Capital Structure and Debt Maturity: Evidence from Emerging Markets

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Abstract

This paper analyses the joint determination of capital structure and debt maturity of the firm for a large sample of countries from Latin America and Eastern Europe. To our knowledge this is the first time such study has been attempted for a multi-country emerging market sample. Employing dynamic panel data analysis, we test Barclay, Marx, and Smith Jr.'s (2003) model of joint capital structure and debt maturity determination using the Generalized Method of Moments on a system of structural equations. The empirical results support three main findings. First, capital structure and debt maturity are policy complements in Latin America and policy substitutes in Eastern Europe. Second, there is a substantial dynamic component in the determination of the endogenous variables that have been neglected by previous research. Finally, firms face moderate adjustment costs towards its optimal maturity.

Keywords: Capital Structure, Debt Maturity, Dynamic Panel Data Analysis, Latin America, Eastern Europe.

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1. Introduction

The aim of this paper is to investigate the choice between debt and equity simultaneously with the decision between short-and long-term debt for a large sample of emerging markets from Latin America and Eastern Europe.

Since the breakthrough work of Modigliani and Miller (1958) (henceforth MM) on capital structure, corporate financial theory has furthered our understanding of a range of financial decisions: the choice between debt and equity, the design of a payout policy, the use of convertible instruments, the management of financial risks, among others. However, most of the theoretical and empirical work so far has focused on a single decision at a time. That is, each financial decision is taken as independent of the other decisions. It may be the case that most of these decisions are not independent but actually complements or substitutes among each other. If that is the case, we must investigate either there is interdependence among them or not.

This paper contributes to the existing body of knowledge in several ways. First, we test the Barclay, Marx, and Smith Jr. (2003) theory of joint capital structure and debt maturity determination in a multi-country framework, in an attempt to understand country-specific differences. We focus on a sample of developing countries that have so far been ignored in empirical studies. To our knowledge, this is the first attempt in the literature to investigate such problem in a multi-country emerging market sample. Moreover, we do so by employing empirical techniques that account properly for cross-section and time series variation. Also, we model dynamic effects that have not been considered in the original research.

Our main findings suggest that there is a substantial dynamic component in the determination of a firm's capital and maturity structures, which has been ignored by previous research. Moreover, our results suggest that capital structure and debt maturity are policy complements in Latin America and policy substitutes in Eastern Europe. The study also finds that firms face moderate adjustment costs towards its optimal policies, and the determinants of the endogenous variables and their effects are similar between Latin American countries and Eastern European ones.

The remaining of the paper is structured as follows: the next section presents the theoretical framework, while section 3 details the methodology, presents the data sources, and describes the variables used in the empirical model. Section 4 reports and comments the estimation results. Section 5 concludes the paper.

2. Theoretical Framework

2.1. Theoretical Work on Capital Structure and Debt Maturity

Explanations for capital structure decisions can be broadly classified in three groups: tradeoff-based theories and information asymmetry-based ones.

A group of explanations are based on the proposition that the optimal leverage ratio of the firm is determined by the tradeoff between current tax-shield benefits of debt against higher bankruptcy costs implied by a higher degree of indebtedness. If the assumptions of no taxes, a fixed interest rate, and the independence between bankruptcy likelihood and the degree of leverage – along with the traditional market efficiency hypothesis – are made, then the classical MM Proposition 1 holds: the irrelevance of the capital structure. As imperfections such as taxes, a variable interest rate, credit constraints, and bankruptcy costs are introduced in the model, the tradeoff results (i.e. Modigliani and Miller (1963), Miller (1977), DeAngelo and Masulis (1980)).

Other branch of the literature encompasses all those explanations that are based on imperfect information assumptions. The seminal papers in this literature are Myers (1977) and Myers and Majluf (1984). Myers (1977) argues that the value of the firm depends on its assets in place (whose value don't depend on future investment) as well as on growth opportunities (whose value depend on future investment strategy). The implication is that this real option characteristic of the firm induces a transfer of wealth between shareholders and bondholders that may prevent the firm to undertake positive NPV projects (the debt overhang – or underinvestment – problem). Myers and Majluf (1984) realize that managers have privileged information regarding both tangible (assets in place) and intangible (growth opportunities) assets and that investors are aware of this fact. In light of such imperfect information there may be wealth transfers between old and new shareholders when the firm decides to issue new securities. This information asymmetry affects the firm's financing-investment decision in a way that causes managers to pass up valuable investment opportunities in order to preserve (old) shareholders' interests: the underinvestment problem.

Other streams of literature have also explored the basic information asymmetry set up in their research of the capital structure problem. Jensen and Meckling (1976) and Jensen (1986) suggest the agency theory framework to study the optimal leverage ratio. In their perspective, too little debt can lead to an overinvestment problem, as managers seek to sustain growth at the expense of profitability. This literature topic is also known as the "free cash flows problem".

Finally, Myers (1984) proposed that, as a result of information costs, managers would prefer to finance corporate investment by first tapping the less agency-costly sources. That means that corporate investment should be financed in order by retained earnings, then by debt, and finally – only as a last resort – by equity issues. This variant of the information asymmetry family is known as the Pecking Order Theory.

Theoretical explanations for the choice of corporate debt maturity are already implied in MM's original paper, but are eventually formalized by Stiglitz (1974). MM's paper does not consider a multi-period setting, and Stiglitz (1974) provides a rigorous analysis of the MM model in such circumstances. His conclusions are that, under a fairly general set of conditions (absence of taxation, transaction costs, bankruptcy costs, and other frictions) the maturity choice of the firm is irrelevant, just as MM's findings regarding the firm's leverage ratio under the same conditions. Of course, once one departs from a frictionless world such imperfections matter, and therefore the maturity decision would influence the firm's valuation just as would the set of other financial policies. A large family of hypotheses explores the tax-based, bankruptcy costs and transaction costs approaches in order to offer an explanation for the maturity choice.

Arguments based on tradeoff considerations rely on the proposition that the optimal maturity of debt is determined by the tradeoff between the costs to rollover short-term debt *vis-à-vis* the usually higher interest rate bore by long-term debt. In many senses the arguments rely on explicit transaction costs of different kinds of debt such as flotation and rollover costs as well as tax-shield benefits and implicit bankruptcy costs. The tax-based explanation suggested by Brick and Ravid (1985) and Brick and Ravid (1991) are perhaps the best known examples.

Another whole family of hypotheses derives from the asymmetric information problem formalized by Jensen and Meckling (1976) and extended by Myers (1977). In this case, the maturity structure is yet another instrument that firms can use in order to solve the agency problems faced by the various stakeholders of the firm. These agency approaches suggest that firms choose the optimal debt maturity in order to solve the information asymmetry that gives rise to the underinvestment (Myers (1977); Myers and Majluf (1984)) and/or overinvestment (Jensen and Meckling (1976); Jensen (1986)) problems. Barnea, Haugen, and Senbet (1980) offer

an explanation for the debt maturity choice – as well as for complex financial contracting – based on market failure in resolving agency problems costlessly.

Also within the asymmetric information mindset, the maturity structure can also be regarded as a means of overcoming the adverse selection problem (Akerlof (1970)) in terms of providing a credible signal to the market, alongside the general lines suggested by Ross (1977). Signaling explanations are therefore also rooted on information asymmetry arguments, but suggests that the maturity choice – as for a number of other publicly known corporate decisions – is used by managers as a way to convey information to the market thus reducing the firm's cost of capital. Within this group is situated Flannery (1986) proposition that risky debt maturity is a valid signal if transaction costs are positive, because high-quality firms can signal their true quality.

