

Are Macroeconomic Factors Important in Determining Capital Structure? Evidence from Latin America

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Abstract

Recent empirical evidence suggests that country-specific factors are major determinants of patterns of capital structure in emerging markets. These country-specific factors include institutional framework, legal and accounting practices, financial infrastructure, and the macroeconomic environment. In this paper I investigate in what extent macroeconomic factors are determinants of capital structures in a sample of firms of seven Latin American countries: Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. These countries are particularly interesting because besides being well-known examples of developing economies, they have gone through a variety of macroeconomic environments in a relatively short period of time. If the environment is somehow important for capital structure decisions, then it is likely that Latin American firms have experienced such effects. Using a Panel Data framework with several measures of leverage, my findings suggest that – contrary to previous studies – country-specific factors although important, are not decisive determinants of the leverage ratio. Moreover, idiosyncratic firm-specific factors emerge as major determinants of capital structure for the sample of firms studied.

1. Introduction

More than forty years after the breakthrough work of Modigliani and Miller [1958], it is surprising how little is actually known about how firms should choose between debt and equity. The literature in this field has been prolific, several theoretical and empirical works have been published, but yet a definite consensus is still to emerge.

Alternative explanations for the capital structure puzzle have been suggested. The best known being the static tradeoff hypothesis (Modigliani and Miller [1963], Miller [1977], DeAngelo and Masulis [1980]), the agency cost framework (Jensen and Meckling [1976], Myers [1977], Myers and Majluf [1984], and Jensen [1986]), the signaling framework (Ross [1977]), and the pecking order hypothesis (Myers [1984]).¹ Major empirical research in this field includes for instance Marsh [1982], Bradley, Jarrell, and Kim [1984], Titman and Wessels [1988], Mackie-Mason [1990], Givoly et al. [1992], Graham [1996], and Fama and French [1998], among others. As mentioned above, despite the large number of empirical studies conducted so far, the debate is far from settled. Recently, evidence in favor of the pecking order hypothesis has become more frequent (i.e. Shyam-Sunder and Myers [1999]).

International studies of capital structure, however, have not been as common as single country studies, particularly from the United States. In a classical paper, Rajan and Zingales [1995] investigate the determinants of capital structure during the period 1987-1991 in the Group of Seven industrialized economies. The authors do not find large differences in the correlations of leverage and its theoretic underlying factors among the countries of the study, and conclude that institutional differences may not be as influent in capital structure decisions. Alternatively, the traditional understanding of the economic underpinnings of such factors may be flawed.

Wald [1999] examines capital structure in the United States, Germany, France, and the United Kingdom and finds that differences in tax policies and agency problems (bankruptcy costs, information asymmetries, and shareholder/creditor conflicts) explain differences across countries. The study suggests links between capital structure decisions and legal and

institutional differences. Demirgüç-Kunt and Maksimovic [1999] examine firm debt maturity in 30 countries during the period 1980-1991. They find that large firms in countries with active markets have more long-term debt, while small firms in countries with large banking sectors tend to have longer maturity debt.

Finally, Booth et al. [2001] find evidence that debt ratios in developing countries are affected in the same way and by the same types of variables that are significant in industrial countries. However, there are systematic differences in the way these ratios are affected by country-specific factors. Also, knowing the country-of-origin is more important than knowing the size of all the independent variables.

In their study, Booth et al. [2001] suggest that the importance of country-specific effects in explaining leverage choices of firms across the world is due to institutional arrangements specific to each country, such as the structure of the financial sector, the tradition of the legal system, and accepted accounting practices. However, the literature on financial contagion raises the hypothesis that macroeconomic similarities may indeed be a determinant factor leading investors to consider countries as similar financial risks.² Similarly, it is possible that similar macroeconomic environments may also lead firms to adopt similar leverage ratios. Hodder and Senbet [1990], for instance, have presented theoretical arguments for the capital structure choice in a multi-country world with differences in taxation and inflation. Also, Korajczyk and Levy [2001] find significant evidence that macroeconomic conditions are important in the security issue decision. Thus, it is important to verify in what extent the macroeconomic environment determines firms' capital structures.

In this paper, I extend the traditional study of the determinants of capital structure by investigating whether macroeconomic factors are relevant in determining capital structure in Latin America. This paper adds to the literature in the following ways: first, by extending the study of capital structure to a emerging market, multi-country framework; second, by employing empirical techniques that account properly for cross-section and time series variation; and finally, by assessing the effect of country-specific and macroeconomic factors on a firm's capital structure. The remaining of the paper is structured as follows: next section details the methodology, presents the data sources, and describes the variables used in the empirical model. Section 3 reports and comments the estimation results. Concluding remarks are presented in section 4. My main findings indicate that, contrary to previous empirical evidence, knowing the country of origin of a firm does not help predicting its leverage decision any more than knowing the firm's idiosyncratic factors.

2. Methodology, Variables, and Data

2.1. Panel Data Analysis³

Panel data analysis presents several advantages for the treatment of economic problems where cross-sectional variation and dynamic effects are relevant. Hsiao [1986] raises three advantages possessed by panel data sets: since they provide a larger number of data points, they allow the increase of the degrees of freedom and reduce the collinearity among explanatory variables; they allow the investigation of problems that cannot be solely addressed by either cross-section or time series data sets; and they provide a means of reducing the missing variable problem.

In principle, classic time series methods can be applied to panels simply by "pooling" all cross-section and time series observations together. Indeed, this approach is often used. However, as Hsiao [1986] points out, coefficients estimated with this approach may be subject to a variety of biases arising from cross-sectional heterogeneity of both slopes and intercepts.

Moreover, in a typical panel (also referred to as a “longitudinal” data set), there are a large number of cross-sectional units and only a few periods. This is the type of panel that is examined in this paper, where there are a relatively large number of firms from different countries observed over little more than a dozen years. In such case, the econometric techniques should focus more on cross-sectional variation (heterogeneity) instead of time variation.

A common assumption is that differences across units can be captured in differences in the regression’s intercept – the fixed-effects model. This model is usually referred to as the least squares dummy variable (LSDV) model (Greene [1993]). This is a classical regression model that can be estimated by Ordinary Least Squares. The hypothesis that the intercepts are all equal – a simple way to test the simple pooling versus the fixed-effects formulations – can be tested with a straightforward F-test. This model is a reasonable approach when the differences between units can be viewed as parametric shifts of the regression function.

