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Determinants of the Development of Corporate Bond Markets in Argentina: One Size Does Not Fit All

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Abstract: Conventional theory leads to expect bonds to be a financing vehicle for large firms because of economies of scale and contracting costs. We find both in our econometric evidence for firms quoted on Latin American stock exchanges, and in our survey results for Argentina, that size of assets is a robust determinant of the use of bond finance. This result, together with the fact that there are few firms that are large in terms of market value, can help understand why Argentina, as well as Latin America, has small bond markets in terms of the ratio of the stock of bonds to GDP. Since firm value represents the present value of the cash flows against which the firm borrows, the outstanding stock of corporate bonds is as small as the size of Argentine firms.

JEL classification codes: G3, E6
Key words: debt structure, leverage, short term debt, corporate bonds, firm size, firm value

I. Introduction

Our approach can be summarized as follows. We conjecture that the drivers of the debt structure of Argentinean and US firms are similar: incentive problems, as well as issue

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costs and economies of scale. In particular, the second driver – issue costs and economies of scale –, makes firm size a key variable to understand the debt structure and debt instruments chosen in Argentina, and more widely in Latin America.

According to conventional theory, for large firms bond markets are a source of cheaper funds than bank credit. The reason is that contracting costs and economies of scale make it far more likely for big companies to issue bonds. We believe this view provides a key to understand whether the corporate bond market in Argentina is underdeveloped, and what the main determinants of the current situation are.

Our econometric evidence, based on firms that are publicly quoted and traded on stock exchanges, indeed points to size as the main determinant of the use of bond finance, not only in Argentina but also in Chile and Colombia. On the other hand, with data that includes firms from Brazil and Peru too, we find that size does not have an important impact on leverage. Size does lead to a significantly lower share of short-term debt. Indirectly, the negative relation between share of short term debt and size is related to the use of bonds by large firms, insofar as bond finance tends to be of much longer nature than bank finance.

Additionally, according to our survey of non-financial corporations that includes firms that are not publicly quoted, only the very largest firms, by Argentinean standards, issue bonds. Independently of the criteria for size (employees, revenues or assets), there is a cut-off below which almost no firms in the survey issue bonds. Since the survey was designed to be representative of the universe of large firms in Argentina, this indicates that in countries like Argentina that have a very small number of big companies, the size and level of development of corporate bond markets will be largely determined by its small proportion of big companies.

If our argument on size is correct, it leads to the question: Why are there so few large firms in Argentina, and can anything be done about that? Of course, the size of firms may be limited by the small size of the bond market, so there may be feedback effects we are not taking into account. However, we will argue that important policy actions have already been put in place in the past: until the late 1980s, corporate bond markets were non-existent; then and in the early 1990s, institutional and tax reforms were put in place that

strongly fostered the development of the corporate bond market. Hence, the reasons for the small size of the bond market may lay elsewhere.

In what follows, after we address the general issue of debt structure of firms, we will then try to understand the determinants of the use of bonds as a particular form of debt, before looking more carefully into the issue of the size of firms.

II. Theoretical determinants of debt structure and evidence from US firms

The natural conceptual framework to investigate the debt structure of firms is the Modigliani-Miller "irrelevance" proposition. The Modigliani-Miller proposition states that the financing policy should not be expected to affect the firm market value under the following restrictive conditions:

(i) There are no corporate or personal taxes,

(ii) There are no contracting costs (in particular, no costs associated to financial difficulties and bankruptcy),

(iii) The corporate investment policy is fixed (in particular, investment and operational decisions are not influenced by financing decisions), and

(iv) There are no information costs.

Empirically, the value of the firm is not independent of its financing policy, so the conditions for the Modigliani-Miller theorem are not satisfied. As Barclay, Smith, and Watts (1999) argue, using the theorem in the logically equivalent way $(A \rightarrow B) \equiv (\sim B \rightarrow \sim A)$, the financial structure of firms:

(i) Must affect taxes paid by issuers or investors, given the specificities of corporate and personal taxes, or

(ii) Must affect contracting costs (this may include costs of issuing debt, the probability and costs associated to getting into financial difficulty or bankruptcy, etc.), or

(iii) Must affect management's incentives to follow the value-maximizing rule of investing in all positive net present value (NPV) projects, or

(iv) Must provide a credible signal to investors of management's confidence (or lack thereof) about the firm's future earnings, in a context of information costs and asymmetric information.

In the United States, the third reason --incentive problems-- is by far the most important determinant of leverage level (Barclay, Smith, and Watts 1999). The particular debt instrument chosen, which in turn affects the maturity of the debt, is also affected strongly by the second reason --cost of issuing debt-- (Barclay and Smith 1999).

We conjecture that the same reasons drive the financing decisions in Latin America and Argentina in particular. Before presenting our econometric results, it is important to explore how financial decisions can generate incentives in managers to change investment decisions (third reason). We will also review how the costs of issuing debt bring the size of the firms into the picture, to understand the debt structure and debt instruments used (second reason).

Suppose a firm is largely debt financed, and that due to a crisis the firm is not able to pay its debt. Suppose, furthermore, that new investment opportunities with positive NPV emerge. How will the firm respond to the investment opportunities? The stockholders, to the extent that they (and not the debt holders) decide about the investments, will probably not invest unless they negotiate a debt reduction. The reason is that a good part (or all) of their investment would become a transfer of money from them to the bondholders. So even though the projects themselves might be NPV>0 projects, that is not so for stockholders, who therefore have incentives to pass them up, reducing the value of the firm. In this way the financing decisions of the past may generate incentives to deviate from the strategy "invest in all positive NPV projects". On the other hand, if the firm had been all equity financed, the stockholders would inject more cash in NPV>0 investments since that would increase their wealth.