2.2. Previous Empirical Evidence on Capital Structure and Debt Maturity

Empirical research on the tradeoff-based explanations for capital structure has been extensive, and although some support for this explanation has been found, by itself the STH does not seem enough to fully explain leverage decisions (e.g. Marsh (1982), Bradley, Jarrell, and Kim (1984), Titman and Wessels (1988), Mackie-Mason (1990), Givoly et al. (1992), Graham (1996)). Agency theory approaches find some support in several empirical works (Friend and Lang (1988), Jensen, Solberg, and Zorn (1992), Bagnani et al. (1994), Jung, Yong-Cheol, and Stultz (1996)), although some controversy remains. The Pecking Order has also found some empirical support (Shyam-Sunder and Myers (1999)).

In terms of international evidence on capital structure, 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. (1999) 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.[1]

Regarding debt maturity, most empirical studies have concentrated on the United States. Mitchell (1991) and Morris (1992) pioneer studies have taken different empirical approaches to the problem. While Morris (1992) investigates the maturity structure of the firm's total indebtedness, Mitchell (1991) focuses on the maturity of single bond issues. These are the two most common empirical approaches in the literature. The first approach is followed by Easterwood and Kadapakkam (1994), Barclay and Smith Jr. (1995), Barclay and Smith Jr. (1996), Stohs and Mauer (1996), Johnson (1997), Scherr and Hulburt (2001), and Lyandres and Zhdanov (2003). The second approach is preferred by Mitchell (1993), Guedes and Opler (1996), and Gottesman and Roberts (2003), the latter investigating the maturity of bank loans. Baker, Greenwood, and Wurgler (2002) also investigate bond issues, and in the aggregate, find evidence of market timing of bond issues.

[1] Indeed, some recent studies stress the relation between a country's financial system structure (i.e. bank-based or market-based) and its degree of financial development to the financing choices of firms (e.g. Demirgüç-Kunt and Maksimovic (1996); Demirgüç-Kunt and Levine (1996); and Demirgüç-Kunt and Maksimovic (1999)).

Few studies investigate debt maturity in an international setting. Schiantarelli and Sembenelli (1997) investigate the maturity structure of 604 non-financial firms from the United Kingdom and 750 non-financial firms from Italy and find support for the hypothesis that firm choose the maturity of their liabilities to match those of their assets. Their results are in line with those of Ozkan (2000) who investigates the maturity issue for 429 non-financial British firms in the period 1983-1996 and Heyman, Deloof, and Ooghe (2003) who investigate the maturity of 1,091 Belgian small firms. Antoniou, Guney, and Paudyal (2002) study the determinants of debt maturity for a sample of 358 French, 582 German, and 2,423 British non-financial firms and find that debt maturity depends on both firm-specific and country-specific factors, opening the question of the degree of influence of each group of factors on the maturity structure.

Larger sets of countries are studied by Demirgüç-Kunt and Maksimovic (1999) who explored the hypothesis that the financial development of a country determines the maturity of its firms' debt. The authors investigate 9,649 non-financial firms from 30 countries including developing ones in the period 1980-1991. They find support for the hypothesis that legal and institutional differences among countries explain a large part of the leverage and debt maturity choices of firms. Fan, Titman, and Twite (2003) also study the subject for 11 industries in 39 countries – in addition to 1,524 chemical firms in the period 1991-2000. Their results largely support Demirgüç-Kunt and Maksimovic (1999) findings.

2.3. Theory of the Joint Determination of Capital Structure and Debt Maturity

Barclay, Marx, and Smith Jr. (2003) propose the requirements for a theory of financial policy to have testable implications. The authors focus their work on the choice between leverage and maturity. They develop their model from the argument that a firm chooses leverage and debt maturity to maximize its value given a set of exogenous firm characteristics such as its

investment opportunity set and regulatory status. In order to obtain unambiguous predictions in reduced form equations, the value functions must have monotone comparative statics, which is guaranteed only if particular properties are satisfied (single-crossing and quasi-supermodularity). The authors show that, for the leverage-maturity problem, the single crossing property holds, but the quasi-supermodularity one does not. The practical implication is that leverage and debt maturity are likely to be ***substitute*** policies instead of complementary ones.

The authors illustrate their point empirically using data from 5765 industrial firms in the United States from 1980 to 1999. Besides endogenous variables for capital structure and debt maturity, the authors employ exogenous variables such as growth opportunities, industry regulation, firm size, profitability, tangibility, asset maturity, average tax rate, net-operating loss carryforwards, and a dummy variable for firms with commercial paper programs. Their empirical analysis suggests that capital structure and debt maturity are substitutes in addressing financial problems of the firms although the authors have faced several difficulties in correctly identifying the leverage equation.

One criticism that may be raised against Barclay, Marx, and Smith Jr.'s (2003) paper is that it ignores the effect that lagged leverage and maturity may have on the determination of the contemporaneous endogenous variables. As a matter of fact, it is likely that the change in a firm's capital structure and debt maturity is somewhat rigid and by no means costless. If that is the case, the previous period's level of debt and maturity is a relevant variable in the firm's choice today. This is one aspect that we intend to improve in the analysis that follows.

3. Data, Variables, and Research Methods

3.1. Macro Financial Data

Our choice of countries for this study focused in emerging markets that have gone through substantial structural changes in the past couple of decades. On one hand we have Latin America, which has experienced hyperinflation and economic instability over the 1980s and profound economic reforms in the 1990s. On the other hand we have a group of countries in Eastern Europe that have made the transition from centralized to market economies about the same period of time. In common, both groups of countries have gone through extensive privatization programs.[2]

In order to provide a better understanding of the economic environment of the countries in our sample, we present country-level summary statistics on key economic and financial indicators for these countries. Data is from World Bank's World Development Indicators (World Bank, 2005a) and World Bank's Financial Structure Database (World Bank, 2005b) put together by Beck et al. (1999).

Table 1 summarizes such indicators. Countries in the sample are Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela (henceforth called "Latin America 7" or simply "LA-7") and Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and the Russian Federation (henceforth called "Eastern Europe 7" or simply "EE-7"). Both groups of countries have presented highly inflationary environments in the period 1990-2003, although the high average annual inflation is influenced by the hyper-inflationary early 1990s in some countries (Argentina, Bulgaria, Brazil, and Mexico). In addition, inflation has been more resilient in Romania and the Russian Federation (henceforth simply "Russia") throughout the sample period. Associated to

[2] See for instance Glade and Corona (1996) and Manzetti (2000) for a discussion of the Latin American privatization

this inflationary environment, countries in the sample displayed dismal growth, particularly in Eastern Europe. Average annualized growth rates are often negative for the EE-7, and generally below 3% in Latin America, although Chile has been an exception with a growth rate of more than 5% a year over the sample period. The economies in the sample are in general small, with three large outliers: Brazil, Mexico, and Russia, which have GDPs above US$300 billion in constant U.S. dollars (2000).

In terms of financial structure, it seems that Latin American economies are in general more developed than Eastern European ones. The EE-7 has a larger ratio of liquid liabilities to GDP than the LA-7 that might be reflect of the higher inflation rate, since central bank assets are proportionally bigger in the LA-7. Both groups of countries are similar in terms of credit to the private sector, but EE-7 countries seem to be more bank-based than the LA-7. Bank deposits to GDP and bank concentration are bigger for these countries. Interestingly, the net interest margin is higher for the LA-7 indicating a less competitive bank market. Private bond markets are equally incipient for both groups of countries, while public bond markets are at least three times bigger. This might suggest that the government crowds out private issuers in such markets.