In other settings, it might be appropriate to view individual specific intercept terms as random variables. Such is the case of the random-effects model. The choice between fixed- and random-effects models involves a tradeoff between the degrees of freedom lost to the dummy variable approach in the fixed-effects model and the treatment of individual effects as uncorrelated with other regressors as is the case with the random-effects formulation. Testing the orthogonality of the random effects and the regressors is thus important. The usual procedure is to use the Hausman test statistic for the difference between the fixed-effects and random-effects estimates, as suggested by Hsiao [1986].

Estimation of Panel Data models can be done by Ordinary Least Squares in the case of simple pooling and fixed-effects formulations and by Generalized Least Squares for the random-effects one (Hall and Cummins [1997]).

The main advantage of such methodology in the investigation of the problem proposed in this paper is that observations of firms from different countries can be pooled together in order to increase the degrees of freedom. Also, by pooling together countries (besides firms) I can infer in what extent the relationships among the variables hold across different countries and determine if country-specific factors help explain the variation observed by other authors.

Pooling of firms together, on the other hand, assumes that parameters (slopes and intercepts) are constant across firms. This is, of course, a very strong assumption and subject to potential biases (Hsiao [1986]). That would be the case if the effects of a given independent variable are different for different kinds of firms, for instance small and large firms. Moreover, in order to include macroeconomic variables (that are fixed for all firms of the same country in a given year), it is not possible to use either fixed- or random-effects formulations that could potentially prevent intercept biases (slope biases may still be present). The addition of firm-specific variables (such as firm size) helps controlling for these possible biases. Nevertheless this remains a limitation of this research.

2.2. Data and Variables⁴

Accounting and stock market firm-level data are from the Economática Pro[©] database (Economática [2001]). Data on country-level variables such as the growth in real gross domestic product, the consumer price annual percentage change, and the nominal deposit interest rates are from the Economist Intelligence Unit’s CountryData[©] database (Economist Intelligence Unit [2001]). Stock market indices are from Morgan Stanley Capital International, except for the Brazilian stock market index for the years 1986 and 1987, which are from the International Finance Corporation’s Emerging Market Database.⁵

All firms are public corporations. It is well known that these firms are not representatives of the typical Latin American firm, particularly in terms of size.⁶ Nonetheless,

I believe the insights provided by this study can also be cautiously extended to the average firm in the region.

Observations are yearly in the period 1986-2000 (subject to availability) and the unit of research is each firm. Countries that are object of this study are Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. An overview of the number of firms available in the database by country and industry sector is shown in Tables 1 and 2. In this study I exclude financial institutions such as banks, financial groups, holding companies, investment corporations, insurance, private pension plans, and “others”. Many of these firms are under a “non-financial” SIC division code. Therefore, in order to exclude such firms, I relied on the database’s own documentation, which classifies the firms in more detail than the SIC division codes.

From Table 1 it can be seen that Brazil heavily influences the sample: it has the most firms included and for the longest time period, responding for more than 40% of the sample composition. Colombia and Venezuela, on the other hand, have little presence on the sample. Table 2 shows that manufacturing is the predominant activity of the firms included in the sample, with a participation of more than 54%. The service sector lies in the other end of the spectrum, with less than 2% of the firms included.

In this paper, I employ balance sheet data for individual firms and aggregate economic data for countries. One common criticism is that firms in this region usually elaborate financial statements mainly for tax purposes. However, in the past decade the issue of corporate governance has been rising in the priority’s agenda of capital market participants everywhere,⁷ and market regulators have toughen their surveillance over proper disclosure.⁸

Another concern regarding accounting data is the existence of firms that present negative book equity. In fact, there are a few such occurrences in the sample but their effect over the estimates is negligible.⁹

The periodicity is annual, since balance sheet information for yearly statements are usually more reliable.¹⁰ Also, considering the long-term implications of the capital structure choice, higher frequency data should not add much to the findings – but it might be noisier.

Accounting information in the database is available in local currency (real or nominal) and in U.S. dollars. Since this is a cross-country study, I use figures denominated in U.S. dollars in order to ease comparisons. In fact such scaling is irrelevant since most variables in this study are ratios. However, a nominal variable such as firm size would be greatly misleading for comparison purposes if kept in local currency terms.

The dependent variable is an indicator of capital structure measured by four different leverage ratios: Total Book Liabilities over Total Book Assets (“Leverage Ratio 1”, henceforth simply LR1), Total Book Liabilities over Book Equity (LR2), Long-Term Book Liabilities over Book Equity (LR3), and the Market Value of Debt over Total Market Value of the Firm (LR4). Strictly speaking, capital structure analyses should concentrate over long-term financing (i.e. long-term liabilities and equity such as in LR3). However, long-term debt financing is scarce in many emerging markets, which could distort the results if the analyses are limited to long-term sources of debt. In order to avoid such problem, I also report results for two total leverage indicators (LR1 and LR2). Finally, the true measure of leverage may be market-based instead of book-based. Therefore I report results using a market leverage ratio as well (LR4).¹¹

Table 3 presents the mean leverage for the firms in the sample for each year. The leverage of Latin American firms has increased on average over the period of study, except for Colombia and Venezuela.¹² The case of Brazil is particularly revealing: average total book indebtedness (LR1) rose to about 80% from less than 33% between 1986 and 2000. Also, the

cross-section variation has also increased somewhat over the years for most variables, except perhaps for LR4.

Firm-specific determinant factors for the capital structure choice are chosen from those often suggested in the literature. Given the objectives of this study, firm-specific explanatory variables can be seen more as “control variables”.¹³ The set of firm-specific explanatory variables is the following: tangibility, profitability, size, growth opportunities, the tax rate, and business risk. I describe each of these in more detail below:

- ← The degree of tangibility of assets, an indicator of collateral value, is given by:

$$Tangibility = \frac{NetFixedAssets}{TotalAssets} \quad [Eq. 1]$$

- ← Profitability is measured according to the usual return on assets ratio:

$$ROA = \frac{EBIT}{TotalAssets} \quad [Eq. 2]$$

Where *EBIT* stands for earnings before taxes and interest.

