# Which macroeconomic factors facilitate corporate financing?[†]

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## Abstract

We investigate how monetary policy measures and the expected performance of the economy affect corporate debt decisions using an international sample. We account for the degree of financial constraints at the firm level and the degree of asymmetric information at the country level. We find that the monetary policy facilitates firms' access to debt regardless of their level of financial constraints and the level of availability of information about the borrowers. Our results also show that financially constrained firms borrow in a pro-cyclical way, while unconstrained firms increase their debt levels counter-cyclically. Constrained firms are more sensitive to macroeconomic conditions. Moreover, we also find that monetary expansions mitigate the impact of economic expectations on firms' debt for the financially constrained group, while an increase in the amount of money in the economy exacerbates the impact of the expected performance of the economy on firms' debt for the financially unconstrained group. Finally, when the level of information between borrowers and lenders is lower, the impact of the monetary policy on debt is stronger regardless of firms' degree of financial constraints. But the availability of information does not affect the relation between the expected performance of the economy and corporate leverage.

Keywords: monetary policy, expected performance of the economy, capital structure, financial constraints.

JEL Classification: E43, E51, G32.

EFM Classification: 140, 560, 550.

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## 1. Introduction

In the current context of crisis and financial constraints, a relevant topic of research is how macroeconomic conditions affect firms' debt decisions given that the macroeconomic context determines the ability of firms to raise capital (Erel, Julio, Kim, & Weisbach, 2012). In this respect, two macroeconomic factors are especially important: the monetary policy, which can be expansionary or contractionary, and the expected performance of the economy. The traditional literature related with this field usually investigates the impact of the expected performance of the economy or the impact of monetary conditions on corporate leverage, but not both macroeconomic dimensions jointly. In this study, we go a step further by investigating the combined effect of the expected performance of the economy and monetary policy measures on the capital structure choices of companies.

Among the studies that investigate corporate capital structure, some of them use international samples that cover a wide range of countries (e.g., Demirgüç-Kunt & Maksimovic, 1999; Giannetti, 2003; Hall, Hutchinson, & Michaelas, 2004; de Jong, Kabir, & Nguyen, 2008; Öztekin & Flannery, 2012; Fan, Titman, & Twite, 2012) but none focuses on the macroeconomic context. Some prior research that investigates the effect of macroeconomic factors on debt decisions proposes a number of theoretical models which have not been tested empirically (Stiglitz & Weiss, 1981; Cooley & Quadrini, 2006; Levy & Hennessy, 2007; Chen, 2010; Bhamra, Kuehn, & Strebulaev, 2010; Bhamra, Fisher, & Kuehn, 2011; Arnold, Wagner, & Westermann, 2013). Among the empirical works that analyze the effect of macroeconomic variables on corporate debt, most of them focus on developed nations (Gertler & Gilchrist, 1994; Berger & Udell, 1998; Korajczyk & Levy, 2003; Frank & Goyal, 2009; Erel, Julio, Kim, & Weisbach, 2012) and present no concluding results beyond this type of economy. Therefore, our work goes forward because we broaden the scope of analysis to new markets and countries. This is relevant because contexts of crises and high volatility in integrated financial markets, such as the recent financial turmoil that began in 2007, entail a latent risk of shocks that can propagate from one economy to another through linkages in the banking sector (Chava & Purnanandam, 2011). Therefore, a better understanding of how macroeconomic conditions impact on

corporate debt can be especially relevant not only for firms but also for policy makers and the economy as a whole.

In this scenario, our objective is to investigate the impact of the monetary policy and the expected performance of the economy on firms' financing policies differentiating between constrained and unconstrained corporations. We also take into account the country-specific transparency between borrowers and lenders as a factor that may mitigate the way in which macroeconomic conditions affect the amount of debt used. To this aim, we not only analyze how the two macroeconomic factors considered affect corporate leverage in isolation, but also examine the possibility of a joint effect. Our results indicate that an expansionary monetary policy leads to higher debt levels in both constrained and unconstrained firms, a pattern that is more pronounced in countries with low levels of credit information available to facilitate lending decisions. Regarding the expected performance of the economy, we find that regardless of the degree of information asymmetries in the country, financially constrained firms borrow more when expectations are better, while unconstrained firms are able to increase their debt levels in a counter-cyclical way. The empirical evidence also suggests that, although constrained firms' debt is more sensitive to macroeconomic conditions, the monetary policy can be a powerful tool that helps to mitigate the impact of economic expectations on leverage when firms face financial constraints.

We contribute to the economics and finance literature in several ways. First, we extend the geographical coverage of previous studies (Frank & Goyal, 2009; Erel, Julio, Kim, & Weisbach, 2012; Korajczyk & Levy, 2003) by investigating the effect of macroeconomic conditions on firm's debt in an international sample that comprises both developed and emerging economies. Second, we use elasticities to determine which group of firms is mostly affected by the analyzed macroeconomic factors (i.e., the monetary policy and the expected performance of the economy). And third, we examine the joint impact of monetary policy measures and the expected performance of the economy on corporate debt, and not only their individual effects separately.

The remainder of the study is organized as follows. Section 2 reviews previous literature concerning the impact of macroeconomic conditions on financing decisions and develops the testable hypotheses. The data, variables, and estimation method are described

in Section 3. Section 4 presents the results and Section 5 shows the robustness tests. Section 6 summarizes the main results and concludes.

## 2. Theory and hypothesis development

Although previous research recognizes the importance of understanding macroeconomic risk as a central factor for corporate credit risk and thus a core factor of financial decisions (Chen, 2010; Arnold, Wagner, & Westermann, 2013), the results are not conclusive and the effect of the macroeconomic context on firms' debt is an issue on which there is still no consensus.

### *2.1. The effect of the monetary policy on corporate debt decisions*

From a theoretical perspective, Cooley & Quadrini (2006) argue that small firms are more sensitive to interest rate shocks than large firms because they are more leveraged. They also present additional evidence to support the view that firms plan their production schemes based on the value of their assets. When this value increases (either because of the valuation effect or because of the reinvestment of profits), the firm is able to expand its production plan. In this sense, a decrease in the nominal rate of loans diminishes interest payments and the firm increases its profits. If the firm decides to reinvest them, the financial capacity of the firm increases.

Relevant literature shows that constrained and unconstrained firms have different patterns in terms of access to credit due to problems such as adverse selection, moral hazard, and credit rationing (Stiglitz & Weiss, 1981; Gertler & Gilchrist, 1994; Berger & Udell, 1998; Frank & Goyal, 2003; Hyytinen & Väänänen, 2006; Beck, Demirgüç-Kunt, & Maksimovic, 2008). Therefore, it is important to divide our sample based on the abovementioned classification criterion because constrained firms, compared with unconstrained firms, are more leveraged, smaller, practice precautionary savings building up liquid assets to invest in the future, do not pay dividends, and have low sales growth despite belonging to industries with high sales growth (Whited & Wu, 2006).