Stock markets are bigger in Latin America, in both absolute and relative terms, although Eastern European stock markets are relatively more actively traded. In all other aspects, Latin American stock markets seem more developed: they trade a larger number of companies and those companies have bigger market capitalization than their counterparts in the EE-7. This is no surprise since stock markets in Latin America date from the beginning of the 20th century while in Eastern Europe such markets have just begun trading a little more than a decade ago.

In summary, these are countries that have a recent history of unstable economies,

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experience and Frydman and Rapaczynski (1994) and Boeri and Perasso (1998) for the Eastern European one.

combining higher inflation with lower growth. These economies are predominantly bank-based, although the LA-7 seems to have more developed stock markets, and where public bond markets are much larger than private ones.

3.2. Firm-Level Data and Variables

The primary data sources are from the Economática Pro© database for the Latin America countries (Economática, 2003) and from the 2004 version of Amadeus (Analyse Major Database from European Sources) Database by Bureau Van Dijk for the Eastern European countries. Only listed firms are included in the sample. Observations are yearly during the period 1990-2002 (Latin America) and 1994-2003 (Eastern Europe) and the level of analysis is each firm.

The database contains 1,242 firms for the LA-7 and 693 industrial firms for the EE-7 over the period covered. Firms from the financial industry were excluded as well as firms with missing data for key variables. Thus, the final sample contains 986 firms and 13,490 observations from Latin America and 686 firms and 7,919 observations from Eastern Europe. In order to reduce the survival bias, firms are allowed to leave and enter the dataset over time. Panel A of Table 2 presents the distribution of firms by country.

Firms are classified in one of the following 19 industry sectors, according to their primary NAICS (Latin America) or NACE (Eastern Europe) codes: Agriculture, Chemical, Construction, Electricity, Electronic, Food and Beverages, Gas and Oil, Machinery, Manufacturing, Mining, Pulp and Paper, Retailing and Wholesaling, Services, Software, Steel, Telecommunications, Textile, Transport and Logistics, and Vehicles and Parts.

In this paper, we employ balance sheet data for individual firms with annual periodicity, since balance sheet information for yearly statements are usually more reliable.[3] Also, considering the long-term implications of the maturity structure choice, higher frequency data should not add much to the findings – but it might be noisier.

Accounting information in the databases is available in local currency (Eastern Europe) and in U.S. dollars (Latin America). Since this is a cross-country study, we 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 stated in local currency. Eastern European figures are converted into U.S. dollars using end of year official exchange rates from International Monetary Fund's International Financial Statistics.©

The endogenous variables are proxies of the leverage and maturity of debt carried by each firm measured as follows: Long-Term Book Debt over Book Equity, i.e. the debt-to-equity ratio ("Leverage"), and Long-Term Financial Debt over Short-Term Loans plus Long-Term Financial Debt ("Maturity"). That is:

$$Leverage = \frac{LongTermDebt}{BookEquity} \qquad \text{(Eq. 1)}$$

and,

$$Maturity = \frac{LongTermDebt}{ShortTermLoans + LongTermDebt} \qquad \text{(Eq. 2)}$$

The dilemma of employing book values *versus* markets values when studying debt caters for a lively discussion of its own. On one hand, book values are subject to "creative accounting" and discretionary criteria defined by regulatory authorities. On the other hand, market values are

[3] Quarterly data is also available in the Economática® database.

subject to distortions induced by low liquidity and concentrated trading in few participants. In this study we choose book values instead of market values because the reliability of market-based figures for emerging market firms, especially with respect to debt valuation, is questionable. Secondary markets are thin, trade is often infrequent, and data availability is difficult. Given these shortcomings, we find book values more adequate to the purposes of this research.

From Table 2 (Panels B and C) it can be seen that Brazil heavily influences the Latin American sample while the most influential countries in the Eastern Europe side are Poland, Russia, and Bulgaria. Venezuela, on the other hand, has little influence on the sample of the Latin American firms as well as Latvia in the Eastern Europe group of firms.

Panels B and C shows the summary statistics of *Leverage* and *Maturity* variables for the LA-7 and EE-7 countries, respectively. It is clear that the maturity ratios for EE-7 countries are substantially higher than those for LA-7 countries (0.59 and 0.48, respectively), being Mexico and Poland the ones with highest values in each sub-sample, with 0.54 and 0.76, respectively. In terms of leverage, long-term debt corresponds to 105% and 19% of equity to LA-7 and EE-7 countries, respectively. Brazil has the highest level of leverage for the whole 14 countries (170%) while Poland has the lowest (8%).

Firm-specific determinant factors for the debt maturity structure are chosen from those often suggested in the literature. The set of firm-specific explanatory variables consists of the following: size, growth opportunities, profitability, liquidity, tangibility, tax effects, and business risk. We describe each of these in more detail below:

§ The size of the firm is measured by:

$$Size = Ln(Sales) \qquad \text{(Eq. 3)}$$

Where *Ln(x)* is the natural logarithm operator.

§ Growth opportunities of the firm are assessed by the market-to-book ratio for Latin American firms:[4]

$$Growth = \frac{BookLiabilities + MarketCapitalization}{TotalBookAssets} \qquad \text{(Eq. 4)}$$

§ For Eastern European firms, growth opportunities are measure as the ratio of intangible fixed assets to total fixed assets:[5]

$$Growth = \frac{Intangible FixedAssets}{TotalFixedAssets} \qquad \text{(Eq. 5)}$$

§ Profitability, a proxy for firm and credit quality, is measured according to the usual return-on-assets ratio:

$$ROA = \frac{OperatingIncome}{TotalBookAssets} \qquad \text{(Eq. 6)}$$

§ Business risk is measured by the degree of operational leverage:

$$Business Risk = \frac{Sales}{OperatingIncome} \qquad \text{(Eq. 7)}$$

§ The degree of liquidity of the firm, also an indicator of cash constraints, is given by the current liquidity ratio:

$$Liquidity = \frac{CurrentAssets}{CurrentLiabilities} \qquad \text{(Eq. 8)}$$

§ The degree of tangibility of assets, an indicator of collateral value, is given by the degree of asset immobilization:

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[4] It may seem odd that we employ a market-based variable after choosing book values throughout the study. However, notice that stock markets in Latin America are much more liquid than debt markets. Therefore, the use of the market-to-book ratio here seems reasonable. we am thankful to Dr. João Zani for this remark.

[5] The majority of Eastern European firms in our sample did not have stock market data available in the database, therefore we choose to proxy this variable with an alternative measure.

$$Tangibility = \frac{NetFixedAssets}{TotalBookAssets} \qquad \text{(Eq. 9)}$$

§ Tax effects of debt are measured by the effective average tax rate of the firm,[6] i.e., the ratio of total tax charges to taxable earnings:

$$TaxEffects = \frac{Taxes}{TaxableEarnings} \qquad \text{(Eq. 10)}$$

Finally, we also define a dummy variable to control for regulated industries. This variable assumes the value of 1 if the firm's main industrial activity belongs to one of the following industries: Construction, Electricity, Gas and Oil, Mining, Telecommunications, and Transport and Logistics. These industries are subject to closer government scrutiny even when pursued solely by private enterprises, and are submitted to stricter regulations than other activities.

Tables 3 and 4 report summary statistics for the exogenous variables of Latin American and Eastern European firms, respectively, such as: Size, Growth Opportunities, Profitability, Business Risk, Liquidity, Tangibility, and Tax Effects. LA-7 firms are bigger, with more growth opportunities, less profitable, have lower business risk and pay less taxes, on average. However, some variables have a large dispersion around their average. That is the case for example for the Business Risk proxy with a standard deviation of 218.00 and 507.45 for LA-7 and EE-7, respectively. Therefore, the averages should be analyzed with some concerns suggesting the presence of large outliers that may inflate the standard deviation for this variable and others. In

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[6] The more correct way to measure the effect of taxes on maturity 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, we choose the average effective tax rate as a substitute, following Booth et al. (2001).

order to account for such cases, in this variable and others, in the data analyzes that follows we take appropriate remedial measures.