- ← The size of the firm is measured by:

$$Size = Log(TotalAssets) \quad [Eq. 3]$$

- ← Growth opportunities of the firm are assessed by:

$$Growth = \frac{MarketCapitalization}{Equity} \quad [Eq. 4]$$

- ← The effective average tax rate of the firm is used as a proxy for the effect of tax shields:

$$AverageTaxRate = \frac{EBT - NetEarnings}{EBT} \quad [Eq. 5]$$

Where *EBT* stands for earnings before taxes.¹⁴

- ← Finally, business risk is measured by:

$$BusinessRisk = \frac{StdDeviation(EBT)}{AverageTotalAssets} \quad [Eq. 6]$$

The quality of measurement of these variables, i.e. in what extent the data reported is accurate, is certainly an issue. Annual accounting reports are usually subject to independent auditing and, since all firms present in the sample are public, accounting reports are subject to supervision of each country’s securities commission. The degree of compliance may nevertheless differ from one country to another depending on how stringent are each commission’s standards and how much will and enforcement power the commission has. Similarly, stock market data is also dependent on each market’s depth. Another possible source of measurement imprecision is the set of accounting standards adopted in each country. These issues shall be taken into account when analyzing the results.

Besides the above variables, the sector of activity of each firm is also included as an explanatory variable, given the possible systematic effects that the nature of the firm’s activities may have over its leverage, in particular the total leverage measures. The sector of activity is represented by a set of dummy variables based on the SIC division codes informed in the database. “Manufacturing” is chosen as the base-case so that the regressions may include an intercept.

Similarly, country-specific effects are captured by a set of dummy variables included in the convenient regressions, where “Brazil” is then chosen as the base-case. Therefore, in the regressions that include both the sector of activity and the country dummy, the intercept

represents the Brazilian manufacturing firm, and the coefficients of the dummy variables report the effects with respect to this base-case. The intercept of any other firm is thus the sum of the general intercept, the sector dummy, and the country dummy.

Macroeconomic similarities are measured by usual macroeconomic indicators: the growth in real gross domestic product, the inflation rate, the (ex-post) real interest rate, and the (ex-post) real return on the stock market. Ex-post real variables are obtained simply by subtracting realized inflation from realized nominal rates. One criticism is that such set of variables is too limited to adequately describe the macroeconomic environment. That may be the case, but although they may not thoroughly describe the macroeconomic environment, they are surely the most important variables for such purpose. If there are any subset of relevant macroeconomic factors, the ones chosen here most certainly must be included. Moreover, in preliminary runs I also included the ex-post real exchange rate as well as the volatility of the variables discussed above (with the volatility of industrial production growth instead of that of GDP growth). None of these variables substantially changed the results reported here.

One final remark is that, in determining capital structure, the nature of the ownership of the firm may induce systematic effects.¹⁵ State-owned firms, for instance, may have a lower bankruptcy probability – a factor that according to theory is decisive for the optimal leverage ratio. Similarly, firms that belong to an industrial conglomerate (“*grupo* effect”) or that are subsidiaries of powerful multinational corporations may face less credit constraints than independent local firms may. Also, given the wide privatization process that took place in Latin America in the early 1990’s, it would be important to precisely determine when the change of ownership status occurred for each firm. Despite the relevance of such aspect, the database does not provide reliable detailed information about the ownership of the firms for most of the countries and periods studied. Therefore, I opt for leaving such variable out of the study.¹⁶

2.3. Empirical Model

A Panel Data analysis is performed according to the following (augmented) model:

$$LR_{it} = \beta_{0i} + \sum_{k=1}^K \beta_{1k} X_{ikt} + \sum_{j=1}^J \beta_{2j} Y_{ijt} + \sum_{m=1}^M \beta_{3m} Z_{imt} + \varepsilon_{it} \quad [\text{Eq. 7}]$$

Where LR_{it} is the stacked vector of the dependent variable (the i^{th} -firm leverage ratio on the t^{th} -period), X_{ikt} is the matrix of K firm-specific independent variables (including the sector dummies), Y_{ijt} is the matrix of J country dummy variables, Z_{imt} is the matrix of M country-specific macroeconomic variables, β_{0i} is the intercept, β_{1j} , β_{2k} , and β_{3m} , are the matrices of coefficients, and ε_{it} is a vector of error terms. The model is estimated including each block of independent variables in turn, in order to assess the explanatory power of each one of them.

3. Empirical Results

In order to assess in what extent country-specific factors influence the capital structure choice, I pool all Latin American firms together in a single database. My objective is to determine if such country-specific factors help in further explaining leverage ratios and – if they do – what kind of factors (institutional or macroeconomic or both) responds for such explanation.

In this paper, I simplify the problem at hand by measuring institutional factors (financial structure, legal tradition, cultural heritage, accounting practices, etc.) as dummy variables for each country. Macroeconomic factors are in turn measured by a set of four broad

macroeconomic indicators: the real growth rate of GDP, the inflation rate, the ex-post real interest rate, and the ex-post real stock returns.

Since country dummies remain constant for each firm over time, the models could not be estimated in the fixed-effects formulation (because country dummies would be collinear with the intercept). Although the simple pooling approach is not as good as the fixed-effects one, it does allow for the kinds of verification desired.

Tables 4 to 7 present estimation results for seven different specifications for each dependent variable, all based on the augmented model presented in Eq. 7 above. Standard errors are heteroskedasticity robust according to the method proposed by White [1980]. The specifications are as follows:

- ← Specification I: traditional firm-specific variables (firm measures and sector dummies) only;
- ← Specification II: traditional firm-specific variables and country dummies;
- ← Specification III: traditional firm-specific variables and macroeconomic variables;
- ← Specification IV: traditional firm-specific variables, country dummies, and macroeconomic variables;
- ← Specification V: country dummies only;
- ← Specification VI: macroeconomic variables only;
- ← Specification VII: country dummies and macroeconomic variables;

The results strongly suggest that firm-specific variables dominate all other blocks of variables. Although country dummies are in fact significant, the augmentations of the traditional capital structure regression do not add much in terms of explanatory power. Adjusted R^2 increase little as the specification aggregates more variables for LR1, LR2, and LR3. In fact, it reduces for LR4. Adjusted R^2 range from a low of 0.000 to a high of 0.327. Preliminary estimation using fixed- and random-effects models displayed R^2 as high as 0.661,¹⁷ indicating that there are idiosyncratic firm-specific factors that are very important in the determination of the leverage ratio. Moreover, the introduction of country variables does not alter the signs of significant firm-specific coefficients,¹⁸ a strong indication that the hypothetical omitted variables suggested by preliminary fixed- and random-effects estimation are not country-specific.