There are other noteworthy reasons to study constrained and unconstrained firms separately. First, growth is constrained by internal finance (Carpenter & Petersen, 2002); second, small and financially constrained firms rely more heavily on the internal generation of funds due to their larger informational opacity (Jõeveer, 2012); and finally, financially

constrained firms are usually small firms (Gertler & Gilchrist, 1994; Gilchrist & Himmelberg, 1995). As a consequence, we expect that when the economy is hit by monetary shocks, the response of constrained and unconstrained firms differs substantially, with constrained firms being more strongly affected than unconstrained firms by monetary expansions and contractions.

Additionally, Berger & Udell (1998) find that bank credit is the most important source of external finance for young firms and small- and medium-sized enterprises. Therefore, we expect that constrained firms' debt is affected positively by the monetary policy. Gertler & Gilchrist (1993) show a relative decline in the aggregate bank loans to small firms following a monetary contraction. This pattern is explained by Brav (2009), who finds that private firms, which are characterized by higher financial costs and less access to capital markets, are likely to hold more cash compared with public companies. Private firms stockpile cash in good times to use it in bad times. Consequently, our expectation is as follows:

**H1a:** A monetary contraction has a negative effect on the level of debt of constrained firms.

Regarding unconstrained firms, Cooley & Quadrini (2006) theoretically state that monetary shocks cause considerable volatility in financial markets. As a consequence, we expect that the risk premium increases, which causes a decline in the market value of equity. When this happens, firm directors "time" the market issuing shares at high prices and repurchasing at low prices, a pattern that is more frequent among companies with low leverage (Baker & Wurgler, 2002). Consequently, the value of debt increases, either because of the decrease in the market value of equity or because the firm borrows new funds.

Additionally, in contrast to the phenomenon faced by constrained companies, for which a monetary contraction entails a reduction in the funds available for borrowing, our expectation is that unconstrained firms are able to increase their amount of debt. The theoretical reason is that loanable funds shift to high-grade firms during tight-money periods and recessions (Levy & Hennessy, 2007). Therefore, we expect that:

**H1b:** A monetary contraction has a positive effect on the level of debt of unconstrained firms.

*2.2. The effect of the expected performance of the economy on corporate debt decisions*

One of the most generally accepted findings on the relation between the expected performance of the economy and debt is supported by Frank & Goyal (2009), who investigate the most relevant determinants of a firm's capital structure decision. They find that during economic expansions stock prices go up, expected bankruptcy costs go down, taxable income goes up, cash increases, and firms borrow more. This is because collateral values are likely to be pro-cyclical and firms borrow against collateral. In this sense, leverage should be pro-cyclical. An important caveat of this result is that Frank & Goyal (2009) consider this effect regardless of firms' financial constraints. However, most finance literature makes a distinction between financially constrained and unconstrained firms, either by size, grade of investment, or level of retained earnings. This classification allows us to provide new evidence in an effort to reconcile previous mixed results.

Regarding constrained firms, Kiyotaki & Moore (1997) predict that pro-cyclical collateral values result in pro-cyclical leverage patterns. Similar arguments have been proposed by Levy & Hennessy (2007), for whom firms facing more stringent constraints issue more debt during expansions. Another reason to expect pro-cyclical leverage is that during booms firms increase their taxable income and in line with the trade-off prediction they aim to get tax shields by increasing their debt levels.

These theoretical predictions are consistent with the empirical findings of Erel, Julio, Kim, & Weisbach (2012), who show that lower-rated and non-invested grade borrowers are less likely to raise capital during contractions, and therefore they issue debt (i.e., they receive loans or issue bonds) and equity when the economic outlook is better. Nevertheless, they also find that these firms can eventually mitigate this lack of capital through private placements of debt and equity. Considering these arguments and findings, we formulate the following hypothesis:

**H2a:** The expected performance of the economy affects constrained firms' debt in a pro-cyclical way.

With respect to unconstrained firms, Jensen & Meckling (1976) and Zwiebel (1996), who use an argument similar to that of Frank & Goyal (2009), but referring to unconstrained firms, contend that there is a pro-cyclical effect of macroeconomic conditions on firms' leverage because when the equity market is performing well, which is common in periods of economic growth, expected bankruptcy costs are lower and firms are more likely to have taxable income to shield. Therefore, debt should be more attractive for unconstrained firms.

However, according to Levy & Hennessy (2007), firms with less stringent financing constraints issue less debt during expansions. This is consistent with Korajczyk & Levy (2003), for whom debt varies counter-cyclically with macroeconomic conditions. The basic intuition behind these results is that expansions coincide with periods in which the equity increases its value, thus creating incentives to substitute debt with capital (Baker & Wurgler, 2002). This substitution effect is more pronounced in firms with good investor protection since the leverage constraint is less restrictive in these companies (Levy & Hennessy, 2007). Additionally, there is evidence that the pecking order theory of capital structure is particularly applicable to large firms (Frank & Goyal, 2003). This theory supports that during booms, firms prefer to use internal funds over external ones, such as debt or equity issues. Erel, Julio, Kim, & Weisbach (2012) provide results that support this line of reasoning. Specifically, these authors show that the supply of capital does not decline for higher-rated firms when macroeconomic conditions are poor. Consequently, we propose that:

**H2b:** The expected performance of the economy affects unconstrained firms' debt in a counter-cyclical way.

*2.3. The combined effect of the monetary policy and the expected performance of the economy on corporate debt*

One of our most important contributions is to investigate the combined effect of the monetary policy and the expected performance of the economy on firms' debt decisions. Although these two macroeconomic factors affect corporate capital structure (Stiglitz & Weiss, 1981; Gertler & Gilchrist, 1993; Berger & Udell, 1998; Korajczyk & Levy, 2003; Cooley & Quadrini, 2006; Levy & Hennessy, 2007; Frank & Goyal, 2009), we expect that

firms incorporate the information jointly, and not isolated from one another, in their decision making processes.

Considering that central banks cannot change the expectations on how the economy will perform in the future, of the two macroeconomic factors that we analyze the monetary policy is the only one that can be determined by policy makers. That is, central banks can opt for either expanding or contracting the liquidity available in the system depending on the current and expected performance of the economy. Consequently, we expect to find not only a direct effect of the monetary policy on firms' capital structure but also an indirect effect to the extent that it influences the way in which the expected performance of the economy affects corporate leverage.

More precisely, the moderating role of monetary policy measures in the relation between economic expectations and firms' debt is likely to depend on the degree of financial constraints. For the group of constrained firms, we anticipate that a monetary expansion mitigates the cyclical pattern of firms' debt with the expected performance of the economy (i.e., it makes constrained firms' debt less sensitive to economic expectations). The rationale behind this idea is that when central banks increase the amount of money available in the economy, companies are more likely to get additional external funds sooner or later, even in an environment of poor economic outlook, due to the increase in competition among lenders, who tend to be less stringent with the credit quality of borrowers. Consequently, we pose that:

**H3a:** The effect of the expected performance of the economy on financially constrained firms' debt is mitigated with monetary expansions.