Table 5 presents the correlation matrix for the explanatory variables. Larger firms tend to be more profitable, with more growth opportunities, less liquidity, riskier and with more fixed assets as a proportion of total assets in the case of LA-7, and less so for the EE-7 countries. Since the correlations are generally low in this sample, there are no multicollinearity problems among the explanatory variables.

The quality of measurement of these variables, to 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 resolve 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, we employ a set of dummy variables as instruments. First, the sector of activity of each firm is included, 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 classification informed in the database. "Food and Beverages" is chosen as the base-case so that the instrument set may include an intercept. Likewise, country dummies are used to account for any country-specific variation such as the institutional framework, business environment, and macroeconomic

conditions. “Brazil” is chosen as the base-case for Latin America and Bulgaria for Eastern Europe.

One final remark is that, in determining capital structure and debt maturity, the nature of the ownership of the firm may induce systematic effects. State-owned firms, for instance, may have a lower bankruptcy probability due to implicit government guarantees – a factor that according to theory is decisive for the optimal maturity. Similarly, firms that belong to an industrial conglomerate or that are subsidiaries of powerful multinational corporations may face less credit constraints than independent local firms. Also, given the wide privatization process and mergers & acquisitions tide that took place in Latin America and Eastern Europe over the 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, we opt for leaving the ownership variable out of the study.[7]

3.3. Panel Data Analysis

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 increase in 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. Baltagi

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

(1995) adds to these the usually higher accuracy of micro-unit data respective to aggregate data and the possibility of exploring the dynamics of adjustment of a particular phenomenon over time.

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, 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 large number of firms from different countries observed over a period of only sixteen years. In such case, the econometric techniques should focus more on cross-sectional variation (heterogeneity) instead of time variation. Time variation that is common to all firms, in this case, can be controlled for by dummy variables.

A common assumption is that differences across units can be captured in differences in the regression's intercept – the fixed-effects model. This is a classical regression model that can be estimated by Ordinary Least Squares (OLS). 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 formulation (Hall and Cummins (1997)). However, in the presence of dynamic effects (lagged dependent variable amongst explanatory variables) OLS estimators are biased and inconsistent, and the same occurs with the GLS estimator (Baltagi (1995)). In order to overcome such problem, Anderson and Hsiao (1981) suggest a first difference transformation to the model so that all variables constant through time for each cross-section unit are wiped out, including the fixed effects intercept. The authors estimate the transformed model with an Instrumental Variable approach. Advancing upon such approach, Arellano and Bond (1991) suggest a two-step estimation procedure using GLS in the first step and then obtaining the optimal Generalized Method of Moments (GMM) estimator in the second step (Hansen (1982)). Such estimation is convenient because GMM does not require any particular distribution form, solving therefore problems of heteroskedasticity, normality, simultaneity, and measurement errors (Antoniou, Guney, and Paudyal (2002)). Also, since GMM is an instrumental variable technique, that employs three-stage estimation in order to obtain the estimates, it is similar to the two-stage approach that Barclay, Marx, and Smith Jr. (2003) employed in their structural equation estimation. Therefore, in this paper we can also estimate the structural equations of leverage and maturity even though they may not have monotone comparative statics.

Another advantage of such method for 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. Pooling together firms, 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 explanatory variable are different for different kinds of firms, for instance small and large firms. The careful choice of firm-specific variables (such as firm size) helps control for these possible biases. Nevertheless, this remains a limitation of this research.

3.4. Empirical Model

The first step is to define the following general (static) model:

$$\begin{aligned} Leverage_{it} &= b_{0i} + b_{0t} + \sum_{k=1}^{K} b_{1k} Y_{ikt} + \sum_{l=1}^{L} b_{2l} Z_{ilt} + u_i + e_{it} \\ Maturity_{it} &= b_{0i} + b_{0t} + \sum_{k=1}^{K} b_{1k} Y_{ikt} + \sum_{l=1}^{L} b_{2l} Z_{ilt} + u_i + e_{it} \end{aligned} \qquad \text{(Eq. 11)}$$

Where $Leverage_{it}$ and $Maturity_{it}$ are the stacked vectors of the endogenous variables (the i^{th}-firm leverage and maturity ratios on the t^{th}-period), Y_{ikt} is the matrix of K firm-specific explanatory variables (including industry dummies in the simple pooling and random-effects models), Z_{ilt} is the matrix of L country dummies (in the simple pooling and random-effects models), b_{0i} is the firm-specific intercept in the fixed-effects model, b_{0t} is the period-specific intercept, b_{1k} and b_{2l} are the matrices of coefficients, n_i is the firm-specific error term in the random-effects model, and e_{it} is a vector of error terms.

The next step is to test the model above for fixed- and random-effects.[8] Once it is established that the fixed-effects model provides a good fit for the model, then the lagged

[8] Such tests are not strictly required to implement the dynamic model, but they are reassuring in that the first differences model is indeed adequate.

endogenous variable is added to Eq. 11, which is then first-differenced yielding the dynamic system below:

$$\Delta Leverage_{it} = b_{0'i}\Delta Leverage_{it-1} + \sum_{k=1}^{K} b_{1k}\Delta Y_{ikt} + e_{it}$$
$$\Delta Maturity_{it} = b_{0'i}\Delta Maturity_{it-1} + \sum_{k=1}^{K} b_{1k}\Delta Y_{ikt} + e_{it} \qquad \text{(Eq. 12)}$$

One advantage of this specification is that the rate of adjustment of the firm towards its optimal capital structure and maturity[9] can be estimated as $l = (1 - b_{0'i})$. If adjustment costs are high, the rate of adjustment is expected to be small (l approaching zero), while a very high rate of adjustment (l approaching one) suggests the presence of negligible adjustment costs.

4. Empirical Results

4.1. Preliminary Specification Tests

In order to determine which model (simple pooling, fixed-effects, or random-effects) better suits the data, we perform two specification tests: the F test of simple pooling *versus* fixed-effects model and the Hausman test of random-effects *versus* fixed-effects. The results are shown in Table 6.

The first step is to determine whether the panel data specification that simply pools together all available data for all firms and time periods is adequate to describe the data. As pointed out by Hsiao (1986), simple least squares estimation of pooled cross-section and time series data may be seriously biased.[10] The model tested in Eq. 11 includes firm-specific variables

[9] Assuming that the optimal capital and maturity structures are determined by the exogenous variables ΔY_{ikt}.

[10] Hsiao (1986) refers to this as the "heterogeneity bias" (p.6).

described above, as well as country-specific dummy variables. The results in Table 6 strongly reject the single intercept hypothesis, both for the LA-7 and for the EE-7.

The next step is to determine which model of variable intercepts across firms better fits the data. Table 6 also presents the results for a Hausman specification test of random- versus fixed-effects. The test, as suggested by Hsiao (1986), p.49), is particularly appropriate in situations where *N* (the number of cross-sectional units) is large relative to *T* (the number of time periods) – precisely the case of this study. Again, the model in Eq. 11 above is employed. The test rejects the random-effects specification for the leverage equation in the LA-7 and the maturity equation for the EE-7. However, for the remaining cases it cannot reject such specification for both groups of countries.

Given these results, after first differencing Eq. 11, firm-specific intercepts disappear. Random-effects, however, are not likely to disappear with differencing and are incorporated to the general error term in the dynamic model of Eq. 12 in the estimation that follows.