This likely development in the event of a crisis affects the financing decisions made beforehand. From the point of view of firm that does business in a region prone to crises, it is not a value maximizing strategy to have mostly debt financing. The reason is that when calculating the present value of their cash flows (i.e., the firm's value) one would have to allow for the probability of crises and the fact that in these circumstances managers will have incentives to pass up positive NPV projects. Alternatively one would assume that under these circumstances the company would default on its debt; anticipating this, creditors would only provide financing at a very high cost.

The best alternative is to have a debt structure less sensitive to crises. Debt structure is a multidimensional concept. We not only have the leverage ratio, but also the maturity, covenant restrictions, convertibility, call provisions, security, and whether the debt is privately placed or held by widely-dispersed public investors. Very important too are the expected costs of renegotiation (even if the "renegotiation option" is not explicitly written in the contract).

Focusing on the leverage ratio and maturity, the arguments above suggest that firms whose managers have more discretion to change investment strategies would tend to have smaller leverage ratios and shorter maturities on their debt. A proxy for these companies is the market-to-book ratio. The difference between market value and book value of a firm reflects the value of investment opportunities (or growth options) requiring manager's discretion to properly exploit them. If a company has a large market-to-book ratio such difference is large. On the other side of the spectrum, companies with a low market-to-book ratio are companies whose value comes primarily from assets in place that could serve as good collateral and should be expected to have higher leverage ratio and larger maturities.[1]

An alternative and related proxy is "tangibility", the proportion of "fixed" assets over firm value. Note that the inverse of the market-to-book ratio is assets over firm value, so the two variables are related. However, we want to distinguish between the two to separate out the effect of those assets ("fixed") that represent the best collateral.

In the United States, companies with lots of investment opportunities (growth-option companies) issue less debt and have shorter maturities. This not only protects lenders against the greater uncertainty associated with growth firms, but also serves to preserve their own financing flexibility and future ability to invest. Growth companies are also likely to choose private over public sources of debt because renegotiating a troubled loan with a banker (or a handful of private lenders) will generally be much easier than getting hundreds of widely dispersed bondholders to restructure the terms of a public bond issue (Barclay, Smith, and Watts 1999; Barclay and Smith 1999).

[1] For Argentina, these factors seem to be relevant. While in 2004 the average leverage ratio for companies that were quoted on the stock exchange was 39%, for the 10% of companies with the smallest market-to-book ratio the leverage ratio was 61% and for the 10% of companies with the largest market-to-book ratio the leverage ratio was 16%. In comparison, the average leverage ratio for all companies, for the 10% of companies with the smallest market-to-book ratio and for the 10% of companies with largest market-to-book ratio was 33%, 42% and 9% in 1992, and 47%, 54% and 18% in 1998. Our data source is Economatica.

Going now to the issue of contracting costs, according to conventional theory different forms of debt have different natural clienteles. Banks, for example, can economically provide finance for smaller borrowers, while bond markets, where issues are subject to a substantial minimum efficient scale, can do so at lower cost for large corporations with substantial funding needs.

The fixed issue costs of public debt issues are generally much higher than the fixed costs of a bank loan or private placement. One widely cited study of some 250 debt offerings in the US over the period 1979-1983 estimates that the average issue cost per $1000 was $11.65 for public debt, but only $7.95 for private debt (Blackwell and Kidwell 1988). On the other hand the interest rate was lower for public debt than for private debt. Thus, larger firms issuing larger amounts of debt are more likely to issue public debt than smaller firms because they more than compensate the higher fixed costs with the lower costs of lower interest rates given the size of their issues. The average size of firms issuing public debt in the study cited above was 3.4 billion dollars of total assets, as compared to 2.3 billion dollars of total assets for issuers of private debt. Moreover, the size of the average public issue was roughly twice the average private issue (80 million dollars as compared to just under 40 million dollars).

This shows that due to contracting costs and economies of scale, the size of the firms should be a relevant variable to understand debt structure. Smith and Barcalay (1999) find a statistically significant positive effect of firm size on the leverage ratio for US firms. However, the economic impact of firm size on leverage is very small. For example, the largest firms had leverage ratios that were only about one percentage point higher than the average of 21%.

On the other hand, they find firm size to be statistically significant and economically important to determine debt maturity: moving from the 10th to the 90th percentile for firm size increases the fraction of long term debt by 54% and reduces the fraction of short term debt by 70%. They attribute this effect of size on maturity to the difference of debt instruments available to small and large firms. While small firms, due to issuing costs, borrow mainly from banks that for regulatory reasons cannot issue long term loans, large firms borrow a much larger proportion of their debt issuing bonds that tend to be of much larger maturity.

III. Evidence on debt structure from firms quoted on Latin-American stock exchanges

To reach a better understanding of the financing choices of Argentine firms, we study the behavior of a sample of firms that are publicly quoted on the stock exchanges of Argentina, Brazil, Chile, Colombia, and Peru using non-consolidated balance-sheet data.[2]

We start by looking at the behavior of the leverage ratio in our sample of firms, using a very stripped down model based on Rajan and Zingales (1995). We apply this same model to look into the debt structure of firms.

We first consider the behavior of the maturity structure of debt, where debt is comprised of bank debt and bonds, focusing on the short-term/long-term debt ratio. Insofar as bonds tend to have a longer maturity than bank debt, the short-term/long-term debt ratio is indirectly related to the use of bond finance.

We then look directly at whether a firm issues bonds or not, before going into the determinants of the amount of bonds issued. We study the amount of bonds issued as a proportion both of market value and book value of assets. Since we are particularly interested in the use of either bank or bond finance, we also look at the ratio of bond debt to bond plus bank debt.

