
Financial Crisis Effect on Latin American Companies' Debts

Submitted 22/02/20, 1st revision 11/03/20, accepted 10/04/20

Michele Nascimento Jucá¹, Albert Fishlow²

Abstract:

Purpose: This study aims to verify changes in the debt structure of companies in the main Latin American countries.

Approach/Methodology/Design: A difference-in-differences test is applied in a sample of 520 publicly-traded and closed companies, whose data are collected in the previous (2003-2007) and subsequent (2008-2012) periods of the crisis.

Findings: The results include the replacement of bank debts by private and public non-bank debts, reduction of maturity of debts and relevance of better level of governance or regulatory environment of countries in guaranteeing the rights of creditors in this process.

Practical Implications: These results are in line with the countercyclical fiscal policy adopted by these countries, guaranteeing them greater credibility in international markets.

Social Implications: This study also suggest questions for future research. Each Latin American country faces many problems that are motivated by diverse events - political, for example - that impact the economy. That task involves the broadening of this methodology to incorporate internal shocks as well as global crisis.

Originality/Value: One of the principal contributions of this study is the finding that companies in the main Latin American countries replace their banking credit by utilizing non-banks, just as done by the developed countries. Understanding better this effect of the global financial crisis may lead to helpful permanent macroeconomic and microeconomic measures.

Keywords: Financial crisis, debt structure, Latin America, difference-in-differences.

JEL classification: G01, G32, G15.

Paper Type: Research paper.

¹Social and Applied Sciences Center, Mackenzie Presbyterian University, Sao Paulo, Brazil, e-mail: michele.juca@uol.com.br

²Institute of Latin American Studies, Columbia University, New York, United States of America, e-mail: af594@columbia.edu

1. Introduction

The last global financial crisis began in the United States in 2007 with a government acquisition of subprime mortgage banking real estate mortgages. In August of that year, the local financial market was unable to solve its problems internally, with a contagion effect abroad. The bankruptcy of Lehman Brothers on September 15th, 2008 is a turning point. This latest global financial crisis is different from others in some aspects. It did not originate in emerging markets such as Latin America and Asia. On the contrary, the experience accumulated from previous financial crises contributed to a transformation where emerging countries have become progressively more a factor in global production and consumption. In the case of Latin America, Brazil (34.5%), Mexico (19.3%), Argentina (10.7%), Colombia (5.2%), Chile (5%) add up to 78% in the region's Gross Domestic Product (GDP) in 2017 (World Bank, 2020).

Among the impacts of this crisis, is a shock in the offer of credit to companies, even more pronounced for firms dependent on bank financing, affecting their debt structure. Banking competition and the quality of the regulatory environment - such as the right of creditors in bankruptcy proceedings - attenuate the restrictive effect of financial crisis. Kirch and Terra (2012) corroborate this argument by identifying how the institutional quality and financial development of markets contribute to the lengthening of maturity of debts. Fernández *et al.* (2013,; 2018) highlight the increase in informational asymmetry between banks and clients during a financial crisis. Banks that have liquidity problems, lower quality or greater risk of their assets, have to be replaced by other sources of credit. The level of protection guaranteed to investors reduces informational asymmetry and can promote the replacement of private bank debts by private and public non-bank debt (Brunnermeier, 2009; Shleifer and Vishny, 2010; Chiqueto *et al.*, 2015; Berg and Gider, 2017).

Moreover, macro and microeconomic measures within individual countries count, helping to offset the effects of the crisis. One example is reform of country legislation to guarantee greater solidity of private contracts. In Brazil, currently, there are discussions about a new law of judicial reorganization and bankruptcy, improvement of the positive register of debtors and clearer rules for the delivery of guarantees in the taking of bank loans (Tozzini Freire, 2018). Possible adjustments to the Basel Accord - which creates minimum capital requirements for banks as a precaution against credit, market, operational and liquidity risks - also are relevant.

The mentioned studies highlight changes adopted by firms in their debt structure. However, they do not delve into the impact of the financial crisis on corporate debt in Latin American countries. According to De Gregorio (2013), although all emerging economies suffered during the last global financial crisis, those in Latin America were more resilient. This study focuses upon changes in the debt structure of principal companies in this region. Among the questions arising are: a) Is there a

replacement of bank debt by non-bank debt; this can be public (e.g., debentures and global notes) or private (e.g., loans from subsidiaries/affiliates and financing with export credit agencies)? b) Is this change more intense for companies with greater bank dependence? c) Is there a change in its maturity as well? and d) What is the influence of the regulatory environment and financial development of individual countries in this eventual change of the debt structure?

These objectives are tested by a difference-in-differences approach (DID). The sample contains 520 public and private companies or 5,200 observations, whose data are collected in prior (2003-2007) and subsequent (2008-2012) periods to the crisis. Identification of companies with high bank dependence, as well as those with access to the public market for debt securities, occurs in 2007, in order to assure that these variables are exogenous to the crisis. The main results include the replacement of bank debt by private and public non-banks debt, reduction of debt maturity and the relevance of governance and regulatory environment of individual countries. These results are in line with the countercyclical fiscal policy adopted by these countries, guaranteeing them greater credibility in international markets.

2. Literature Review

The last systematic financial crisis, ironically, occurs 50 years after the publication of the seminal article by Modigliani and Miller (1958). Its effects ratify the relevance of the capital structure of companies, but reality avoids the assumption of a perfect market leading to those initial propositions. Market frictions amend traditional theories of capital structure. The ones that stand out the most are: trade-off, pecking order, agency and its costs, informational asymmetry, moral hazard and adverse selection and signaling. However, they do little to discriminate between bank and non-bank debt options (Ross, 1977; Myers and Majluf, 1984; Ardalán, 2017; Sony and Bhaduri, 2018; Nicodano and Regis, 2019).

Empirical studies that seek to understand the decisions about the debt structure of companies, in the light of the aforementioned theories, affirm that financing through bank debt has an advantage over nonbank ones (Grima and Thalassinós, 2020). The main arguments identified include aspects of efficiency in monitoring, access to private information, mitigation of the adverse selection effect associated with better credit provider quality (Antoniou *et al.*, 2008) and efficiency of settlement and renegotiation in situations of financial difficulties (Kale and Meneghetti, 2011; Thalassinós *et al.*, 2015b; Thalassinós and Stamatopoulos, 2015). Denis and Mihov (2003) point out that the main determinant of the source of debt is the credit quality of the issuer. A separate result is obtained by Rauh and Sufi (2010), who verify that companies with low credit ratings tend to have a varied debt structure with bank and non-bank credits.

The financial crisis of 2008 forced companies to change the composition of their debts from banks to non-banks (Thalassinós *et al.*, 2015a). This change comes from

shock on the supply of credit and demand for products and services. According to Brunnermeier (2009) and Shleifer and Vishny (2010), the banking system has not expended the money supply in response to the financial crisis. For Kahle and Stulz (2013), the increase in uncertainty and the decrease in the demand for products, followed by the financial crisis, led to a decrease in investment and demand from companies for credit to already struggling banks. Fernández *et al.* (2018) point out that in a financial crisis, the decrease in the supply of credit causes the search for alternative sources of resources such as non-banks. In view of the above, the following hypothesis emerges:

H1: In a financial crisis, there is replacement of bank by non-bank debt.

Capital structure theories most related to the maturity of the debts are agency costs and signaling. Myers (1977), Saona and Vallelado (2014) argue that reducing debt maturities may mitigate conflicts of interest. The periodic payment of the principal of the debt in the short term obliges managers to present information to investors about the risk and return of their operating decisions, reducing the problem of underinvestment. Signaling theory indicates that the choice of the term of the debt signals the quality of the project financed. Jun and Jen (2003) reinforce this argument, stating that short-term credits have the advantage of lower cost; however, they have the disadvantage of a high refinancing risk, which in turn can cause a high financial cost.