4.2. Dynamic Panel Data Estimation Results

Preliminary runs of the fixed-effects model of Eq. 11 revealed a substantial presence of autocorrelation in the residuals. This finding raises the question that the maturity choice of the firm may be dynamic, i.e., current maturity may depend on past maturity. Antoniou, Guney, and Paudyal (2002) explicitly model such possibility, and suggest that a dynamic rather than static panel data analysis may be more adequate. However, as mentioned above, usual OLS and GLS estimators are biased and inconsistent when the lagged dependent variable is included in the right-hand side of the panel data model. In order to overcome this problem, GMM estimation is used instead.

Eq. 12 is then estimated by Generalized Method of Moments (GMM) using as instruments first-order lagged values of the levels[11] of explanatory variables, sector dummies, country dummies, and a constant. Standard errors are heteroskedasticity robust according to the method proposed by White (1980)[12] and are also robust to autocorrelation. Results are reported in Table 7 for all countries pooled together and in Table 8 for each region separately.

One important issue when estimating via GMM is to make sure that the instrument set is adequate. Tables 7 and 8 report the Sargan's test statistic for the null hypothesis that moment restrictions are orthogonal. Results cannot reject the restrictions in all cases. Therefore, we conclude that the instrument set is valid.

One major empirical result is that maturity equations perform slightly better than leverage ones. When all countries are pooled together and a dummy variable is used to signal the difference between the two regions, it becomes significant for the leverage equation but not for the maturity one. This result indicates that the level of debt is different between the two samples.

Another interesting result is that it is easier for the firm to change the maturity of its debt than to adjust its leverage ratio. At the same time, adjustment to the target maturity is by no means costless and instantaneous.

Dynamic effects are significant in all cases, except for the leverage equation of the LA-7. The estimated rate of adjustment to an optimal capital structure ranges between 0.55 and 0.64, an indication that firms in the sample face moderate adjustment costs. Adjustment costs for are in general higher for capital structure than for debt maturity, and this is a common pattern between the LA-7 and the EE-7 samples. This suggests The cross-effects between leverage and maturity

[11] As suggested by Arellano (1989).

[12] Given the heterogeneity in the firms in the sample, we anticipate that heteroskedasticity might be a problem.

behave exactly the opposite between the LA-7 and the EE-7. While maturity has a significant positive contemporaneous effect on leverage (and *vice versa*) for the LA-7, it has a significant negative effect in the EE-7. Interestingly, the signal reverses for one-period lagged leverage and maturity, and it happens in both samples.

It is worth to underscore that the two variables pointed out by Barclay, Marx, and Smith Jr. (2003) as the major theoretical determinants of the joint decision, Growth Opportunities and the Regulation dummy, are not significant in any equation and sample.

Regarding the remaining explanatory variables, Size is found significant in Latin America, but not in Eastern Europe. Liquidity is also significant in both samples and all equations, being in general negative (i.e. more liquid firms choose less and shorter debt). Tax Effects are also significant and positive (except for the leverage equation of the EE-7), indicating that more heavily taxed firms choose a higher level of indebtedness and longer maturity. The other variables are not significant anywhere.

4.3. Sensitivity Analyses

One question that emerges from the cross-country approach chosen in this paper is whether a single country may be driving the results. In order to check for the robustness of the findings, we apply Leamer's (1983) global sensitivity approach to the sample. We therefore re-estimate Eq. 12 dropping all observations of a given country at a time. We also check for the influence of a single year over the results by dropping all observations of a given year at a time, and that of a single industry by dropping all firms of an industry at a time[13]. Results of these sensitivity analyses in general support the robustness of the previous findings. Average

[13] Figures available upon request.

coefficients for independent variables are similar to the results reported above, and so are the t-statistics. In particular, the significance is in general confirmed in the Leamer's histograms for those variables that are significant in the whole sample analysis presented in table 8 (lagged leverage and lagged maturity, contemporaneous leverage and maturity, size, liquidity, and tax effects).

We therefore conclude that results reported in this paper are robust to the choice of countries, period, and industries covered.

5. Conclusion

The aim of this paper is to investigate the choice between debt and equity simultaneously with the decision between short-and long-term debt for a large sample of emerging markets from Latin America and Eastern Europe. To address this question a sample of 986 non-financial firms from Latin America and 686 from Eastern Europe over a 14-year period was analysed.

The empirical results support three main findings. First, cross-effects between capital structure and debt maturity suggest that these policy variables are likely complements in Latin America and substitutes in Eastern Europe. Second, there is a substantial dynamic component in the determination of the endogenous variables, a factor that has been overlooked by previous research, and such effect is similar to Latin America and Eastern Europe. Finally, firms face moderate adjustment costs towards its optimal maturity.

In spite of the results, the variables measurement quality should be looked with some caution. As noted, accounting standards, financial market depth, and the degree of supervision on financial reporting may vary largely across countries which may harm the comparability of the results. Also, some truly exogenous variables are not available for this sample, and the exogeneity of other variables may be weak.

Some additional issues should be addressed to develop this study. First, the different privatization policies followed in the Eastern countries, which gives rise to different corporate governance types. Second, the development of the financial markets and the importance of the banking sector. Finally, an extension to small-medium sized unlisted firms which differ with respect to agency and asymmetric information problems from large listed counterparts, giving rise to different financing sources.

6. References

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TABLE 1. MACRO FINANCIAL DATA. The data presented below are from the Financial Structure Database (World Bank, 2005a) and World Development Indicators Online (World Bank, 2005b). The sample consists of yearly observations for each country over the period 1990-2003 (unless indicated otherwise), depending on data availability. EE-7" refers to the simple average of country-level data for Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania and Russia, and "LA-7" refers to the simple average of country-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela.

PANEL A: LATIN AMERICA

Country			Argentina	Brazil	Chile	Colombia	Mexico	Peru	Venezuela	LA-7
Variable	Unit	Period								
Annual inflation rate	%	1990-2003 Average	13,21%	123,63%	7,30%	15,65%	14,04%	26,31%	34,91%	33,58%
Real GDP (constant 2000 US$)	US$ Millions	2003	263.469	624.490	81.955	90.131	593.551	57.862	101.878	259.048
Real GDP growth	%	1990-2003 Average	2,67%	2,18%	5,21%	2,32%	2,61%	3,45%	0,48%	2,70%
GDP per capita	US$	2003	6.957	3.536	5.196	2.022	5.803	2.131	3.968	4.230
GDP per capita growth	%	1990-2003 Average	1,51%	0,90%	3,82%	0,56%	1,11%	1,76%	-1,38%	1,18%
Deposit money bank vs. central bank assets	%	1990-2003 Average	83,99%	73,16%	76,64%	92,66%	93,65%	98,47%	70,07%	84,09%
Liquid liabilities (M3) to GDP	%	1990-2003 Average	21,70%	25,66%	37,14%	28,86%	26,81%	23,03%	23,98%	26,74%
Central bank assets to GDP	%	1990-2003 Average	5,25%	14,14%	16,06%	1,50%	2,67%	0,28%	6,87%	6,68%
Private credit by deposit money banks to GDP	%	1990-2003 Average	18,03%	25,80%	49,76%	16,83%	20,99%	16,62%	11,06%	22,73%
Private credit by deposit money banks and other financial institutions to GDP	%	1990-2003 Average	18,39%	31,53%	60,29%	26,82%	21,70%	17,34%	14,36%	27,20%
Bank deposits to GDP	%	1990-2003 Average	17,60%	22,65%	33,38%	16,60%	23,59%	18,66%	17,55%	21,43%
Bank concentration (share of 3 largest banks in total deposits)	%	1990-2003 Average	44,34%	45,47%	60,95%	37,38%	62,60%	71,74%	60,32%	54,69%
Net Interest Margin	%	1990-2003 Average	7,64%	12,16%	5,53%	7,06%	6,48%	10,63%	17,52%	9,57%
Stock market capitalization to GDP	%	1990-2003 Average	28,44%	24,97%	79,64%	13,19%	27,82%	17,25%	9,78%	28,73%
Stock market total value traded to GDP	%	1990-2003 Average	4,03%	12,94%	7,56%	1,01%	9,88%	3,71%	2,15%	5,89%