Specifications V to VII exclude firm-specific variables in order to verify what explanatory power, if any, these variables have. The results do not yield the same conclusions as Booth et al. [2001]. According to their study, knowing the country of origin of a firm is more important than knowing the levels of all firm-specific variables. Here, I find that, although significant, the country of origin seems a minor influence in the leverage decision of firms.

Results for macroeconomic variables that describe the economic environment of the firms are even less impressive. Again, although some macro variables are significant (in particular the rate of growth of real GDP and, to a less extent, the inflation rate), their combined explanatory power is not remarkable. Significant coefficients for GDP growth are negative, indicating that firms choose a low leverage strategy during expansions in the business cycle. Interestingly enough, this result can also be interpreted in support of Myers' Pecking Order Hypothesis: when the economy is booming firms resort to internal sources of capital, while in recessions – when profits are usually depressed – firms are forced to tap external sources of capital.

The weaker evidence of the inflation rate also points to a negative relationship with the leverage ratio. Such finding is puzzling, since in rising inflationary periods nominal assets

such as debt depreciate in value, thus becoming more attractive to the borrower. A possible explanation is offered: if debt contracts are somehow indexed to the price level, then the possible capital gains from nominal assets are offset. Such was the case in Brazil over most of the 1980's up to the mid-1990's. Since Brazilian firms make up more than 40% of the sample, it is difficult to dismiss such proposition. That, combined with the well-documented negative relationship between stock returns and inflation (e.g. Fama [1981], Geske and Roll [1983], Gultekin [1983]), offer a compelling explanation for these empirical regularities.

In summary, country-specific factors, whether institutional or macroeconomic are significant in explaining capital structures but seem not to matter decisively in such decisions, in line with the results of Rajan and Zingales [1995]. Contrary to previous studies (Booth et al. [2001]) though, here I find that the explanatory power of such factors is well offset by the much more important firm-specific factors. Moreover, given the previous evidence obtained from the fixed-effects panel data analysis, there are unknown idiosyncratic firm factors that seem to matter much more in determining the leverage of the firm.

4. Concluding Remarks

In this paper, I investigate if country-specific factors are indeed relevant in the leverage decision, and if so, whether these effects can be accounted for by the macroeconomic environment or by other institutional factors in a sample of emerging markets from Latin America. I do so by applying panel data techniques to a sample of over 700 firms from Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela in the period 1986-2000.

The results suggest that (1) country-specific factors, whether institutional or macroeconomic are significant in explaining capital structures but seem not to matter decisively in such decisions; (2) contrary to previous studies, I find that the explanatory power of such factors is well offset by the much more important firm-specific factors; and (3) given the evidence obtained from panel data analysis, there are still unknown idiosyncratic firm factors that seems to matter in the determination of the leverage of the firm.

The goals of this paper are rather unpretentious. It is not meant to give the final word on a diverse topic such as capital structure, but simply to contribute with a couple of empirical regularities that question some of previous findings. This way, I hope I can catch attention for a few points that have been overlooked in present research.

Of course, the study presented here has its shortcomings: as mentioned before, there may be systematic effects induced by the nature of ownership of the firm, an omitted variable here. The variables chosen to proxy for the macroeconomic environment and the institutional framework of the countries studied here are admittedly limited. The quality of the measurement of the variables is also an issue. As noted, accounting standards, stock market depth, and the degree of supervision on financial reporting may vary largely across countries. Also, dynamic shifts in the relationship of the variables have been largely ignored. This is the case of the effects of financial liberalization and economic stabilization, two major structural phenomena that took place in Latin America around the period of study. Nevertheless, I believe that a couple of lesson can be derived from the results.

First, although a great deal has been said about the influence of country-specific factors and how these shape the way managers and firms behave, the evidence presented in this paper signals in the opposite direction: the factors that influence capital structure decisions are remarkably similar across countries. Moreover, firm-specific factors explain a lot more than country-specific ones. In addition, traditional theory-suggested determinants of capital structure – although relevant – do not seem to capture the whole story. There are grounds to believe that other yet unknown firm-specific factors can further the understanding of this phenomenon.

One of such unknown factors may be managerial discretion. As a mere speculative example, perhaps the stock of human capital of a given firm may be determinant of its capital structure in the sense that better managerial teams are more capable of assessing the “true” value of the firm, balancing its leverage ratio closer to the optimal one, and thus avoiding costly corrections. The strong effect of profitability over the leverage ratio verified here could then be proxying for this genuine idiosyncratic factor.

Needless to say, more theoretical and empirical efforts shall further the understanding of this major research problem.

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6. Endnotes

¹ For thorough literature reviews on capital structure, see Harris and Raviv [1991], Barclay and Smith Jr. [1999], and Graham [2001].

² For instance, IMF [1999] Chapter III offers a review of recent episodes of international financial contagion and an analysis of common factors shared by affected countries. Besides macroeconomic similarities, other possible channels of contagion may be investors' herd

behavior, common exogenous shocks, and trade and financial linkages.

³ The methods described in this section are a summary compiled mainly from Hsiao [1986], Greene [1993], and Hall and Cummins [1997].

⁴ I am thankful to Ms. Genessa Robinson for helping with the retrieval of the data for this paper.

⁵ MSCI does not cover the period prior to December 1987 for the Latin American countries.

⁶ Among other well known problems of emerging markets, such as thin capital markets, discontinuous trading, restricted external finance, poorly designed and enforced legislation, and incomplete institutional framework. These should not however serve as an excuse for inaction.

⁷ Also due to the widespread financial globalization of the 1990's, among other reasons.

