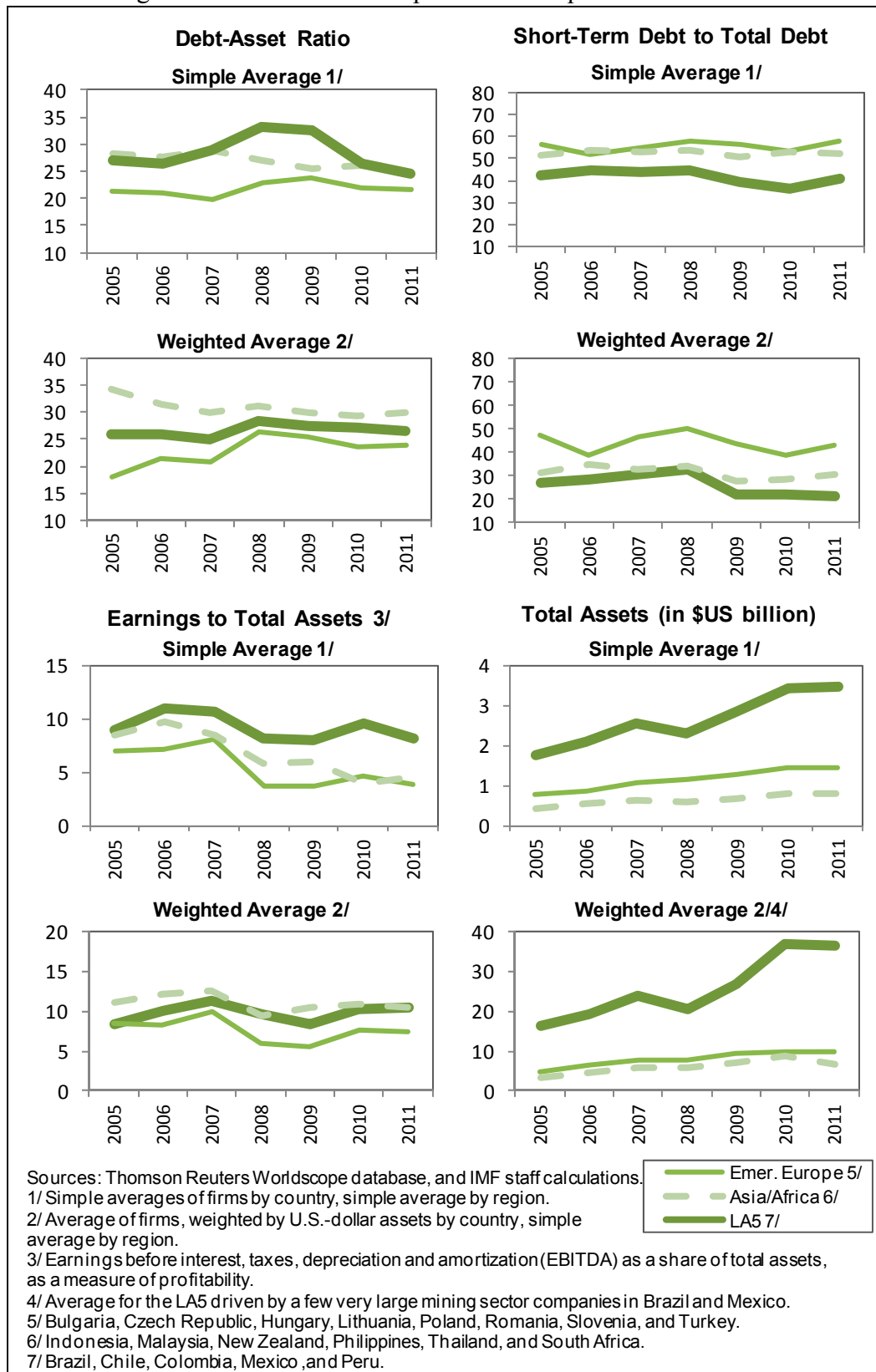
To gauge the presence of corporate sector vulnerabilities in LA5 countries, we use firm-level data from the Thomson Reuters Worldscope database, which we examine in two steps. First, we take a deep look at key corporate financial health indicators in the region to identify stylized facts and signs of a possible buildup of risks, particularly after the Lehman crisis. Second, we assess the share of firms in each country's sample that are vulnerable to a sudden stop in financing—both from domestic and foreign sources. Thus, a “vulnerable” firm is defined as one that has a high probability of needing to rollover its debt falling due, which would make it exposed to a sharp reversal in financial conditions under a tail event. To this end, we use a probit framework, estimated using an unbalanced panel of about 3,100 firms in 18 emerging markets and small developed countries in 2000–11, based both on individual firm characteristics (such as size, leverage burden, maturity exposure, collateral and liquidity buffers), and domestic and external macroeconomic conditions and policies. We use the model's predicted probabilities to evaluate the share of firms exposed to a sudden stop in financing over time in the LA5 countries, based on the benchmark probability of 50 percent.

Results from the probit estimation are intuitive and in line with the literature—suggesting that high leverage and maturity exposures raise a firm's probability to become exposed to a funding shock, while a larger firm size, as well as large liquidity and collateral buffers reduce it. Estimates also indicate that the average firm in our sample is a non-exporter, and hints at the possible presence of net foreign currency liability exposures. We also provide evidence that greater exchange rate flexibility can help mitigate corporate vulnerability to a sudden stop in financing, possibly by encouraging hedging, in line with previous literature (see, for instance, Martinez and Werner, 2002; Céspedes et al, 2004; Parley and Popper, 2006; Cowan et al, 2008; Patnak and Shah, 2010; and Kamil, 2012).

The results also suggest that the interplay of firm-level indicators and macroeconomic conditions has been such that, by end-2011, the number of firms in the LA5 countries that had a high probability of facing difficulties in securing financing in the case of a dry up in funding availability was at least as high as in 2007. Firms more likely to require market access are also relatively more vulnerable to a sharp reversal in financing conditions. We conclude that some vulnerabilities may be growing in Latin American countries—these would be led by rising leverage, net currency exposures and moderating buffers. These effects are partially offset, however, by a general and significant improvement in maturity exposures across the region.

The paper is structured as follows. Section II presents the stylized facts about the corporate sector in the LA5 countries; section III describes the probit model and its results, including the assessment of the share of vulnerable firms per country. Section IV concludes.

Figure 1. International Comparison of Corporate Performance



## II. SOME STYLIZED FACTS ABOUT THE CORPORATE SECTOR IN LATIN AMERICA

### A. A Look at the Data and its Caveats

We assess corporate vulnerability based on publicly traded firm-level data from the Thomson Reuters Worldscope database. In particular, balance sheet and cash-flow data are available for some 3,100 firms in 18 emerging markets and small advanced economies (including the LA5 countries) during the period 2000–11 (see Annex A for a detailed description of the database and the procedures used in the preparation for its analysis).

There are several caveats related to the use of these data for macroeconomic analysis. Among the most important is the fact that the database includes only a fraction of each country's corporate sector—which renders the question on the actual relevance of the sample. In our view, the dataset is valuable for macro-surveillance purposes, not only given the very large corporate sector data gaps existing in most countries, but also because as publicly traded firms tend to be large they are relevant at the macroeconomic level, and thus serve well to gauging corporate vulnerabilities that could impinge on the wider domestic economy.<sup>3</sup> For the LA5 countries, the aggregate assets of firms in the sample represent 20–125 percent of GDP, while aggregate debt ranges between 5–35 percent of GDP, on average, for 2000–11 (Table 1 and Annex B).<sup>4</sup>

Table 1. LA5: Number of Firms, Assets and Debt Held

	Total Number of Firms			Aggregate Assets to GDP 1/			Aggregate Debt to GDP 1/		
	2000	2005	2011	2000	2005	2011	2000	2005	2011
Brazil	153	208	220	39.3	42.4	57.6	11.2	11.4	17.2
Chile	101	124	121	126.4	119.3	126.0	45.3	36.2	35.2
Colombia	11	29	31	6.2	15.4	36.6	0.8	2.4	6.7
Mexico	61	74	77	24.7	39.4	36.3	6.1	12.2	10.8
Peru	34	67	66	17.4	17.8	20.5	5.7	4.7	5.5

Source: Thomson Reuters Worldscope and IMF World Economic Outlook.

1/ Cumulative values held by group, as a share of GDP.

A second important caveat has to do with the sample size, which varies within country over time—a feature that could give rise to a built-in survivorship bias of firms. The option of restricting the analysis to those firms that remain in sample for a specific period of time would only magnify such a bias, and would deplete the sample from information on the new firms that enter it or the failing companies that drop out. With this problem being particularly relevant for the estimation of the probit model, we take the approach of verifying the robustness of our results through a Heckman selection model.

<sup>3</sup> Indeed, systemic issues relating to a generalized weakness of a large number of relatively smaller (as in: non-publicly traded) firms would be missed by this analysis.

<sup>4</sup> A review of the assets and debt held by firm size suggests that firms in the fourth quartile per country sample (that is, the largest 25 percent of firms per country) hold more than 90 percent of the total assets, also per country sample (Annex B).

## B. A View by Sector of Economic Activity

We first review the health of the corporate sector in the LA5 countries from a sector-wide perspective (Annex A, Table A4). To do so, we examine the relative changes in key indicators of corporate financial health and performance before and after the Lehman crisis. When possible, we compare against benchmarks from the literature or levels observed in past macroeconomic crises where a weak corporate sector played an important role.<sup>5</sup> We focus on the following corporate indicators:

1. *Debt-asset ratio*, a first measure of a company's leverage burden, as a share of its total (book) asset value;
2. *Debt-equity ratio*, a second measure of the company's leverage, relative to the capital of the company's shareholders;
3. *Debt-sales ratio*, a third indicator of the debt burden over a firm's sales receipts;
4. *Short-term ratio*, equal to the sum of short term debt plus long-term debt falling due within one year, as a share of total debt—to measure the residual maturity structure of debt for the firms;
5. “*Quick ratio*” (also known as the “*Acid-Test ratio*”), a measure of liquidity that equals a firm's short term assets (net of inventories, which are considered less liquid, particularly in the low part of the cycle) over its short term liabilities; a quick ratio lower than one is generally considered a sign of weakness. Its *inverse* can help gauge the firm's *maturity mismatches*.
6. *Fixed- to-total-asset ratio*, a *proxy* of the potential collateral the firm has at hand—often referred to as a measure of *tangibility*. Collateral helps firms to access rationed credit markets at times of stress, reducing the risk of the lender suffering the agency costs of debt (like risk shifting), and helping the firm retain more value under liquidation (Rajan and Zingales, 1995).
7. *Earnings-to-total-asset ratio*, equal to the earnings before interest, taxes, depreciation and amortization (EBITDA) as a share of total assets—a basic measure of profitability.<sup>1</sup>

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<sup>5</sup> The literature tends to shy away from using general benchmarks to define areas of risk on key financial corporate health ratios, since corporate structures can vary significantly across countries, sectors and firm sizes, including because of different tax structures and the fact that financial systems in some countries may be more “market” oriented while others tend to be more “bank” oriented. Rajan and Zingales (1995) study corporate structures for the G7 countries, resolving some of these well-known discrepancies. In their analysis of corporate vulnerabilities in the G7 countries, Kennedy and Slok (2005) use “rule of thumb” benchmarks for a couple of corporate indicators, also based on values derived by earlier literature focused on industrialized countries. For a basic discussion, see Ross et al (2008), pp. 479-482.



A first assessment of corporate performance and financial health by sector and region suggests that (Figure 2):