In the study by Orman and Köksal (2017), they do not identify changes in the maturity of the debts of Turkish companies during the financial crisis of 2008. However, Fernández *et al.* (2013) see a reduction in the maturity of debts of several countries in the context of the global financial crisis. Informational asymmetry is greater in long-term debt than in short-term debt. Short-term contracts with creditors allow them to perform more frequent monitoring and to change their terms by not renewing them. In addition, during a banking crisis, there is an increase in the conflict of interests between creditors and debtors (Jędrzejowska-Schiffauer *et al.*, 2019). A similar result is obtained by González (2015). He notes that debt maturity declines during this period, due to an increase in the volume of short-term debt. The hypothesis arising from these arguments is:

H2: In a financial crisis, companies with banking dependence have an even greater reduction of the maturity of their debt.

The return on equity investment occurs through the distribution of dividends to its owners, varying according to the company's results, while the debt offers a fixed payment of interest. Ordinary owners are granted the right to vote in the decisions of organizations, while creditors are given the right to dispose of collateral when the company defaults. The rights associated with such securities are even more critical when there is an agency conflict of interest between investors and managers. Without them, investors could not be paid and companies would have difficulty in

raising external resources. These rights, in turn, depend on the regulatory environment in which such securities are issued (Myers, 1977; Attig *et al.* 2016; Bebchuk *et al.* 2017).

La Porta *et al.* (1998) show that the regulatory environment of countries affects the corporate decisions of companies. Kirch and Terra (2012) and González (2015) provide evidence that institutional quality is a first-order determinant and has a positive effect on the volume and maturity of debt. These effects are even more significant in emerging markets than in developed economies. González (2015) points out that greater protection of creditors gives them greater power during a bankruptcy process, increasing the rate of recovery of credits, reducing the risk of these investors. In turn, a higher level of protection for creditors induces managers not to take excessive risks and not to replace assets, mitigating possible agency conflicts.

Petersen and Rajan (1994; 1995) and Orman and Köksal (2017) corroborate the argument that the quality of the regulatory environment (e.g., protection of creditor rights), as well as levels of financial development or banking competition, directly influence the availability of credit to firms. Both factors exert an influence on informational asymmetry, agency conflicts of interest among stakeholders, costs of bankruptcy and tax evasion of companies. For Kahle and Stulz (2013), the increase in uncertainty about future leads to credit supply and demand shock, which impacts companies' access to usual sources of capital.

González (2016) argues that a country with lower regulatory environment and financial development increase the information asymmetries and conflicts of interests among shareholders, creditors, and managers, especially in times of financial distress. The combination of these elements leads companies to seek alternative sources of capital. These arguments give rise to the following hypotheses:

H3a: In a financial crisis, better regulatory environment favors the replacement of bank by non-bank debt and

H3b: In a financial crisis, greater financial development favors the replacement of bank by non-bank debt.

3. Methodology

3.1 Data Sample and Variables

The final sample is made up of 520 companies (5,200 observations), of which 348 are publicly held and 172 are privately held, belonging to the main Latin American countries - Brazil (193), Chile (115), Peru (71), Mexico (68), Argentina (50) and Colombia (23). All of them have total assets above US\$ 1 million and positive equity in 2002. Also are included only those that have data for all the years of the sample, leading to a balanced panel. Financial companies (SIC code 6000 to 6999)

are excluded. 2008 is the year of reference for the beginning of the crisis in countries other than the United States. In line with the studies of González (2015) and Fernández *et al.* (2018), the sample analyzes the first five years before - 2003 to 2007 - and after - 2008 to 2012 - the crisis, in order to capture its lagged impact on corporate leverage. Additionally, a robustness test is performed for the periods 2004-2007 (pre) and 2008-2011 (post), 2005-2008 (pre) and 2009-2012 (post), in order to capture possible non-crisis effects on the corporate debt structure.

Appendix A provides an overview of the formulas, data sources and references in the literature considering the same variables as this study. However, further details are provided here. The classification of companies as bank dependents or not occurs in 2007 (BankDebt07) to prevent it from being endogenous to the crisis. The higher values of the continuous variable (bank debt/total assets and bank debt/total debt) in 2007 indicate greater banking dependence. The same test is applied when considering this variable as a dummy, whose percentages above the country median are classified as one and the below this measure are considered zero. Both ways of measuring debt level seek to capture its degree of sensitivity to the independent variables. Regarding the types of non-bank debt, if the company has a long-term debt rating in 2007 (Drating07), it is classified as dependent on public non-bank debt with dummy equal to one. For those without, the rating is equal to zero. Non-rated companies have less access to the debentures and global bonds market, being more dependent on loans from subsidiaries/affiliates or being financed by export credit agencies.

The regulatory environment is measured by a proxy for governance indicators, developed by a World Bank research group (Kaufmann *et al.*, 2010). The index is obtained in the year 2007 (KKM07), based on the average of six dimensions - voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption. This gives the country score, for each dimension, in units of a standard normal distribution, that is, varying approximately between -2.5 and +2.5. Thus, the higher, the better the index value. The data are obtained from the World Bank's Worldwide Governance Indicators (WGI) database which presents aggregate and individual governance indicators from more than 200 countries as of 1996.

Financial development can be understood as a higher level of competition or less power in the banking market. The proxy considered for bank competition is the Lerner index, defined as the difference between prices (total bank revenue on assets) and marginal costs (in relation to prices). The Lerner index estimates are obtained in 2007 (Lerner07) and follow the methodology described by Demirgüç-Kunt and Pería (2010). The index varies between 0 and 1, and the higher its value, the lower the bank competition. The data are available on the World Bank's Global Financial Development Database (GFDD), which reports a set of characteristics of the financial system of more than 200 countries since 1960.

3.2 Research Tests and Models

Initially, the variables of this study are analyzed through descriptive statistics and a mean difference test. Table 1 presents the characteristics of the debt structure before (2003-2007) and after (2008-2012) the crisis. Table 2 describes the same structure of debt by groups of companies with high and low banking dependence and with or without credit rating, indicating the existence of public debts. Table 3 verifies the maturity of the debts, being of short and long term, in the periods before and after the financial crisis.

The hypotheses of this study are tested using the DID method. According to Angrist and Pischke (2008), Robert and Whited (2013) and Lee (2016), DID is an instrument of analysis that uses time and group dimensions to control for unobserved fixed omitted variables. Both fixed effects and DID are based on the assumption of time-invariant missing variables and can be used to limit problems of endogeneity of omitted variables. Thus, possible correlation between explanatory variables and the error term, associated with countries, industries and firms are controlled by a set of dummy variables in the regression model. The characteristics of the countries are considered at the end of the year prior to the crisis (2007) in order to mitigate concerns about potential endogeneity. The financial crisis affects everyone at the same time, being less dependent on the characteristics of countries and the level of corporate leverage than any crisis in a particular country. Given this, it is assumed that differences between countries' characteristics before the financial crisis are predetermined.

H1 is tested by Equation 1 in three stages. The results can be observed in Tables 4 and 5. The dependent variable is the debt structure, which can be bank or non-bank debt. In the three stages, control variables are included lagged by one year, in order to avoid simultaneity with the debt. Fixed-effect dummies are added to capture any heterogeneity due to omitted variables. The industry-year effect controls for possible shocks in specific industries, while country-year effect controls for shocks and changes in the institutional and regulatory environment in certain countries. The specific effect of the company controls for omitted variables that do not vary over time. In addition, the standard errors are grouped by country. The observations are independent between groups of countries clusters, but not necessarily within them. Both adjustments allow the control for specific effects of the companies that are not observed. According to Petersen (2009), this last adjustment is more appropriate since it pertains whether the individual effects are fixed or not.

$$\text{DebtS}_{it} = \alpha_0 + \alpha_1 \text{Crisis}_{kt} + \alpha_2 (\text{Crisis}_{kt} * \text{BankDebt07}_i) + \alpha_3 (\text{Crisis}_{kt} * \text{Drating07}_i) + \alpha_4 \text{Firm controls}_{it-1} + \lambda_{jt} + \theta_{kt} + \gamma_{ijk} + \mu_{ijkt} \quad (1)$$

where:

DebtS = Debt structure, corresponding to the percentage of bank and non-bank debt;
Crisis = dummy, being 1 after and 0 before the crisis; BankDebt07 = ratio between

bank debt and total assets at the end of 2007; Drating07 = dummy, being 1 for those companies that have a long-term debt rating at the end of 2007 and 0 for those that do not have it; Firm controls = size, tangibility, growth opportunity, profitability and liquidity, i = company; j = industry; k = country; t = year; λ_{jt} = industry-year effect; θ_{kt} = country-year effect; γ_{ijkt} = specific effects of the company; μ_{ijkt} = residuals.