⁸ Besides, after the events of 2001 involving Enron, Worldcom, Arthur Andersen, and others, it is fair to say that inaccurate financial statements are not a privilege of emerging markets. As long as the inaccuracies are not systematic across firms, the results may be less precise but still unbiased.

⁹ Precisely, there are only 149 observations of negative book equity, among 6218 observations available (each observation refers to a single firm in a single year).

¹⁰ Quarterly data is also available in the Economática database.

¹¹ Notice that the reliability of market-based figures for Latin American firms, especially with respect to debt valuation, is questionable. Also, there are less observations available for LR4 in the database than for the other three measures of leverage.

¹² Summary statistics for each country are not reported for concision sake, but they are available upon request to the author.

¹³ Of course, they are not control variables in the strict statistical meaning, but given the importance of these variables as documented by several previous studies their omission could greatly bias the results.

¹⁴ The more correct way to measure the effect of taxes on capital structure would be calculating the Miller Tax Term, i.e.:

$$Miller = 1 - \left(\frac{(1 - T_c) \times (1 - T_e)}{(1 - T_i)} \right)$$

Where T_c is the corporate tax rate, T_i is the personal tax rate and T_e is the tax rate on equity income. However, obtaining reliable tax rates over several years for seven different countries can prove difficult. Here, I choose the average effective tax rate as a substitute, following Booth et al. [2001].

¹⁵ I am thankful to Omar Toulan for pointing this out.

¹⁶ Indeed, most empirical studies on capital structure overlook such variable as well. However, since most of these studies are conducted for developed countries – where the presence of state-owned firms is less prevalent – such omission is more forgivable there than here.

¹⁷ Results not reported here for concision sake, but available upon request to the author.

¹⁸ The only exception is the proxy for business risk in LR2 equations, which gains significance for specification II and IV. Even then, such gain in significance is marginal at best, since the previous specification p-values are respectively 0.08 and 0.06.

TABLE 1. DESCRIPTION OF THE SAMPLE*Firms by Country*

Country	Firms in Database	Firms Selected	% Selected	% Sample Composition	Period Covered
Argentina	85	53	62.4%	7.5%	1990-2000
Brazil	328	293	89.3%	41.4%	1986-2000
Chile	189	101	53.4%	14.3%	1987-2000
Colombia	42	26	61.9%	3.7%	1992-2000
Mexico	151	112	74.2%	15.8%	1988-2000
Peru	124	98	79.0%	13.9%	1991-2000
Venezuela	53	24	45.3%	3.4%	1992-2000
Latin America 7	972	707	72.7%	100.0%	1986-2000

TABLE 2. DESCRIPTION OF THE SAMPLE*Firms by Sector of Activity (SIC Division Codes)*

Sector (SIC Division)	Firms in Database	Firms Selected	% Selected	% Sample Composition
Agriculture, Forestry and Fishing	37	34	91.9%	4.8%
Construction	30	29	96.7%	4.1%
Finance, Insurance and Real Estate	214	0	0.0%	0.0%
Manufacturing	397	386	97.2%	54.6%
Mining	39	39	100.0%	5.5%
Nonclassifiable Establishments	2	0	0.0%	0.0%
Retail Trade	43	38	88.4%	5.4%
Services	27	13	48.1%	1.8%
Transportation and Public Utilities	166	151	91.0%	21.4%
Wholesale Trade	17	17	100.0%	2.4%
Total Overall	972	707	72.7%	100.0%

TABLE 3. SAMPLE MEAN LEVERAGE RATIO*Average by Leverage Ratio and by Year*

Year	Leverage Ratio			
	LR1	LR2	LR3	LR4
1986	0.3275	0.6431	0.1889	0.0220
1987	0.3174	0.6871	0.2289	0.4732
1988	0.3292	0.6668	0.2077	0.3307
1989	0.3187	0.3504	0.1071	0.0031
1990	0.3787	0.9725	0.2851	0.5164
1991	0.3198	0.5978	0.2139	0.3172
1992	0.3706	1.4189	0.3717	0.2381
1993	0.3900	1.1204	0.4678	0.2460
1994	0.3887	1.3416	0.5179	0.1396
1995	0.4004	0.7060	0.3125	0.3771
1996	0.4184	1.2420	0.5060	0.1980
1997	0.4477	1.4108	0.6933	0.1891
1998	0.4865	1.6058	0.6900	0.2949
1999	0.5449	2.2158	1.2114	0.2597
2000	0.5980	1.6835	0.9083	0.2409

TABLE 4. PANEL DATA ANALYSIS OF LEVERAGE RATIOS USING POOLED DATA FOR LATIN AMERICA. The results are ordinary least squares estimation of all data pooled together for all Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), in the period 1986-2000; Dummy variable base-cases are “Brazil” (for countries) and “Manufacturing” (for industry sectors). Reported standard errors are heteroskedasticity-robust (White [1980]); *Standard errors in italic*; *Significant at the 5% level; **Significant at the 1% level.

Dependent Variable is Total Book Liabilities/Total Book Assets (LR1)