The estimation strategy followed is to estimate tobit models, since the dependent variable basically varies in the 0-1 interval, and there are many left-censored observations at 0. In the specific case of whether or not firms use bond financing, we estimate a probit model because the dependent value takes value 1 if there is bond financing, and zero otherwise.

Our data source is the Economatica database, an equity analysis tool.[3] We have bi-annual data over the 1992-2004 period. The year 1992 is the first for which we have

[2] The data source is Economatica. We chose unconsolidated data because more information is available for Argentina (Colombia only has unconsolidated data). For the regressions on the use of bond finance the sample is basically restricted to Argentina, Chile and Colombia, because in Peru at times only one firm used bond finance, and in Brazil the information on bond finance is hard to aggregate. In Economatica there is also some information for Mexico, United States, and Venezuela, but only at the consolidated level.

[3] The data starts as early as 1986, depending on the country. It includes quarterly company balance sheets and daily market data, as well as financial and trading ratios. The user can choose to display the data in domestic currency, US dollars or the currency in which the original balance sheets were filed. Descriptive information for each firm includes industrial sector, type of asset, company ID, SEDOL code (an ID assigned by the International Stock Exchange of London), company web site, ticker, exchange where the asset is traded, names of main shareholders (and numbers of shares held), number of individual shareholders, etc.

comprehensive data for Argentine firms. At any rate, before 1991 firms in Argentina had practically not issued bonds, regardless of firm size, due to the absence of an adequate legal framework. After that year, thanks to the legal changes introduced in the corporate bond law in 1991 that made the tax treatment of corporate bonds similar to sovereign bonds, thus making them more attractive in relation to bank loans, the legal framework no longer seems to have been a limiting factor.

Table 1 describes the variables in the dataset. We control for the presence of country fixed effects. In the panel estimates we also control for time effects, taking 1994 as the base year (since we lag the explanatory variables to avoid endogeneity problems, we lose the year 1992).

Table 1. Description of variables in dataset

Variable	Name	Definition
Primary data		
fixed assets	Fixed assets	Book value of fixed assets, in thousands of US dollars
assets	Total assets	Book value of total assets, in thousands of US dollars
firm value	Market value of assets	Book value of debt plus market value of equity, in thousands of US dollars
Dependent variables		
liabilities	Book value of liabilites	Total assets minus stockholders equity, in thousands of US dollars
short term debt/ total debt	Share of short term debt	Short term bank debt and bonds divided by total bank debt and bonds
bonds	Dummy for bonds	1 when firm has bonds outstanding, 0 otherwise
trade debt	Trade debt	Accounts payable and long term supplier's credit, in thousands of US dollars
bank debt	Bank debt	Short and long term bank debt, in thousands of US dollars
bond debt	Bond debt	Short and long term bonds outstanding, in thousands of US dollars
Explanatory variables		
size	Size of firms	log(*assets*)
tangibility	Tangibility of assets	*fixed assets/assets*
q	Market to book ratio	*firm value/assets*
roa	Return on assets	Ratio of net income to total assets
dumleverage	Dummy for extremely leveraged non-financial firms	1 when *liabilities/firm value*>.9, 0 otherwise (alternatively: 1 when 1 *liabilities/assets*>.9, 0 otherwise)
country x, where *x=arg, bra, chi, col, per*	Dummies for country fixed effects	1 when firm is from given country, 0 otherwise
year t, where *t=1996, 1998,2000,2002,2004*	Dummies for time effects	1 when data is from year *t*, 0 otherwise

A. Leverage

We measure leverage as *liabilities/firm value*, the ratio of total liabilities to the market value of assets, in accordance with the standard practice in the Finance literature of focusing on market leverage. However, for robustness and to establish a link with the survey results below, we also look at book leverage measured as *liabilites/assets*, the ratio of total liabilities to the book value of assets. This is a broad definition of leverage, since total liabilities are larger than total debt, which consists of bank debt plus bonds.

Our specification follows Rajan and Zingales (1995), except that instead of estimating a separate regression for each country, we pool the information and control for country fixed effects. We thus start by estimating the following basic regression that adds country dummies, where *i* stands for firm and *t* for time:

$$leverage_{i,t} = \alpha + \beta_1\, size_{i,t-2} + \beta_2\, tangibility_{i,t-2} + \beta_3\, q_{i,t-2} + \beta_4\, roa_{i,t-2} + country\ x + u_{it}. \quad (1)$$

The variable *size* is our key variable of interest. Though we do not expect size to affect leverage, our main conjecture is that *size* is an important determinant of the use of bond finance. While Rajan and Zingales (1995) measure size with the log of sales, we use the log of total assets. Rajan and Zingales find that size has a significantly positive relation to leverage in four of the G-7 countries, but in Germany it has a significantly negative effect.

The control variables in Rajan and Zingales (1995) are: share of fixed assets over total assets, which has a positive effect on both market and book leverage in all G-7 countries studied by Rajan and Zingales; the market to book ratio, which has a negative effect; and the return on assets, which almost always has a negative effect (only two out of fourteen coefficients are positive, but these are not statistically significant). To avoid problems of endogeneity, the explanatory variables are lagged two years (however, the results using contemporaneous variables are pretty similar).

Table 2 shows our tobit estimates for market leverage, *liabilities/firm value*, in 1998, a relatively normal year (columns 1 and 2), and 2002, a crisis year (columns 4 and 5). We control for country fixed effects, taking Brazil as the base country. Book leverage,

liabilities/*assets*, is also reported (columns 3 and 6), but the results are not too different from market leverage.