Conversely, for the group of unconstrained firms we expect that a monetary expansion exacerbates their counter-cyclical behavior in terms of leverage (i.e., it makes constrained firms' debt more sensitive to economic expectations). The reason is that, during periods when it is expected that the economy will perform poorly, an increase in the amount of liquidity may imply that financially unconstrained firms do not issue debt in the same proportion as when there are money restrictions, hence freeing up resources for firms that face financial constraints. Considering this, we expect that:

**H3b:** The effect of the expected performance of the economy on financially unconstrained firms' debt is exacerbated with monetary expansions.

We initially expect to find differences in the way in which macroeconomic factors affect corporate leverage depending on the degree of financial constraints. In addition, we expect to find differences in the intensity of these effects. Levy & Hennessy (2007) show that during tight-money periods and recessions financial resources go to high-grade firms. Furthermore, Cooley & Quadrini (2006) theoretically predict that constrained firms are often more strongly affected than unconstrained firms by changes in macroeconomic conditions. Therefore, we propose that:

**H4:** The effect of macroeconomic conditions (i.e., monetary policy and the expected performance of the economy) on firms' capital structure is stronger for financially constrained firms.

*2.4. The effect of country-level information asymmetries on the relation between macroeconomic factors and firms' debt*

As highlighted above, most economics and finance literature concerning the impact of macroeconomic factors on firms' debt pays special attention to developed nations. However, based on previous research (Demirgüç-Kunt & Maksimovic, 1999; de Jong, Kabir, & Nguyen, 2008; Fan, Titman, & Twite, 2012; Jõeveer, 2013), there are reasons to believe that country-specific factors are likely to moderate the relations proposed in the previous hypotheses. In this respect, it is important to disentangle how the flow of information between lenders and borrowers help to reduce the asymmetric information and the adverse selection costs, which vary counter-cyclically (Choe, Masulis, & Nanda, 1993) and explain that firms prefer internal to external funds (Myers, 1984).

In this regard, when lenders know more about borrowers (i.e., about their credit history and current obligations), they are less concerned about the risk of financing unprofitable projects and therefore they provide more credit (Jaffee & Russell, 1976; Stiglitz & Weiss, 1981). This effect may be especially pronounced during contractions because adverse selection costs vary counter-cyclically (Choe, Masulis, & Nanda, 1993). Overall, we expect that the impact of macroeconomic factors (i.e., monetary policy and the

expected performance of the economy) on leverage may be mitigated when better information about the credit history of borrowers is available. We focus on the credit depth of information index that exists in each country as a measure of information asymmetries since it has been considered an important factor in determining credit availability (Jappelli & Pagano, 1993; Jappelli & Pagano, 2002; Sapienza, 2002). Consequently, we propose that:

> **H5a:** Regardless of the degree of financial constraints, firms' debt is more sensitive to the monetary policy in countries where the availability of credit information on the borrower is lower.

> **H5b:** Regardless of the degree of financial constraints, firms' debt is more sensitive to the expected performance of the economy in countries where the availability of credit information on the borrower is lower.

## 3. Data, variables, and estimation method

### *3.1. Data sources and sample*

To test our hypotheses, we need two types of information (firm and country specific), which is obtained from three different sources. First, we use the financial statements of the companies to calculate the book value of the dependent variable as well as some of the control variables that refer to firm characteristics. We obtain this information from the ORBIS database. Second, we use the historical rates of sovereign debt at different maturities to calculate the term spread. We extract this data from BLOOMBERG. Third, we need the monetary aggregates to measure the monetary policy, as well as the credit depth of information index. Additionally, historical gross domestic product (GDP) and the inflation of each country are needed to control for these country-level dimensions. We obtain this information from the World Bank website.

Our final sample consists of an unbalanced panel containing 16,743 listed companies (112,719 firm-year observations) that cover 33 countries during the time period from 2004 to 2011. The sample includes companies for which there are at least four consecutive years of data. This requirement is necessary to test for the absence of second-order serial correlation, because our estimation method (the generalized method of moments) is based

on this assumption. We exclude financial, insurance, and utilities sectors. Table 1 contains the distribution of the sample by country.

(Insert Table 1 about here)

*3.2. Model specification*

We split the sample in constrained (9,745) and unconstrained (6,998) firms using the index proposed by Whited & Wu (2006) to test our hypotheses. Table 2 shows the distribution of the sample by classifying firms according to the index. In a first stage, we use a broad definition of financial constraints and divide the sample in two groups using the median of the index. Companies with the highest scores correspond to constrained firms, while companies with the lowest scores correspond to unconstrained ones. In a second stage, we take the stricter definition of Whited & Wu (2006) and divide the sample into quartiles. The first quartile contains the least constrained firms, while the fourth one contains the most constrained firms. This is what we call the narrow definition of financial constraints. Each of the 33 countries represented in the sample contains both types of firms.

(Insert Table 2 about here)

For each of these groups, we estimate a partial adjustment model of debt that follows the specification proposed by Öztekin & Flannery (2012):

$$LEV_{it} = \left(1 - \lambda_j\right)LEV_{i,t-1} + \left(\lambda_j\beta_j\right)M_{jt} + \left(\lambda_j\beta_j\right)X_{it} + \left(\lambda_j\beta_j\right)X_{jt} + \lambda_j F_{ij} + \delta_{it}$$

where $\lambda_j$ is the adjustment speed of leverage and should comply with the condition that $0<\lambda_j<1$, $LEV_{it}$ is the book value of leverage of the company i at the end of the year t, computed as total debt (long term and short term) over total assets (Öztekin & Flannery, 2012). $M_{jt}$ is the vector of macroeconomic variables, $X_{it}$ is the vector of firm-specific control variables, $X_{jt}$ is the vector of country-specific control variables, $F_{ij}$ is the fixed effect, and $\delta_{it}$ is the error term.

The vector of macroeconomic variables contains the four variables of interest to test our hypotheses. First, the monetary policy (MAGROWTH), measured as the annual growth

of the monetary aggregate (Gertler & Gilchrist, 1993). Central banks determine the monetary policy with several measures that they have at their disposal. In particular, to influence the level of liquidity available in the economy, central banks can resort to open market operations (OMO), which basically consist in buying or selling government bonds in the open market; and they can also manage short-term rates and change reserve requirements for commercial banks. Our proxy for the monetary policy is the monetary aggregates (MA) because they capture the result of all possible monetary policy measures (i.e., the result of combining the three measures mentioned above), so that an increase in the MA means an expansionary policy and a decrease implies a contractionary policy.