Model	Including Firm-Specific Variables				Excluding Firm-Specific Variables		
	I	II	III	IV	V	VI	VII
Intercept	0,580 **	0,635 **	0,600 **	0,677 **	0,464 **	0,487 **	0,539 **
	<i>0,047</i>	<i>0,058</i>	<i>0,051</i>	<i>0,063</i>	<i>0,016</i>	<i>0,013</i>	<i>0,024</i>
Tangibility	-0,374 **	-0,359 **	-0,361 **	-0,347 **			
	<i>0,028</i>	<i>0,029</i>	<i>0,029</i>	<i>0,030</i>			
Profitability	-1,032 **	-1,022 **	-1,028 **	-1,013 **			
	<i>0,211</i>	<i>0,212</i>	<i>0,213</i>	<i>0,213</i>			
Size	0,006	0,001	0,005	-0,001			
	<i>0,004</i>	<i>0,005</i>	<i>0,004</i>	<i>0,005</i>			
Growth Options	0,018 **	0,018 **	0,016 **	0,017 **			
	<i>0,005</i>	<i>0,005</i>	<i>0,005</i>	<i>0,005</i>			
Tax Rate	0,000	0,000	0,000	0,000			
	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>			
Business Risk	0,009	0,009	0,010	0,010			
	<i>0,009</i>	<i>0,008</i>	<i>0,009</i>	<i>0,008</i>			
Agriculture	-0,115 **	-0,100 **	-0,132 **	-0,105 **			
	<i>0,017</i>	<i>0,017</i>	<i>0,018</i>	<i>0,017</i>			
Construction	-0,059 **	-0,074 **	-0,063 **	-0,076 **			
	<i>0,021</i>	<i>0,020</i>	<i>0,021</i>	<i>0,020</i>			
Mining	0,002	0,015	-0,009	0,012			
	<i>0,032</i>	<i>0,035</i>	<i>0,033</i>	<i>0,036</i>			
Retail Trade	-0,011	-0,022	-0,017	-0,025 *			
	<i>0,012</i>	<i>0,011</i>	<i>0,013</i>	<i>0,012</i>			
Services	0,107 **	0,079	0,093 *	0,075			
	<i>0,041</i>	<i>0,041</i>	<i>0,041</i>	<i>0,041</i>			
Public Utilities	0,079 **	0,091 **	0,071 **	0,083 **			
	<i>0,012</i>	<i>0,012</i>	<i>0,012</i>	<i>0,012</i>			
Wholesale Trade	-0,028	-0,036 *	-0,036 *	-0,039 *			
	<i>0,017</i>	<i>0,016</i>	<i>0,017</i>	<i>0,016</i>			
Argentina		-0,001		-0,030 *	-0,041 *		-0,099 **
		<i>0,013</i>		<i>0,015</i>	<i>0,020</i>		<i>0,027</i>
Chile		-0,034 *		-0,067 **	-0,146 **		-0,201 **
		<i>0,015</i>		<i>0,016</i>	<i>0,018</i>		<i>0,027</i>
Colombia		-0,050 **		-0,079 **	-0,142 **		-0,214 **
		<i>0,017</i>		<i>0,019</i>	<i>0,023</i>		<i>0,029</i>
Mexico		0,051 **		0,023 *	0,034		-0,027
		<i>0,011</i>		<i>0,012</i>	<i>0,019</i>		<i>0,027</i>
Peru		-0,031		-0,066 **	-0,035		-0,096 **
		<i>0,016</i>		<i>0,020</i>	<i>0,018</i>		<i>0,027</i>
Venezuela		-0,074 **		-0,097 **	-0,138 **		-0,213 **
		<i>0,017</i>		<i>0,019</i>	<i>0,024</i>		<i>0,030</i>
GDP Growth			-0,019	0,128		-0,805 **	-0,321
			<i>0,145</i>	<i>0,138</i>		<i>0,149</i>	<i>0,164</i>
Inflation Rate			-0,003 *	-0,004 **		-0,010 **	-0,012 **
			<i>0,001</i>	<i>0,001</i>		<i>0,001</i>	<i>0,002</i>
Interest Rate			0,000	0,000		0,001	0,000
			<i>0,000</i>	<i>0,000</i>		<i>0,000</i>	<i>0,000</i>
Stock Returns			-0,001	-0,002		0,002	0,000
			<i>0,001</i>	<i>0,001</i>		<i>0,001</i>	<i>0,001</i>
# Observations	6.218	6.218	6.218	6.218	6.218	6.218	6.218
Adjusted R2	0,319	0,322	0,322	0,327	0,008	0,006	0,017

TABLE 5. PANEL DATA ANALYSIS OF LEVERAGE RATIOS USING POOLED DATA FOR LATIN AMERICA. The results are ordinary least squares estimation of all data pooled together for all Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), in the period 1986-2000; Dummy variable base-cases are “Brazil” (for countries) and “Manufacturing” (for industry sectors). Reported standard errors are heteroskedasticity-robust (White [1980]); *Standard errors in italic*; *Significant at the 5% level; **Significant at the 1% level.

Dependent Variable is Total Book Liabilities/Book Equity (LR2)