While column (1) points out a negative relationship between firm size and leverage, this result is not too clear-cut. In column (4) for year 2002, *size* is not significant, as is standard in many studies for US firms. However, in a regression with pooled data for the 1994-2004 period, *size* has a significantly negative effect on market leverage (see Table 3, column 3, for a pooled regression).

Table 2. Tobit regression models for leverage
Argentina, Brazil, Chile, Colombia and Peru, cross-sections for 1998 and 2002

Explanatory variables	*liabilities/firm value*		*liabilities/ assets*	*liabilities/firm value*		*liabilities/ assets*
	(1) 1998	(2) 1998	(3) 1998	(4) 2002	(5) 2002	(6)2002
size(-2)	-.3456	-.1898	-.0271	-.0452	.0145	.0717
	(.1887)*	(.1838)	(.0278)	(.1278)	(.1223)	(.0222)***
tangibility(-2)	.5178	.3458	-.0041	-.0097	-.0245	.0023
	(.1847)***	(.1820)*	(.0061)	(.0200)	(.0199)	(.0033)
q(-2)	-.3499	-.2831	-.0093	-.0101	-.0057	-.0010
	(.2268)	(.2221)	(.0063)	(.0122)	(.0116)	(.0023)
roa(-2)	-.0261	-.0035	-.0093	-.0255	-.0211	-.0027
	(.0111)**	(.0124)	(.0016)***	(.0072)***	(.0166)	(.0011)**
dumleverage		1.3681	.6358		1.0737	.3708
		(.3645)***	(.1519)***		(.2245)***	(.0746)***
dumleverage		-.0622	.0007		.0071	-.0087
**roa(-2)*		(.0250)**	(.0049)		(.0181)	(.0025)***
arg	-1.0203	-.7745	-.0693	-.5731	-.3552	.0146
	(.3519)***	(.3404)**	(.0524)	(.2881)**	(.2769)	(.0484)
chi	-.7099	-.3840	-.0641	-.6219	-.3356	-.1010
	(.3576)**	(.3494)	(.0465)	(.2148)***	(.2129)	(.0366)***
col	-.3527	-.2254	-.1859	.1336	.1509	-.1518
	(.5369)	(.5150)	(.0767)**	(.3750)	(.3565)	(.0660)**
per	dropped -	dropped -	-.4670	-.6718	-.3096	-.0396
	collinearity	collinearity	(.3013)	(.4719)	(.4526)	(.0732)
cons	3.6084	2.2223	.6633	1.5807	.7917	.0805
	(1.1630)***	(1.1534)*	(.1645)***	(.7476)**	(.7447)	(.1275)
Method	Cross-section	Cross-section	Cross-section	Cross-section	Cross-section	Cross-section
LR chi2	48.39***	70.00***	114.22***	23.49***	50.76***	85.08***
Pseudo R2	0.0479	0.0693	0.4919	0.0255	0.0552	0.5982
Number of observations	239	239	287	256	256	306
Left-censored observations	2	2	2	4	4	1

Note: Standard errors of coefficients within parenthesis. ***,**, and * denote significance at 1, 5 and 10% levels. Peru country dummy *per* dropped due to collinearity in some regressions. In columns (2) and (5), *dumleverage*=1 when *liabilites/firm value(-2)*>0.9; in columns (3) and (6), *dumleverage*=1 when *liabilites/assets(-2)*>0.9. Source is Economatica, unconsolidated data.

Consistent with our previous discussion, in 1998 *tangibility* and the market-to-book ratio *q* have the expected signs, though only tangibility is statistically significant (column 1). Though in 2002 neither variable is statistically significant (column 4), in regressions

that pool all the bi-annual data from 1994 to 2004, lagged *tangibility* affects market leverage positively and lagged *q* affects market leverage negatively in a statistically significant way (see Table 3, column 3, for a pooled regression). This is similar to the results in Rajan and Zingales (1995). We had initially conjectured that because of slow and uncertain legal proceedings, tangibility might not be a relevant variable to determine debt levels in Argentina and Latin America in general. The present results suggest otherwise, though this need not mean that collateral is as effective as in the United States to get access to more credit.

Return on assets *roa* has a negative relationship to *liabilities/firm value* both in 1998 and 2002 (columns 1 and 4). Though this result is pretty common in the Finance literature, this is unexpected if market leverage represents the availability of credit, as is implicit in our research strategy. More financing should be available to firms with higher returns because, among other things, higher returns can be an indication of better corporate governance (cf. Bebczuk 2004 for case of firms in Argentina), so this should increase the willingness of borrowers to lend funds to the firm.

Indeed, Petersen and Rajan (1995) point out that leverage is an inherently ambiguous measure of credit availability: the firm's debt ratio is simultaneously determined by the firm's demand for credit and the supply of credit. In their sample of small firms, they find that large firms have a higher debt-to-assets ratio, which is consistent with higher quality firms having larger credit availability. However, more profitable firms have a lower debt ratio, which may be due to a lower demand for external credit instead of a supply effect because of rationing by creditors.

Another angle we explore here is that high leverage might not indicate high credit availability, but rather firms in financial distress that are overindebted. To explore this hypothesis, we modify the basic Rajan and Zingales setup by introducing *dumleverage*, a dummy that take value 1 for firms that were extremely indebted in the past. Given that we exclude financial firms from our sample, we take a past level of leverage (two years before) larger than .9 as an indication of firms that may be financially distressed.

Using past leverage, we find that the negative effect of *roa* on current leverage is no longer statistically significant in columns (2) and (5). That is, a large part of the negative effect of profitability on leverage was due to firms that were highly indebted in the past.

When all the bi-annual data over the 1994-2004 period are pooled, it turns out that *roa* still has a significantly negative effect on leverage. However, this effect is a lot smaller once *dumleverage*roa* is introduced: the effect of highly indebted firms is significantly negative and twice as large in magnitude.