(continues)

TABLE 1. MACRO FINANCIAL DATA. (continued)

PANEL A: LATIN AMERICA (continued)

Country / Variable	Unit	Period	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Venezuela	LA-7
Stock market turnover ratio	%	1990-2003 Average	27,18%	51,18%	9,18%	7,51%	34,94%	22,31%	18,19%	24,36%
Private bond market capitalization to GDP	%	1990-2003 Average	3,90%	9,93%	15,52%	0,47%	2,14%	2,49%	N/A	5,74%
Public bond market capitalization to GDP	%	1990-2003 Average	8,42%	30,15%	27,85%	10,13%	12,32%	1,63%	N/A	15,08%
Listed domestic companies, total	Number	1990-2003 Median	142	540	261	118	192	238	87	192
Market capitalization of listed companies	US$ Millions	1990-2002 Average	65.636	149.069	52.354	11.254	119.715	9.104	7.766	59.271

PANEL B: EASTERN EUROPE

Country / Variable	Unit	Period	Bulgaria	Czech Republic	Latvia	Lithuania	Poland	Romania	Russia	EE-7
Annual inflation rate	%	1990-2003 Average	71,10%	5,36%	25,09%	27,16%	19,30%	75,35%	76,56%	42,84%
Real GDP (constant 2000 US$)	US$ Millions	2003	14.380	60.186	9.553	14.179	177.016	42.688	306.690	89.242
Real GDP growth	%	1990-2003 Average	-0,31%	0,73%	-0,62%	-0,85%	3,04%	-0,32%	-1,63%	0,00%
GDP per capita	US$	2003	1.838	5.899	4.116	4.105	4.634	1.963	2.138	3.528
GDP per capita growth	%	1990-2003 Average	0,46%	0,84%	0,38%	-0,37%	3,03%	0,14%	-1,39%	0,44%
Deposit money bank vs. central bank assets	%	1990-2003 Average	80,10%	96,68%	93,54%	99,81%	89,39%	91,38%	71,55%	88,92%
Liquid liabilities (M3) to GDP	%	1990-2003 Average	46,08%	65,70%	26,09%	21,33%	34,47%	21,81%	N/A	35,91%
Central bank assets to GDP	%	1990-2003 Average	8,50%	2,01%	1,29%	0,03%	3,76%	1,70%	N/A	2,88%
Deposit money bank assets to GDP	%	1990-2003 Average	48,33%	62,86%	21,18%	16,90%	29,70%	19,34%	N/A	33,05%

(continues)

TABLE 1. MACRO FINANCIAL DATA. (continued)

PANEL B: EASTERN EUROPE (continued)

Private credit by deposit money banks and other financial institutions to GDP	%	1990-2003 Average	29,37%	54,58%	15,02%	12,22%	20,89%	7,60%	N/A	23,28%
Bank deposits to GDP	%	1990-2003 Average	37,28%	57,57%	17,37%	15,01%	28,74%	18,99%	N/A	29,16%
Bank concentration (share of 3 largest banks in total deposits)	%	1990-2003 Average	60,58%	76,72%	55,35%	89,09%	55,30%	76,44%	38,98%	64,64%
Net Interest Margin	%	1990-2003 Average	5,27%	3,12%	4,66%	4,92%	5,13%	9,25%	8,47%	5,83%
Stock market capitalization to GDP	%	1990-2003 Average	3,14%	20,61%	5,69%	9,99%	8,91%	3,17%	15,94%	9,64%
Stock market total value traded to GDP	%	1990-2003 Average	0,40%	8,59%	1,39%	1,42%	3,98%	0,60%	5,47%	3,12%
Stock market turnover ratio	%	1990-2003 Average	9,78%	44,20%	24,33%	17,76%	72,85%	28,54%	54,74%	36,03%
Private bond market capitalization to GDP	%	1990-2003 Average	N/A	4,17%	N/A	N/A	N/A	N/A	N/A	4,17%
Public bond market capitalization to GDP	%	1990-2003 Average	N/A	21,51%	N/A	N/A	27,98%	N/A	3,62%	17,70%
Listed domestic companies, total	Number	1990-2003 Median	355	213	62	54	143	93	196	143
Market capitalization of listed companies	US$ Millions	1990-2002 Average	453	12.488	404	1.151	13.932	1.052	42.803	10.326

TABLE 2. SUMMARY STATISTICS FOR ENDOGENOUS VARIABLES. The sample consists of 13,490 observations for firms of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela (Economatica Pro© database, 2003) over the period 1990-2002 and 7,919 observations for firms of Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia (Amadeus© database, 2004) over the period 1994-2003. *Leverage* is calculated as the book value of long-term debt over book value of equity. *Maturity* is the book value of long-term financial debt over book value of short-term loans plus book value of long-term financial debt. "LA-7" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela while "EE-7" refers to the pooling of firm-level data for Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia.

PANEL A: FIRMS BY COUNTRY

Latin America		**Eastern Europe**	
Argentina	76	Bulgaria	148
Brazil	395	Czech Republic	48
Chile	169	Latvia	21
Colombia	47	Lithuania	27
Mexico	145	Poland	146
Peru	126	Romania	48
Venezuela	28	Russia	134
LA-7	**986**	**EE-7**	**686**

PANEL B: LATIN AMERICA

	Leverage			**Maturity**		
Countries	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**
Argentina	614	0.9552	6.7349	538	0.4184	0.3283
Brazil	3270	1.6999	15.1451	2850	0.4645	0.3078
Chile	1742	0.3266	0.6098	1518	0.4997	0.3540
Colombia	280	0.4687	1.7781	241	0.4617	0.3410
Mexico	1324	0.6869	1.2427	1204	0.5431	0.3227
Peru	1012	1.0447	19.5014	142	0.4012	0.3392
Venezuela	175	0.2757	0.3367	146	0.4292	0.3112
LA-7	**8417**	**1.0527**	**11.7826**	**6639**	**0.4808**	**0.3272**

PANEL C: EASTERN EUROPE

	Leverage			**Maturity**		
Countries	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**
Bulgaria	633	0.3324	1.0155	540	0.5249	0.4283
Czech Republic	417	0.1441	0.2046	364	0.3684	0.3582
Latvia	115	0.1465	0.2330	87	0.4337	0.3559
Lithuania	190	0.1902	0.2543	161	0.5181	0.3374
Poland	755	0.0808	0.3462	234	0.7640	0.2964
Romania	421	0.0945	0.4080	267	0.7116	0.3663
Russia	655	0.2777	2.0953	603	0.6952	0.3692
EE-7	**3186**	**0.1903**	**1.0852**	**2256**	**0.5881**	**0.3960**

TABLE 3. SUMMARY STATISTICS FOR EXPLANATORY VARIABLES. The sample consists of 13,490 observations for firms of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela (Economatica Pro© database, 2003) over the period 1990-2002. *Size* is the natural logarithm of sales. *Growth Opportunities* is equal as the book value of liabilities plus market capitalization over book value of total assets. Profit. *Profitability* is equal to operating income over book value of total assets. *Business Risk* is calculated as sales over operating income. *Liquidity* is book value of current assets over book value of current liabilities. *Tangibility* is defined as net fixed assets over book value of total assets. *Tax Effects* is equal to taxes over taxable earnings. "Latin America" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela.