In Table 5, a robustness test is performed considering variations of the two periods. In the first scenario, there is a reduction of the horizon of analysis for four years, with maintenance of the beginning of the crisis in 2008, 2004 to 2007 before and 2008 to 2011 after the crisis. In a second scenario, there is also a reduction to four years. However, a postponement of the beginning of the crisis is made for 2005 to 2008 and 2009 to 2012 after the crisis.

H2 is tested in Equation 2. The dependent variable is the maturity of the debt. The treatment group refers to companies with banking dependence, while the control group is composed of those without this dependence. Companies with banking dependence are those with a percentage of bank debt over total assets, in 2007, above the median of each country - dummy equal to one. In Table 6, initially only the dummy variable Crisis is included in the model. In this case, the coefficient β_1 captures the impact of changing the maturity of corporate debt after the onset of the crisis when they are less dependent on bank debt. In a second test, the interaction variable Crisis*DBankDebt07 is added. The coefficient β_2 then measures the impact of the financial crisis on the debt maturity of companies that are more dependent on bank financing. When the dependent variable is the percentage of long-term debt, a negative value is expected for β_2 and it is assumed that long-term debt will be replaced by short-term debt. When the dependent variable is the percentage of short-term debt, a positive value is expected for β_2 .

$$\text{DebtM}_{it} = \beta_0 + \beta_1 \text{Crisis}_{ikt} + \beta_2 (\text{Crisis}_{ikt} * \text{DBankDep07}_i) + \beta_3 \text{Firm controls}_{i,t-1} + \lambda_{jt} + \theta_{kt} + \gamma_{ijkt} + \mu_{ijkt} \quad (2)$$

where:

DebtM = Maturity of the debt, corresponding to the percentage of long and short-term debt; Crisis = dummy, being 1 after and 0 before the crisis; DBankDebt07 = dummy, 1 if ratio between bank debt and total assets at the end of 2007 is higher than the country median and 0 if it is lower; Firm controls = size, tangibility, growth opportunity, profitability and liquidity, i = company; j = industry; k = country; t = year; λ_{jt} = industry-year effect; θ_{kt} = country-year effect; γ_{ijkt} = specific effects of the company; μ_{ijkt} = residuals.

H3 is tested by Equation 3 for the sub-sample of companies that have banking dependence. To this end, the proxies of regulatory environment and financial development are included in Equation 1. The coefficients δ_2 and δ_3 , respectively, capture how the impact of the financial crisis on bank and non-bank debt ratios

changes when the regulatory environment is better or there is more bank competition. The application of a fixed-effects model circumvents problems of endogeneity in the level of corporate indebtedness, since these independent variables are invariant over time. Table 7 shows the changes in the debt structure of companies after the crisis, considering the regulatory environment and the banking concentration of the countries.

$$\text{DebtS}_{it} = \delta_0 + \delta_1 \text{Crisis}_{kt} + \delta_2 (\text{Crisis}_{kt} * \text{KKM07}_k) + \delta_3 (\text{Crisis}_{kt} * \text{Lerner07}_k) + \delta_4 (\text{Crisis}_{kt} * \text{BankDebt07}_i) + \delta_5 (\text{Crisis}_{kt} * \text{Drating07}_i) + \delta_6 \text{Firm controls}_{it-1} + \lambda_{jt} + \theta_{kt} + \gamma_{ijk} + \mu_{ijkt} \quad (3)$$

where:

DebtS = Debt structure, corresponding to the percentage of bank and non-bank debt; Crisis = dummy, being 1 after and 0 before the crisis; KKM07 = Kaufmann, Kraay and Mastruzzi Index (2010), obtained at the end of 2007. It is the average of six indicators, being voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption; Lerner07 = Lerner index obtained at the end of 2007. This is a measure of the power/concentration of the banking market; BankDebt07 = ratio between bank debt and total assets at the end of 2007; Drating07 = dummy, being 1 for those companies that have a long-term debt rating at the end of 2007 and 0 for those that do not have it; Firm controls = size, tangibility, growth opportunity, profitability and liquidity, i = company; j = industry; k = country; t = year; λ_{jt} = industry-year effect; θ_{kt} = country-year effect; γ_{ijk} = specific effects of the company; μ_{ijkt} = residuals.

4. Analysis of Results

Table 1 shows the average of the debt structure variables after the crisis - from 2003 to 2012 - for each sampled country. In addition, a matched mean difference test is performed to identify the statistical significance of these ratios between the two periods – after (POST) and before (PRE) the crisis. Chile (1.5%), Colombia (2%) and Mexico (1.7%) show an increase in their ratio between bank debt and total assets after the financial crisis. However, when considering the ratio of bank debt to total debt, Brazil (7.5%) stands out from the other countries with a reduction in its level of bank indebtedness. This result is corroborated by the fact that Brazil is the country with the highest level of bank indebtedness in 2007 (16.3%). Regarding the ratio between non-bank debt and total assets, after the financial crisis, Brazil and Mexico (2.8%) increase this ratio; while Argentina (3.9%), Chile (3.5%) and Peru (2.6%) decreased. Mexico (29.4%) is the country with the highest percentage of companies with a rating in 2007; while Peru had no rated companies at that time. These results corroborate H1 only for Brazilian companies, which are the largest in the sample.

Table 1. Debt structure before and after the financial crisis by country

Description	Argentina	Brazil	Chile	Colombia	Mexico	Peru
Number of companies	50	193	115	23	68	71
BDebtTA = bank debt/total asset	0.118	0.195	0.156	0.056	0.130	0.136
BDebtTA (POST – PRE crisis) = bank debt/total asset	0.000	-0.006	0.015 **	0.020 **	0.017 **	-0.003
NBDebtTA = non-bank debt/total asset	0.138	0.097	0.132	0.093	0.156	0.097
NBDebtTA (POST – PRE crisis) = non-bank debt/total asset	-0.039 ***	0.028 ***	-0.035 ***	-0.004	0.028 ***	-0.026 ***
BDebtTD = bank debt/total debt	0.541	0.712	0.591	0.343	0.500	0.582
BDebtTD (POST – PRE crisis) = bank debt/total debt	0.128 ***	-0.075 ***	0.085 ***	0.078 *	0.002	0.081 ***
BankDebt07 = bank debt/total asset in 2007	0.077	0.163	0.142	0.057	0.125	0.132
Drating07 = # companies that have rating in 2007	0.120	0.135	0.139	0.087	0.294	0.000

Notes: Levels of significance of 1% (***), 5% (**) and 10% (*).

Source: Own calculations.

Table 2 presents the average of debt-related variables before and after the global financial crisis, considering sub samples of companies with high and low banking dependence, as well as those with and without rating. For the total sample, on average, the ratio of bank and non-bank debt to total assets is 15.6% and 11.6%, respectively. The ratio between bank debt and total debt is 60.7%. In addition, there is a 1.8% increase in bank indebtedness in relation to total debt, before and after the financial crisis. However, companies with high banking dependence reduce this proportion by 3.4%. In the case of companies with low banking dependence, the opposite is true. They increase the ratio of bank debt to total assets (0.8%) and reduce the ratio of non-bank debt (0.7%).