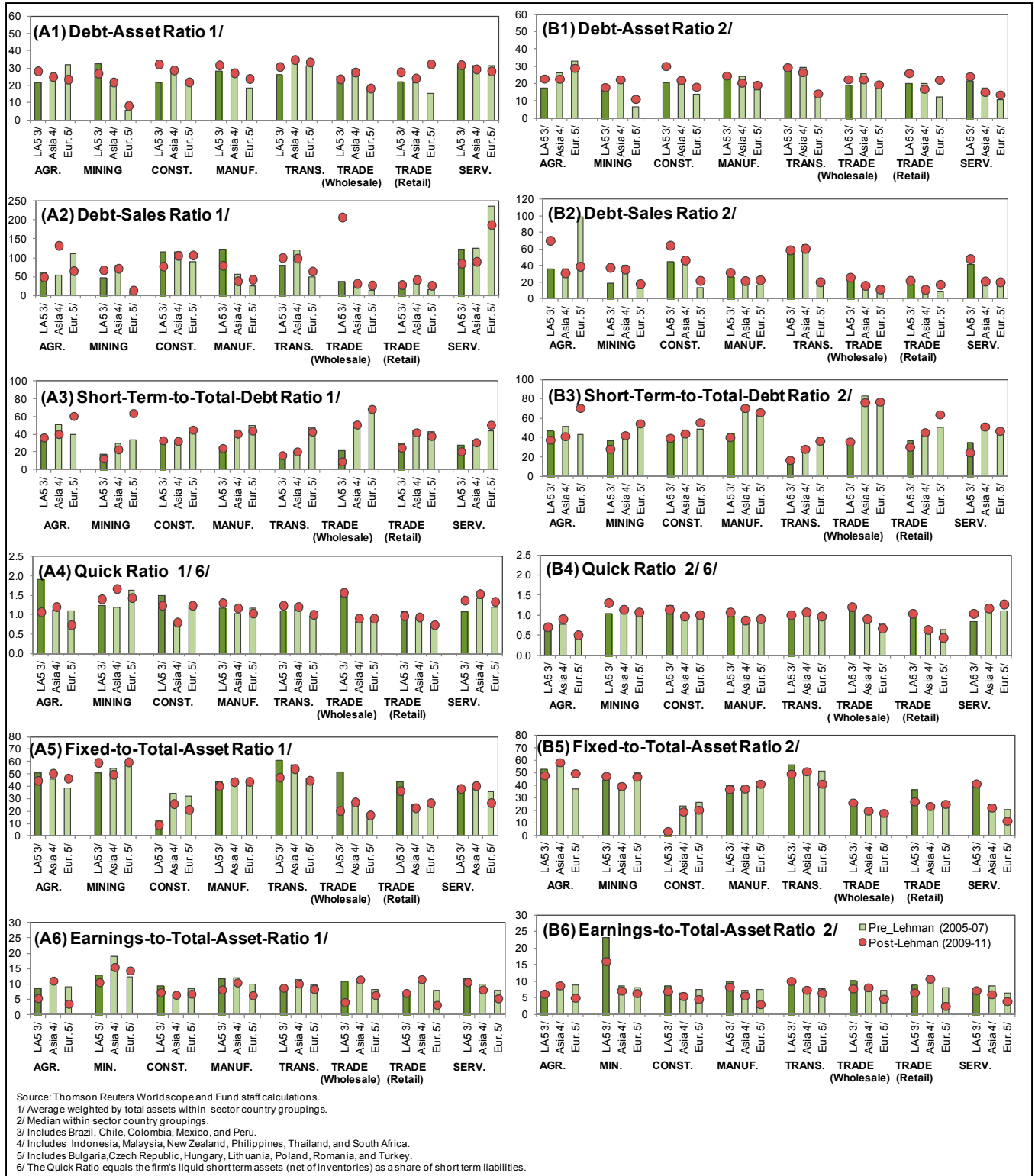
- *Debt-asset ratios rose in some sectors since the Lehman crisis*, particularly in agriculture, construction, manufacturing, transport,<sup>6</sup> retail trade and services. Leverage in these cases is relatively high in the LA5 countries vis-à-vis the region's peers—both in terms of weighted averages (Panel A) and for the median firm (Panel B). Debt-to assets remain at manageable levels (under 30 percent), although these moderate ratios are partly explained by the solid increases in asset valuation observed in recent years. Debt-sales indicators, on the other hand, show some “spikes” in the post-Lehman period, which are largely due to the impact of a few large firms with dropping sales turnover. This is the case for relatively large firms in the mining, transport and wholesale trade sectors (Panel A) and, more generally, for the median firm in agriculture and construction in the region (Panel B).
- *Short-term maturity exposures are low and improving, including vis-à-vis country comparators*. Short-term-debt-to-total-debt ratios have generally declined since the Lehman crisis across sectors, both for relatively large firms (as seen in the weighted averages, Panel A) and the median firm (Panel B). Further, maturity exposures for the LA5 are significantly lower (both pre- and post-Lehman) than those in comparison countries in Asia, Africa and Europe.<sup>7</sup>
- *Other indicators confirm some weakening in performance since the Lehman crisis*. Liquidity buffers have remained healthy in the post-Lehman period—both for the larger firms (Panel A), and the median level (Panel B), except for the agricultural sector. This said, collateral held has narrowed—especially for transportation and wholesale trade. Interestingly, there is a drastic difference in the share of fixed assets held by the construction sector in the LA5 countries compared to emerging Europe and emerging and advanced countries in Asia and Africa. This difference could be due to the backlog of real estate inventories in the latter regions, which does not seem to be present in the LA5 countries as a whole. Profitability has moderated noticeably in all sectors.

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<sup>6</sup> We use the term “transport” to define the sector comprised by firms in transport, communications and utilities (Annex A, Table A4).

<sup>7</sup> The declining short-term debt to total debt ratios in LA5 countries owe to easy financing conditions, including greater access to long-term financing, rather than to a cutoff in short term funding (see Annex C, Figure C1).

Figure 2. International Comparison: Corporate Financial Indicators by Sector



### C. A View by Individual Country

An analysis of corporate indicators by country also hints at some buildup of vulnerabilities (Figure 3):

- In *Brazil*, leverage (measured by the debt-asset ratio) has risen somewhat since the Lehman crisis, not only for the larger firms (Panel A1) but also for the median firm (Panel B1). The increase in the debt-burden is also evident from the debt-sales ratios, which have trended up in the post-Lehman period (Panels A2/B2).<sup>8</sup> Also pointing to some weakening of the corporate sector in the country are the diminishing collateral buffers (Panels A5/B5) and the declining profitability (Panels A6/B6). A mild improvement in the degree of short-term maturity exposures (Panels A3/B3) and the level of liquidity buffers (Panel A4/B4) help mitigate existing risks for the distribution of firms as a whole.
- In *Chile*, debt-asset ratios are generally lower post-Lehman, but debt-asset ratios have risen recently, particularly in the case of larger firms (Panel A2). Collateral and profitability are also trending down somewhat, offset by marked improvements in the maturity structure of corporate debt and a rise in liquidity cushions.
- *Colombia* is characterized by some of the lowest debt-asset and debt-sales ratios within the LA5 (Panels A1/A2), with burdens generally well-contained post-Lehman. This said, debt-sales ratios have risen somewhat in 2010–11, especially for the median firm in the sample, and maturity exposures are relatively high, compared to other LA5 countries.<sup>9</sup> Unlike most countries in the group, Colombian companies have raised collateral buffers, while sharply reducing liquidity (especially in the case of the largest firms, Panel A4). Profitability has held well in the case of the median firm, increasing significantly for the largest companies in the sample (Panels A6/B6).
- Debt burdens in *Mexico* have increased marginally since the Lehman crisis, both as a share of assets and as a share of sales. Still, Mexico is one of the countries with lowest debt as a share of turnover in the region, and short-term maturity exposures are also markedly low, particularly in the case of larger firms (Panel A2). While collateral holdings are trending down, liquidity buffers have remained strong in the post-Lehman period, and profitability has recovered.

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<sup>8</sup> In fact, a review of both leverage indicators broken by firm size suggests that excess leverage in Brazil worsened significantly, especially in the first two quartiles (the smallest half of the distribution). For full detail, see Annex C, Fig. C2. Moreover, histograms per indicator also show a shift to the right for the distribution of the leverage burden in Brazil (Annex C, Fig. C3.1).

<sup>9</sup> Short-term debt to total debt ratios as particularly high (reaching up to 70 percent of total debt) for the first three quartiles of the distribution (based on size), see Annex C, Fig. C2.

Figure 3. LA5 Countries: Corporate Financial Indicators, 2005–11



- In *Peru*, leverage indicators are contained and have improved after the Lehman crisis, but the country has the highest maturity exposures of LA5 countries, with short-term debt at around 40 percent of total debt for both the largest and the median firm (Panels A3/B3). Liquidity buffers also tend to be low relative to the region, although they have rebounded since the Lehman crisis; collateral and profitability are strong—both relative to the pre-Lehman period and vis-à-vis the country’s regional peers.

In sum, LA5 countries have recorded some rise in leverage in the post-Lehman period. These remain largely at manageable levels, with the exception of the (weighted average) debt-sales ratio in Brazil, Chile and Colombia, which have held up above 70 percent in recent years.<sup>10</sup> Short-term debt maturities are low and fell in all LA5 countries after the Lehman crisis; buffers are moderating—with mixed trends for collateral and liquidity cushions across countries. Profitability performance has also been mixed, ebbing in Brazil and Chile, while growing in Colombia, Mexico and Peru, especially for the largest firms.

### III. ASSESSING CORPORATE VULNERABILITY FROM A MACRO PERSPECTIVE

#### A. Methodological Strategy

While indicators point at rising leverage and reduced buffers in some LA5 countries, they cannot—by themselves—answer whether these trends are enough to make the corporate sector vulnerable to a sudden stop in financing. To gauge such vulnerability, we use a simple panel probit model, estimated on our firm-level database (including over 3,100 non-financial firms in 18 EMEs and small advanced economies), for 2000–11. The framework seeks to identify firms that have a high probability of becoming vulnerable to a loss in financing at a given moment in time.

#### Basic Specification

The dependent variable is a dummy equal to one whenever the firm’s cash flow falls below its short-term debt obligations (the sum of short-term debt plus long-term debt falling due within a year)—an event that would require the firm to roll over its debt, making it exposed to a worsening in financing conditions.<sup>11</sup> This measure of exposure to funding stress assumes a situation in which the company may not cover the principal of the liabilities falling due if financing becomes unavailable. In this sense, the indicator chosen for this paper is more stringent than the more commonly used measure of ability to pay known as the “coverage ratio”—the ratio of earnings before taxes and depreciation of assets (EBITDA) to interest expense falling due. The latter implies that liabilities will be rolled over, which, as pointed by

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<sup>10</sup> Firms in South Korea had debt-asset ratios of 50 percent and debt-sales ratios of 100 percent in the 1997-98 crisis. Coricelli et al (2010) and Medina (2012) derive thresholds for the debt-asset ratios above which growth/recovery from a crisis becomes more difficult; these range from 40-48 percent.

<sup>11</sup> This measure of liquidity stress has been often used in corporate sector liquidity stress tests (see Hviding and Papi, 2002) and assumes a situation in which a firm may not cover the principal of the liabilities falling due if financing becomes unavailable.

Rajan and Zingales (1995) need not be true in times of distress.<sup>12</sup> Thus, the event is defined as:

$$Exposure\ to\ Sudden\ Stop_t = \begin{cases} 1, & \text{cash flow}_t < \text{short term debt}_t \\ 0, & \text{otherwise} \end{cases}$$

The model includes three types of explanatory variables: (i) *individual firm characteristics*, such as size, leverage burden, maturity exposure, collateral and liquidity buffers; (ii) *macroeconomic conditions*, both at global and domestic level, including policies (to be described later in more detail); (iii) fixed and/or random effects.

The probit model can then be written as:

$$\Pr[Event_{i,t}] = \alpha + \sum_{j=1}^J \beta_j F^j_{i,t} + \sum_{k=1}^K \theta_k W^k_{n,t} + \sum_{l=1}^L \varphi_l X^l_{i,t} + \sum_{m=1}^M \delta_m Z^m_{s,t} + \varepsilon_{i,n,t}$$

where  $i=1 \dots, I$  is the number of firms,  $n=1 \dots, N$  is the number of countries,  $s=1 \dots, S$  is the number of sectors of economic activity,  $t=1 \dots, T$  represents the number of years in the sample. In addition,  $F_{i,t}$  represents the firms' characteristics;  $W^k_{n,t}$  are the  $k$  domestic and global conditions;  $Z_{s,t}$  stands for fixed effects by sector and/or event-specific dummies (e.g., the Lehman crisis), and  $X_{i,t}$  is a set of random effects.

### Alternative Specifications

To investigate further on the data characteristics and verify robustness, we estimate other alternative specifications on the model described above. A few of these alternatives deserve special mention. To verify robustness vis-à-vis a possible built-in survivorship bias of firms in the sample, we estimate the probit through a Heckman selection model that includes a selection equation based on the basic model's explanatory variable plus a measure of profitability (see, for instance, Claessens, et al, 2011). In addition, we also estimate the model through a fixed-effects specification.

<sup>12</sup> Alternative definitions of financial stress were also tested in the PROBIT framework, including: (i) **technical insolvency**, defined as an event in which a firm's total liabilities exceed total assets; (ii) **a reduction in real capital expenditures**, a situation which could possibly be triggered by financing constraints, (iii) **a reduction in real sales**, and (iv) pair combinations of the funding shock (cash-flow vs. short-term debt) with technical insolvency, a reduction of real capital expenditure, and a reduction of real sales. Results for these indicators are broadly supportive of the main conclusions of this study, but somewhat less "clean cut" as none of these three alternatives are as directly related to a funding shock as our chosen event. For instance, technical insolvency can be sustained for a long time as long as a firm does not face a liquidity shock in parallel; a firm's investment retrenchment decisions may be related to events that are entirely independent from available financing, and a sales shock may not need to put the firm into financing stress. These estimations are available upon request.

A second specification takes a simple twist on the early-warning indicators literature, in particular the work by Kaminsky, Lizondo and Reinhart (1998), later extended by Berg and Pattillo (1998) and Mulder, Perrelli and Rocha (2002). Under this approach, firm-level variables in the probit estimation are replaced by their ordering (or ranking) in their country-specific distribution for 2000–11.<sup>13</sup> The assumption under such a specification is that what matters is not the firm-level variable per se, but is position relative to the country sample.<sup>14</sup> Intuitively, then, a large firm from a small country will still be treated as a large firm in the full panel. Likewise, the specific country's lower (or greater) "tolerance" to corporate leverage or maturity structure can be accounted for.

### Explanatory Variables

There are six types of explanatory variables in the model: (i) firm-level data; (ii) domestic and external demand; (iii) financing availability; (iv) global conditions; (v) corporate currency exposures; and (vi) fiscal and exchange rate policies (Annex A, Table A2):

- *At firm level*, we test for the impact of leverage in the model with two alternative indicators (the debt-asset ratio and debt-sales ratio), to ensure robustness. As mentioned, an alternative set up of the model includes a set of firm-level variables transformed into their rankings in the country-specific distribution. Whenever needed, variables are included with a lag to prevent endogeneity bias.
- *Demand conditions* are tested at both the domestic and external level; the basic model includes the (lagged) real domestic demand growth and terms of trade growth for this purpose.
- *Global shocks* are measured by global risk aversion (measured by the Chicago Board Options Exchange Market Volatility Index, VIX) and the change in oil prices.
- We include two measures of *financing availability*: at the domestic level, the increase in (lagged) private sector credit to GDP; at the external level, the (lagged) growth in cross-border loans by banks to the non-bank private sector, as reported by the Bank for International Settlements (BIS). Alternatively, we also use the (lagged) growth in the net portfolio inflows in the balance of payments, and measure the impact of the country's sovereign having achieved investment grade by at least two rating agencies.
- Lacking firm-level information on *foreign-currency liability exposures*, we follow Medina (2012) and include (alternatively) the nominal exchange rate depreciation and the real (bilateral) exchange rate depreciation to gauge the impact of currency movements on the firms' balance sheets and cash flow.

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<sup>13</sup> So, for example, for a variable  $x_{it}$ ,  $p(x_{it})$  will be a number between zero and 100 representing where  $x_{it}$  fits in the country-specific distribution of  $x_i$ . For the purpose of this study, each variable is allocated into 20 segments of the distribution or *quintiles*, each of them containing five percent of the observations of the variable per country in the whole sample period 2000-11, ordered from the smallest to the largest.

<sup>14</sup> The transformation can be thought as an exercise close to "normalizing" the variables by the country-specific distribution.