Second, the expected performance of the economy (TERM_SPREAD) is measured with the term spread (Cox, Ingersoll, & Ross, 1985; Campbell & Shiller, 1987; Fama & Bliss, 1987; Korajczyk & Levy, 2003; Frank & Goyal, 2009; Erel, Julio, Kim, & Weisbach, 2012). Although it can be measured in several ways,[1] we measure it as the difference between long-term and short-term sovereign bond yields of each country. Given that we are unable to get the same bond maturities for all countries represented in the sample, we choose those maturities for which we can obtain more data. In particular, for 31 countries we define the term spread as the difference between the 10-year and the 2-year bond yields. For Israel, we use the difference between the 8-year and the 2-year bond yields because this approach increases considerably the time period covered. We use a similar strategy for Russia, but in this case instead of modifying the maturity of the long-term bond, we modify the maturity of the short-term bond, using the 3-year bond yield. Given that we need to get comparable term spreads across countries, we calculate the equivalent rates for a period of eight years for all countries, adjusting the measures for Israel and Russia.[2]

Third, the joint effect of the macroeconomic variables is measured with the following interaction term: MAGROWTH*TERM_SPREAD. The credit depth of information index measures the rules that affect the scope, accessibility, and quality of credit information available through public or private credit registries. The index ranges from 0 to 6, with higher values indicating the availability of more credit information, from either a public

[1] Korajczyk & Levy (2003) calculate term spread as the three months lagged difference between long-term government bond yield (usually 20-year government bond) and the short-term Treasury-bill rate (usually one month). However, there is another alternative approach that has been used in more recent papers (Frank & Goyal, 2009 and Custódio, Ferreira, & Laureano, 2013), which is to measure it as the difference between the yield on 10-year government bonds and the yield on 1-year government bonds.

[2] We calculate the equivalent 8-year term spread with the following calculations for Israel and Russia, respectively: $(1+\text{6-year term spread})^{(8/6)}-1$ and $(1+\text{7-year term spread})^{(8/7)}-1$.

registry or a private bureau. The index that we use has been obtained from the World Bank website and it is a slightly modified version of the index proposed by Djankov, McLiesh, & Shleifer (2007). The index is based on the six characteristics of registries that are associated with more private credit.[3] Using this information, we define a dummy variable (FDI_LOW) that equals one if the index of depth of information is equal to or lower than three, and zero otherwise. Therefore, the dummy variable takes the value of one for countries with low flow of information between lenders and borrowers. Consequently, the vector of macroeconomic variables is defined as follows:

$$M_{jt} = \beta_1 MAGROWTH_{jt} + \beta_2 TERM\_SPREAD_{jt} + \alpha_1 MAGROWTH_{jt} TERM\_SPREAD_{jt} + \gamma_1 MAGROWTH_{jt} FDI\_LOW_{jt} + \gamma_2 TERM\_SPREAD_{jt} FDI\_LOW_{jt}$$

Following our hypotheses, which propose that the two country-level variables that play a moderating role are the monetary policy and the level of information asymmetries between borrowers and lenders, the vector can be rearranged as:

$$M_{jt} = (\beta_1 + \gamma_1 FDI\_LOW_{jt}) MAGROWTH_{jt} + (\beta_2 + \alpha_1 MAGROWTH_{jt} + \gamma_2 FDI\_LOW_{jt})\, TERM\_SPREAD_{jt}$$

Following previous capital structure research, the vector of control variables contains the following firm-level characteristics: profitability (PROFITAB), measured as earnings before interest and taxes (EBIT) over total assets (Öztekin & Flannery, 2012); growth opportunities (GROP), measured as the difference between sales growth of the firm and the sales growth of the industry of each country (La Porta, Lopez-de-Silanes, Shleifer, &

3 The index consists of six dummy criteria corresponding to the six dimensions measured. For each country the sum of the dummies is the final value of the index. To lower is the value of the index, the greater is the lack of information available on the borrowers. The six dimensions considered in the index are: (i) data on both firms and individuals are provided; (ii) both positive credit information (for example, outstanding loan amounts and pattern of on-time repayments) and negative information (for example, late payments and the number and amount of defaults and bankruptcies) are provided; (iii) data from retailers and utility companies as well as financial institutions are provided; (iv) more than 2 years of historical data are available (credit registries and bureaus that delete data on defaults as soon as they are repaid obtain a score of 0 for this indicator); (v) data on loan amounts below 1% of income per capita are provided (note that a credit registry or bureau must have a minimum coverage of 1% of the adult population to score a 1 on this indicator); (vi) by law, borrowers have the right to access their data in the largest credit registry or bureau in the economy.

Vishny, 2000); the proxy for the need of interest deductions (DEPAMTA), measured as depreciation and amortization expenses over total assets (Öztekin & Flannery, 2012); size (SIZE), measured as the logarithm of total assets (Erel, Julio, Kim, & Weisbach, 2012; Öztekin & Flannery, 2012); tangible assets (TANG), measured as fixed assets over total assets (Rajan & Zingales, 1995; Frank & Goyal, 2009; Öztekin & Flannery, 2012); industry leverage (INDLEV), measured as the mean of the leverage of the sector using the 2-digit of the SIC classification by country (Öztekin & Flannery, 2012); and liquidity (LIQ), measured as short-term assets over short-term liabilities (Öztekin & Flannery, 2012).

Additionally, we control for the annual growth in nominal GDP (GDPGR) (Korajczyk & Levy, 2003; Frank & Goyal, 2009; Öztekin & Flannery, 2012) and the annual inflation (INFLATION) (Beck, Demirgüç-Kunt, & Maksimovic, 2008; Jõeveer, 2012; Öztekin & Flannery, 2012; Erel, Julio, Kim, & Weisbach, 2012). We also include country and year dummies in the right-hand side of the models to control for country and time effects. The main descriptive statistics of all variables considered in our analyses are reported in Table 3.

(Insert Table 3 about here)

*3.3. Estimation method*

We use the panel data methodology in the estimation of the capital structure models to alleviate the risk of obtaining biased results due to the unobservable heterogeneity. Moreover, we use the generalized method of moments (GMM) to control for the endogeneity problem, which is inherent in any corporate finance study. More specifically, as we can assume that the stationary assumption holds in our context, we use the system GMM. Regarding the unobservable heterogeneity problem, we must consider that each company has its own characteristics that affect the decision making process and remain constant over time, but are unobservable to the researcher. In our case, there may be important differences in the extent that managers understand, rely on, and incorporate macroeconomic information in their funding decisions. Hence, we control for the individual heterogeneity through the fixed effect, which is eliminated before estimating our specifications. Consequently, the error term in the model is split in four components: the

individual fixed effect ($F_{ij}$); the time-specific effect (captured by year dummies); the country-specific effect (captured by country dummies); and the random disturbance.

Additionally, we use instrumental variables to control for the endogeneity problem. As in Pindado, Requejo, & de la Torre (2011), we use the lags from t−1 to t−4 of all the right-hand side variables as instruments for the equations in differences (except for the lagged variable included in the models –Leverage–, whose instruments are lags from t−2 to t−5) and only one instrument for the equations in levels, as suggested in Blundell & Bond (1998).

Moreover, to disentangle which group of firms' debt is more sensitive to changes in the macroeconomic factors, we compute elasticities for constrained and unconstrained firms, as in Hillier, Pindado, de Queiroz, & de la Torre (2011). The elasticity index is computed using the following formula, in which $x_i$ stands for the corresponding variable, $\beta_i$ is its coefficient, and $\bar{x}_i$ is its mean:

$$E_{x_i} = \beta_i \left( \bar{x}_i \Big/ \sum_{i=0}^{n} \beta_i \bar{x}_i \right)$$

Given that we use the GMM estimator, we check for the potential misspecification of the models (see Tables 5 and 7). First, we use the Hansen *J* statistic of overidentifying restrictions to test for the absence of correlation between the instruments and the error term. Second, we perform the $m_2$ statistic (Arellano & Bond, 1991) to test for the lack of second-order serial correlation in the first-difference residual. Additionally, we use the Wald test to check the joint significance of the reported coefficients.