These results suggest that overindebtedness is in part driving the result of the negative relationship between profitability and leverage. Perhaps financially distressed firms with higher returns are forced to cancel debt. Given that this might be an alternative way to interpret the negative influence of return to assets on leverage, we explore this further below when we look at the term structure of debt: a restriction of credit should affect more short-term credit in contrast to long term credit, which has more inertia and is affected by decisions taken far back in the past.

An alternative interpretation of *roa* is that it may indicate riskiness, insofar as high return is associated to high risk. In that case, it would not be surprising to find that *roa* is negatively related to market leverage and credit availability. This could also help explain why highly leveraged firms have a stronger negative response to *roa*, because highly indebted firms are more liable to go into default. If high return indicates high risk, one should also expect firms with higher roa to have more short term credit, a problem that should be especially acute for highly leveraged firms. We look at this below.

To see the robustness of the cross-section results for leverage, we estimate random-effects tobit regressions in Table 3 using bi-annual data from the 1994-2004 period. In addition to controlling for country effects, we also control for time effects:

$$leverage_{i,t} = \alpha + \beta_1\, size_{i,t-2} + \beta_2\, tangibility_{i,t-2} + \beta_3\, q_{i,t-2} + \beta_4\, roa_{i,t-2} + country\ x + year\ t + u_{it}, \qquad (2)$$

A regression with pooled data is included in column (3) for purposes of comparison to the panel models of market leverage. On the other hand, a pooled regression with a specification like the panel model of book leverage in column (4) is not shown because the results are remarkably similar.

With the exception of *tangibility*, the coefficients of random-effects panel in column (2) have the same sign as the coefficients in pooled regression in column (3), so the results are in accordance with cross-section regressions. However, none of the variables except for

the dummy *dumleverage* has a significant effect on market leverage. The Wald test does not reject the null hypothesis that the model has no joint explanatory power.

The panel for the book value of assets in column (4) has similar signs of coefficients as column (2), and in this case the market-to-book ratio *q* and *roa*, as well as *dumleverage*roa*, have a significantly negative effect on leverage. Here, *size* has no impact on *leverage* once we control for all variables in dataset.

Table 3. Tobit regression models for leverage
Argentina, Brazil, Chile, Colombia and Peru, bi-annual data 1994-2004

Explanatory variables	*liabilities/firm value*			*liabilities/ assets*
	(1)	(2)	(3)	(4)
size(-2)	-.1119	-.0605	-.1963	-.0083
	(.4041)	(.3949)	(.0701)***	(.0228)
tangibility(-2)	.0321	-.0091	.05159	-.0004
	(.1191)	(.1204)	(.0196)***	(.0007)
q(-2)	-.0857	-.0786	-.0233	-.00812
	(.0504)*	(.0490)	(.0090)***	(.0031)***
roa(-2)	-.0207	-.0024	-.0084	-.0040
	(.0198)	(.0266)	(.0047)*	(.0012)***
dumleverage		1.2416	1.1145	.6102
		(.6998)*	(.1240)***	(.0939)***
*dumleverage *roa(-2)*		-.0218	-.0163	-.0182
		(.0397)	(.0070)**	(.0020)***
arg	-.4171	-.2167	-.2715	-.0140
	(.8152)	(.8028)	(.1427)*	(.0472)
chi	-.5777	-.2465	-.3487	-.0908
	(.6745)	(.6884)	(.1223)***	(.0382)**
col	.1051	.2013	.08792	-.1471
	(1.267)	(1.2353)	(.2196)	(.0717)**
per	-.4028	-.2011	-.3467	-.0054
	(1.6421)	(1.6040)	(.2851)	(.0856)
cons	2.0803	.6557	1.3955	.4319
	(2.4561)	(2.3535)	(.4177)***	(.1331)***
year dummies	yes	yes	yes	yes
Method	Random-effects panel	Random-effects panel	Pooled data	Random-effects panel
Wald chi2	6.32	10.04	-	424.77***
LR chi2	-	-	234.70***	-
Pseudo R2	-	-	0.0386	-
Number of observations	1473	1473	1473	1715
Left-censored observations	17	17	17	7
Number of firms	454	454	-	539

Notes: Standard errors of coefficients within parenthesis. ***,**, and * denote significance at 1, 5 and 10% levels. In columns (1)-(4), *dumleverage*=1 when *liabilites/market value assets(-2)*>0.9; in column (5), *dumleverage*=1 when *liabilites/book value assets(-2)*>0.9. Source is Economatica, unconsolidated data.

B. Maturity structure

We now explore the determinants of the maturity structure. This issue is related to the use of bond finance, since bonds typically have a longer maturity than bank loans.

As argued before, the debt structure should make the company and their lenders less sensitive to crises. In equilibrium this implies that the typical maturity should be shorter in a crisis prone country than in the United States. The lender will not be willing to lend money for the long term knowing that the probability of a crisis (that would imply a default) is high unless the interest is extraordinarily high; in that case the borrower, facing such a steep term structure, will prefer to use debt of shorter maturity.

Table 4 shows our estimates, where we start out with *size*, and then control for other variables. The variable s*ize* has a strong negative effect on the share of short-term debt which is statistically significant at the 1% level. This result is robust to all the controls we introduce, and consistent with a story based on contracting costs and economies of scale.

The variable *tangibility* is significant at the 10% level, but it has a sign opposite to that expected based on the reasons given above (on the other hand, though the market-to-book *q* has a positive effect, it is not significant once all controls are introduced).

The country effect for Chile is significant, indicating that it has less short-term debt than Brazilian firms (our reference case), as well as firms from Argentina, Colombia and Peru. That Chile has a negative coefficient might be explained, following the earlier arguments on incentive problems, by the fact that Chile is less affected by crises than other countries.