- Finally, we include the following *policy and institutional variables*: (i) an index of the flexibility in the exchange rate regime, constructed based on data from the *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER), where higher values represent greater flexibility; (ii) and index of counter-cyclical fiscal policies, which takes a value of 1 whenever fiscal policy is expansionary (or contractionary) and output is below (or above) potential; (iii) alternatively, we test for the (lagged) primary balance of the general government, as a share of GDP, and (iv) we include an index of the recovery rate under insolvency, constructed from data from the World Bank's doing business indicators, to represent the quality of the institutional corporate framework in each country.<sup>15</sup>

## B. Main Results

### Basic Model

Results of the basic model (estimated under random effects with the debt-asset ratio as the leverage measure) are presented in Table 2A. They confirm that:

- *Leverage and maturity exposures raise a firm's probability of becoming vulnerable to a sudden stop, while larger buffers reduce such probability.*<sup>16</sup> Also, in line with the literature, there is evidence that larger firms tend to be more resilient to financing shocks.<sup>17</sup>
- *Buoyant demand conditions lessen a firm's probability of exposure to a sudden stop, while adverse global shocks increase it.* Higher real domestic demand growth significantly reduces vulnerability; terms-of-trade growth (external demand) has the expected negative sign but is not significant, implying that the average firm in the sample is *not* a net exporter. Adverse global shocks—rising global risk aversion (VIX) and higher oil prices—add to the probability of a firm becoming vulnerable to a funding shock.
- *Greater domestic financing tends to dampen the probability of exposure to a sudden stop, but excessive access to external financing can magnify it.* This is in line with the crisis literature, which suggests that abundant foreign inflows can facilitate the buildup of foreign liability exposures,<sup>18</sup> especially when credit constraints are present in the domestic market. We test whether this effect applies, in particular, for the LA5 countries by introducing an additional regional dummy interacted with the growth in foreign financing (Robustness model 3); the coefficient is not statistically significant, suggesting that greater foreign inflows may increase corporate risks in the region. In

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<sup>15</sup> Alternative institutional indicators of the quality of the corporate framework were also tested, but had to be dropped from the estimation due to their relatively low variation over time, which caused colinearity issues.

<sup>16</sup> Results are in line with Medina (2012) and Coricelli et al (2010).

<sup>17</sup> See Froot et al (1993), and Gelos (2003).

<sup>18</sup> See Krugman (1999) and Caballero and Krishnamurthy (2000).



this specification, the investment-grade dummy is not a significant determinant of the degree of exposure of firms to a sudden stop in financing (Robustness model 4).

- *The average firm in the 18-country sample seems to be a net-importer, and possibly has net foreign currency liability exposures, which raise the probability of becoming vulnerable to a sudden stop.* In particular, the estimated coefficient on the depreciation of the nominal exchange rate is significant and positive, implying that firms are, on average, vulnerable to drastic exchange rate changes—be it due to the cost effect on their imported inputs, or the high net foreign currency liability exposures. This result holds when the model is estimated using the (bilateral) real exchange rate (Robustness model 2).<sup>19</sup>
- *Greater exchange rate flexibility can help reduce corporate vulnerabilities.* We include two policy variables: a dummy that equals one when countercyclical fiscal policies are pursued, and an index of exchange rate regime flexibility.<sup>20</sup> Estimates show that *greater* exchange rate flexibility is a relevant *mitigating* factor of corporate vulnerability—consistent with the literature proposing that greater currency flexibility entices firms to hedge, thus helping reduce their net currency exposures. The fiscal policy dummy is not statistically significant, and neither is its alternative—the general government’s primary balance as a share of GDP (see Robustness model 1). The index of recovery under insolvency is also not-significant (Robustness model 5).

The estimation results generally hold under a fixed effects model at the country level, and under the Heckman selection model that controls for the (possible) bias on firm survival.

### **Accounting for “Corporate Debt Tolerance”**

Estimates from a second specification, including the percentile rankings of the firm-level variables are presented in Table 2A (once again, based on the debt-asset ratio as they measure for the leverage burden). As noted previously, this specification can help account for a structural relationship between the distribution of the variables and the probability of becoming exposed to a sudden stop—providing greater flexibility as to what “too much leverage” or “too small buffers” may be in each particular country, especially as these may be (at least partly) determined by unobservable variables.

Earlier results are robust to this new specification—including the mitigating effect from greater exchange rate flexibility to the corporate exposure to a sudden stop. At the same time, a few important variables become statistically significant. Most noticeably:

- *With regard to financing availability,* there is some evidence that the adverse effect of foreign borrower may not apply to the LA5 countries. The coefficient of the

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<sup>19</sup> Since the bilateral real exchange rate has been constructed to reflect an appreciation as it increases, a negative coefficient implies that a real depreciation (which would have a negative sign) increases the probability of a firm becoming exposed to a sudden stop in financing.

<sup>20</sup> The index ranges from 1-4 depending on the IMF’s classification under the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).

interacted regional dummy (Robustness model 3) becomes significant and with a negative sign, dampening the impact of the non-interacted coefficient.<sup>21</sup> Moreover, the investment grade dummy has also become significant, suggesting that a better credit rating held by the government has a benign spillover effect on the firms.

- *With regard to policy and institutional variables*, there is now some evidence that prudent fiscal policies—be it a carefully implemented countercyclical policies (Robustness model 8) or a generally more conservative primary balance (Robustness model 1)—can help reduce the probability of the corporate sector of becoming exposed to a sudden stop in financing. Likewise, a stronger corporate institutional framework (ensuring a higher rate of recovery under insolvency) also tends to reduce the corporate exposures to a sudden stop.

Once more, the estimations under fixed effects and the Heckman selection model tend to confirm our results with this specification.

### **Other Robustness Tests**

Annex C presents some additional estimates under the same two specifications, using the debt-sales ratio as a key measure of leverage (Tables D1–D2), which confirm our results.<sup>22,23</sup>

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<sup>21</sup> The full effect for the LA5 countries from foreign financing would be equal to the sum of both (significant) coefficients, which in this case is becomes negative.

<sup>22</sup> Additional estimates (not reported) using the debt-equity ratio as a main leverage measure are also in line with the findings of this paper. Results are available upon request.

<sup>23</sup> Additional robustness tests (not reported), using fixed effects at the firm level also confirm above results. Estimates are available upon request.

Table 2. Main Results: Exposure to a Sudden Stop, Main Model and Robustness Estimations (Debt-Asset Ratio)

Explanatory Variable	(A) Random Effects										(B)	(C)
	Basic (0)	Rob 1	Rob 2	Rob 3	Rob 4	Rob 5	Rob 6	Rob 7	Rob 8	Heckman Select. 1/	Fixed Effects	
<b>Firm-Specific</b>												
Size (lag)	-0.1010 *** (0.0137)	-0.0909 *** (0.0135)	-0.0969 *** (0.0139)	-0.0996 *** (0.0138)	-0.1020 *** (0.0137)	-0.1310 *** (0.0143)	-0.1030 *** (0.0136)	-0.1020 *** (0.0137)	-0.0943 *** (0.0153)		-0.0310 *** 0.0021	-0.0936 *** (0.0071)
Leverage Ratio (lag)	0.0207 *** (0.0008)	0.0193 *** (0.0008)	0.0206 *** (0.0008)	0.0207 *** (0.0008)	0.0206 *** (0.0008)	0.0275 *** (0.0011)	0.0207 *** (0.0008)	0.0207 *** (0.0008)	*** (0.0009)		0.0006 *** 0.0000	0.0286 *** (0.0012)
Short-Term Debt to Total (lag)	0.0064 *** (0.0005)	0.0064 *** (0.0005)	0.0065 *** (0.0005)	0.0064 *** (0.0005)	0.0064 *** (0.0005)	0.0070 *** (0.0006)	0.0065 *** (0.0005)	0.0065 *** (0.0005)	0.0062 *** (0.0006)		0.0032 *** 0.0001	0.0100 *** (0.0004)
Quick Ratio (lag)	-0.0144 *** (0.0043)	-0.0156 *** (0.0043)	-0.0144 *** (0.0043)	-0.0143 *** (0.0043)	-0.0143 *** (0.0043)	-0.0125 *** (0.0045)	-0.0145 *** (0.0043)	-0.0144 *** (0.0043)	-0.0150 *** (0.0045)		-0.0140 *** 0.0010	-0.0165 ** (0.0081)
Fixed-to-Total-Asset Ratio (lag)	-0.0013 (0.0009)	-0.0011 (0.0009)	-0.0012 (0.0010)	-0.0013 (0.0009)	-0.0013 (0.0009)	-0.0015 (0.0010)	-0.0013 (0.0009)	-0.0013 (0.0009)	-0.0002 (0.0010)		-0.0004 *** 0.0002	-0.0021 *** (0.0005)
<b>Dom. and Ext. Demand</b>												
Dom. Demand Growth (real, lag, %)	-0.0062 * (0.0037)	-0.0076 ** (0.0037)	-0.0063 * (0.0038)	-0.0058 (0.0038)	-0.0053 (0.0038)	-0.0043 (0.0039)	-0.0052 (0.0039)		-0.0069 * (0.0038)		0.0009 (0.0009)	-0.0063 ** (0.0031)
Real GDP Growth (real, lag, %)								-0.0066 (0.0051)				
Terms of Trade Growth (%)	-0.0035 (0.0024)	-0.0039 * (0.0023)	-0.0030 (0.0028)	-0.0038 (0.0024)	-0.0032 (0.0024)	-0.0027 (0.0025)		-0.0035 (0.0024)	-0.0027 (0.0026)		-0.0005 (0.0006)	-0.0017 (0.0020)
Real Adv. Econ. Growth (real, lag, %)							-0.0070 (0.0187)					
<b>Financing Availability</b>												
Priv. Sect. Cred. (%GDP, lag, chg.)	-0.0034 (0.0025)	-0.0030 (0.0025)	-0.0029 (0.0025)	-0.0033 (0.0025)	-0.0029 (0.0025)	-0.0059 ** (0.0029)	-0.0031 (0.0024)	-0.0036 (0.0025)	-0.0028 (0.0026)		-0.0024 *** (0.0004)	-0.0010 (0.0020)
Ext. Finan. Growth (USD, lag, %)	0.0010 ** (0.0005)	0.0013 *** (0.0005)	0.0010 ** (0.0005)	0.0011 ** (0.0005)	0.0011 ** (0.0005)	0.0009 * (0.0005)	0.0010 ** (0.0005)	0.0010 ** (0.0005)			0.0003 ** (0.0001)	0.0008 ** (0.0004)
Interact: Ext. Fin. Growth * LatAm Dum.				-0.0015 (0.0018)								
Net Private Capital Inflows (USD, lag, %)										0.0000 (0.0000)		
Investment Grade Dummy					-0.0735 (0.0478)							
<b>Global Economy</b>												
VIX	0.0105 *** (0.0036)	0.0060 (0.0040)	0.0089 ** (0.0037)	0.0110 *** (0.0037)	0.0100 *** (0.0037)	0.0133 *** (0.0038)	0.0101 ** (0.0046)	0.0109 *** (0.0036)	0.0043 (0.0040)		0.0016 * (0.0010)	0.0078 *** (0.0029)
World Oil Price Growth (%)	0.0014 (0.0010)	0.0002 (0.0010)	0.0008 (0.0010)	0.0014 (0.0010)	0.0014 (0.0010)	0.0023 ** (0.0010)	0.0018 (0.0016)	0.0015 (0.0010)	0.0001 (0.0011)		0.0001 (0.0002)	0.00137* (0.0008)
<b>Currency Exposure</b>												
Nom. Exch. Rate (% chg., +=deprec)	0.0038 ** (0.0017)	0.0055 *** (0.0015)		0.0038 ** (0.0017)	0.0040 *** (0.0017)	0.0025 (0.0018)	0.0035 ** (0.0018)	0.0039 ** (0.0017)	0.0068 *** (0.0020)		0.0009 *** (0.0002)	0.0030 ** (0.0014)
Real Exch. Rate (5 chg., -= deprec)			-0.0058 *** (0.0018)									
<b>Policies and Institutional</b>												
Exch. Rate Flex. (Index= 1-4, 4=max flex)	-0.0620 *** (0.0231)	-0.0548 ** (0.0225)	-0.0623 *** (0.0232)	-0.0623 *** (0.0231)	-0.0628 *** (0.0231)	-0.0444 (0.0324)	-0.0611 *** (0.0227)	-0.0645 *** (0.0231)	-0.0618 *** (0.0236)		-0.0240 *** (0.0033)	-0.0271 (0.0217)
Countercyc. Fisc. Pol. Dummy	-0.0351 (0.0294)		-0.0355 (0.0293)	-0.0337 (0.0295)	-0.0412 (0.0297)	-0.0423 (0.0317)	-0.0373 (0.0293)	-0.0387 (0.0293)	-0.0687 ** (0.0321)		-0.0076 (0.0051)	-0.0101 (0.0249)
Primary Balance, Gen.Gov (%GDP, lag)		-0.0123 (0.0078)										
Recov if Insolv (Index: 1-10, 10=max recov)						-0.0152 (0.0131)						
<b>Statistics</b>												
Observations	18,678	19,590	17,950	18,678	18,678	16,312	18,763	18,678	16,397		17,869	18,678

Robust standard errors; P-Values as: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.  
1/ Based on selection equation determined on firm-level variables, including profitability (Earnings to Total Assets).