## 4. Results

### *4.1. Descriptive statistics*

To identify the differences between constrained and unconstrained firms, we carry out a difference of mean test for each variable included in the models. To perform this test, we opt for the more general case that variances are unequal across groups. Consequently, we use the Welch's formula. As Table 4 highlights, constrained firms differ from unconstrained firms along several dimensions. The results of the univariate tests show that unconstrained firms are more leveraged, more profitable, have higher growth opportunities,

are larger, and have more tangible assets. Furthermore, constrained firms are more dependent on the non-debt tax shields, such as depreciations and amortizations, and exhibit higher liquidity levels, consistent with the view that firms that face financial restrictions tend to hold more cash compared with unconstrained firms (Opler, Pinkowitz, Stulz, & Williamson, 1999; Almeida, Campello, & Weisbach, 2004; Brav, 2009).

(Insert Table 4 about here)

*4.2. Multivariative analysis*

In this section, we present the regression results obtained using the broad definition of financial constraints. In the robustness test section, we use the narrow definition of financial constraints to check the sensitivity of the results.

Given that we use a partial adjustment model of debt, our first finding is related with the speed of adjustment. The intuition behind this type of model is that each year a firm closes a portion of the gap between its target level of debt and its actual debt (Flannery & Rangan, 2006). This portion corresponds to the term $\lambda_j$. In our model, we obtain the speed of adjustment through the expression $1-\left(1-\lambda_j\right)$. The term in parentheses corresponds to the coefficient on $Lev_{i,t-1}$ (see Table 5). Given that the debt model is estimated separately for constrained and unconstrained firms, we can see whether the speed of adjustment differs across groups. Specifically, the results show that the speed of adjustment is 0.2763 for the constrained group and 0.3034 for the unconstrained group. As expected, unconstrained firms approach their target debt faster than constrained firms.

(Insert Table 5 about here)

Regarding our first hypothesis, the results support H1a, according to which a monetary contraction has a negative effect on the level of debt of constrained firms (see the positive and statistically significant coefficient 0.0677 on the variable MAGROWTH in Table 5). Our findings confirm the theoretical prediction of Cooley & Quadrini (2006) and advance previous empirical research (Gertler & Gilchrist, 1993, 1994; Gilchrist & Himmelberg, 1995; Berger & Udell, 1998; Brav, 2009; Jõeveer, 2012) by including both macroeconomic variables in the model (i.e., the monetary policy and the expected

performance of the economy) and covering a wide range of developed and emerging economies. Nevertheless, we reject hypothesis H1b, which states that a monetary contraction has a positive effect on unconstrained firms' debt (see the positive and statistically significant coefficient 0.0447 on the variable MAGROWTH in Table 5). Consequently, our results contradict the theoretical proposition of Levy & Hennessy (2007), leading us to conclude that regardless of the degree of financial constraints increasing the level of corporate debt is easier during monetary expansions.

Our empirical evidence confirms hypothesis H2a. In particular, constrained firms' debt changes pro-cyclically with the expected performance of the economy (see the positive and statistically significant coefficient 0.6780 on the variable TERM_SPREAD in Table 5). Our findings are consistent with Kiyotaki & Moore (1997), Levy & Hennessy (2007), Frank & Goyal (2009), and Erel, Julio, Kim, & Weisbach (2012). We also find support for hypothesis H2b, which proposes that unconstrained firms' debt moves counter-cyclically with the expected performance of the economy (see the negative and statistically significant coefficient -0.1757 on the variable TERM_SPREAD in Table 5). Although these results are consistent with Baker & Wurgler (2002), Korajczyk & Levy (2003), Frank & Goyal (2003), Levy & Hennessy (2007), and Erel, Julio, Kim, & Weisbach (2012), our findings contradict Jensen & Meckling (1976) and Zwiebel (1996). A possible explanation for this contradiction could be that a counter-cyclical effect is more consistent with the pecking order theory, which decribes better large companies' behavior (Frank & Goyal, 2003). Note that a larger dimension is a characteristic that usually defines uncostrained firms.

Regarding the third hypothesis, our results confirm that the monetary policy has not only a direct, but also an indirect effect through economic expectations on firms' capital structure (see the estimated coefficients on the interaction term MAGROWTH* TERM_SPREAD in Table 5, which are statistically significant). However, this indirect effect of the monetary policy affects firms' debt differently depending on the degree of financial constraints. Regarding the constrained group, a monetary expansion mitigates the pro-cyclical pattern of firms' debt related with the expected performance of the economy (see the negative and statistically significant coefficient -1.4530 on the interaction term MAGROWTH*TERM_SPREAD in Table 5). In other words, during tight money periods the constrained firms' debt becomes more sensitive to the expected performance of the economy.

On the contrary, an expansionary monetary policy exacerbates the effect of the expected performance of the economy on financially unconstrained firms' leverage, making their debt decisions even more counter-cyclical (see the negative and statistically significant coefficient -1.1176 on the interaction term MAGROWTH*TERM_SPREAD in Table 5). Our findings are especially relevant for central banks. Although an increase in the amount of money has a direct positive effect on firms' debt, whose intensity depends on the degree of financial constraints, it also has an indirect effect through its moderating role in the relation between the expectations and leverage. Therefore, we can conclude that central banks should be careful when defining their monetary policy because it is possible that indirectly they either mitigate or exacerbate the effect of an uncontrollable variable, such as economic expectations, on firms' debt.

After computing elasticity indices, we accept the fourth hypothesis of the study. The results confirm a stronger impact of macroeconomic conditions on constrained firms' capital structure. In particular, the monetary policy affects the constrained group to a greater extent (note that, as reported in Table 6, the elasticity index of 0.0241 on constrained firms is larger than the elasticity index of 0.0117 on unconstrained firms) and financially constrained firms are also the most affected ones by economic expectations (note that, as reported in Table 6, the elasticity index of 0.0287 on constrained firms is larger than the elasticity index of 0.0055 on unconstrained firms). We also find that the moderating effect of the monetary policy in the relation between expectations and debt is stronger in the group of companies facing financial constraints (note that, as reported in Table 6, the elasticity index of 0.048 on constrained firms is larger than the elasticity index of 0.0027 on unconstrained firms).

(Insert Table 6 about here)

With respect to our fifth hypothesis, we expect that in countries with poor registers of information, the lending process suffers from more opacity and the effect of macroeconomic conditions (i.e., the monetary policy and the expected performance of the economy) on debt is stronger. Regarding H5a, we find that the direct effect of the monetary policy on leverage is exacerbated in countries with poorer information on borrowers. Nevertheless, this effect is only significant for the group of unconstrained firms (see the

positive and statistically significant coefficient 0.0827 on the interaction term MAGROWTH*FDI_LOW in Table 5).