Above, we argued that leverage may be affected by financially distressed firms that are overindebted. If so, this can be expected to be reflected in the maturity structure of firm debt: insofar as short-term debt represents recent decisions, because its maturity is less than one year, while long-term debt is locked in for longer periods of time, once creditors refuse new credit to the firm this would be quickly reflected in a drop in short term debt. Hence, in column (3) of Table 4.4 the variable *dummyleverage*roa* is introduced.

Once one controls for the presence of highly indebted firms, firms with higher returns have larger short-term debt. In this regard, *short-term debt* may reflect availability of credit in the margin better than *liabilities*, because the current levels of debt are less

affected by past decisions that have nothing to do with the present willingness of creditors to give loans (as for example the recent crisis of Argentina attests).

Table 4. Tobit regression models for share of short-term debt

Argentina, Brazil, Chile, Colombia and Peru, bi-annual data 1994-2004

Explanatory variables	*short term debt/ total debt*				
	(1)	(2)	(3)	(4)	(5)
size(-2)	-10.8800	-14.4823	-14.6794	-14.4662	-14.4850
	(1.1113)***	(1.7874)***	(1.7929)***	(1.2647)***	(1.7884)***
tangibility(-2)		.0638	.0690	.0678	.0637
		(.0377)*	(.0376)*	(.0373)*	(.0376)*
q(-2)		1.4058	.7728	.8339	1.1976
		(.7765)*	(.7924)	(.8049)	(.7846)
roa(-2)		.0789	.2548	.2968	.1604
		(.0538)	(.0892)***	(.0971)***	(.0725)**
dumleverage			-4.7969	-4.5106	-2.5121
			(2.0373)**	(2.1282)**	(4.8560)
dumleverage			-.3137	-.3929	-.1959
**roa(-2)*			(.1125)***	(.1206)***	(.1106)*
arg		3.3855	2.4224	1.4725	3.6778
		(3.6975)	(3.6533)	(2.5263)	(3.6956)
chi		-11.1618	-13.2237	-14.3297	-11.1386
		(3.1344)***	(3.2134)***	(2.2546)***	(3.1363)***
col		.6578	-.4503	-1.3891	.5936
		(5.1541)	(5.2074)	(3.8326)	(5.1533)
per		-2.5992	-3.5219	-3.2735	-2.5836
		(4.9348)	(4.9377)	(4.5946)	(4.9320)
cons	109.3809	128.1465	128.9015	130.6402	125.9815
	(5.8396)***	(10.2245)***	(10.1612)***	(7.5667)***	(10.010)***
year dummies	no	yes	yes	yes	yes
Method	Random-effects panel	Random-effects panel	Random-effects panel	Pooled data	Random-effects panel
Wald chi2	95.85***	83.27***	97.67***	-	86.81***
LR chi2	-	-	-	164.61***	-
Number of observations	2903	1490	1490	1490	1490
Pseudo R2	-	-	-	0.0113	-
Left-censored observations	50	16	16	16	16
Number of firms	795	491	491	-	491

Notes: Standard errors of coefficients within parenthesis. ***,**, and * denote significance at 1, 5 and 10% levels. In columns (1)-(4), *dumleverage*=1 when *liabilites/firm value(-2)*>0.9; in column (5), *dumleverage*=1 when *liabilites/assets(-2)*>0.9. Source is Economatica, unconsolidated data.

Alternatively, we conjectured that *roa* could instead reflect riskier, lower quality firms. One would then expect these firms to have a larger share of short term debt, and this effect should be especially strong for highly indebted firms. While we observe the first effect, we do not see the second: highly leveraged firms with high returns have less short

term credit. This is an indication that our first interpretation, namely, that short-term debt reflects credit availability in the margin better than leverage, might be at work.[4]

C. Use of bond finance

We now look at the question of bond finance, with data from Argentina, Chile and Colombia (Peru has almost no observations, and the data from Brazil was presented in a way difficult to aggregate for us). We first ask whether firms issue (1) or do not issue (0) bonds. We estimated in column (1) of Table 5 a random-effects probit model using panel data. Our random-effects panel estimates show that *size* is a very significant determinant of the use of bond finance, which is consistent with the cost of issuing and economies of scale hypothesis. Controlling for other factors, firms in Chile and Colombia have a greater likelihood of resorting to bond finance that firms in Argentina. The other control variables do not have any clear and systematic relationship to the decision to issue bonds.

Our next step is to look at the behavior of *bond debt/firm value*, as well as *bond debt/assets* (to link the regressions to survey results), using random-effects tobit panel. The tobit estimates measure the quantitative effect of size on financing choices. To be brief, we only present the full estimates with all the variables. In column (2) of Table 5 we find that *size* is positively related to *bond debt/firm value*. The use of book values in column (3) does not affect these results at all.

Since both bank and bond debt increase with *size*, our last question is which of these two sources of finance increase more with size. Column (4) of Table 5 looks at the behavior of *bond debt/(bond +bank debt)* with panel data from 1994-2004 using random-effects tobit regressions. The ratio of bonds to bank plus bond debt strongly increases with *size*.

In the case of Argentina, the corporate bond market was only starting to take off in 1992, thanks to the legal changes introduced in the corporate bond law in 1991 that made tax treatment of bonds similar to sovereign loans. Hence, one would not have expected to find any relationship between *size* and bond finance before that. The fact that *size* is indeed an important determinant of the use of bond finance, and of the amount used, can be linked

[4] An even better measure of credit availability would be unused credit lines. Streb et al. (2001) explore this idea, based on loan commitment contracts in Melnik and Plaut (1986). Another possibility would be to consider jointly both leverage and spread, or rating, of firm debt.

with our initial hypothesis that what drives the development of bond markets in Argentina (and Latin America) are large firms, because of the fixed costs of issuing bonds and the economies of scale.