Table 3. Main Results: Exposure to a Sudden Stop, Main Model and Robustness Estimations (Debt-Asset Ratio, Percentiles)

Explanatory Variable	Random Effects										Heckman Selection Model 1/	Fixed Effects
	Basic	Rob 1	Rob 2	Rob 3	Rob 4	Rob 5	Rob 6	Rob 7	Rob 8			
<b>Firm-Specific</b>												
Size (lag)	-0.0312 *** (0.0041)	-0.0295 *** (0.0039)	-0.0310 *** (0.0041)	-0.0311 *** (0.0040)	-0.0310 *** (0.0040)	-0.0343 *** (0.0044)	-0.0315 *** (0.0040)	-0.0313 *** (0.0040)	-0.0302 *** (0.0043)		-0.0107 **** (0.0006)	-0.0349 *** (0.0021)
Leverage Ratio (lag)	0.1140 *** (0.0041)	0.1120 *** (0.0040)	0.1160 *** (0.0042)	0.1140 *** (0.0041)	0.1140 *** (0.0041)	0.1160 *** (0.0045)	0.1140 *** (0.0041)	0.1140 *** (0.0041)	0.1180 *** (0.0045)		0.0346 *** (0.0008)	0.1170 *** (0.0028)
Short-Term Debt to Total (lag)	0.0330 *** (0.0033)	0.0335 *** (0.0032)	0.0345 *** (0.0034)	0.0330 *** (0.0033)	0.0331 *** (0.0033)	0.0326 *** (0.0036)	0.0331 *** (0.0033)	0.0330 *** (0.0033)	0.0335 *** (0.0035)		0.0173 *** (0.0007)	0.0546 *** (0.0024)
Quick Ratio (lag)	-0.0480 *** (0.0037)	-0.0465 *** (0.0036)	-0.0477 *** (0.0037)	-0.0479 *** (0.0037)	-0.0476 *** (0.0037)	-0.0482 *** (0.0040)	-0.0481 *** (0.0037)	-0.0481 *** (0.0037)	-0.0512 *** (0.0039)		-0.0150 *** (0.0007)	-0.0477 *** (0.0024)
Fixed-to-Total-Asset Ratio (lag)	-0.0272 *** (0.0038)	-0.0268 *** (0.0037)	-0.0269 *** (0.0038)	-0.0274 *** (0.0038)	-0.0271 *** (0.0038)	-0.0264 *** (0.0041)	-0.0272 *** (0.0038)	-0.0271 *** (0.0038)	-0.0265 *** (0.0040)		-0.0088 *** (0.0007)	-0.0275 *** (0.0023)
<b>Dom. and Ext. Demand</b>												
Dom. Demand Growth (real, lag, %)	-0.0038 (0.0037)	-0.0047 (0.0037)	-0.0032 (0.0038)	-0.0029 (0.0038)	-0.0023 (0.0038)	-0.0045 (0.0040)	-0.0028 (0.0039)		-0.0047 (0.0038)		-0.0011 (0.0010)	-0.0052 (0.0033)
Real GDP Growth (real, lag, %)									-0.0011 (0.0051)			
Terms of Trade Growth (%)	-0.0058 ** (0.0024)	-0.0062 *** (0.0023)	-0.0048 * (0.0028)	-0.0062 *** (0.0024)	-0.0052 ** (0.0024)	-0.0049 ** (0.0025)			-0.0057 ** (0.0024)	-0.0056 ** (0.0026)	-0.0003 (0.0006)	-0.0020 (0.0021)
Real Adv. Econ. Growth (real, lag, %)									-0.0059 (0.0187)			
<b>Financing Availability</b>												
Priv. Sect. Cred. (%GDP, lag, chg.)	-0.0057 ** (0.0025)	-0.0048 * (0.0025)	-0.0049 * (0.0025)	-0.0052 ** (0.0025)	-0.0048 * (0.0025)	-0.0086 *** (0.0029)	-0.0052 ** (0.0024)	-0.0054 ** (0.0025)	-0.0053 ** (0.0026)		0.0002 (0.0006)	-0.0011 (0.0021)
Ext. Finan. Growth (USD, lag, %)	0.0010 ** (0.0005)	0.0013 *** (0.0005)	0.0010 ** (0.0005)	0.0013 *** (0.0005)	0.0011 ** (0.0005)	0.0010 ** (0.0005)	0.0009 ** (0.0005)	0.0009 ** (0.0005)			0.0003 ** (0.0001)	0.0008 ** (0.0004)
Interact: Ext. Fin. Growth * LatAm Dum.				-0.0032 * (0.0018)								
Net Private Capital Inflows (USD, lag, %)									0.0000 (0.0000)			
Investment Grade Dummy					-0.1250 *** (0.0453)							
<b>Global Economy</b>												
VIX	0.0084 ** (0.0036)	0.0035 (0.0040)	0.0063 * (0.0037)	0.0095 ** (0.0037)	0.0097 *** (0.0037)	0.0103 *** (0.0038)	0.0079 * (0.0047)	0.0092 ** (0.0036)	0.0019 (0.0040)		0.0017 ** (0.0009)	0.0078 ** (0.0030)
World Oil Price Growth (%)	0.0021 ** (0.0010)	0.0008 (0.0010)	0.0013 (0.0010)	0.0021 ** (0.0010)	0.0021 ** (0.0010)	0.0026 *** (0.0010)	0.0022 (0.0016)	** (0.0010)	0.0010 (0.0011)		0.0003 (0.0003)	0.0019 ** (0.0008)
<b>Currency Exposure</b>												
Nom. Exch. Rate (% chg., +=deprec)	0.0040 ** (0.0017)	0.0058 *** (0.0016)		0.0038 ** (0.0017)	0.0042 ** (0.0017)	0.0022 (0.0018)	0.0039 ** (0.0018)	0.0039 ** (0.0017)	0.0066 *** (0.0020)		0.0011 ** (0.0004)	0.0037 ** (0.0015)
Real Exch. Rate (5 chg., - = deprec)			-0.0058 *** (0.0018)									
<b>Policies and Institutional</b>												
Exch. Rate Flex. (Index= 1-4, 4=max flex)	-0.0925 *** (0.0225)	-0.0813 *** (0.0219)	-0.0910 *** (0.0224)	-0.0919 *** (0.0224)	-0.0939 *** (0.0224)	-0.0630 ** (0.0310)	-0.0919 *** (0.0221)	-0.0934 *** (0.0225)	-0.0913 *** (0.0227)		-0.0133 ** (0.0067)	-0.0455 ** (0.0224)
Countercyc. Fisc. Pol. Dummy	-0.0313 (0.0294)		-0.0334 (0.0293)	-0.0284 (0.0294)	-0.0420 (0.0297)	-0.0364 (0.0316)	-0.0338 (0.0293)	-0.0379 (0.0293)	-0.0662 ** (0.0320)		-0.0026 (0.0073)	-0.0138 (0.0261)
Primary Balance, Gen.Gov (%GDP, lag)		-0.0132 * (0.0074)										
Recov if Insolv (Index: 1-10, 10=max recov)									-0.0361 *** (0.0122)			
<b>Statistics</b>												
Observations	18,678	19,590	17,950	18,678	18,678	16,312	18,763	18,678	16,397		17,942	18,678

Robust standard errors; P-Values as: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

1/ Based on selection equation determined on firm-level variables, including profitability (Earnings to Total Assets).

### C. Measuring Vulnerability

We now use the probit model's estimates to measure the evolving degree of corporate vulnerability in the LA5 countries. For this purpose, we define a "vulnerable" firm as one which predicted probability of becoming exposed to a sudden stop is greater or equal than 50 percent. Thus, we use the predicted (non-linear) probabilities emerging from the "basic" models estimates presented in Tables 2A, 2B (using the debt-asset ratio as a key leverage measure) and Tables D1 and D2 (in the Annex, using the debt-sales ratio as an indicator of leverage).

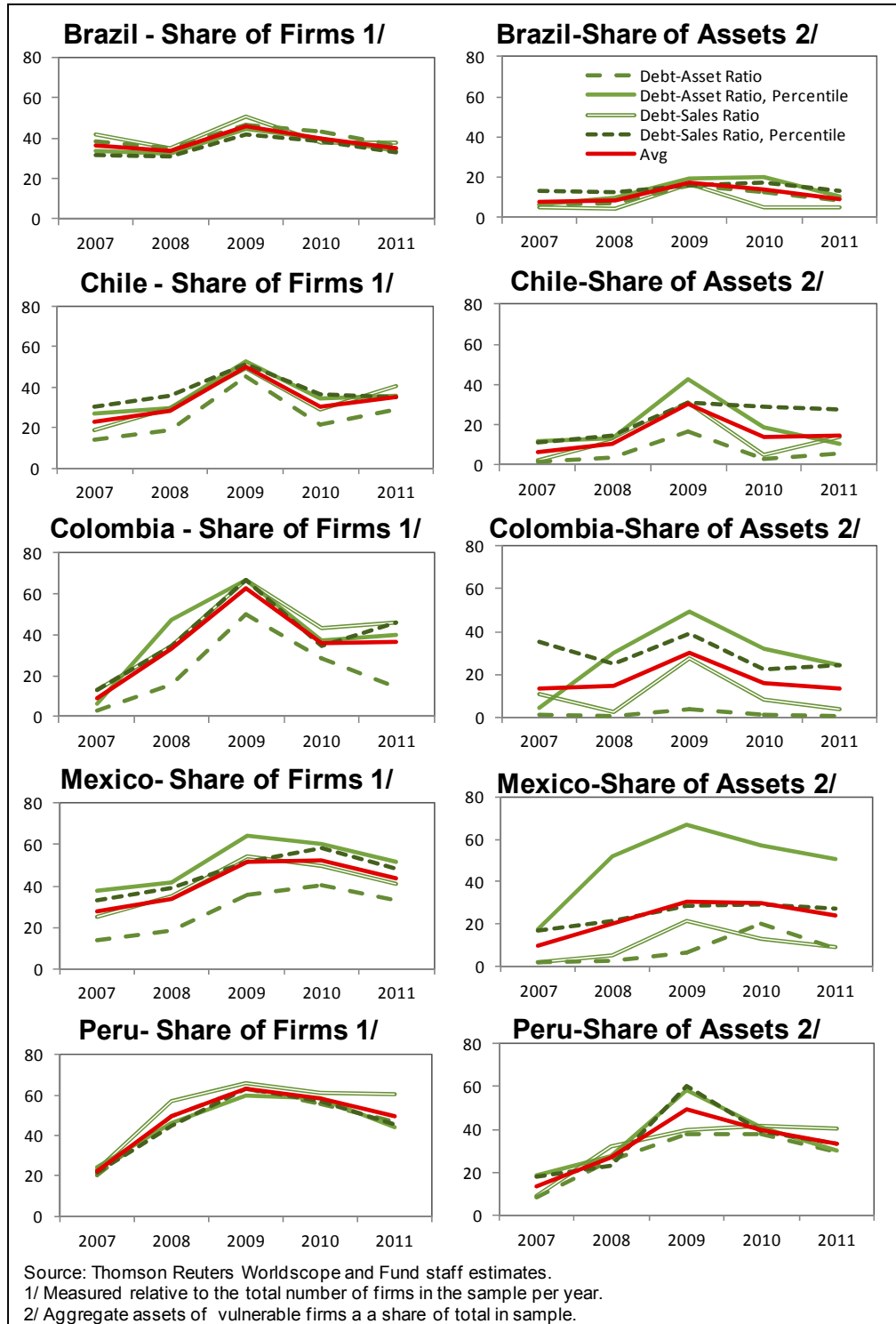
The number of firms as a share of the sample is plotted by country and year (Fig. 4). To gauge the relative size of the vulnerable firms, we also plot their cumulative assets as a share of the sample. All countries registered a hike in the share of vulnerable firms in the year following the Lehman crisis (2009). The share of "vulnerable" firms has trended down since then; however, by end-2011, it remained somewhat higher than in 2007 in Chile, Colombia, Mexico and Peru. Brazil had a relatively low increase at the time of the Lehman crisis, although the share of vulnerable firms has remained relatively high throughout the period under analysis. To put things in perspective, this means that the interplay of firm-level indicators and macroeconomic conditions has been such that in 2011 there were more firms that had a high probability of having to rollover their debt compared to the number of firms in the same situation in 2007. Firms more likely to require market access are also relatively more vulnerable to a sharp reversal in financing conditions.

Inspection of the share of cumulative assets held by the vulnerable firms (relative to the rest of the country specific sample) suggests that, for most countries, companies exposed to a sudden stop in financing tend to be in the lower end of the country distribution by size. Only in Mexico one of the model's estimations (based on the debt-sales ratio) seems to identify a few larger firms.<sup>24</sup>

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<sup>24</sup> Moreover, the "total debt at risk" held by these firms is also relatively low—at under 2 percent of GDP for Colombia and Mexico, 3 percent of GDP for Brazil and Peru, and 4 percent of GDP in the case of Chile (for the firms identified under the basic model based on the debt-asset ratio). Since our sample represents a fraction of the total in each country, these amounts can be interpreted as the "lower bounds" for the corporate debt at risk.

Figure 4. Vulnerable Firms in the LA5 Countries



#### IV. CONCLUDING REMARKS AND POLICY IMPLICATIONS

We identify corporate sector vulnerabilities in the LA5 countries (Brazil, Chile, Colombia, Mexico, and Peru). An in-depth look at corporate financial indicators suggests that leverage may be building up in some countries—albeit from manageable starting points and with improving maturity structures. A probit model also suggests that, while the share of firms at risk in the LA5 countries have fallen since the Lehman crisis, they may be greater today than they were in 2007—just preceding the Lehman crisis. This said, the aggregate size of the identified firms at risk is on the smaller end of the sample distribution, suggesting that their risk should be more manageable.

More generally, the model hints at the possible presence of net foreign currency liability exposures, and illustrates the risks that may be posed by abundant external financing. A case may be made, then, in favor of judiciously using macro-prudential policies to limit the effects of strong capital inflows. Results show that more flexible exchange rate regimes can help reduce corporate vulnerabilities to a sudden stop by creating incentives for firms to hedge. The results are also supportive of generally prudent macroeconomic frameworks (insofar a better credit rating can help reduce the probability of exposure of the corporate sector) and of a strong institutional framework for the resolution of insolvent firms.

### ANNEX A: DATA SOURCES

We use firm-level balance sheet and cash flow data for some 3,100 publicly traded companies, available from the *Thomson Reuters Worldscope* database. The sample selected includes firms from 18 countries from non-financial sectors, for the period 2000–11 (Table A1). A number of adjustments are made to the data:

- *Timing correction.* For firms ending their fiscal year on or after January 15, Thomson Reuters Worldscope assigns their data to the current calendar year. We reassign data for firms reporting on or before June 30 to the previous calendar year, to better align it with the timing of macroeconomic data.
- *Treatment of outliers.* Outliers are defined as observations at eight or more standard deviations, based on the country-specific distribution.
- *General screening.* Sample is screened following the Fund’s Corporate Vulnerability Utility manual (Brooks and Ueda, 2011), to ensure that single listings of stock by firms.
- *Varying sample.* The firm sample varies by country and year; the analysis provides for a robustness check vis-à-vis built-in survivorship bias via a Heckman-selection model (see Gonzalez-Miranda, 2012).