As a consequence, there is a 5.4% increase in the ratio between bank debt and total debt when considering the difference between the periods before and after the aforementioned crisis. These results reinforce Hypothesis 1. In the financial crisis, there is replacement of bank by non-bank debt for the sub-sample of companies with high banking dependence. In the case of companies with a rating, they have the option of raising funds in the public debt market. Thus, there is a reduction of its bank debt level in relation to total assets (1.9%) and total debt (6%). There is also an increase in the funding of non-bank debt (3.1%). On the contrary, companies that do not have a rating have greater difficulty in raising funds in the public debt market. For them, there was an increase in bank debt in relation to total assets (0.7%) and total debt (3%), as well as a drop in non-bank debt (0.6%).

Table 2. Debt structure and financial dependence of companies

Description	Total sample	Companies with high banking dependence	Companies with low banking dependence	Companies with rating	Companies without rating
BDebtTA = bank debt/total asset	0.156	0.226	0.108	0.147	0.424
BDebtTA (POST – PRE crisis) = bank debt/total asset	0.004	-0.002	0.008 **	-0.019 ***	0.007 **
NBDebtTA = non-bank debt/total asset	0.116	0.092	0.133	0.187	0.424
NBDebtTA (POST – PRE crisis) = non-bank debt/total asset	-0.001	0.007	-0.007 *	0.031 ***	-0.006 **
BDebtTD = bank debt/total debt	0.607	0.730	0.522	0.447	0.424
BDebtTD (POST – PRE crisis) = bank debt/total debt	0.018 **	-0.034 ***	0.054 ***	-0.060 ***	0.030 ***

Notes: Levels of significance of 1% (***), 5% (**) and 10% (*).

Source: Own calculations.

Table 3 shows the average maturity of the debt by country, for the total sample, as well as for groups of companies with high and low banking dependence. On average, companies in the countries have a ratio of 17.8% (9.4%) of long (short) debt to total assets. However, when considering the relationship between long-term debt and total debt, this percentage increases to 59.3%. The analysis of the sub-sample of firms with high banking dependence points to an increase (reduction) of long (short) term debt, after the financial crisis, contrary to the behavior presented by companies from developed countries (Fernández *et al.*, 2013; González, 2015). The only country that presents a reduction (increase) of the long (short) term debt is Mexico. This country, close to the United States (US), is the most dependent upon US decisions.

In the case of Brazil, for example, the National Economic and Social Development Bank (BNDES) is the main source of long-term credit for companies. It operates with subsidized rates, being below the average market rates of short-term interest rates (Ferraz and Coutinho, 2019). In other Latin American countries, on a much smaller scale, other development or government banks fulfill this function.

Table 3. Debt maturity before and after the financial crisis

Description	AR	BR	CH	CO	ME	PE	Total	HBD	LBD
LTDebtTA = long-term debt/total asset	0.144	0.186	0.204	0.101	0.207	0.134	0.178	0.205	0.141
LTDebtTA (POST – PRE crisis) = long-term debt/total asset	-0.011	0.027 ***	-0.001	0.014	0.026 ***	-0.012 *	0.011 ***	0.015 ***	0.004 **
STDebtTA = short-term debt/total asset	0.111	0.106	0.084	0.044	0.077	0.098	0.094	0.111	0.092
STDebtTA (POST – PRE crisis) = short-term debt/total asset	-0.025 **	-0.004	-0.018 ** *	0.004	0.021 ***	-0.015 ***	-0.007 ***	-0.009 **	-0.004 *
LTDebtTD = long-term debt/total debt	0.489	0.591	0.636	0.580	0.692	0.511	0.593	0.620	0.509
LTDebtTD (POST – PRE crisis) = long-term debt/total debt	-0.019	0.049 ***	0.044 ***	0.032	-0.045 **	0.003	0.022 ***	0.032 ***	0.011 *

Notes: AR = Argentina; BR = Brazil; CH = Chile; CO = Colombia; ME = Mexico; PE = Peru; HBP = Companies with high banking dependence; LBP = Companies with low banking dependence; Levels of significance of 1% (***), 5% (**) and 10% (*).

Source: Own calculations.

Tables 4 to 7 present the results of the DID tests relating to the hypotheses of this study. Table 4 indicates the result referring to Equation 1. In models 1, 4 and 7 only the crisis dummy variable is included. In this case, the α_1 coefficient captures the impact of the change in the corporate debt structure after the onset of the crisis. In model 1, there is a reduction of bank debt by 0.19%, after the start of the crisis, when the ratio of debt to total assets is considered. However, model 7 points to an opposite result, with a 0.20% increase in bank debt in relation to total debt.

Models 2, 5 and 8 add an interaction variable between crisis and bank debt, considering the bank dependence as a dummy. For these models, the coefficient α_2 of the interaction variables measures the impact of the financial crisis on the debt structure of companies that are dependent on bank financing. When the dependent variable is the bank debt, a negative value is expected for α_2 and it is assumed that the substitution of bank debts for non-banks is assumed. When the dependent variable is the non-bank debt, a positive value is expected for α_2 .

Model 2 in which bank debt is a ratio between bank and total asset – doesn't present a reduction at bank debt level. However, model 8 - in which bank debt is a ratio between bank and total debt - indicates that there is a reduction in the level of bank indebtedness for companies that are more dependent on this type of debt. Model 5 shows that these companies partially replace bank debt by non-bank debt or by other possible sources of capital.

Models 3, 6 and 9 add an interaction variable between crisis and the existence of credit rating for long-term debt in 2007. In this case, α_2 measures the difference in the impact of the crisis on the level of leverage of companies that are dependent on bank debt and do not have a long-term debt rating. As these companies have less access to the capital market, the change in the percentage of non-bank debt of companies without long-term debt rating is considered as a proxy for the change in non-bank private debts. In turn, α_3 captures the impact of the presence of the crisis on companies that have long-term debt ratings. A possible difference in the behavior of these companies may be associated with their access to the capital market and changes in non-bank public debt.

The positive coefficient of the Crisis*Drating07 variable of model 6 and its non-significance in models 3 and 9 indicate that companies that have a long-term debt credit rating after the crisis increase their debt ratios inter alia, by virtue of their access to the capital market, that is to say by means of public issues. Although it is worth noting that the coefficient of the variable Crisis*DBankDebt07 in model 5 remains positive and significant after the crisis. This fact suggests the relevance of private non-bank debt as a substitute for bank debt. In economic terms this means that companies that have a rating or that access the public debt market after the crisis increase their non-bank debt by 0.03%. Those with banking dependence increase their private non-bank debt by 0.01%. The results of Table 4 confirm H1. This result is also verified in the study by Fernández *et al.* (2018).

Regarding the control variables, the most significant results occur in models 1 to 3, where the dependent variable is bank debt in relation to total assets. In these models, the positive coefficient of the size variable is in agreement with the trade-off theory. Banks lend more to larger companies. On the other hand, the negative coefficients of the variables of profitability and liquidity are in line with the pecking order theory, with a prioritization of internal sources to the detriment of debt. In the case of models 4 to 6, where the dependent variable is non-bank debt, there is a negative relation with the growth opportunity proxy.

According to agency theory, debt-financed companies risk less, giving up valuable potential investment alternatives, establishing a conflict of interest between shareholders and managers. The opposite relationship is verified in the models of bank indebtedness.