Table 5. Random-effects regressions for issue of corporate bonds and bond debt ratios Argentina, Chile, and Colombia, bi-annual data 1994-2004

Explanatory variables	*bonds=1, no bonds=0*	*bond debt/ firm value*	*bond debt/ assets*	*bond debt/ (bond + bank debt)*
	(1)	(2)	(3)	(4)
size(-2)	1.4688	.0997	.0830	.2651
	(.1975)***	(.0155)***	(.0097)***	(.0354)***
tangibility(-2)	-.0006	-.0045	9e-06	.0006
	(.0050)	(.0038)	.0004	(.0020)
q(-2)	.0081	-.0007	-.0004	.0121
	(.0283)	(.0030)	(.0024)	(.0155)
roa(-2)	-.0069	-.0023	-.0007	-.0023
	(.0054)	(.0006)***	(.0003)**	(.0012)*
chi	.9409	.1874	.1401	.5183
	(.2511)***	(.0268)***	(.0180)	(.0549)***
col	.8461	.0980	.0670	.3312
	(.4483)*	(.0384)**	(.0273)	(.1019)***
cons	-6.5720	-.7128	-.5753	-1.8084
	(.5936)***	(.0928)***	(.0580)***	(.2170)***
year dummies	yes	yes	yes	
Method	probit	tobit	tobit	tobit
Wald chi2	65.28***	77.02***	113.37***	123.66***
Number of observations	1385	1190	1385	1188
Left-censored observations	-	768	912	715
Number of firms	412	354	412	371

Notes: Standard errors of coefficients within parenthesis. ***,**, and * denote significance at 1, 5 and 10% levels. Source is Economatica, unconsolidated data. The figures of bond debt for Chile were adjusted to include items that were reported in a different format than other countries.

IV. Few large firms in Argentina?

If large firms in Argentina and Latin America issue bonds, and the amount used of bond finance increases with size, then a possible explanation for the small development of the corporate bond market in Argentina and Latin America in terms of GDP is that there are few large firms. Another is that large firms issue bonds, but they rely less on bond finance than, for example, comparable firms in the United States. We look into this now.

A. Corporations quoted on stock exchange

We compared the Argentine corporations quoted on the stock exchange to similarly sized firms in the US. For this purpose, we resorted to the Economatica database. Since we do not have information on bond issue for US firms, we look instead at the maturity structure of debt.

We first classified Argentine corporations quoted on the Merval according to the size of their assets. Though they are all large firms by Argentine standards, we divided the firms in Table 6 into large firms (assets of 3.2 billion dollars or more) and small firms (assets below 3.2 billion dollars). The table shows that larger firms have larger book leverage (gross debt over total assets) and a lower participation of short term in total debt. The main difference between both groups lies in the reliance on short term debt.

Table 6. Financial indicators of Argentine corporations quoted on stock exchange, 1998

	Short term debt/total debt	Leverage (Gross debt/assets)	No. firms
Large firms	19.9	38.7	10
Small firms	52.1	28.7	70
Total	49.7	29.4	80

Note: large firms have (book value) of assets between 3.2 and 13.1 billion US dollars. Small firms have (book value) of assets between 10 million and 2.4 billion US dollars. Source: Economatica

We then looked at the same indicators for US corporations. To be able to compare US corporations to Argentine corporations according to size, we divided the US firms in Table 7 into three groups: very large (assets above 13.2 billion dollars), large and small corporations. The very large US firms are larger than any Argentine firms. The group of large US firms is comparable to large Argentine firms, and the same holds for small firms in the United States and Argentina. In the United States, neither leverage nor the participation of short term debt over total debt varies a lot over the range of sizes we are considering (and in the sample we are analyzing).

Table 7. Financial indicators of US corporations quoted on stock exchange, 1998

	Short term debt/total debt	Leverage (Gross debt/assets)	No. firms
Very large firms	24.2	29.0	92
Large firms	20.6	31.7	248
Small firms	25.1	26.0	340
Total	22.8	27.4	680

Note: very large firms have (book value) of assets between 13.2 and 355.9 billion US dollars. Large firms have (book value) of assets between 2.4 and 13.1 billion US dollars. Small firms have (book value) of assets between 10 million and 2.4 billion US dollars. Source: Economatica.

An interesting result that springs from this comparison is that there is no major difference between US and Argentine firms in our sample as to leverage: the average in Argentina is 29%, versus 27% in the United States. However, there is a big difference in relation to the maturity of their debt: in Argentina short term debt represents 50% of total debt, in contrast to 23% in the United States. This difference is explained by Argentine firms that have smaller size, since the larger firms have a ratio very similar to US firms (besides having access to international markets).

Hence, once one controls for size, these results point in the direction that the largest firms in Argentina are similar to comparable firms in the US as to leverage and reliance on short term debt. The differences spring out when one goes down to the next tier of firms. Even though these smaller firms have similar leverage to comparable US firms, they have a much greater reliance on short term debt.

The maturity structure is indirectly related to the use of bond finance, since bonds tend to be longer term than bank loans. According to Kidwell and Blackwell (1988), the issuers of bonds in the US had on average assets of 3.4 billion dollars, compared to 2.3 billion dollars of issuers of private placements. Hence, one would expect bond issues to be concentrated amongst what we call the large and very large firms, i.e., firms that have 2.4 billion US dollars or more in assets. Since there are no differences among firms above that level as to maturity structure, this evidence does not seem to indicate that the problem is that large firms in Argentina issue less bonds than large firms in the United States. More direct evidence would, of course, be relevant to settle this issue.