Macroeconomic data (Table A2) is derived from several databases, including the Fund’s *World Economic Outlook*, the *International Financial Statistics* and the *Annual Report on Exchange Rate Arrangements and Exchange Rate Restrictions (AREAER)*. Additional databases used include Haver (for the VIX) and the locational statistics on cross-border inflows by country from the *Bank for International Settlements (BIS)*.

Table A1. Country Sample

		2000	2005	2011
1	Brazil	164	223	238
2	Bulgaria	0	139	149
3	Chile	107	145	138
4	Colombia	12	31	34
5	Czech Republic	6	10	9
6	Hungary	13	17	20
7	Indonesia	185	229	295
8	Lithuania	0	12	20
9	Malaysia	427	757	830
10	Mexico	73	85	85
11	New Zealand	44	90	109
12	Peru	37	73	68
13	Philippines	82	102	116
14	Poland	42	244	318
15	Romania	0	80	84
16	Slovenia	1	12	22
17	South Africa	159	217	258
18	Thailand	238	381	414
19	Turkey	123	222	244

Source: Thomson Reuters Worldscope.



Table A2. Explanatory Variables and Sources

<b>Individual Firm Characteristics</b>	<b>Source</b>
Size (lag, natural log of total assets in USD)	Thomson Reuters Worldscope
Debt-Asset Ratio (lag)	Thomson Reuters Worldscope
Debt-Sales Ratio (lag)	Thomson Reuters Worldscope
Short-Term Debt Ratio (lag)	Thomson Reuters Worldscope
Quick Ratio (lag)	Thomson Reuters Worldscope
Fixed-to-Total Asset Ratio (lag)	Thomson Reuters Worldscope
Size (lag, quintile)	Thomson Reuters Worldscope
Debt-Asset Ratio (lag, quintile)	Thomson Reuters Worldscope
Debt-Sales Ratio (lag, quintile)	Thomson Reuters Worldscope
Short-Term Debt Ratio (lag, quintile)	Thomson Reuters Worldscope
Quick Ratio (lag, quintile)	Thomson Reuters Worldscope
Fixed-to-Total Asset Ratio (lag, quintile)	Thomson Reuters Worldscope
<b>Demand</b>	
Real domestic demand growth (lag, %)	World Economic Outlook (IMF)
Real GDP growth (lag, %)	World Economic Outlook (IMF)
Terms of Trade (% change)	World Economic Outlook (IMF)
Real growth in advanced economies (lag, %)	World Economic Outlook (IMF)
<b>Global Conditions</b>	
World oil price (index, % change)	World Economic Outlook (IMF)
World metal price (index, % change)	World Economic Outlook (IMF)
VIX (average)	Haver
VIX (average of the annual standard deviation)	Haver
<b>Financing Availability</b>	
Domestic credit (% of GDP, lag, change)	International Financial Statistics (IMF)
Cross border loans (lag, US dollars, % change)	Bank for International Settlements
Net private capital inflows (lag, US dollars, % change)	World Economic Outlook (IMF)
Investment Grade (IG) Dummy (equals 1 if IG by 2-3 rating agencies)	JPMorgan, Fitch, Standard&Poors
<b>FX Exposure</b>	
Nominal exchange rate (% change, depreciation=+)	Thomson Reuters Worldscope
Real exchange rate, bilateral (% change)	World Economic Outlook (IMF)
Real exchange rate, bilateral (% change, depreciation= —)	World Economic Outlook (IMF)
<b>Policies and Institutional Variables</b>	
Dummy, Exchange Rate Regime Flexibility (1-4, 4 = max. flexibility)	Own construction from AREAER data 1/
Dummy, Fiscal Counter-Cyclical Policies	World Economic Outlook (IMF)
Primary balance, General Government (lag, share of GDP)	World Economic Outlook (IMF)
Index, recovery rate under insolvency (1-10, 10 maximum recovery)	Own construction from World Bank's Doing Business

Table A3. Firm-Level Data from Thomson Reuters Worldscope Database

Sample	Variable Name	Code
2000-11	Total assets	02999
2000-11	Current assets	02201
2000-11	Property plant and equipment-net (fixed assets)	02501
2000-11	Cash and short term investments	02001
2000-11	Cash	02003
2000-11	Inventories-total	02101
2000-11	Total liabilities	03351
2000-11	Current liabilities	03101
2000-11	Total Debt	03255
2000-11	Short-term debt and current portion of long-term debt	03051
2006-11	Total Debt as a share of Common Equity	08231
2006-11	Total Debt as a share of Total Assets	08236
2006-11	Current ratio	08106
2006-11	Quick ratio	08101
2006-11	Return on Assets	08326
2006-11	Return on Equity - Total (%)	08301
2006-11	Price/earnings ratio-close	09104
2006-11	Net sales or revenues	01001
2000-11	Funds from operations	04201
2000-11	Capital expenditures	04601
2000-11	Market cap US\$	07210
2000-11	Total assets US\$	07230
2000-11	Net sales or revenues US\$	07240
2000-11	Earnings before interest and taxes (EBIT)	18191
2000-11	amortization (EBITDA)	18198
2000-11	SIC Code 1	07021

Table A4. Sectors of Economic Activity

	Sector
1	Agriculture, Forestry and Fishing
2	Mining
3	Construction
4	Manufacturing
5	Transport, Communications and Utilities
6	Wholesale Trade
7	Retail Trade
8	Services (Nonfinancial)

## ANNEX B: DATA DESCRIPTION

Table B1. LA5: Number of Firms, Assets and Debt Held by Size

		Total Number of Firms			Aggregate Assets to GDP 1/			Aggregate Debt to GDP 1/		
		2000	2005	2011	2000	2005	2011	2000	2005	2011
<b>Brazil</b>	<b>Full Sample</b>	<b>153</b>	<b>208</b>	<b>220</b>	<b>39.3</b>	<b>42.4</b>	<b>57.6</b>	<b>11.2</b>	<b>11.4</b>	<b>17.2</b>
	First Quartile (Size)	52	55	19	0.4	0.3	0.0	0.2	0.1	0.0
	Second Quartile (Size)	42	64	40	1.4	1.4	0.4	0.4	0.4	0.1
	Third Quartile (Size)	31	49	65	4.6	4.8	2.5	1.5	1.4	0.7
	Fourth Quartile (Size)	28	40	96	32.9	35.9	54.7	9.1	9.6	16.3
<b>Chile</b>	<b>Full Sample</b>	<b>101</b>	<b>124</b>	<b>121</b>	<b>126.4</b>	<b>119.3</b>	<b>126.0</b>	<b>45.3</b>	<b>36.2</b>	<b>35.2</b>
	First Quartile (Size)	25	24	14	0.8	0.5	0.2	0.2	0.1	0.0
	Second Quartile (Size)	33	30	24	6.3	3.3	1.5	1.4	0.8	0.3
	Third Quartile (Size)	21	34	43	14.0	12.8	9.5	4.4	4.0	2.4
	Fourth Quartile (Size)	22	36	40	105.3	102.7	114.9	39.4	31.3	32.4
<b>Colombia</b>	<b>Full Sample</b>	<b>11</b>	<b>29</b>	<b>31</b>	<b>6.2</b>	<b>15.4</b>	<b>36.6</b>	<b>0.8</b>	<b>2.4</b>	<b>6.7</b>
	First Quartile (Size)	1	11	5	0.0	0.1	0.0	0.0	0.0	0.0
	Second Quartile (Size)	5	4	7	1.8	0.5	0.4	0.3	0.1	0.0
	Third Quartile (Size)	5	7	7	4.4	2.8	1.8	0.5	0.3	0.2
	Fourth Quartile (Size)	0	7	12	0.0	12.0	34.4	0.0	2.0	6.4
<b>Mexico</b>	<b>Full Sample</b>	<b>61</b>	<b>74</b>	<b>77</b>	<b>24.7</b>	<b>39.4</b>	<b>36.3</b>	<b>6.1</b>	<b>12.2</b>	<b>10.8</b>
	First Quartile (Size)	23	19	13	0.4	0.3	0.2	0.1	0.0	0.0
	Second Quartile (Size)	14	18	18	1.0	1.1	1.0	0.2	0.2	0.3
	Third Quartile (Size)	12	19	21	2.8	3.0	3.2	0.8	0.6	0.8
	Fourth Quartile (Size)	12	18	25	20.6	35.1	31.9	5.0	11.3	9.7
<b>Peru</b>	<b>Full Sample</b>	<b>34</b>	<b>67</b>	<b>66</b>	<b>17.4</b>	<b>17.8</b>	<b>20.5</b>	<b>5.7</b>	<b>4.7</b>	<b>5.5</b>
	First Quartile (Size)	12	23	4	0.4	0.5	0.0	0.1	0.1	0.0
	Second Quartile (Size)	5	15	18	0.4	1.3	0.7	0.1	0.3	0.1
	Third Quartile (Size)	12	18	12	5.3	5.4	1.4	1.9	1.3	0.4
	Fourth Quartile (Size)	5	11	32	11.2	10.6	18.4	3.7	3.0	5.0

Source: Thomson Reuters Worldscope and IMF's World Economic Outlook.

1/ Cumulative values held by group, as a share of GDP.

Table B2. Asia and Africa: Number of Firms, Assets and Debt Held by Size

		Total Number of Firms			Aggregate Assets to GDP 1/			Aggregate Debt to GDP 1/		
		2000	2005	2011	2000	2005	2011	2000	2005	2011
<b>Indonesia</b>	<b>Full Sample</b>	<b>161</b>	<b>207</b>	<b>255</b>	<b>27.8</b>	<b>22.6</b>	<b>22.8</b>	<b>16.5</b>	<b>8.7</b>	<b>6.8</b>
	First Quartile (Size)	49	47	33	0.5	0.2	0.1	0.2	0.1	0.0
	Second Quartile (Size)	43	60	46	1.6	1.0	0.3	1.0	0.4	0.1
	Third Quartile (Size)	40	56	70	4.5	3.4	1.4	2.8	1.1	0.4
	Fourth Quartile (Size)	29	44	106	21.2	18.1	21.1	12.5	7.2	6.3
<b>Malaysia</b>	<b>Full Sample</b>	<b>362</b>	<b>648</b>	<b>604</b>	<b>111.9</b>	<b>115.5</b>	<b>107.1</b>	<b>38.9</b>	<b>37.2</b>	<b>28.5</b>
	First Quartile (Size)	88	172	120	1.8	1.8	0.6	0.5	0.3	0.1
	Second Quartile (Size)	100	180	126	4.1	5.1	1.8	0.9	1.2	0.4
	Third Quartile (Size)	82	159	155	8.9	11.7	5.9	2.5	3.5	1.3
	Fourth Quartile (Size)	92	137	203	97.0	96.9	98.7	34.9	32.2	26.7
<b>New Zealand</b>	<b>Full Sample</b>	<b>33</b>	<b>71</b>	<b>42</b>	<b>26.1</b>	<b>31.7</b>	<b>8.9</b>	<b>12.2</b>	<b>11.9</b>	<b>2.6</b>
	First Quartile (Size)	4	11	10	0.1	0.1	0.0	0.0	0.0	0.0
	Second Quartile (Size)	10	17	11	1.0	0.7	0.2	0.3	0.2	0.1
	Third Quartile (Size)	10	22	8	3.3	3.3	0.6	1.0	1.0	0.1
	Fourth Quartile (Size)	9	21	13	21.8	27.6	8.0	10.9	10.7	2.4
<b>Philippines</b>	<b>Full Sample</b>	<b>65</b>	<b>82</b>	<b>81</b>	<b>42.1</b>	<b>38.4</b>	<b>49.0</b>	<b>17.5</b>	<b>14.6</b>	<b>17.9</b>
	First Quartile (Size)	13	14	5	0.2	0.1	0.0	0.0	0.0	0.0
	Second Quartile (Size)	19	21	18	1.4	0.9	0.5	0.4	0.2	0.1
	Third Quartile (Size)	14	27	23	3.7	4.5	1.9	1.1	1.3	0.3
	Fourth Quartile (Size)	19	20	35	36.7	32.9	46.6	16.0	13.1	17.5
<b>South Africa</b>	<b>Full Sample</b>	<b>136</b>	<b>190</b>	<b>124</b>	<b>50.7</b>	<b>67.0</b>	<b>43.5</b>	<b>10.6</b>	<b>14.0</b>	<b>9.8</b>
	First Quartile (Size)	44	55	14	0.4	0.2	0.0	0.1	0.1	0.0
	Second Quartile (Size)	26	40	33	1.3	1.0	0.6	0.2	0.2	0.1
	Third Quartile (Size)	39	44	36	10.1	5.9	2.9	1.9	1.0	0.4
	Fourth Quartile (Size)	27	51	41	38.8	59.9	40.0	8.5	12.7	9.2
<b>Thailand</b>	<b>Full Sample</b>	<b>221</b>	<b>342</b>	<b>349</b>	<b>46.5</b>	<b>58.5</b>	<b>68.3</b>	<b>27.4</b>	<b>22.1</b>	<b>23.1</b>
	First Quartile (Size)	62	98	52	0.8	0.9	0.2	0.3	0.2	0.1
	Second Quartile (Size)	59	83	70	1.9	1.9	0.8	0.8	0.5	0.2
	Third Quartile (Size)	56	87	98	4.8	5.3	2.9	2.2	1.8	0.8
	Fourth Quartile (Size)	44	74	129	39.0	50.4	64.4	24.0	19.5	22.1

Source: Thomson Reuters Worldscope and IMF's World Economic Outlook.

1/ Cumulative values held by group, as a share of GDP.