Model	Including Firm-Specific Variables				Excluding Firm-Specific Variables		
	I	II	III	IV	V	VI	VII
Intercept	-1,589	0,349	-0,335	1,004	1,564 **	1,561 **	1,924 **
	<i>1,157</i>	<i>0,812</i>	<i>0,842</i>	<i>0,766</i>	<i>0,186</i>	<i>0,189</i>	<i>0,293</i>
Tangibility	0,767	0,654	0,530	0,677			
	<i>1,087</i>	<i>0,985</i>	<i>0,986</i>	<i>0,979</i>			
Profitability	-4,810 **	-4,125 **	-4,481 **	-3,948 **			
	<i>1,475</i>	<i>1,255</i>	<i>1,363</i>	<i>1,221</i>			
Size	-0,017	-0,118	-0,064	-0,131			
	<i>0,074</i>	<i>0,097</i>	<i>0,087</i>	<i>0,100</i>			
Growth Options	2,795 **	3,172 **	2,974 **	3,230 **			
	<i>1,043</i>	<i>1,110</i>	<i>1,079</i>	<i>1,120</i>			
Tax Rate	0,000	0,000	0,000	0,000			
	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>			
Business Risk	0,595	0,768 *	0,656	0,799 *			
	<i>0,340</i>	<i>0,354</i>	<i>0,344</i>	<i>0,361</i>			
Agriculture	-0,669 **	1,671 *	-0,034	1,627 *			
	<i>0,249</i>	<i>0,705</i>	<i>0,259</i>	<i>0,689</i>			
Construction	0,209	0,515	0,170	0,457			
	<i>0,338</i>	<i>0,420</i>	<i>0,329</i>	<i>0,403</i>			
Mining	-1,804 **	-1,141 **	-1,561 **	-1,173 **			
	<i>0,582</i>	<i>0,387</i>	<i>0,489</i>	<i>0,388</i>			
Retail Trade	-2,176 **	-1,342 **	-2,114 **	-1,415 **			
	<i>0,687</i>	<i>0,398</i>	<i>0,650</i>	<i>0,417</i>			
Services	-1,652	-0,185	-1,316	-0,182			
	<i>0,934</i>	<i>0,723</i>	<i>0,848</i>	<i>0,720</i>			
Public Utilities	-1,419	-0,723	-1,199	-0,795			
	<i>0,724</i>	<i>0,499</i>	<i>0,636</i>	<i>0,514</i>			
Wholesale Trade	-1,278 **	-0,048	-1,028 *	-0,059			
	<i>0,443</i>	<i>0,411</i>	<i>0,400</i>	<i>0,411</i>			
Argentina		-1,561 *		-1,550 *	0,396		0,141
		<i>0,652</i>		<i>0,635</i>	<i>0,488</i>		<i>0,509</i>
Chile		-4,445 **		-4,151 **	-0,986 **		-1,212 **
		<i>1,427</i>		<i>1,303</i>	<i>0,187</i>		<i>0,234</i>
Colombia		-0,383		-0,621	-0,609 *		-0,925 **
		<i>0,281</i>		<i>0,319</i>	<i>0,280</i>		<i>0,338</i>
Mexico		-3,014 **		-3,010 **	-0,412		-0,682 *
		<i>1,064</i>		<i>1,043</i>	<i>0,248</i>		<i>0,300</i>
Peru		-2,157 **		-1,993 **	-0,456 *		-0,727 **
		<i>0,747</i>		<i>0,676</i>	<i>0,217</i>		<i>0,270</i>
Venezuela		-0,866 **		-1,191 **	-0,931 **		-1,276 **
		<i>0,224</i>		<i>0,289</i>	<i>0,195</i>		<i>0,285</i>
GDP Growth			-26,195 **	-14,523 **		-5,154 *	-2,149
			<i>9,327</i>	<i>5,422</i>		<i>2,566</i>	<i>2,398</i>
Inflation Rate			0,043	0,010		-0,035	-0,050
			<i>0,045</i>	<i>0,044</i>		<i>0,041</i>	<i>0,042</i>
Interest Rate			-0,004	-0,017		0,002	-0,002
			<i>0,017</i>	<i>0,017</i>		<i>0,015</i>	<i>0,015</i>
Stock Returns			0,007	-0,043		0,014	-0,001
			<i>0,042</i>	<i>0,041</i>		<i>0,037</i>	<i>0,036</i>
# Observations	6.203	6.203	6.203	6.203	6.203	6.203	6.203
Adjusted R2	0.236	0.272	0.252	0.277	0.002	0.000	0.002

TABLE 6. PANEL DATA ANALYSIS OF LEVERAGE RATIOS USING POOLED DATA FOR LATIN AMERICA. The results are ordinary least squares estimation of all data pooled together for all Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), in the period 1986-2000; Dummy variable base-cases are “Brazil” (for countries) and “Manufacturing” (for industry sectors). Reported standard errors are heteroskedasticity-robust (White [1980]); *Standard errors in italic*; *Significant at the 5% level; **Significant at the 1% level.

Dependent Variable is Long-Term Book Liabilities/Book Equity (LR3)

Model	Including Firm-Specific Variables				Excluding Firm-Specific Variables		
	I	II	III	IV	V	VI	VII
Intercept	-1,966 *	-0,734	-1,084	-0,197	0,720 **	0,760 **	0,977 **
	<i>0,949</i>	<i>0,445</i>	<i>0,553</i>	<i>0,389</i>	<i>0,124</i>	<i>0,127</i>	<i>0,211</i>
Tangibility	1,212	1,139	1,076	1,156			
	<i>1,009</i>	<i>0,918</i>	<i>0,912</i>	<i>0,913</i>			
Profitability	-2,404 *	-1,988 *	-2,171 *	-1,844 *			
	<i>1,056</i>	<i>0,848</i>	<i>0,935</i>	<i>0,792</i>			
Size	0,002	-0,064	-0,032	-0,077			
	<i>0,061</i>	<i>0,086</i>	<i>0,077</i>	<i>0,091</i>			
Growth Options	1,805	2,038	1,914	2,072			
	<i>1,006</i>	<i>1,097</i>	<i>1,052</i>	<i>1,111</i>			
Tax Rate	0,000	0,000	0,000	0,000			
	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>	<i>0,000</i>			
Business Risk	0,454	0,560	0,495	0,582			
	<i>0,326</i>	<i>0,358</i>	<i>0,338</i>	<i>0,366</i>			
Agriculture	-0,334	1,169	0,035	1,132			
	<i>0,178</i>	<i>0,673</i>	<i>0,183</i>	<i>0,656</i>			
Construction	0,274	0,467	0,238	0,422			
	<i>0,277</i>	<i>0,378</i>	<i>0,264</i>	<i>0,359</i>			
Mining	-1,021	-0,602	-0,874 *	-0,613			
	<i>0,527</i>	<i>0,319</i>	<i>0,431</i>	<i>0,319</i>			
Retail Trade	-1,396 *	-0,922 **	-1,370 *	-0,975 **			
	<i>0,637</i>	<i>0,356</i>	<i>0,608</i>	<i>0,378</i>			
Services	-1,098	-0,270	-0,912	-0,271			
	<i>0,758</i>	<i>0,437</i>	<i>0,669</i>	<i>0,446</i>			
Public Utilities	-0,869	-0,435	-0,747	-0,493			
	<i>0,668</i>	<i>0,445</i>	<i>0,585</i>	<i>0,463</i>			
Wholesale Trade	-0,813 *	-0,070	-0,663 *	-0,076			
	<i>0,332</i>	<i>0,289</i>	<i>0,277</i>	<i>0,289</i>			
Argentina		-1,199		-1,237 *	0,042		-0,146
		<i>0,617</i>		<i>0,602</i>	<i>0,211</i>		<i>0,242</i>
Chile		-2,753 *		-2,605 *	-0,435 **		-0,602 **
		<i>1,403</i>		<i>1,282</i>	<i>0,125</i>		<i>0,163</i>
Colombia		-0,122		-0,324	-0,210		-0,423
		<i>0,180</i>		<i>0,224</i>	<i>0,186</i>		<i>0,235</i>
Mexico		-1,776		-1,813	-0,189		-0,386 *
		<i>1,032</i>		<i>1,014</i>	<i>0,130</i>		<i>0,181</i>
Peru		-1,339		-1,281 *	-0,353 **		-0,530 **
		<i>0,711</i>		<i>0,641</i>	<i>0,132</i>		<i>0,178</i>
Venezuela		-0,422 **		-0,674 **	-0,449 **		-0,687 **
		<i>0,142</i>		<i>0,215</i>	<i>0,127</i>		<i>0,199</i>
GDP Growth			-16,940	-9,557		-3,098 *	-1,431
			<i>9,121</i>	<i>5,265</i>		<i>1,538</i>	<i>1,258</i>
Inflation Rate			0,010	-0,011		-0,035 *	-0,044 *
			<i>0,013</i>	<i>0,010</i>		<i>0,015</i>	<i>0,018</i>
Interest Rate			0,000	-0,008		0,003	0,001
			<i>0,003</i>	<i>0,005</i>		<i>0,004</i>	<i>0,004</i>
Stock Returns			0,018	-0,013		0,020	0,012
			<i>0,014</i>	<i>0,011</i>		<i>0,013</i>	<i>0,012</i>
# Observations	6.163	6.163	6.163	6.163	6.163	6.163	6.163
Adjusted R2	0.207	0.236	0.220	0.241	0.000	0.001	0.002