Table 4. Changes in the structure of debts after the financial crisis

Variables	BDebtTA = Bank debt/Total asset			NBDebtTA = Non-bank debt/Total asset			BDebtTD = Bank debt/Total debt		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crisis	-0.19 ***	0.04 ***	0.15 ***	-0.04	-0.10 ***	0.14 **	0.20 **	0.28 ***	0.17 ***
Crisis* DBankDebt07	n/a	-0.01	-0.01	n/a	0.01 *	0.01 *	n/a	-0.06 **	-0.07 **
Crisis* Drating07	n/a	n/a	-0.01	n/a	n/a	0.03 ***	n/a	n/a	-0.08
Size _{t-1}	0.03 *	0.03 *	0.03 *	0.01	0.01	0.01	-0.01	-0.00	-0.00
Tang _{t-1}	-0.01	-0.01	-0.01	0.01	0.01	0.01	0.00	-0.01	-0.01
GrOp _{t-1}	0.20 ***	0.20 ***	0.21 ***	-0.13 **	-0.13 **	-0.13 **	0.38 **	0.37 **	0.39* *
Profit _{t-1}	-0.12 **	-0.13 **	-0.13 **	-0.11	-0.11	-0.11	0.13	0.12	0.12
Liq _{t-1}	-0.02 **	-0.02 **	-0.02 **	-0.00	-0.00	-0.00	-0.02	-0.02	-0.02
Industry-year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster by country (SE)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.00	0.01	0.00	0.00	0.00	0.05	0.01	0.00	0.00
F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
# Obs	5200	5200	5200	5200	5200	5200	5200	5200	5200
# Firms	520	520	520	520	520	520	520	520	520

Notes: n/a: not applicable; significance levels of 1% (***), 5% (**) and 10% (*); SE = standard error.

Source: Own calculations.

In turn, Table 5 presents the results of robustness tests of changes in debt structure after the financial crisis - see Equation 1. The country-year fixed effect controls for shocks and changes in the institutional and regulatory environment in certain countries, avoiding a possible correlation with the crisis dummy variables. Its exclusion in models 1, 5 and 9 of Table 5 does not change the results obtained in models 5, 10 and 15 of Table 4. The control by country-year dummy can completely remove the correlation between the observations in the same period if the effect is fixed. However, if it varies, Petersen (2009) suggests clustering the standard errors in order to capture the unspecified correlations between the observations of the same unit in different periods. The exclusion of clustering from the countries' standard errors in models 2, 6 and 10 of Table 5 presents similar results.

The scenario that considers a possible lagged effect of the crisis, starting in 2009 - models 4, 8 and 12 of Table 5 - presents similar results to models 5 and 10 of Table 4. This means that the effects of the financial crisis on the structure of debts are

perceived in 2008 and remain consistent in 2009. However, the scenario that considers the crisis period between 2008 and 2011 - models 3, 7 and 11 of Table 5 - presents different results only for the variable Crisis, in relation to the models 5 and 10 of Table 4, being similar in the other variables. This is partly due to the fact that in 2012 non-bank debt accounts represent almost two times the bank debt. The negative coefficients of Crisis*DBankDebt07 in models 11 and 12 of Table 5 confirm the results obtained by model 15 of Table 4. In addition, in both Tables 4 (model 10) and 5 (models 7 and 8), is identified that after the crisis there is an increase in public non-bank debt (Crisis*Drating07) and private debt of firms with greater banking dependence (Crisis*DBankDebt07).

Table 5. Robustness tests on changes in debt structure after the financial crisis

Variables	BDebtTA = Bank debt/Total asset				NBDebtTA = Non-bank debt/Total asset				BDebtTD = Bank debt/Total debt			
	WC YFE	WSE CC	CP08 -11	CP09 -12	WC YFE	WSE CC	CP08 -11	CP09 -12	WC YFE	WSE CC	CP08 -11	CP09 -12
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
C	0.11 ***	0.24 **	-0.18 ***	0.13 **	-0.06 *	-0.16 *	-0.05 *	0.08	0.44 **	0.19	0.20 ***	-0.15 *
C*DBD	-0.01	-0.01 **	-0.02 **	-0.04 ***	0.01 *	0.01 **	0.02 **	0.03 ***	-0.07 **	-0.07 ***	-0.10 ***	-0.14 ***
C*DR	-0.01	-0.02 *	-0.01	-0.01	0.04 ***	0.03 ***	0.03 ***	0.03 ***	-0.09	-0.08 **	-0.08	-0.06
S	0.02	0.03 ***	0.02	0.02	0.02 *	0.01 ***	0.02 *	0.01 *	-0.05 ***	-0.00	-0.01	0.00
T	-0.01	-0.01	-0.01	-0.01	0.00	0.01	-0.00	-0.01	-0.01	-0.01	0.01	-0.01
GP	0.21 ***	0.21 ***	0.18 ***	0.15 ***	-0.15 ***	-0.13 ***	-0.12 *	-0.10	0.46 ***	0.39 ***	0.46 ***	0.33 ***
P	-0.14 ***	-0.13 ***	-0.12 **	-0.12 ***	-0.11	-0.11 ***	-0.10	-0.06	0.14	0.12	0.07	0.01
L	-0.02 **	-0.02 ***	-0.02 **	-0.02 ***	-0.00	-0.00	-0.00	-0.00	-0.02	-0.02 ***	-0.02	-0.02
IYE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CYE	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
FSE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CBC (SE)	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes
R ²	0.01	0.02	0.01	0.00	0.08	0.08	0.00	0.02	0.02	0.05	0.00	0.02
F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Obs	5200	5200	4160	4160	5200	5200	4160	4160	5200	5200	4160	4160
Firm	520	520	520	520	520	520	520	520	520	520	520	520

Notes: significance levels of 1% (***), 5% (**) and 10% (*); SE = standard error; WCYFE = Without country-year fixed effect; WSECC = Without SE clustered by country; CP08-11 = Crisis period 2008-2011; CP09-12 = Crisis period 2009-2012; C = Crisis; C*DBD = Crisis*DBankDebt07; C*DR = Crisis*Drating07; S = Size_{t-1}; T = Tangibility_{t-1}; GO = Groth opportunity_{t-1}; P = Profit_{t-1}; L = Liquidity_{t-1}; IYE = Industry-year effect; CYE = Country-year effect; FSE = Firm-specific effect; CBC(SE) = Cluster by country (SE).
Source: Own calculations.

Table 6 presents the results of the Equation 2 tests, when analyzing the changes in the maturity of the debts after the financial crisis. In models 1 and 5, it is observed that there is a reduction of long-term debt, after the onset of the global financial

crisis, for companies not dependent on bank debt. However, the inclusion of the Crisis*DBankDebt07 interaction variable is not statistically significant. This means that the fact that the company has a banking dependency does not reduce its long-term debt after the crisis, according to the results of models 2 and 6. In addition, contrary to expectations, there is also a reduction of short-term debt, after the start of the financial crisis, for companies with and without banking dependence - see models 3 and 4. In Latin America, governmental banks usually contribute with the largest portion of long-term credit, while non-governmental banks lend more short-term loans to companies. According to Table 6, it can be seen that both of them reduce their supply of resources to companies.

These results do not allow the confirmation of H2. Similar to the result obtained by this study, Fernández *et al.* (2013) identify a reduction in the maturity of corporate debt in general in post-financial crisis periods, not specifically analyzing the issue of corporate banking dependence. The study by González (2015) identifies that the reduction of debt maturity occurs only for companies that had greater dependence on banks before the financial crisis. This was due to an increase in the volume of short-term debt.

Table 6. Changes in the maturity of debts after the financial crisis

Variables	LTDebtTA = Long-term debt/Total asset		STDebtTA = Short-term debt/Total asset		LTDebtTD = Long-term debt/Total debt	
	(1)	(2)	(3)	(4)	(5)	(6)
Crisis	-0.09 **	-0.047 ***	-0.16 ***	-0.02 *	-0.54 ***	-0.71 ***
Crisis*DBankDebt07	n/a	0.01	n/a	-0.01 *	n/a	0.01
Size _{t-1}	0.04 **	0.04 **	0.01	0.01	0.06 **	0.06 *
Tang _{t-1}	-0.01	-0.01	-0.00	-0.00	0.05	0.05
GrOp _{t-1}	0.17 ***	0.18 ***	-0.07 *	-0.07 *	0.37 **	0.37 **
Profit _{t-1}	-0.17 *	-0.17 *	-0.07 *	-0.07 *	-0.05	-0.05
Liq _{t-1}	0.00	0.00	-0.03 ***	-0.03 ***	0.04 **	0.04 **
Industry-year effect	Yes	Yes	Yes	Yes	Yes	Yes
Country-year effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific effect	Yes	Yes	Yes	Yes	Yes	Yes
Cluster by country (SE)	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.05	0.03	0.01	0.03	0.00	0.00
F	0.00	0.00	0.00	0.00	0.00	0.00
# Obs	5200	5200	5200	5200	5200	5200
# Firms	520	520	520	520	520	520

Notes: n/a: not applicable; significance levels of 1% (***), 5% (**) and 10% (*); SE = standard error.