The results in Tables 6 and 7 points to the second explanation for the small development of the corporate bond market, that there are few large firms in Argentina, and these large firms are not too large. Indeed, on the basis of the Economatica sample, there

are 92 very large firms in the United States, compared to none in Argentina (see Tables 6 and 7).

The available evidence, for example on average employees per firm, also suggests that firms in Argentina tend to be of smaller size than in the United States. Starting from Gibrat's law of proportional growth of firms, Herbert Simon many times discussed the reasons for a Pareto distribution for firm sizes. In this regard, if Argentine firms follow a Pareto distribution like U.S. firms, a smaller average firm size of Argentine firms would imply by itself that there is a smaller proportion of large firms in Argentina (Axtell 2001). The problem with having direct information on the size distribution of firms in Argentina is that because of the huge size of the informal economy, that is concentrated in small firms, the number of small firms is underreported; in contrast, the United States has a lot better statistics in census of all firms in economy.

The vast majority of Argentine firms, which are not public, are a lot smaller than the firms included in Table 6, so they presumably have less access to credit, and more reliance on short term credit, than the firms included here. The results of the survey to firms confirm this. We turn to this now.

B. Survey of non-financial firms

The econometric estimates in this chapter point in the direction that the size of firms is a relevant factor that determines the use of bond financing in Latin American countries. This is not too surprising by itself, since the United States shows the same pattern. In the United States, larger firms are more likely than smaller firms to issue publicly traded debt and commercial paper. However, our econometric results above are based on firms that are quoted on the stock exchange. Though these firms are few and small by US standards, they are much larger than the typical Argentina firm.

Our survey of nonfinancial firms (see Alegre, Pernice and Streb 2007) shows that the average assets of the 8 firms issuing corporate bonds was 2.5 billion dollars, compared to 1 billion dollars of assets for those not issuing bonds (the average assets of whole sample of 56 firms was 2 billion dollars). These are large sizes, but firms that quote on the stock

exchange are even larger (while only 15% of the firms in our survey of large firms issued stocks, 47% of firms on stock exchange issued stocks).

The firms issuing bonds in our sample had on average 5000 employees, almost 4 billion pesos in yearly revenue (1.3 billion dollars), and almost 8 billion pesos in assets (2.5 billion dollars). Independently of the criteria for size (employees, revenues or assets), there is a cut-off below which almost no firms in the survey issue bonds.

If one uses employment as size indicator, firms under 1500 employees in the sample practically do not issue bonds (only one of the eight cases). Of the firms larger than this size, 41% issued bonds. If one extends the interval to include firms with 1000 employees or more, this gives 37% of firms. Multiplying these percentages by the amount of firms that have more than 1500 employees (more than 1000 employees) in *Guia Senior* gives an estimate of 44 (60) firms issuing bonds in 2005. Our database of corporate bonds (see Bedoya, González, Pernice, Streb, Czerwonko and Díaz Santillán 2007) shows that 56 firms had outstanding bonds in December 2005 (there were 68 firms in December 2004, and 75 firms in December 2003, with outstanding bonds). Hence, this simple cut-off point can predict fairly well the universe of firms issuing bonds in Argentina.

The survey is intended to be representative of large firms in Argentina, since the 56 responses in the survey are taken from a sample of 766 firms with over 200 employees, or with over 150 million pesos in yearly revenue that mimic the survey of large firms carried out by INDEC in Argentina.

V. Summary

Our results point in the following direction. A first fact is that in Argentina and Latin America, the size of firms is a key determinant of the use of bond finance, just as it is in the United States. In particular, both our econometric evidence and our surveys show that larger firms rely more on bond finance. Theoretically, this can be explained by differences in contracting costs (specially fixed costs of bond issue), combined with the economies of scale which make bond issues the debt instrument of choice only for large firms and large issues.

Furthermore, firms in Argentina (as in Latin America) tend to be a lot smaller than firms in the United States. We have basically compared firms that are publicly quoted on the stock exchanges of Argentina and the United States, but this should hold true if one looks at the complete universe of firms in both countries.

The small size of firms in Argentina can help explain why the bond market is a lot less developed in Argentina, given the minimum size required for bond issues to be an attractive source of financing. The fact that many corporations in Argentina are reluctant to go public, and remain as closely held family businesses, might help explain this pattern of size distributions, as well as other features of capital markets. When one connects facts one and two, they imply that the overall size of the bond market in Latin America should be smaller than in the United States.

Our results do not imply that institutional factors do not matter. In the case of Argentina, there was practically no corporate bond market before 1991. When bonds started to receive a tax treatment as favorable as bank loans, the market started to boom (this is the effect of the violation of the no-tax hypothesis of Modigliani-Miller irrelevance proposition). What our results may imply is that a large part of the institutional obstacles to bond finance were removed in the 1990s.

However, other kind of institutional limits to the growth of firms seem to be present, given that most firms in Argentina still remain as small, closely held family firms. If, for example, for tax reasons firms do not have an incentive to release information, and this limits their possibility of going public, and hence their growth possibilities, the limitations to the bond market might in part be grounded in factors that go strictly beyond the costs of issuing bonds. As a sample of the attitude towards releasing information, in question 5 of our survey 76% percent of small firms and 53% of the big firms answered that requirements of public information to issue bonds was either a problem or did not respond the question.

Hence, a key question to look into more carefully is why Argentina has so few large firms. Given the prevalence of small and medium firms, it also leads to another question: How to promote financial instruments that can be used by small and medium enterprises (SMEs)? Asset-backed securities and checks of deferred payment have been important developments on this front (see Bedoya, Fernández, González, Pernice and Streb 2007).

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