When we use the broad definition of financial constraints, for both groups of firms we find that the availability of information on borrowers has no significant moderating effect in the particular case of expectations. In this sense, our empirical results suggest that, although previous literature finds that the information between lenders and borrowers determines the availability of credit, the effect of the expected performance of the economy on debt is not mitigated in countries where the index indicates better access to the credit history of borrowers.

Regarding the control variables, we find patterns of pecking order behavior in both groups of firms in the sense that there is a significant negative relation between profitability and debt (see the negative and statistically significant coefficients -0.0419 and -0.2382 on PROFITAB in Table 5). Additionally, we find that the non-debt tax shields have a positive impact on firms' debt for both groups (see the positive and statistically significant coefficients 0.0585 and 0.1010 on DEPAMTA in Table 5), which is consistent with the empirical findings of Frank & Goyal (2009).

Regarding the size of the company, we find a positive effect for the unconstrained group (see the positive and statistically significant coefficient 0.0061 on SIZE in Table 5), perhaps because they are more transparent, have lower asset volatility, or have better access to public debt markets (Öztekin & Flannery, 2012). Furthermore, as expected, we find a positive relation between the proportion of tangible assets and debt (see the positive and statistically significant coefficients 0.1552 and 0.1682 on TANG in Table 5) because these assets are usually offered as collateral.

Conversely, liquidity has a negative impact on the level of debt of both groups of firms (see the negative and statistically significant coefficients -0.0019 and -0.0007 on LIQ in Table 5), which confirms the idea that firms with more liquid assets can use them as an internal source of funds and as a substitute for debt.

## 5. Robustness tests

In this section, we check whether our results are robust to the use of a narrow definition of financial constraints (Whited & Wu, 2006). Therefore, we obtain two new subsamples:

5,805 firms belong to the group of the most constrained firms, while 3,324 firms belong to the group of the least constrained firms (see Table 2).

The empirical evidence supports our initial findings. Hypothesis H1a is confirmed (see the positive and statistically significant coefficient 0.0457 on the variable MAGROWTH in Table 7), but we still reject hypothesis H1b (see the positive and statistically significant coefficient 0.0614 on the variable MAGROWTH in Table 7).

(Insert Table 7 about here)

H2a and H2b are also supported by our findings (see the positive and statistically significant coefficient 0.4696 on the variable TERM_SPREAD in Table 7 for the most constrained group, and the negative and statistically significant coefficient -0.3662 on the variable TERM_SPREAD in Table 7 for the least constrained group). Regarding the third hypothesis of the study, we also find that the monetary policy moderates the relation between economic expectations and corporate debt, at least for the case of constrained firms. This result is consistent with the empirical evidence obtained using the broad definition of financial constraints (see negative and statistically significant coefficient -1.2433 on the interaction term MAGROWTH*TERM_SPREAD in Table 7).

The elasticity indices also support previous results related with H4 (see Table 8). That is, we confirm a stronger effect of the monetary policy and economic expectations on the level of debt of constrained firms. Although the effect of the monetary policy on debt is positive regardless of the degree of financial constraints, we expect that constrained firms are more strongly affected by monetary policy measures. For this reason, we compute elasticities using the narrow definition of financial constraints (see Table 8). The elasticity indices confirm that, although the monetary policy has a positive impact on firms' debt for constrained and unconstrained firms, firms that face financial constraints are more sensitive to monetary policy measures.

(Insert Table 8 about here)

Finally, confirming the evidence related with the fifth hypothesis of the study, we find that in countries with a low value in the credit depth of information index the direct

effect of the monetary policy on leverage is stronger for the least constrained group (see the positive and statistically significant coefficient 0.1077 on the interaction term MAGROWTH*FDI_LOW in Table 7).

## 6. Conclusions

Previous economics and finance literature investigates the effect of the monetary policy or the expected performance of the economy on firms' debt decisions separately. For this purpose, firms are usually classified in different groups depending on the degree of financial constraints that they face. Using the same classification criterion and extending the coverage to a wide international sample that comprises developed and emerging economies, we find that the monetary policy positively affects firms' debt decisions. However, constrained firms are more sensitive to monetary policy measures. Additionally, we confirm previous findings related with the impact of the expected performance of the economy on the financing behavior of firms. Constrained firms behave pro-cyclically in terms of their debt decisions, while debt levels of unconstrained firms are counter-cyclical.

We go a step further by investigating the joint effect of macroeconomic conditions on corporate debt. We find that firms are affected by the monetary policy and the expected performance of the economy jointly regardless of their degree of financial constraints. In other words, the monetary policy has an indirect effect on corporate debt by affecting the strength of the relation between the expected performance of the economy and leverage. More specifically, a monetary expansion mitigates the effect of economic expectations on debt for the group of constrained firms, while it exacerbates such effect for unconstrained firms. As a result, we can conclude that the use of the monetary policy as a tool to increase the liquidity in the market and to facilitate the improvement of stagnant economies will be most effective when agents and decision makers have positive expectations about the future performance of the economy. Therefore, policy makers should create the necessary conditions to improve future economic prospects. Additionally, the monetary policy can be an important tool for central banks to facilitate that companies, and especially constrained firms, have access to external financing, which may contribute to alleviate funding restrictions during economic shocks.

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**Table 1. Distribution of the sample by country**
This table shows the number of firms and observations by country. Data are extracted for companies for which information is available for at least four consecutive years between 2004 and 2011 in the ORBIS database. We exclude financial, insurance, and utilities sectors.

| | Firms | % | Observations | % |
|---|---|---|---|---|
| Australia | 504 | 3.01% | 3,320 | 2.95% |
| Austria | 52 | 0.31% | 397 | 0.35% |
| Belgium | 74 | 0.44% | 550 | 0.49% |
| Canada | 540 | 3.23% | 3,466 | 3.07% |
| China | 1,840 | 10.99% | 11,055 | 9.81% |
| Denmark | 87 | 0.52% | 634 | 0.56% |
| Finland | 93 | 0.56% | 719 | 0.64% |
| France | 160 | 0.96% | 1,116 | 0.99% |
| Germany | 455 | 2.72% | 3,235 | 2.87% |
| Hong Kong | 96 | 0.57% | 714 | 0.63% |
| India | 1,978 | 11.81% | 12,824 | 11.38% |
| Indonesia | 229 | 1.37% | 1,459 | 1.29% |
| Israel | 226 | 1.35% | 1,247 | 1.11% |
| Italy | 111 | 0.66% | 636 | 0.56% |
| Japan | 2,449 | 14.63% | 18,625 | 16.52% |
| Malaysia | 613 | 3.66% | 3,014 | 2.67% |
| Mexico | 53 | 0.32% | 377 | 0.33% |
| Netherlands | 91 | 0.54% | 680 | 0.60% |
| New Zealand | 66 | 0.39% | 472 | 0.42% |
| Norway | 119 | 0.71% | 803 | 0.71% |
| Pakistan | 184 | 1.10% | 1,129 | 1.00% |
| Portugal | 34 | 0.20% | 239 | 0.21% |
| Republic of Korea | 709 | 4.23% | 4,775 | 4.24% |
| Russia | 67 | 0.40% | 426 | 0.38% |
| Singapore | 450 | 2.69% | 3,164 | 2.81% |
| South Africa | 174 | 1.04% | 1,089 | 0.97% |
| Spain | 83 | 0.50% | 610 | 0.54% |
| Sweden | 268 | 1.60% | 1,784 | 1.58% |
| Switzerland | 147 | 0.88% | 1,106 | 0.98% |
| Taiwan | 1,206 | 7.20% | 8,204 | 7.28% |
| Thailand | 350 | 2.09% | 2,399 | 2.13% |
| United Kingdom | 682 | 4.07% | 4,766 | 4.23% |
| United States of America | 2,553 | 15.25% | 17,685 | 15.69% |
| Total | 16,743 | 100% | 112,719 | 100% |