Table B3. Emerging Europe: Number of Firms, Assets and Debt Held by Size

		Total Number of Firms			Aggregate Assets to GDP 1/			Aggregate Debt to GDP 1/		
		2000	2005	2011	2000	2005	2011	2000	2005	2011
<b>Bulgaria</b>	<b>Full Sample</b>	<b>0</b>	<b>103</b>	<b>114</b>	<b>0.0</b>	<b>19.9</b>	<b>16.5</b>	<b>0.0</b>	<b>3.8</b>	<b>5.2</b>
	First Quartile (Size)	0	17	21	0.0	0.1	0.1	0.0	0.0	0.0
	Second Quartile (Size)	0	32	27	0.0	0.9	0.4	0.0	0.2	0.1
	Third Quartile (Size)	0	34	26	0.0	3.1	1.5	0.0	0.6	0.4
	Fourth Quartile (Size)	0	20	40	0.0	15.8	14.4	0.0	3.0	4.7
<b>Czech Rep.</b>	<b>Full Sample</b>	<b>5</b>	<b>8</b>	<b>6</b>	<b>20.8</b>	<b>18.1</b>	<b>20.0</b>	<b>4.8</b>	<b>2.3</b>	<b>5.3</b>
	First Quartile (Size)	1	2	0	0.2	0.1	0.0	0.0	0.0	0.0
	Second Quartile (Size)	1	1	3	0.4	0.2	0.5	0.0	0.0	0.1
	Third Quartile (Size)	1	3	1	3.4	3.4	1.5	0.8	0.7	0.1
	Fourth Quartile (Size)	2	2	2	16.9	14.4	18.0	3.9	1.5	5.1
<b>Hungary</b>	<b>Full Sample</b>	<b>10</b>	<b>15</b>	<b>19</b>	<b>17.3</b>	<b>18.6</b>	<b>27.2</b>	<b>4.7</b>	<b>4.1</b>	<b>6.2</b>
	First Quartile (Size)	1	3	7	0.0	0.1	0.1	0.0	0.0	0.0
	Second Quartile (Size)	3	3	4	1.0	0.3	0.3	0.2	0.1	0.1
	Third Quartile (Size)	4	5	3	3.6	2.0	1.4	0.4	0.4	0.2
	Fourth Quartile (Size)	2	4	5	12.7	16.2	25.3	4.1	3.6	5.9
<b>Lithuania</b>	<b>Full Sample</b>	<b>0</b>	<b>12</b>	<b>17</b>	<b>0.0</b>	<b>3.6</b>	<b>4.8</b>	<b>0.0</b>	<b>0.6</b>	<b>0.8</b>
	First Quartile (Size)	0	4	5	0.0	0.4	0.2	0.0	0.2	0.1
	Second Quartile (Size)	0	5	4	0.0	0.8	0.4	0.0	0.3	0.0
	Third Quartile (Size)	0	2	4	0.0	0.7	1.1	0.0	0.1	0.3
	Fourth Quartile (Size)	0	1	4	0.0	1.7	3.0	0.0	0.0	0.4
<b>Poland</b>	<b>Full Sample</b>	<b>21</b>	<b>197</b>	<b>287</b>	<b>8.9</b>	<b>17.8</b>	<b>31.0</b>	<b>2.8</b>	<b>3.0</b>	<b>5.4</b>
	First Quartile (Size)	1	59	50	0.0	0.1	0.1	0.0	0.0	0.0
	Second Quartile (Size)	6	53	76	0.1	0.5	0.5	0.0	0.1	0.1
	Third Quartile (Size)	6	47	70	0.4	1.4	1.5	0.0	0.3	0.3
	Fourth Quartile (Size)	8	38	91	8.4	15.8	28.8	2.8	2.6	5.0
<b>Romania</b>	<b>Full Sample</b>	<b>0</b>	<b>61</b>	<b>60</b>	<b>0.0</b>	<b>10.6</b>	<b>10.3</b>	<b>0.0</b>	<b>1.0</b>	<b>1.8</b>
	First Quartile (Size)	0	20	10	0.0	0.2	0.1	0.0	0.0	0.0
	Second Quartile (Size)	0	21	17	0.0	0.5	0.2	0.0	0.1	0.0
	Third Quartile (Size)	0	8	13	0.0	0.5	0.4	0.0	0.0	0.1
	Fourth Quartile (Size)	0	12	20	0.0	9.4	9.6	0.0	0.9	1.7
<b>Turkey</b>	<b>Full Sample</b>	<b>111</b>	<b>195</b>	<b>214</b>	<b>15.8</b>	<b>23.8</b>	<b>30.1</b>	<b>5.4</b>	<b>6.9</b>	<b>10.8</b>
	First Quartile (Size)	29	47	39	0.3	0.3	0.1	0.1	0.1	0.0
	Second Quartile (Size)	42	50	45	1.3	0.8	0.5	0.3	0.2	0.1
	Third Quartile (Size)	24	49	55	1.8	1.9	1.6	0.5	0.4	0.4
	Fourth Quartile (Size)	16	49	75	12.4	20.8	27.8	4.5	6.3	10.3

Source: Thomson Reuters Worldscope and IMF's World Economic Outlook.  
1/ Cumulative values held by group, as a share of GDP.