TABLE 7. PANEL DATA ANALYSIS OF LEVERAGE RATIOS USING POOLED DATA FOR LATIN AMERICA. The results are ordinary least squares estimation of all data pooled together for all Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela), in the period 1986-2000; Dummy variable base-cases are “Brazil” (for countries) and “Manufacturing” (for industry sectors). Reported standard errors are heteroskedasticity-robust (White [1980]); *Standard errors in italic*; *Significant at the 5% level; **Significant at the 1% level.

Dependent Variable is Market Value of Debt/Total Market Value of the Firm (LR4)

Model	Including Firm-Specific Variables				Excluding Firm-Specific Variables		
	I	II	III	IV	V	VI	VII
Intercept	0.352	0.402	0.397 *	0.434	0.291 **	0.301 **	0.325 **
	<i>0.195</i>	<i>0.226</i>	<i>0.194</i>	<i>0.231</i>	<i>0.037</i>	<i>0.024</i>	<i>0.045</i>
Tangibility	0.059	0.076	0.059	0.074			
	<i>0.119</i>	<i>0.132</i>	<i>0.115</i>	<i>0.127</i>			
Profitability	-0.343 **	-0.335 **	-0.330 **	-0.325 **			
	<i>0.094</i>	<i>0.095</i>	<i>0.092</i>	<i>0.093</i>			
Size	-0.004	-0.009	-0.006	-0.010			
	<i>0.009</i>	<i>0.011</i>	<i>0.009</i>	<i>0.011</i>			
Growth Options	-0.051 **	-0.051 **	-0.047 **	-0.049 **			
	<i>0.013</i>	<i>0.012</i>	<i>0.013</i>	<i>0.012</i>			
Tax Rate	0.000	0.000	0.000	0.000			
	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>			
Business Risk	-0.087 **	-0.087 *	-0.085 *	-0.085 *			
	<i>0.034</i>	<i>0.034</i>	<i>0.034</i>	<i>0.034</i>			
Agriculture	-0.093	-0.079	-0.083	-0.081			
	<i>0.093</i>	<i>0.091</i>	<i>0.094</i>	<i>0.092</i>			
Construction	0.221	0.206	0.219	0.203			
	<i>0.157</i>	<i>0.161</i>	<i>0.157</i>	<i>0.161</i>			
Mining	-0.071	-0.060	-0.072	-0.065			
	<i>0.048</i>	<i>0.050</i>	<i>0.049</i>	<i>0.051</i>			
Retail Trade	-0.334 **	-0.348 **	-0.335 **	-0.352 **			
	<i>0.098</i>	<i>0.104</i>	<i>0.098</i>	<i>0.104</i>			
Services	0.090	0.055	0.093	0.055			
	<i>0.050</i>	<i>0.054</i>	<i>0.052</i>	<i>0.054</i>			
Public Utilities	-0.010	0.001	-0.007	-0.001			
	<i>0.023</i>	<i>0.024</i>	<i>0.024</i>	<i>0.024</i>			
Wholesale Trade	-0.126 *	-0.135 *	-0.123	-0.138 *			
	<i>0.063</i>	<i>0.061</i>	<i>0.065</i>	<i>0.062</i>			
Argentina		-0.005		0.000	-0.028		-0.015
		<i>0.051</i>		<i>0.065</i>	<i>0.051</i>		<i>0.062</i>
Chile		-0.029		-0.004	-0.146 **		-0.098
		<i>0.049</i>		<i>0.067</i>	<i>0.045</i>		<i>0.066</i>
Colombia		-0.044		-0.053	-0.089		-0.101
		<i>0.100</i>		<i>0.106</i>	<i>0.099</i>		<i>0.104</i>
Mexico		0.059		0.067	-0.065		-0.046
		<i>0.045</i>		<i>0.062</i>	<i>0.039</i>		<i>0.055</i>
Peru		-0.026		-0.015	-0.069		-0.039
		<i>0.064</i>		<i>0.080</i>	<i>0.045</i>		<i>0.062</i>
Venezuela		-0.050		-0.059	-0.039		-0.057
		<i>0.044</i>		<i>0.053</i>	<i>0.046</i>		<i>0.054</i>
GDP Growth			-0.783 *	-0.821		-1.622 **	-1.337 **
			<i>0.372</i>	<i>0.465</i>		<i>0.326</i>	<i>0.445</i>
Inflation Rate			-0.001	-0.001		0.000	-0.001
			<i>0.006</i>	<i>0.006</i>		<i>0.006</i>	<i>0.006</i>
Interest Rate			0.000	0.000		0.000	0.000
			<i>0.002</i>	<i>0.002</i>		<i>0.002</i>	<i>0.002</i>
Stock Returns			0.001	0.001		0.003 *	0.002
			<i>0.006</i>	<i>0.001</i>		<i>0.001</i>	<i>0.001</i>
# Observations	4,823	4,823	4,823	4,823	4,823	4,823	4,823
Adjusted R2	0.009	0.008	0.008	0.007	0.000	0.001	0.000