Countries	**Argentina**			**Brazil**			**Chile**			**Colombia**		
Variables	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*
Size	582	11.3880	1.8235	2896	11.5804	1.8322	1580	10.2488	1.8960	297	11.0402	1.5650
Growth Opportunities	497	0.9887	0.4354	2813	0.8115	0.4786	1320	2.1829	8.6707	201	0.8253	0.4274
Profitability	614	0.3538	0.0711	3262	0.0308	0.8922	1748	0.05872	0.1025	287	0.0303	0.0781
Business Risk	594	0.8755	155.6350	3253	1.2234	155.8223	1633	12.7145	125.3976	286	31.1815	725.7262
Liquidity	614	1.6938	2.7358	3263	2.5267	22.5466	1738	5.0646	43.2245	281	1.6976	1.1712
Tangibility	597	0.4597	0.2619	3265	0.3578	0.2621	1719	0.4111	0.2879	274	0.2494	0.1894
Tax Effects	344	0.1399	1.0425	3260	0.4042	12.4357	1482	0.0295	0.8842	287	0.1107	1.5110

Countries	**Mexico**			**Peru**			**Venezuela**			**Latin America**		
Variables	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*
Size	1335	12.2981	1.7981	1005	10.2201	1.2713	166	10.9196	1.8189	7861	11.2121	1.9207
Growth Opportunities	873	1.2778	0.6577	633	1.1085	0.7247	140	0.7463	0.3507	6477	1.1955	3.9775
Profitability	1339	0.0756	0.7630	1010	0.0597	0.1178	175	0.0346	0.0659	8435	0.0475	0.0938
Business Risk	1339	16.8693	196.8102	1006	14.8608	267.0739	171	2.1902	51.4443	8282	8.7048	218.0081
Liquidity	1340	5.2687	99.4697	1012	2.0033	4.2355	175	2.1203	2.8290	8423	3.3263	46.4780
Tangibility	1340	0.5120	0.2716	1012	0.4771	0.2220	175	0.5355	0.2263	8382	0.4152	0.2705
Tax Effects	1339	-4.1846	137.5319	1009	0.3121	3.9597	174	0.0971	1.5772	7895	-0.4851	57.2277

TABLE 4. SUMMARY STATISTICS FOR EXPLANATORY VARIABLES. The sample consists of 7,919 observations for firms of Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia (Amadeus© database, 2004) over the period 1994-2003. *Size* is the natural logarithm of sales. *Growth Opportunities* is equal as the book value of liabilities plus market capitalization over book value of total assets. Profit. *Profitability* is equal to operating income over book value of total assets. *Business Risk* is calculated as sales over operating income. *Liquidity* is book value of current assets over book value of current liabilities. *Tangibility* is defined as net fixed assets over book value of total assets. *Tax Effects* is equal to taxes over taxable earnings. "Eastern Europe" refers to the pooling of firm-level data for Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia.

Countries	**Bulgaria**			**Czech Republic**			**Latvia**			**Lithuania**		
Variables	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*
Size	1434	6.8570	6.8570	480	16.0723	6.4678	206	9.1521	8.2399	270	11.7904	7.9011
Growth Opportunities	633	0.1066	0.0106	417	0.0122	0.0200	115	0.0280	0.0640	190	0.0058	0.0107
Profitability	633	0.0030	0.0030	417	0.0548	0.0790	115	1.3005	13.3508	190	0.0670	0.0911
Business Risk	628	30.5194	30.5194	402	12.6361	232.3752	115	18.3172	75.8044	187	11.2720	112.5914
Liquidity	633	2.2747	2.2747	417	1.9586	2.1405	114	5.3497	8.3273	188	2.7688	3.2459
Tangibility	633	0.5637	0.5637	417	0.6444	0.1962	115	0.5370	0.1797	190	0.5829	0.1353
Tax Effects	628	-0.7088	-0.7088	403	0.0891	0.3397	115	0.1540	0.4990	186	0.0858	0.1412

Countries	**Poland**			**Romania**			**Russia**			**Eastern Europe**		
Variables	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*	*Obs.*	*Mean*	*Std. Dev*
Size	1443	9.1656	8.7902	473	15.0243	5.4213	1325	8.8765	9.3132	5631	9.7159	8.6823
Growth Opportunities	757	0.5502	0.0907	421	0.0095	0.0312	655	0.0309	0.1116	3188	0.0257	0.0750
Profitability	758	0.0630	0.1190	421	0.1117	0.1117	655	0.0915	0.1952	3189	0.1072	2.5387
Business Risk	750	11.0998	181.9291	421	22.0645	181.7592	654	2.9837	158.3979	3157	15.2124	507.4524
Liquidity	746	1.7289	1.9473	421	1.6851	1.2560	655	1.7785	2.2589	3174	2.0640	2.8004
Tangibility	758	0.4416	0.2056	421	0.5459	0.1578	655	0.5501	0.2012	3189	0.5403	0.2002
Tax Effects	750	0.1595	2.3871	421	0.2524	0.2372	654	1.0830	19.0344	3157	0.1769	12.0275

TABLE 5. CORRELATION MATRICES. PANEL A presents the correlation matrix for firms in Latin America while PANEL B presents the correlation matrix for firms in Eastern Europe. "LA-7" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela in the period 1990-2002 while "Eastern Europe" refers to the pooling of firm-level data for Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia in the period 1994-2003.

PANEL A: LATIN AMERICA

	Size	Growth Opportunities	Profitability	Business Risk	Liquidity	Tangibility	Tax Effects
Size	1.0000						
Growth Opportunities	0.0696	1.0000					
Profitability	0.2085	0.0233	1.0000				
Business Risk	0.0116	-0.0016	0.0110	1.0000			
Liquidity	-0,0060	-0,0243	-0.0177	-0.1498	1.0000		
Tangibility	0.1652	0.0568	0.1169	0.0070	-0.0505	1.0000	
Tax Effects	-0.0200	-0.0008	0.0039	-0.0028	0.0003	-0.0028	1.0000

PANEL B: EASTERN EUROPE

	Size	Growth Opportunities	Profitability	Business Risk	Liquidity	Tangibility	Tax Effects
Size	1.0000						
Growth Opportunities	0.0937	1.0000					
Profitability	0.0312	0.0642	1.0000				
Business Risk	0.0024	-0.0221	-0.0003	1.0000			
Liquidity	-0.1053	0.0164	0.0554	-0.0089	1.0000		
Tangibility	-0.0166	-0.1819	0.0028	-0.0138	-0.0602	1.0000	
Tax Effects	0.0293	-0.0040	0.0005	-0.0017	0.0122	-0.0330	1.0000

TABLE 6. SPECIFICATION TESTS. PANEL A presents the F-Test of a Simple Pooled OLS against a Fixed-Effects Specification. This test statistic is for testing the null hypothesis that firms' intercepts in the basic fixed-effects panel data model are all equal, against the alternative hypothesis that each firm has its own (distinct) intercept. The test assumes identical slopes for all independent variables across all firms, and it is distributed $F(df_1,df_2)$. PANEL B presents the Hausman Specification Test of Random-Effects against Fixed-Effects Specification. This test statistic is for testing the null hypothesis of the random-effects specification against the alternative hypothesis of the fixed-effects specification in the basic panel data model, and it is distributed $\chi^2(df)$. "ALL" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela, Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia. "LA-7" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela while "EE-7" refers to the pooling of firm-level data for Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia; the data covers the period 1990-2003. Endogenous Variables: Leverage=Long-Term Book Liabilities÷Book Equity; Maturity=Long-Term Debt÷Total Debt; *p-values in italic*; *significant at the 5% level; **significant at the 1% level.