ANNEX C: SUPPLEMENTAL INFORMATION ON STYLIZED FACTS AND ROBUSTNESS

Figure C1. LA5 Countries: Long Term and Short Term Debt Held by Country

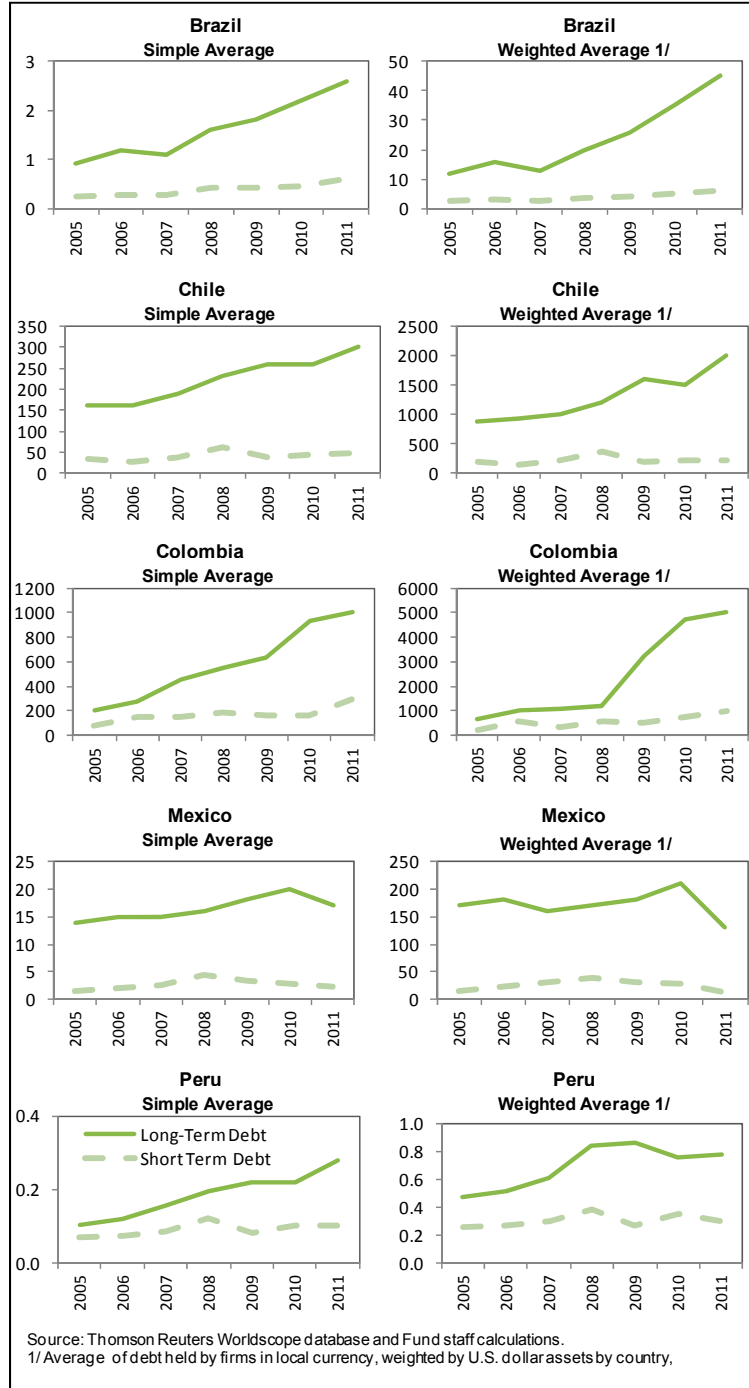


Figure C2. LA5 Countries: Corporate Financial Indicators by Firm Size 1/



Figure C3.1. Brazil: Histograms for Key Corporate Indicators 1/

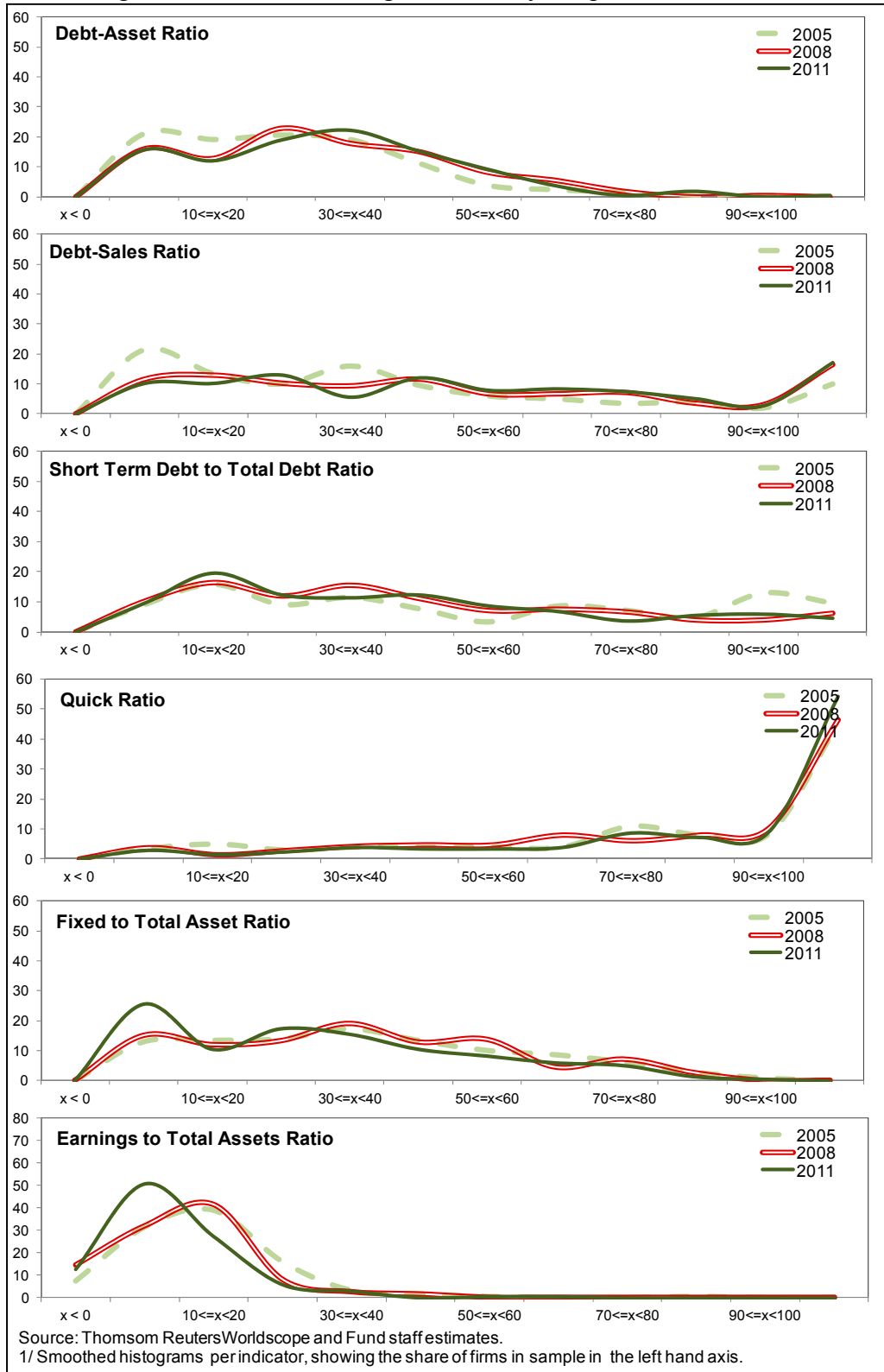




Figure C3.2. Chile: Histograms for Key Corporate Indicators 1/

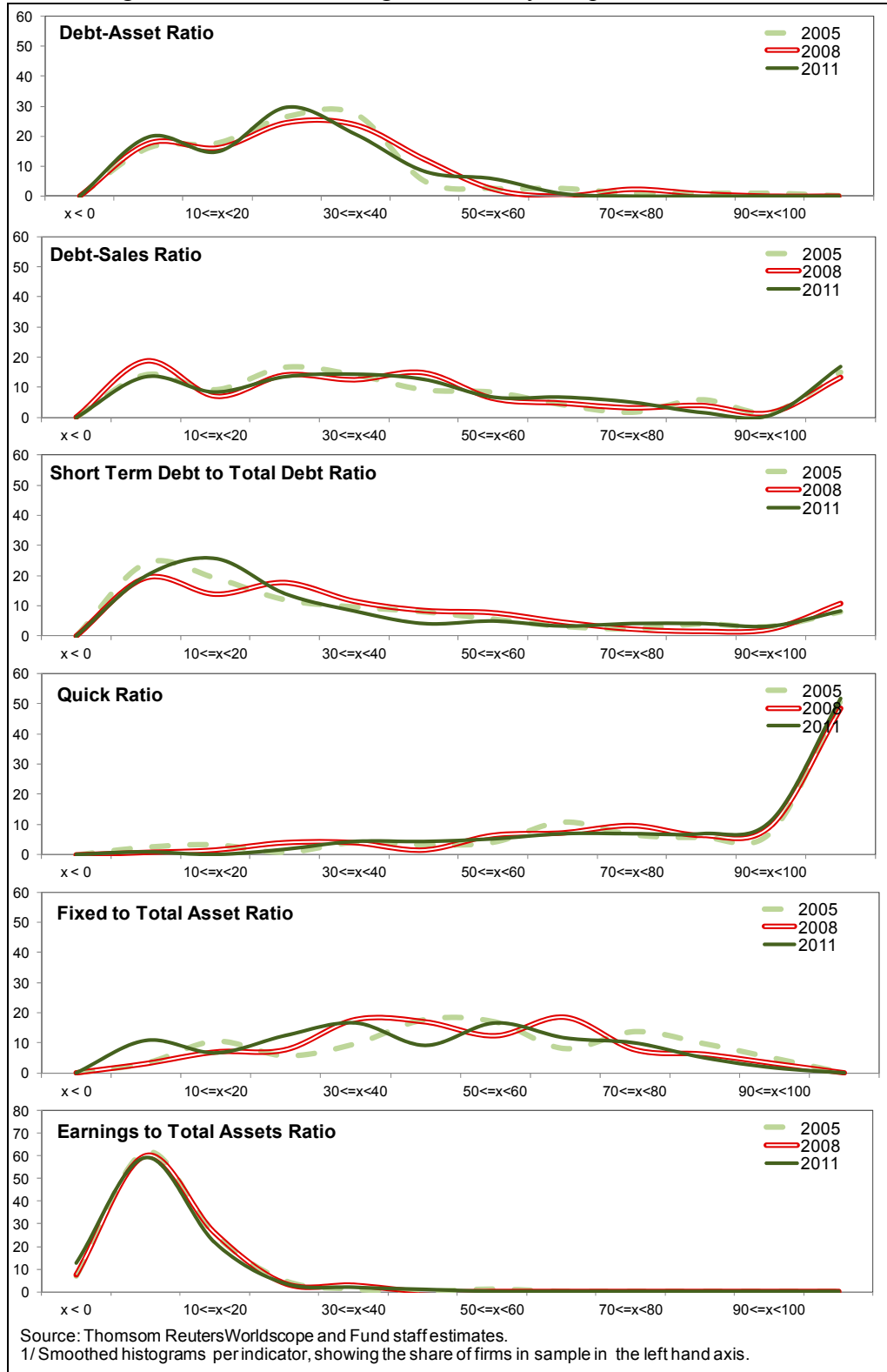


Figure C3.3. Colombia: Histograms for Key Corporate Indicators 1/

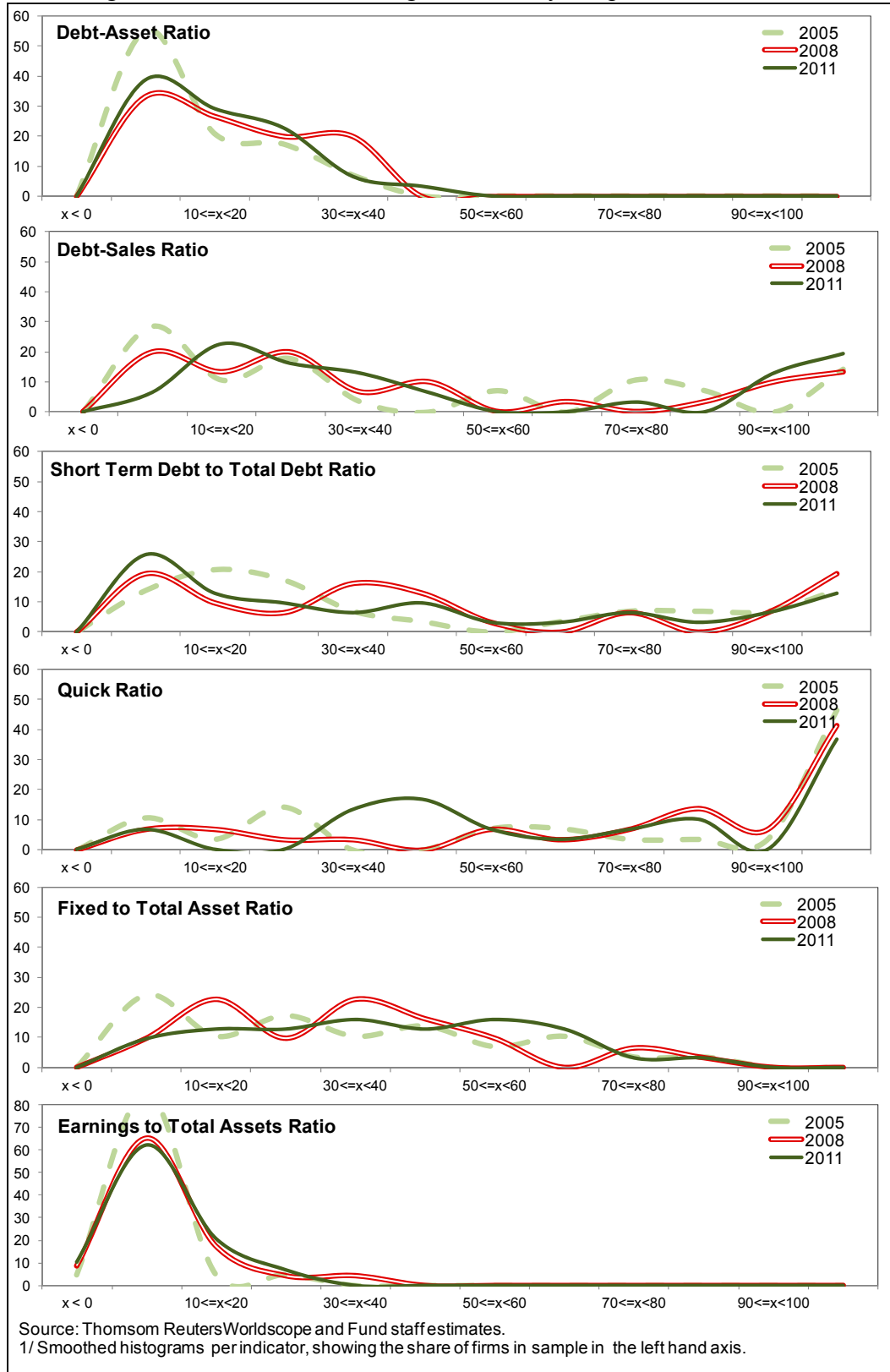


Figure C3.4. Mexico: Histograms for Key Corporate Indicators 1/

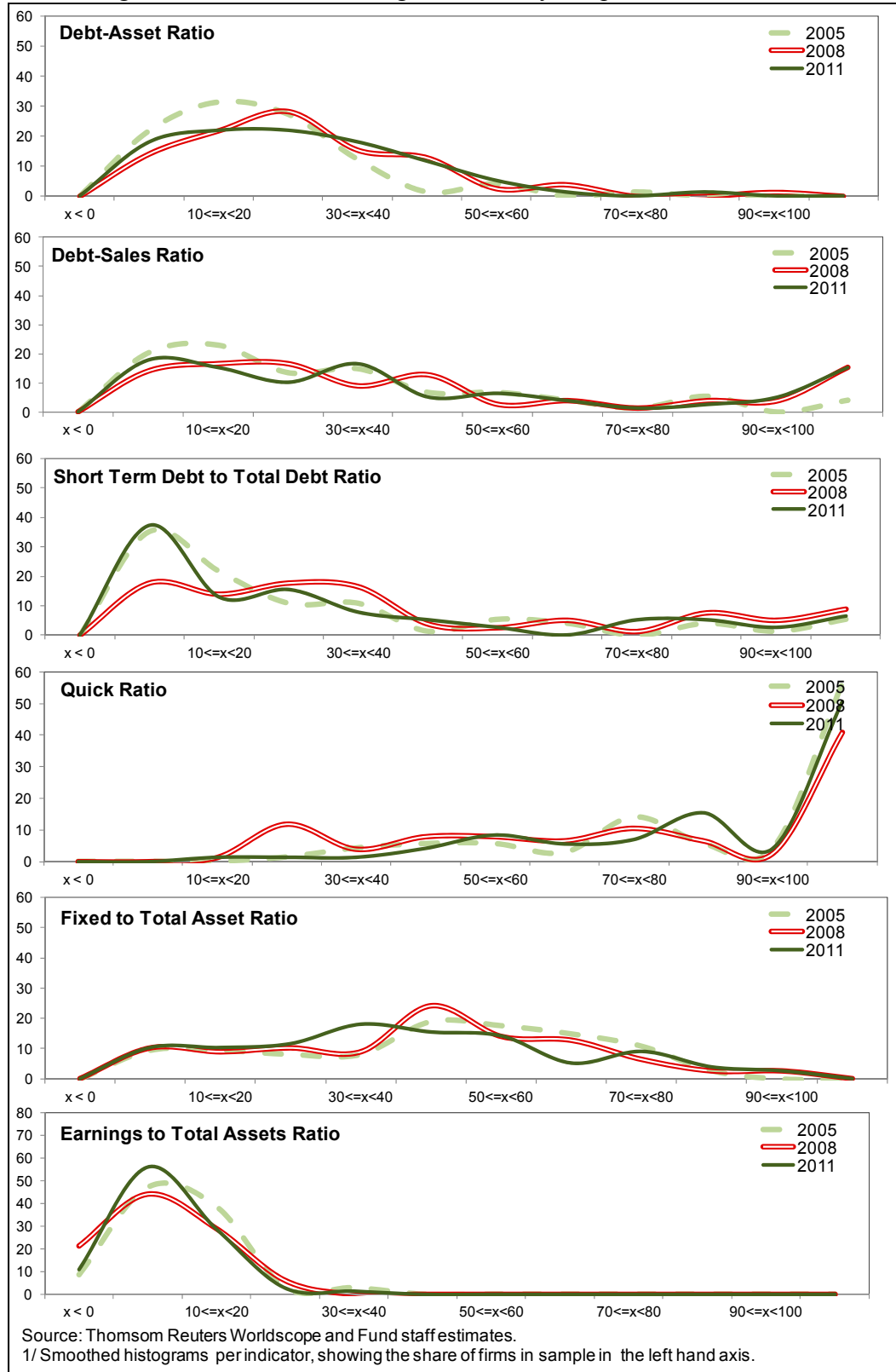
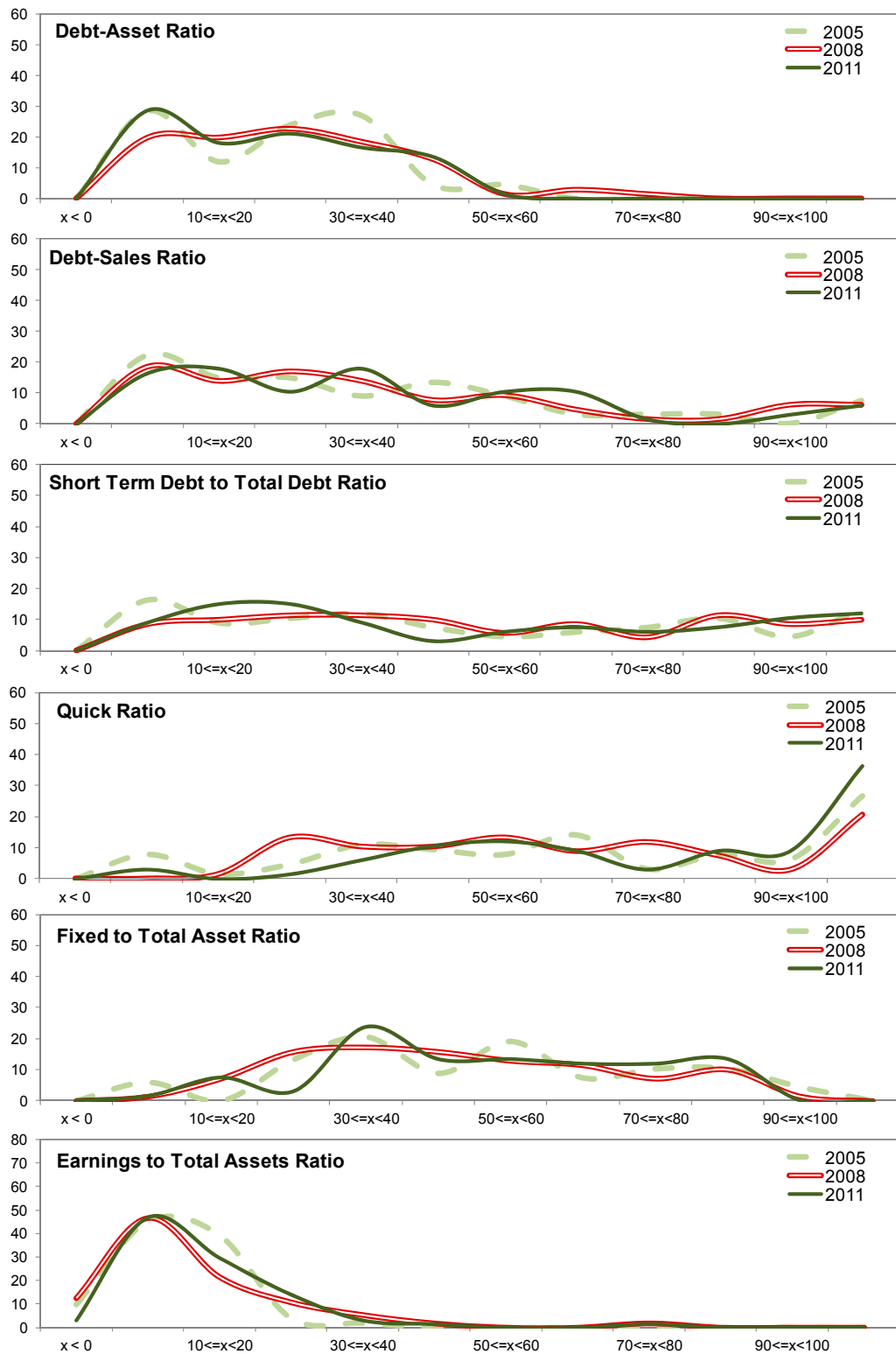


Figure C3.5. Peru: Histograms for Key Corporate Indicators 1/



Source: Thomson ReutersWorldscope and Fund staff estimates.