**Table 2. Distribution of the sample in constrained and unconstrained categories**

To identify whether firms are constrained or not, we use the index proposed by Whited & Wu (2006). This table shows the number of firms in each group by country. Columns 1 and 2 present the classification of firms using the broad definition of financial constraints, while columns 3 and 4 show the classification of firms using the narrow definition of financial constraints. Data are extracted for companies for which information is available for at least four consecutive years between 2004 and 2011 in the ORBIS database. We exclude financial, insurance, and utilities sectors.

| | Broad definition | | Narrow Definition | |
|---|---|---|---|---|
| | Constrained | Unconstrained | Most Constrained | Least Constrained |
| Australia | 288 | 216 | 167 | 106 |
| Austria | 32 | 20 | 18 | 8 |
| Belgium | 52 | 22 | 33 | 11 |
| Canada | 316 | 224 | 181 | 106 |
| China | 1250 | 590 | 890 | 286 |
| Denmark | 54 | 33 | 32 | 11 |
| Finland | 43 | 50 | 27 | 21 |
| France | 95 | 65 | 71 | 27 |
| Germany | 285 | 170 | 175 | 78 |
| Hong Kong | 54 | 42 | 32 | 20 |
| India | 1223 | 755 | 686 | 346 |
| Indonesia | 121 | 108 | 81 | 43 |
| Israel | 131 | 95 | 36 | 41 |
| Italy | 71 | 40 | 39 | 12 |
| Japan | 1318 | 1131 | 811 | 595 |
| Malaysia | 331 | 282 | 169 | 153 |
| Mexico | 30 | 23 | 21 | 10 |
| Netherlands | 55 | 36 | 29 | 21 |
| New Zealand | 40 | 26 | 26 | 9 |
| Norway | 80 | 39 | 46 | 25 |
| Pakistan | 99 | 85 | 52 | 35 |
| Portugal | 18 | 16 | 17 | 3 |
| Republic of Korea | 424 | 285 | 264 | 139 |
| Russia | 38 | 29 | 28 | 9 |
| Singapore | 301 | 149 | 213 | 79 |
| South Africa | 106 | 68 | 69 | 31 |
| Spain | 56 | 27 | 29 | 14 |
| Sweden | 183 | 85 | 125 | 42 |
| Switzerland | 96 | 51 | 56 | 27 |
| Taiwan | 745 | 461 | 443 | 187 |
| Thailand | 201 | 149 | 127 | 76 |
| United Kingdom | 398 | 284 | 253 | 147 |
| United States of America | 1211 | 1342 | 559 | 606 |
| Total | 9,745 | 6,998 | 5,805 | 3,324 |

**Table 3. Descriptive statistics**
This table presents the main descriptive statistics of the dependent, macroeconomic, and control variables used in the analyses.

| | Mean | Std. Dev. | Minimum | Median | Maximum |
|---|---|---|---|---|---|
| LEVERAGE | 0.211 | 0.182 | 0.000 | 0.183 | 0.949 |
| MAGROWTH | 0.091 | 0.083 | -0.346 | 0.082 | 0.530 |
| TERM_SPREAD | 0.011 | 0.008 | -0.030 | 0.010 | 0.090 |
| FDI_LOW | 0.057 | 0.232 | 0.000 | 0.000 | 1.000 |
| PROFITAB | 0.091 | 0.151 | -1.993 | 0.096 | 1.474 |
| GROP | -0.026 | 4.735 | -83.456 | 0.099 | 99.879 |
| DEPAMTA | 0.044 | 0.054 | 0.000 | 0.032 | 0.875 |
| SIZE | 12.141 | 2.057 | 3.584 | 12.066 | 19.737 |
| TANG | 0.477 | 0.206 | 0.050 | 0.470 | 0.945 |
| INDLEV | 0.351 | 3.895 | 0.000 | 0.218 | 197.635 |
| LIQ | 2.514 | 3.499 | 0.022 | 1.650 | 98.681 |
| GDPGR | 0.037 | 0.042 | -0.085 | 0.031 | 0.148 |
| INFLATION | 0.029 | 0.030 | -0.013 | 0.024 | 0.203 |

**Table 4. Differences between constrained and unconstrained firms**

Difference of means tests based on the broad definition of financial constraints. *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively.

| | All | Constrained | Unconstrained | t-statistic (2 ) - ( 3 ) |
|---|---|---|---|---|
| | ( 1 ) | ( 2 ) | ( 3 ) | ( 4 ) |
| No. Obs. | 112719 | 53751 | 58968 | |
| LEVERAGE | 0.2101 | 0.1943 | 0.2272 | -30.3721*** |
| PROFITAB | 0.0604 | 0.0595 | 0.1194 | -66.1403*** |
| GROPDUM | 0.6653 | -0.4767 | 0.3853 | -29.6585*** |
| DEPAMTA | 0.0991 | 0.0451 | 0.0423 | 8.7222*** |
| SIZE | 12.0444 | 10.7822 | 13.3801 | -274.4383*** |
| TANG | 0.4745 | 0.4427 | 0.5085 | -54.1926*** |
| LIQ | 3.4073 | 2.8728 | 2.1869 | 32.2917*** |

**Table 5. Effects of macroeconomic factors on corporate debt (broad definition)**

GMM regression results from $Lev_{ij,t} = (1-\lambda_j)\text{Lev}_{ij,t-1} + (\lambda_j\beta_j)\,M_{ij,t} + (\lambda_j\beta_j)\,X_{ij,t} + \lambda_j F_{ij} + \delta_{ij,t}$. All the variables are defined in Section 3. The results are obtained using the broad definition of financial constraints. Standard errors are in parentheses. The Wald test is a test of the joint significance of the reported coefficients, asymptotically distributed as $\chi^2$ under the null of no relation, degrees of freedom in parentheses. $m_2$ is a second order serial correlation test using residuals in first differences, asymptotically distributed as N(0,1) under the null of no serial correlation. The Hansen test is a test of the over-identifying restrictions, asymptotically distributed as $\chi^2$ under the null of no correlation between the instruments and the error term, degrees of freedom in parentheses. *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively.