Source: Own calculations.

Table 7 tests Equation 3. It analyzes the changes in debt structures after the financial crisis, considering the regulatory environment (KKM07) and financial development

(Lerner07) of the countries. The results indicate that, after the onset of the crisis, there is a decrease in bank debts (models 1 and 3) and an increase in non-bank debt (model 2), especially in countries with a better regulatory environment, such as Chile. However, with respect to the financial development proxy or bank competition, it is omitted from the regression test result because of its high collinearity. In fact, there is a positive and significant correlation of about 96% between Crisis*Lerner07 and Crisis.

This suggests that after the onset of the financial crisis there is a greater level of banking concentration in these markets. Data provided by the World Bank's Global Financial Development Database (GFDD) show an increase in bank concentration through two other proxies, in addition to the Lerner index itself. The first refers to the banking concentration of the assets of the three largest banks in relation to the total assets of commercial banks. In this case, there is an increase of about 10% of this index for Brazil, between the periods after (2008-2012) and before the crisis (2003-2007). The second one analyzes the percentage of assets of the five largest banks in relation to the total assets of commercial banks. For them, there is an even more significant increase, being 13.4% for Brazil, 0.63% for Chile and 2.2% for Colombia. It is worth mentioning that Brazil represents 37%, Chile 22% and Colombia 4%, totaling 63% of the sample.

In view of the above, H3a; but not H3b. These results differ from those obtained by Fernández *et al.* (2018). Contrary to expectations, its study points to a reduction of non-bank debt, after the crisis, when a country presents a better level of regulatory environment. In addition, they noted that the fact of the country has a greater concentration of banking, it stimulates the capture of non-bank debt by companies after the global financial crisis.

Table 7a. Changes in debt structures after the financial crisis, considering the regulatory environment and financial development of the countries

Variables	BDebtTA = Bank debt/Total asset	NBDebtTA = Non-bank debt/Total asset	BDebtTD = Bank debt/Total debt
	(1)	(2)	(3)
Crisis	-0.10 **	0.03	-0.09 ***
Crisis*KKM07	-0.15 ***	0.24 ***	-0.85 ***
Crisis*BankDebt07	-0.06	0.01	-0.23 **
Crisis*Drating07	-0.02	0.03 ***	-0.08
Size _{t-1}	0.03 *	0.01	-0.00
Tang _{t-1}	-0.01	0.00	-0.01
GrOp _{t-1}	0.21 ***	-0.13 **	0.40 **
Profit _{t-1}	-0.13 ***	-0.11	0.14
Liq _{t-1}	-0.02 **	-0.00	-0.02
Industry-year effect	Yes	Yes	Yes

Table 7b. Changes in debt structures after the financial crisis, considering the regulatory environment and financial development of the countries (continuation)

Variables	BDebtTA = Bank debt/Total asset	NBDebtTA = Non- bank debt/Total asset	BDebtTD = Bank debt/Total debt
Country-year effect	Yes	Yes	Yes
Firm-specific effect	Yes	Yes	Yes
Cluster by country (SE)	Yes	Yes	Yes
R ²	0.02	0.01	0.00
F	0.00	0.00	0.00
# Obs	5200	5200	5200
# Firms	520	520	520

Notes: Levels of significance of 1% (***), 5% (**) and 10% (*); SE = standard error.

Source: Own calculations.

5. Conclusion

The global financial crisis, originating in the United States at the end of 2007, caused a shock in the supply of credit in several countries. As a consequence, non-financial companies sought alternative sources of third-party capital, particularly public and private non-bank debt. Another impact of the crisis on the corporate debt structure was reduction of its maturity, especially for those with greater banking dependence. In addition, prestudies with developed countries show that a better regulatory environment and greater competition in the banking market encourages the replacement of bank by non-bank debt. Unlike previous crises, this last global crisis does not originate in emerging markets. However, the previous experience they accumulated made it easier for them to undertake a process of successful transform.

In the case of Latin America, Brazil, Mexico, Argentina, Colombia, Chile and Peru are a useful sample with about 78% of the region's GDP in 2017. This study examined the impact of the recent global financial crisis upon the corporate sector. A sample of 520 non-financial public and private companies is analyzed. Hypotheses are tested using difference-in-differences models, considering previous years 2003-2007 and a period, 2008-2012, to the crisis.

Like the results of Fernández *et al.* (2018), this study confirms how non-bank sources arose to replace previous bank debt. Tables 1, 2 and 4 indicate the replacement occurring not only for companies in general, but also for those with greater initial banking dependence before the crisis, confirming H1. The new non-bank credit consists of public and private debts. Alternative sources of debt by companies is not limited to the issuance of fixed income securities such as debentures. Other options are available to companies indicating the prior development of diversity in these markets.

Two theories try to clarify this replacement of bank by non-bank debt. The first one argues that the banking system did not maintain credit supply, forcing companies to seek other sources (Brunnermeier, 2009; Shleifer and Vishny, 2010). The second one indicates that the increase of uncertainty and the reduction in the demand for products encouraged companies to decrease their investment and leverage (Kahle and Stulz, 2013).

Table 6 shows a reduction of long and short-term debt after the financial crisis, regardless of the level of banking dependence of the companies. This goes against H2 - *In a financial crisis, companies with banking dependence reduce the maturity of their debts*. In times of cyclical crisis, conflict of interests between creditors and debtors occur more frequently. Banks then prefer short-term contracts, since they allow for more frequent monitoring and changing of their terms. In the case of Latin American countries, it is important to highlight the role of development and governmental banks in granting long-term credit (eg BNDES in Brazil). Non-governmental banks, in particular, become responsible only for supplying short-term credit. Table 6, shows that both governmental and non-governmental agencies reduce their supply of long-term resources to the companies. The reduction of long-term debt, after the crisis, for companies in general, is verified in the study by Fernández *et al.* (2013). However, González (2015) notes this occurs in an increase in the volume of short-term bank debt, but only for companies that have greater dependence on banks before the financial crisis.

In turn, the influence of the countries' regulatory environment is indicated by the Kaufmann, Kraay and Mastruzzi index in the year 2007 (KKM07). Table 7 shows that a better regulatory environment encourages the substitution of non-bank debt for those of banks. This result confirms H3a - *In a financial crisis, better regulatory environment favors the replacement of bank by non-bank debt*. According to Orman and Köksal (2017), the quality of the regulatory environment and bank competition directly influence the availability of credit to companies.

Financial development is measured by a proxy of bank competition, represented by the Lerner index in 2007 (Lerner07). The interaction variable Crisis*Lerner07 is omitted from the model, due to its high collinearity with the variable Crisis. Analysis of other banking competition proxies provided by the World Bank confirms that the assets of the three and five largest banks in relation to the total assets of commercial banks increases in the years following the financial crisis (2008-2012) for Brazil, Chile and Colombia. The companies in these countries represent 63% of the sample of this study. Therefore, it is not possible to confirm H3b - *In a financial crisis, greater financial development favors the replacement of bank by non-bank debt*. The study of Fernández *et al.* (2018) also is unable to confirm hypothesis 3, using these same explanatory variables.