1/ Smoothed histograms per indicator, showing the share of firms in sample in the left hand axis.

Table D1. Main Results: Exposure to a Sudden Stop, Main Model and Robustness Estimations (Debt-Sales Ratio)

Explanatory Variable	(A) Random Effects										(B)	(C)
	Basic (0)	Rob 1	Rob 2	Rob 3	Rob 4	Rob 5	Rob 6	Rob 7	Rob 8	Heckman Select. 1/	Fixed Effects	
<b>Firm-Specific</b>												
Size (lag)	-0.0695*** (0.0155)	-0.0630 *** (0.0151)	-0.0675 *** (0.0157)	-0.0692 *** (0.0156)	*** (0.0155)	*** (0.0167)	-0.0927 *** (0.0154)	-0.0709*** (0.0154)	-0.0704 *** (0.0173)	-0.0638 *** (0.0023)	-0.0245 *** (0.0023)	-0.0605*** (0.0067)
Leverage Ratio (lag)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0003 *** (0.0001)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Short-Term Debt to Total (lag)	0.00459*** (0.0005)	0.0047 *** (0.0005)	0.0047 *** (0.0006)	0.0046 *** (0.0005)	0.0046 *** (0.0005)	0.0043 *** (0.0006)	0.00461*** (0.0005)	0.0046 *** (0.0005)	0.0045 *** (0.0006)	0.0028 *** (0.0001)	0.0028 *** (0.0001)	0.00593*** (0.0003)
Quick Ratio (lag)	-0.0251*** (0.0047)	-0.0262 *** (0.0046)	-0.0253 *** (0.0047)	-0.0251 *** (0.0047)	-0.0249 *** (0.0051)	-0.0267 *** (0.0047)	-0.0253*** (0.0047)	-0.0251 *** (0.0047)	-0.0242 *** (0.0048)	-0.0137 *** (0.0011)	-0.0137 *** (0.0011)	-0.0445*** (0.0156)
Fixed-to-Total-Asset Ratio (lag)	0.00181* (0.0010)	0.0018 * (0.0010)	0.0020 * (0.0010)	0.0018 * (0.0010)	0.0018 * (0.0010)	0.0020 * (0.0011)	0.00180* (0.0010)	0.0019 * (0.0010)	0.0030 *** (0.0011)	0.0000 (0.0002)	0.0000 (0.0002)	-0.0002 (0.0006)
<b>Dom. and Ext. Demand</b>												
Dom. Demand Growth (real, lag, %)	-0.00733* (0.0038)	-0.0092 ** (0.0038)	-0.0074 * (0.0039)	-0.0073 * (0.0038)	-0.0062 (0.0038)	-0.0066 (0.0040)	-0.00655* (0.0040)			-0.0091 ** (0.0039)	0.0008 (0.0008)	-0.00868*** (0.0030)
Real GDP Growth (real, lag, %)									-0.0065 (0.0051)		0.0005 (0.0006)	
Terms of Trade Growth (%)	-0.0032 (0.0024)	-0.0039 (0.0024)	-0.0021 (0.0028)	-0.0033 (0.0024)	-0.0027 (0.0024)	-0.0015 (0.0026)				-0.0031 (0.0024)	-0.0023 (0.0026)	-0.0012 (0.0020)
Real Adv. Econ. Growth (real, lag, %)							-0.0126 (0.0189)					
<b>Financing Availability</b>												
Priv. Sect. Cred. (%GDP, lag, chg.)	-0.00538** (0.0025)	-0.0048 * (0.0026)	-0.0047 * (0.0025)	-0.0054 ** (0.0025)	-0.0048 * (0.0025)	-0.0067 ** (0.0029)	-0.00489** (0.0025)	-0.0055 ** (0.0025)	-0.0048 * (0.0027)		-0.0018 *** (0.0007)	-0.0029 (0.0020)
Ext. Finan. Growth (USD, lag, %)	0.0006 (0.0005)	0.0008 * (0.0005)	0.0006 (0.0005)	0.0007 (0.0005)	0.0007 (0.0005)	0.0007 (0.0005)	0.0006 (0.0005)	0.0006 (0.0005)			0.0003 ** (0.0001)	0.000623* (0.0004)
Interact: Ext. Fin. Growth * LatAm Dum.				-0.0002 (0.0019)								
Net Private Capital Inflows (USD, lag, %)										0.0000 (0.0000)		
Investment Grade Dummy					-0.0882 * (0.0522)							
<b>Global Economy</b>												
VIX	0.00798** (0.0037)	0.0049 (0.0041)	0.0058 (0.0038)	0.0081 ** (0.0037)	0.0090 ** (0.0037)	0.0104 *** (0.0039)	0.0066 (0.0047)	0.0087 ** (0.0037)	0.0011 (0.0041)		0.0013 (0.0010)	0.00470* (0.0028)
World Oil Price Growth (%)	0.0006 (0.0010)	-0.0001 (0.0011)	-0.0002 (0.0010)	0.0006 (0.0010)	0.0007 (0.0010)	0.0011 (0.0011)	0.0014 (0.0016)	0.0008 (0.0010)	-0.0008 (0.0011)		0.0000 (0.0003)	0.0003 (0.0008)
<b>Currency Exposure</b>												
Nom. Exch. Rate (% chg., +=deprec)	0.00369** (0.0017)	0.0056 *** (0.0016)		0.0037 ** (0.0017)	0.0039 ** (0.0017)	0.0027 (0.0019)	0.00316* (0.0018)	0.0037 ** (0.0018)	0.0072 *** (0.0020)		0.0009 ** (0.0005)	0.00287** (0.0014)
Real Exch. Rate (5 chg., - = deprec)			-0.0061 *** (0.0018)									
<b>Policies and Institutional</b>												
Exch. Rate Flex. (Index= 1-4, 4=max flex)	-0.0630*** (0.0242)	-0.0484 ** (0.0234)	-0.0633 *** (0.0243)	-0.0631 *** (0.0242)	-0.0640 *** (0.0242)	-0.0252 (0.0354)	-0.0640*** (0.0238)	-0.0655 *** (0.0242)	-0.0647 *** (0.0248)		-0.0192 *** (0.0037)	-0.0311 (0.0210)
Countercyc. Fisc. Pol. Dummy	-0.0273 (0.0299)		-0.0290 (0.0299)	-0.0271 (0.0299)	-0.0344 (0.0302)	-0.0332 (0.0325)	-0.0297 (0.0297)	-0.0335 (0.0298)	-0.0591 * (0.0327)		-0.0069 (0.0069)	0.0030 (0.0241)
Primary Balance, Gen.Gov (%GDP, lag)		-0.0067 (0.0083)										
Recov if Insolv (Index: 1-10, 10=max recov)						-0.0257 * (0.0155)						
<b>Statistics</b>												
Observations	18,576	19,484	17,860	18,576	18,576	16,229	18,661	18,576	16,322	17,854	18,576	

Robust standard errors; P-Values as: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.  
1/ Based on selection equation determined on firm-level variables, including profitability (Earnings to Total Assets).

Table D2. Main Results: Exposure to a Sudden Stop, Main Model and Robustness Estimations (Debt-Sales Ratio, Percentiles)

Explanatory Variable	Random Effects								Heckman Selection Model 1/	Fixed Effects		
	Basic	Rob 1	Rob 2	Rob 3	Rob 4	Rob 5	Rob 6	Rob 7			Rob 8	
<b>Firm-Specific</b>												
Size (lag)	-0.0318 *** (0.0041)	-0.0301 *** (0.0040)	-0.0322 *** (0.0041)	-0.0317 *** (0.0041)	-0.0316 *** (0.0041)	-0.0348 *** (0.0044)	-0.0321 *** (0.0041)	-0.0319 *** (0.0041)	-0.0296 *** (0.0044)	-0.0100 *** (0.0006)	-0.0322 *** (0.0021)	
Leverage Ratio (lag)	0.1200 *** (0.0043)	0.1200 *** (0.0042)	0.1230 *** (0.0043)	0.1210 *** (0.0043)	0.1210 *** (0.0043)	0.1210 *** (0.0046)	0.1200 *** (0.0043)	0.1210 *** (0.0043)	0.1170 *** (0.0046)	0.0354 *** (0.0008)	0.1190 *** (0.0030)	
Short-Term Debt to Total (lag)	0.0360 *** (0.0034)	0.0361 *** (0.0033)	0.0374 *** (0.0034)	0.0360 *** (0.0034)	0.0362 *** (0.0034)	0.0350 *** (0.0037)	0.0361 *** (0.0034)	0.0361 *** (0.0034)	0.0347 *** (0.0036)	0.0188 *** (0.0007)	0.0582 *** (0.0025)	
Quick Ratio (lag)	-0.0524 *** (0.0036)	-0.0503 *** (0.0035)	*** (0.0037)	*** (0.0036)	-0.0523 *** (0.0036)	-0.0520 *** (0.0036)	-0.0537 *** (0.0040)	-0.0525 *** (0.0036)	-0.0524 *** (0.0036)	-0.0568 *** (0.0039)	-0.0563 *** (0.0024)	
Fixed-to-Total-Asset Ratio (lag)	-0.0341 *** (0.0039)	-0.0337 *** (0.0038)	-0.0340 *** (0.0039)	-0.0343 *** (0.0039)	-0.0340 *** (0.0039)	-0.0337 *** (0.0042)	-0.0342 *** (0.0039)	-0.0340 *** (0.0039)	-0.0331 *** (0.0041)	-0.0124 *** (0.0007)	-0.0390 *** (0.0024)	
<b>Dom. and Ext. Demand</b>												
Dom. Demand Growth (real, lag, %)	-0.0016 (0.0038)	-0.0026 (0.0038)	-0.0008 (0.0038)	-0.0008 (0.0038)	-0.0001 (0.0038)	-0.0026 (0.0040)	-0.0009 (0.0039)		-0.0023 (0.0038)	-0.0007 (0.0010)	-0.0040 (0.0033)	
Real GDP Growth (real, lag, %)								0.0019 (0.0051)				
Terms of Trade Growth (%)	-0.0056 ** (0.0024)	-0.0060 ** (0.0023)	-0.0039 (0.0028)	-0.0060 ** (0.0024)	-0.0050 ** (0.0024)	-0.0044 * (0.0025)			-0.0054 ** (0.0024)	-0.0052 ** (0.0026)	-0.0001 (0.0006)	-0.0022 (0.0022)
Real Adv. Econ. Growth (real, lag, %)							-0.0076 (0.0188)					
<b>Financing Availability</b>												
Priv. Sect. Cred. (%GDP, lag, chg.)	-0.0062 ** (0.0025)	-0.0054 ** (0.0026)	-0.0055 ** (0.0025)	-0.0058 ** (0.0025)	-0.0053 ** (0.0025)	-0.0089 *** (0.0029)	-0.0057 ** (0.0025)	-0.0058 ** (0.0025)	-0.0057 ** (0.0026)	-0.0003 (0.0006)	-0.0013 (0.0021)	
Ext. Finan. Growth (USD, lag, %)	0.0012 ** (0.0005)	0.0014 *** (0.0005)	0.0011 ** (0.0005)	0.0014 *** (0.0005)	0.0013 *** (0.0005)	0.0011 ** (0.0005)	0.0011 ** (0.0005)	0.0011 ** (0.0005)	0.0011 ** (0.0005)	0.0003 *** (0.0001)	0.0010 ** (0.0004)	
Interact: Ext. Fin. Growth * LatAm Dum.				-0.0030 * (0.0018)								
Net Private Capital Inflows (USD, lag, %)									0.0000 (0.0000)			
Investment Grade Dummy					-0.1270 *** (0.0458)							
<b>Global Economy</b>												
VIX	0.0063 * (0.0037)	0.0018 (0.0040)	0.0041 (0.0038)	0.0073 * (0.0037)	0.0076 ** (0.0037)	0.0082 ** (0.0039)	0.0054 (0.0047)	0.0071 * (0.0037)	-0.0004 (0.0040)	0.0015 * (0.0009)	0.0049 (0.0030)	
World Oil Price Growth (%)	0.0014 (0.0010)	0.0002 (0.0010)	0.0007 (0.0010)	0.0015 (0.0010)	0.0015 (0.0010)	0.0020 * (0.0010)	0.0017 (0.0016)	0.0016 (0.0010)	0.0003 (0.0011)	0.0003 (0.0001)	0.0010 (0.0008)	
<b>Currency Exposure</b>												
Nom. Exch. Rate (% chg., +=deprec)	0.0027 (0.0017)	0.0046 *** (0.0016)		0.0026 (0.0017)	0.0029 * (0.0017)	0.0010 (0.0018)	0.0026 (0.0018)	0.0025 (0.0017)	0.0053 *** (0.0020)	0.0006 (0.0004)	0.0029 * (0.0015)	
Real Exch. Rate (5 chg., -= deprec)			-0.0043 ** (0.0018)									
<b>Policies and Institutional</b>												
Exch. Rate Flex. (Index= 1-4, 4=max flex)	-0.0929 *** (0.0226)	-0.0826 *** (0.0221)	-0.0913 *** (0.0226)	-0.0924 *** (0.0226)	-0.0943 *** (0.0226)	-0.0602 * (0.0314)	-0.0928 *** (0.0222)	-0.0927 *** (0.0226)	-0.0931 *** (0.0230)	-0.0137 ** (0.0068)	-0.0489 ** (0.1600)	
Countercyc. Fisc. Pol. Dummy	-0.0250 (0.0296)			-0.0223 (0.0296)	-0.0358 (0.0299)	-0.0272 (0.0318)	-0.0274 (0.0295)	-0.0312 (0.0295)	-0.0589 * (0.0322)	0.0024 ** (0.0071)	-0.0040 (0.0033)	
Primary Balance, Gen.Gov (%GDP, lag)		-0.0112 (0.0075)										
Recov if Insolv (Index: 1-10, 10=max recov)						-0.0396 *** (0.0125)						
<b>Statistics</b>												
Observations	18,576	19,484	17,860	18,576	18,576	16,229	18,661	18,576	16,322	17,854	18,576	

Robust standard errors; P-Values as: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

1/ Based on selection equation determined on firm-level variables, including profitability (Earnings to Total Assets).

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