Region	Period	PANEL A: F Test		PANEL B: Hausman Test	
		Leverage	Maturity	Leverage	Maturity
ALL	1990-2003	F(1205; 5637) 2.7088 ** *0.000*	F(1205; 5637) 4.9346 ** *0.000*	$\chi^2(6)$ 11.170 *0.083*	$\chi^2(11)$ 14.230 *0.221*
LA-7	1990-2002	F(714; 3908) 2.0101 ** *0.000*	F(714; 3908) 4.9446 ** *0.000*	$\chi^2(4)$ 101.960 ** *0.000*	$\chi^2(13)$ 16.864 *0.206*
EE-7	1994-2003	F(490; 1696) 2.4474 ** *0.000*	F(490; 1696) 3.5822 ** *0.000*	$\chi^2(2)$ 1.9853 *0.3706*	$\chi^2(10)$ 45.418 ** *0.000*

TABLE 7. PANEL DATA ANALYSIS OF MATURITY RATIOS FOR POOLED COUNTRIES. First-differences model so that idiosyncratic firm-effects constant through time are eliminated. The model is estimated by Generalized Method of Moments (GMM) using as instruments first order lagged values of the levels of explanatory variables, industry dummies, country dummies, and a constant. Estimation in the period 1990-2003. The sample refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela, Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia. Endogenous Variables: Leverage=Long-Term Book Liabilities÷Book Equity; Maturity=Long-Term Debt÷Total Debt. Reported t-statistics are calculated using heteroskedasticity-robust standard errors (White) and are also robust to autocorrelation (Bartlett Kernel); *t-statistics in italic*; degrees of freedom in (brackets); p-values in (square brackets); *significant at the 5% level; **significant at the 1% level.

Model:

$$\Delta Leverage_{it} = b_{0'i}\Delta Leverage_{it-1} + \sum_{k=1}^{K} b_{1k}\Delta Y_{ikt} + e_{it}$$

$$\Delta Maturity_{it} = b_{0'i}\Delta Maturity_{it-1} + \sum_{k=1}^{K} b_{1k}\Delta Y_{ikt} + e_{it}$$

Explanatory Variables – **Endogenous Variables** ®	**Leverage**	**Maturity**
ΔLeverage$_t$		0.0062 *0.7951*
ΔMaturity$_t$	1.2707 *1.3585*	
ΔLeverage$_{t-1}$	0.4646 * *2.3833*	0.0010 0.2540
ΔMaturity$_{t-1}$	-0.6379 *-1.4060*	0.3662 ** *9.6831*
ΔSize$_t$	-0.0191 *-0.2080*	-0.0123 *-1.4663*
ΔGrowth Opportunities$_t$	0.1767 *1.5220*	0.0038 *0.1622*
ΔProfitability$_t$	0.1898 *0.1895*	0.1379 *1.3297*
ΔBusiness Risk$_t$	0.0000 *0.0791*	0.0000 *-1.7631*
ΔLiquidity$_t$	-0.0231 *-0.4335*	0.0169 * *1.9758*
ΔTangibility$_t$	1.0902 *0.6615*	-0.0544 *-0.2651*
ΔTax Effects$_t$	0.0001 *1.2487*	-0.0001 ** *-3.8930*
Regulation Dummy	-0.0229 *-0.6052*	0.0021 *0.2518*
Latin America Dummy	0.0919 ** *2.9976*	-0.0039 *-0.6183*
Number of Observations	4,436	4,436
F-statistic $F(df_1; df_2)$	0.1570 (11; 4424)	3.0269 ** (11; 4424)
Sargan's Test Statistic (p-value) χ^2(df)	38.8082 (0.969) (57)	

TABLE 8. PANEL DATA ANALYSIS OF MATURITY RATIOS FOR LATIN AMERICA AND EASTERN EUROPE. First-differences model so that idiosyncratic firm-effects constant through time are eliminated. The model is estimated by Generalized Method of Moments (GMM) using as instruments first order lagged values of the levels of explanatory variables, industry dummies, country dummies, and a constant. Estimation in the period 1990-2003. "Latin America" refers to the pooling together of all firm-level data for Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. "Eastern Europe" refers to the pooling together of all firm-level data for Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania, and Russia. Endogenous Variables: Leverage=Long-Term Book Liabilities÷Book Equity; Maturity=Long-Term Debt÷Total Debt. Reported t-statistics are calculated using heteroskedasticity-robust standard errors (White) and are also robust to autocorrelation (Bartlett Kernel); *t-statistics in italic*; degrees of freedom in (brackets); p-values in (square brackets); *significant at the 5% level; **significant at the 1% level.

Model:

$$\Delta Leverage_{it} = b_{0'i}\Delta Leverage_{it-1} + \sum_{k=1}^{K} b_{1k}\Delta Y_{ikt} + e_{it}$$

$$\Delta Maturity_{it} = b_{0'i}\Delta Maturity_{it-1} + \sum_{k=1}^{K} b_{1k}\Delta Y_{ikt} + e_{it}$$

Explanatory Variables — **Region** ®	**Latin America**		**Eastern Europe**	
Endogenous Variables ®	**Leverage**	**Maturity**	**Leverage**	**Maturity**
ΔLeverage$_t$		0.0262 ** *6.9861*		-0.4109 ** *-11.0160*
ΔMaturity$_t$	15.8237 ** *8.9450*		-1.9181 ** *-16.9139*	
ΔLeverage$_{t-1}$	0.3281 *1.2109*	-0.0039 *-0.6735*	0.4543 * *2.2236*	0.2067 * *2.0843*
ΔMaturity$_{t-1}$	-5.8078 ** *-6.0183*	0.3679 ** *8.8230*	0.6808 ** *5.5210*	0.3629 ** *5.6040*
ΔSize$_t$	2.0690 * *2.5093*	-0.1089 ** *-2.6423*	-0.0114 *-1.1196*	-0.0057 *-0.9155*
ΔGrowth Opportunities$_t$	0.3043 *0.7780*	-0.0153 *-0.6760*	0.3296 *0.4204*	0.2233 *0.7125*
ΔProfitability$_t$	-1.2305 *-0.3338*	0.1477 *0.8179*	0.1597 *0.9369*	0.0627 *0.6947*
ΔBusiness Risk$_t$	0.0005 *1.3408*	0.0000 *-1.5770*	0.0000 *-0.1483*	0.0000 *-0.2950*
ΔLiquidity$_t$	-0.5759 ** *-3.1660*	0.0329 ** *2.5854*	-0.0668 * *-2.4803*	-0.0383 * *-2.3800*
ΔTangibility$_t$	-5.6540 *-1.3894*	0.2333 *1.1477*	0.6023 *1.0268*	0.3167 *1.0093*
ΔTax Effects$_t$	0.0015 ** *3.5933*	-0.0001 ** *-3.9366*	0.0080 * *1.9943*	0.0038 * *2.3653*
Regulation Dummy	-0.0238 *-0.1707*	0.0018 *0.2446*	-0.0163 *-0.5778*	-0.0086 *-0.5024*
Number of Observations	3,305	3,305	1,131	1,131
F-statistic	0.1145	2.7712 **	1.1492	2.3916 **
$F(df_1; df_2)$	(10; 3294)	(10; 3294)	(10; 1120)	(10; 1120)
Sargan's Test Statistic (p-value) χ^2(df)	26.7493 (0.986) (45)		21.9077 (0.998) (44)	