One of the principal contributions of this study is the finding that companies in the main Latin American countries replace their banking credit by utilizing non-banks,

just as done by the developed countries. Understanding better this effect of the global financial crisis may lead to helpful permanent macroeconomic and microeconomic measures. An example is the implementation of new bankruptcy and judicial reorganization laws, improvement of the positive debtor register and clearer rules for the delivery of guarantees in bank borrowing, as well as possible adjustments in the Basle agreement.

These results also suggest questions for future research. Each Latin American country faces many problems that are motivated by diverse events - political, for example - that impact the economy. That task involves the broadening of this methodology to incorporate internal shocks as well as global crisis.

References:

- Angrist, J., Pischke, J.S. 2008. *Mostly harmless econometrics*. Princeton University Press, United States of America.
- Antoniou, A., Guney, Y., Paudyal, K. 2008. The determinants of corporate debt ownership structure: Evidence from market-based and bank-based economies. *Managerial Finance*, 34(12), 821-847. <https://doi.org/10.1108/03074350810915806>.
- Ardalan, K. 2017. Capital structure theory: reconsidered. *Research in International Business and Finance*, 39(B), 696-710. <https://doi.org/10.1016/j.ribaf.2015.11.010>.
- Arena M.P. 2011. The corporate choice between public debt, bank loans, traditional private debt placements, and 144A debt issues. *Review of Quantitative Finance and Accounting*, 36(3), 391-416. <https://doi.org/10.1007/s11156-010-0182-3>.
- Attig, N., Boubakri, N., Ghoual, S.E., Guedhami, O. 2016. The global financial crisis, family control, and dividend policy. *Financial Management*, 45(2), 291-313. <https://doi.org/10.1111/fima.12115>.
- Berg, T., Gider, J. 2017. What explains the difference in leverage between banks and nbanks? *Journal of Financial and Quantitative Analysis*, 52(6), 2677-2702. <https://doi.org/10.1016/j.jbankfin.2005.05.015>.
- Brunnermeier, M. 2009. Deciphering the liquidity and credit crunch 2007–2008. *Journal of Economic Perspectives*, 23, 77-100. <http://dx.doi.org/10.1257/jep.23.1.77>.
- Chiqueto, F., Silva, R.L.M., Colossal, G., Carvalho, L.N.G. 2015. Relevance of fair value of Brazilian banks securities in the financial crisis. *International Journal of Emerging Markets*, 10(4), 684-696. <http://dx.doi.org/10.1108/IJoEM-11-2012-0150>.
- Bebchuk, L.A., Cohen, A., Hirst, S. 2017. The agency problems of institutional investors. *Journal of Economic Perspectives*, 31(3), 89-112. <https://doi.org/10.1257/jep.31.3.89>.
- Colla, P., Ippolito, F., Li, K. 2013. Debt Specialization. *Journal of Finance*, 68(5), 2117-2141. <http://dx.doi.org/10.1111/jofi.12052>.
- De Gregorio, J. 2013. *How Latin America weathered the global financial crisis*. Peterson Institute for International Economics, Washington, DC.
- Demirgüç-Kunt, A., Pería, M.S.M. 2010. A framework for analyzing competition in the banking sector: an application to the case of Jordan. Policy Research Working Paper, 5499, 1-26. Development Research Group, The World Bank. <http://documents.worldbank.org/curated/en/349041468063241288/pdf/WPS5499.pdf>.
- Denis, D.J. Mihov, V.T. 2003. The choice among bank debt, n-bank private debt, and public debt: evidence from new corporate borrowings. *Journal of Financial Economic*, 70(1), 3-28. <https://doi.org/10.1016/S0304-405X0300140-5>.

- Fernández, A.I., González, F., Suárez, N. 2013. Banking crises and the lending channel: Evidence from industrial firms in developing countries. *Revista Española de Financiación y Contabilidad*, XLII(158), 137-163. <https://doi.org/10.1080/02102412.2013.10779743>.
- Fernández, A.I., González, F., Suárez, N. 2018. Bank supply shocks and the substitution between bank and nbank debt, *Journal of Corporate Finance*, 48, 122-147. <https://doi.org/10.1016/j.jcorpfin.2017.10.010>.
- Ferraz, J.C., Coutinho, L. 2019. Investment policies, development finance and economic transformation: Lessons from BNDES, *Structural Change and Economic Dynamics*, 48, 86-102. <https://doi.org/10.1016/j.strueco.2017.11.008>.
- Gao, W., Zhu, F. 2015. Information asymmetry and capital structure around the world, *Pacific-Basin Finance Journal*, 32(C), 131-159. <https://doi.org/10.1016/j.pacfin.2015.01.005>.
- González, F. 2016. Creditor rights, bank competition, and corporate investment during the global financial crisis. *Journal of Corporate Finance*, 37(C), 249-270. <https://doi.org/10.1016/j.jcorpfin.2016.01.001>.
- González, V.M. 2015. The financial crisis and corporate debt maturity: The role of banking structure. *Journal of Corporate Finance*, 35(C), 310-328. <https://doi.org/10.1016/j.jcorpfin.2015.10.002>.
- Grima, S., Thalassinos, I.E. 2020. *Financial Derivatives: A Blessing or a Curse?* Emerald Publishing Co., London UK. ISBN: 9781789732467. <https://books.emeraldinsight.com/page/detail/Financial-Derivatives/?k=9781789732467>.
- Hall, T.W. 2012. The collateral channel: Evidence on leverage and asset tangibility. *Journal of Corporate Finance*, 18(3), 570-583. <https://doi.org/10.1016/j.jcorpfin.2011.12.003>.
- Jędrzejowska-Schiffauer, I., Schiffauer, P., Thalassinos, I.E. 2019. EU Regulatory Measures Following the Crises: What Impact on Corporate Governance of Financial Institutions? *European Research Studies Journal*, 22(3), 432-456.
- Jun, S.G., Jen, F.C. 2003. Trade-off model of debt maturity structure. *Review of Quantitative Finance and Accounting*, 20(1), 5-34. <https://doi-org.ezproxy.cul.columbia.edu/10.1023/A:1022190205033>.
- Kahle, K.M., Stulz, R.M. 2013. Access to capital, investment, and the financial crisis. *Journal of Financial Economics*, 110(2), 280-299. <https://doi.org/10.1016/j.jfineco.2013.02.014>.
- Kale, J.R., Meneghetti, C. 2011. The choice between public and private debt: a survey. *IIMB Management Review*, 23(1), 5-14. <https://doi.org/10.1016/j.iimb.2010.12.001>.
- Kaufmann, D., Kraay, A., Mastruzzi, M. 2010. The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the Rule of Law*, 3(2), 220-246. <https://doi.org/10.1017/S1876404511200046>.
- Kirch, G., Terra, P.R.S. 2012. Determinants of corporate debt maturity in South America: Do institutional quality and financial development matter? *Journal of Corporate Finance*, 18(4), 980-993. <https://doi.org/10.1016/j.jcorpfin.2012.05.004>.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A. 1998. Law and finance. *Journal of Political Economy*, 106(6), 1113-1155. <http://dx.doi.org/10.1086/250042>.
- Lee, M.J. 2016. *Matching, regression discontinuity, difference in differences, and beyond*. Oxford University Press, New York.
- Modigliani, F., Miller, M. 1958. The cost of capital, corporation finance and the theory of investment. *American Economic Review*, 48(3), 261-297. <http://www.jstor.org/stable/1809766>.
- Myers, S.C. 1977. Determinants of corporate borrowing, *Journal of Financial Economics*, 5(2), 147-175. <https://doi.org/10.1016/0304-405X7790015-0>.