| | Constrained | Unconstrained |
|---|---|---|
| MAGROWTH | 0.0677 (0.0093)*** | 0.0447 (0.0076)*** |
| TERM_SPREAD | 0.678 (0.1062)*** | -0.1757 (0.086)** |
| MAGROWTH*TERM_SPREAD | -1.453 (0.5451)*** | -1.1176 (0.4603)** |
| MAGROWTH*FDI_LOW | 0.0062 (0.0202) | 0.0827 (0.0183)*** |
| TERM_SPREAD*FDI_LOW | 0.0078 (0.2246) | 0.1775 (0.1797) |
| LEV_1 | 0.7264 (0.0099)*** | 0.6966 (0.0086)*** |
| PROFITAB | -0.0419 (0.0068)*** | -0.2382 (0.0113)*** |
| GROP | 0 (0.0001) | 0.0001 (0.0001) |
| DEPAMTA | 0.0585 (0.0144)*** | 0.101 (0.0145)*** |
| SIZE | -0.0005 (0.0011) | 0.0061 (0.0011)*** |
| TANG | 0.1552 (0.0099)*** | 0.1682 (0.0097)*** |
| INDLEV | 0.0002 (0.0002) | 0.0001 (0.0001) |
| LIQ | -0.0019 (0.0002)*** | -0.0007 (0.0003)** |
| GDPGR | -0.0247 (0.0125)** | 0.1216 (0.0174)*** |
| INFLATION | 0.0283 (0.0314) | 0.1393 (0.0258)*** |
| CONSTANT | -0.0256 (0.0117)** | -0.1133 (0.0147)*** |
| Wald | 684.04 (14)*** | 1289.04 (14)*** |
| m2 | 0.89 | 0.68 |
| Hansen | 1244.53 (394) | 1835.29 (394) |

**Table 6. Elasticities (broad definition)**
The elasticity indices are computed using the results of the GMM regressions and the means of each variable and following the strategy proposed in Hillier, Pindado, de Queiroz, & de la Torre (2011). The table contains the indices calculated using the broad definition of financial constraints.

| | Constrained | Unconstrained |
|---|---|---|
| MAGROWTH | 0.0241 | 0.0117 |
| TERM_SPREAD | 0.0287 | 0.0055 |
| MAGROWTH*TERM_SPREAD | 0.0048 | 0.0027 |
| MAGROWTH*FDI_LOW | 0.0000 | 0.0021 |
| TERM_SPREAD*FDI_LOW | 0.0000 | 0.0000 |
| LEV_1 | 0.6041 | 0.4260 |
| PROFITAB | 0.0149 | 0.0625 |
| GROP | 0.0000 | 0.0000 |
| DEPAMTA | 0.0100 | 0.0127 |
| SIZE | 0.0000 | 0.2152 |
| TANG | 0.2907 | 0.2318 |
| INDLEV | 0.0000 | 0.0000 |
| LIQ | 0.0191 | 0.0050 |
| GDPGR | 0.0036 | 0.0131 |
| INFLATION | 0.0000 | 0.0117 |

**Table 7. Effects of macroeconomic factors on corporate debt: Robustness (narrow definition)**
GMM regression results from $Lev_{ij,t} = (1-\lambda_j)\text{Lev}_{ij,t-1} + (\lambda_j\beta_j)\text{M}_{ij,t} + (\lambda_j\beta_j)\text{X}_{ij,t} + \lambda_j\text{F}_{ij} + \delta_{ij,t}$. All the variables are defined in Section 3. The results are obtained using the narrow definition of financial constraints. Standard errors are in parentheses. The Wald test is a test of the joint significance of the reported coefficients, asymptotically distributed as $\chi^2$ under the null of no relation, degrees of freedom in parentheses. $m_2$ is a second order serial correlation test using residuals in first differences, asymptotically distributed as N(0,1) under the null of no serial correlation. The Hansen test is a test of the over-identifying restrictions, asymptotically distributed as $\chi^2$ under the null of no correlation between the instruments and the error term, degrees of freedom in parentheses. *, **, and *** indicate significance at the 1%, 5%, and 10% level, respectively.

| | Most Constrained | Least Constrained |
|---|---|---|
| MAGROWTH | 0.0457 (0.0126)*** | 0.0614 (0.0093)*** |
| TERM_SPREAD | 0.4696 (0.1455)*** | -0.3662 (0.1033)*** |
| MAGROWTH*TERM_SPREAD | -1.2433 (0.719)* | -0.4398 (0.531) |
| MAGROWTH*FDI_LOW | -0.0232 (0.026) | 0.1077 (0.0243)*** |
| TERM_SPREAD*FDI_LOW | 0.1696 (0.2825) | -0.224 (0.2155) |
| LEV_1 | 0.736 (0.01)*** | 0.6733 (0.0114)*** |
| PROFITAB | -0.0368 (0.007)*** | -0.2402 (0.0148)*** |
| GROP | -0.0001 (0.0001) | 0.0001 (0.0001) |
| DEPAMTA | 0.0801 (0.0167)*** | 0.1295 (0.0181)*** |
| SIZE | 0.0002 (0.0012) | 0.0097 (0.0012)*** |
| TANG | 0.1437 (0.013)*** | 0.1846 (0.0129)*** |
| INDLEV | 0.001 (0.0003)*** | 0.0001 (0.0001)*** |
| LIQ | -0.0027 (0.0002)*** | -0.0014 (0.0005)*** |
| GDPGR | -0.0229 (0.0174) | 0.0255 (0.013)* |
| INFLATION | 0.0036 (0.042) | 0.1215 (0.0328)*** |
| CONSTANT | -0.0233 (0.0135)* | -0.1621 (0.0164)*** |
| Wald | 459.74 (14)*** | 986.3 (14)*** |
| m2 | -0.01 | -0.56 |
| Hansen | 852.47 (394) | 1242.48 (394) |

**Table 8. Elasticities (narrow definition)**
The elasticity indices are computed using the results of the GMM regressions and the means of each variable and following the strategy proposed in Hillier, Pindado, de Queiroz, & de la Torre (2011). The table contains the indices calculated using the narrow definition of financial constraints.

| | Most Constrained | Least Constrained |
|---|---|---|
| MAGROWTH | 0.0167 | 0.0141 |
| TERM_SPREAD | 0.0204 | 0.0100 |
| MAGROWTH*TERM_SPREAD | 0.0000 | 0.0000 |
| MAGROWTH*FDI_LOW | 0.0000 | 0.0024 |
| TERM_SPREAD*FDI_LOW | 0.0000 | 0.0000 |
| LEV_1 | 0.6296 | 0.3623 |
| PROFITAB | 0.0135 | 0.0554 |
| GROP | 0.0000 | 0.0000 |
| DEPAMTA | 0.0141 | 0.0144 |
| SIZE | 0.0000 | 0.2993 |
| TANG | 0.2770 | 0.2237 |
| INDLEV | 0.0014 | 0.0001 |
| LIQ | 0.0272 | 0.0092 |
| GDPGR | 0.0000 | 0.0000 |
| INFLATION | 0.0000 | 0.0090 |