- Myers, S.C., Majluf, N.S. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221. <https://doi.org/10.1016/0304-405X8490023-0>.
- Naga, M. 2018. What promotes/prevents firm bond issuance in emerging economies: Bank-firm relationship or information asymmetry? *International Review of Economics and Finance*, 56(C), 161-177. <https://doi.org/10.1016/j.iref.2017.10.022>.
- Nicoda, G, Regis, L. 2019. A trade-off theory of ownership and capital structure. *Journal of Financial Economics*, 131(3), 715-735. <https://doi.org/10.1016/j.jfineco.2018.09.001>.
- Orman, C., Köksal, B. 2017. Debt maturity across firm types: Evidence from a major developing economy. *Emerging Markets Review*, 30(C), 169-199. <https://doi.org/10.1016/j.ememar.2016.12.001>.
- Petersen, M.A. 2009. Estimating standard errors in finance panel data sets: comparing approaches. *The Review of Financial Studies*, 22(1), 435-480. <https://doi.org/10.1093/rfs/hhn053>.
- Petersen, M.A., Rajan, R.G. 1994. The benefits of lending relationships: evidence from small business data. *Journal of Finance*, 49(1), 1367-1400. <https://doi.org/10.1111/j.1540-6261.1994.tb04418.x>.
- Petersen, M.A., Rajan, R.G. 1995. The effect of credit market competition on lending relationships. *Quarterly Journal of Economics*, 110(2), 407-443. <https://doi.org/10.2307/2118445>.
- Purnanandam, A., Rajan, U. 2018. Growth option exercise and capital structure. *Review of Finance*, 22(1), 177-206. <https://doi.org/10.1093/rof/rfw062>.
- Rauh, J.D., Sufi, A. 2010. Capital structure and debt structure. *Review of Financial Studies*, 23(12), 4242-4280. <https://doi.org/doi:10.1093/rfs/hhq095>.
- Roberts, M.R., Whited, T.M. 2013. Endogeneity in empirical corporate finance. In *Handbook of the Economics of Finance*, 2, Part A, Chapter 7, 493-572. Elsevier, UK.
- Ross, S.A. 1977. Determination of financial structure: the incentive-signalling approach. *Bell Journal of Economics*, 8(1), 23-40. <http://dx.doi.org/10.2307/3003485>.
- Saona, P., Vallelado, E. 2014. Is bank-debt maturity contingent on the financial system? *Academia Revista Latinoamericana de Administración*, 27(2), 183-208. <http://dx.doi.org.ezproxy.cul.columbia.edu/10.1108/ARLA-09-2013-0141>.
- Sheikh, N.A., Wang, Z. 2011. Determinants of capital structure: an empirical study of firms in manufacturing industry of Pakistan. *Managerial Finance*, 37(2), 117-133. <https://doi.org/10.1108/03074351111103668>.
- Shleifer, A., Vishny, R. 2010. Unstable banking. *Journal of Financial Economics*, 97(3), 306-318. <https://doi.org/10.1016/j.jfineco.2009.10.007>.
- Sony, B., Bhaduri, S. 2018. Information asymmetry and equity issue decision of low-leverage firms. *Managerial Finance*, 44(11), 1330-1346. <https://doi.org/10.1108/MF-04-2018-0158>.
- Thalassinos, I.E., Thalassinos, E.P., Venedictova, B., Yordanov, V. 2015a. Currency Board Arrangement Capital Structure Macro-Financial Diagnostic. SSRN-id2624333.pdf.
- Thalassinos, I.E., Stamatopoulos, D.T., Thalassinos, E.P. 2015b. The European Sovereign Debt Crisis and the Role of Credit Swaps. Chapter book in *The WSPC Handbook of Futures Markets* (eds) W. T. Ziemba and A.G. Malliaris, in memory of Late Milton Miller (Nobel 1990) *World Scientific Handbook in Financial Economic Series Vol. 5*, Chapter 20, 605-639. DOI: 10.1142/9789814566926_0020.
- Thalassinos, I.E. and Stamatopoulos, V.T. 2015. The Trilemma and the Eurozone: A Pre-Announced Tragedy of the Hellenic Debt Crisis. *International Journal of Economics and Business Administration*, 3(3), 27-40. DOI:10.35808/ijeba/77.

Tozzini Freire. 2018. Legislative bill on judicial reorganization and bankruptcy was sent to the Brazilian national congress. Business restructuring and judicial reorganization. <http://tozzinifreire.com.br/en/noticias/legislative-bill-on-judicial-reorganization-and-bankruptcy-was-sent-to-the-brazilian-national-congress>.

Word Bank. 2020. GDP growth annual %. DataBank.

<https://databank.worldbank.org/data/reports.aspx?source=world-development-indicators#>.

Appendix A. Description of variables

Initials	Name	Formula	Source	References
Debt structure (DebtS)				
BDebtTA	Bank debt on total assets	$BDebtTA = \text{Bank debt} / \text{Total assets}$	Capital IQ	Saona and Vallelado (2014); Fernández <i>et al.</i> (2018)
NBDebtTA	Non-bank debt on total asset	$NBDebtTA = \text{Non-bank debt} / \text{Total asset}$	Capital IQ	Fernández <i>et al.</i> (2018)
BDebtTD	Bank debt on total debt	$BDebtTD = \text{Bank debt} / \text{Total debt}$	Capital IQ	Fernández <i>et al.</i> (2013, 2018)
Debt maturity (DebtM)				
LTDebtTA	Long-term debt on total asset	$LTDebtTA = \text{Long-term debt} / \text{Total asset}$	Capital IQ	Hall (2012)
STDebtTA	Short-term debt on total asset	$STDebtTA = \text{Short-term debt} / \text{Total asset}$	Capital IQ	Hall (2012)
LTDebtTD	Long-term debt on total debt	$LTDebtTD = \text{Long-term debt} / \text{Total debt}$	Capital IQ	Hall (2012); Saona and Vallelado (2014); Gao and Zhu (2015)
Financial crisis				
Crisis	Global financial crisis	Crisis = 1 (2008 to 2012) and 0 (2003 to 2007)	n/a	González (2015); Fernández <i>et al.</i> (2018)
Bank dependency				
BankDebt07	Bank debt in 2007	$BankDebt07 = \text{Bank debt} / \text{Total asset}$	Capital IQ	Fernández <i>et al.</i> (2018)
DBankDebt07	Dummy of bank debt dependence in 2007	$DBankDebt07 = 1$ (if value > median of country bank debt in 2007) and 0 (if value ≤ median of country bank debt in 2007)	Capital IQ	Fernández <i>et al.</i> (2018)
Drating07	Dummy of credit rating in 2007	$Drating07 = 1$ (if there is a rating for long-term debt) and 0 (if there is no rating for long-term debt)	Capital IQ	Fernández <i>et al.</i> (2018)
Regulatory environment and financial development				
KKM07	Kaufmann Kraay and Mastruzzi index in 2007	KKM07 = It varies between -2.5 and 2.5. The higher the regulatory environment index, the better	Worldwide Governance Indicators (WGI) – World Bank	Kirch and Terra (2012); González (2015)
Lerner07	Lerner index in	$Lerner07 = \text{It varies}$	Global	González (2016);

	2007	between 0 and 1. The higher the bank competition index, the worse	Financial Development Database (GFDD)- World Bank	Fernández <i>et al.</i> (2018)
--	------	---	---	--------------------------------

Control variables				
Size	Size	Size = Ln (Total asset)	Capital IQ	Antoniou <i>et al.</i> (2008); Arena (2011); Colla <i>et al.</i> (2013)
Tang	Tangibility	Tang = Net fixed asset/Total asset	Capital IQ	Antoniou <i>et al.</i> (2008); Arena (2011); Colla <i>et al.</i> (2013); Gao and Zhu (2015); Berg and Gider (2017)
GrOp	Growth opportunity	GrOp = Capital expenditures/Total asset	Capital IQ	Arena (2011); Colla <i>et al.</i> (2013); Purnanandam and Rajan (2018)
Control variables				
Profit	Profitability	Profit = Ebit/Total asset	Capital IQ	Antoniou <i>et al.</i> (2008); Arena (2011); Colla <i>et al.</i> (2013); Saona and Vallelado (2014); Nagano (2018)
Liq	Liquidity	Liq = Current asset/Current liability	Capital IQ	Antoniou <i>et al.</i> (2008); Sheikh and Wang (2011)