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The Brazilian Bankruptcy Law Experiment

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THE BRAZILIAN BANKRUPTCY LAW EXPERIMENT

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Abstract

In early 2005 a new bankruptcy law was approved by the Brazilian Congress, taking effect a few months later. The new legislation improved creditor protection and the bankruptcy system's efficiency. This paper tries to shed some light on the empirical consequences of a bankruptcy reform on a poorly developed credit market. Using data from Argentine, Brazilian, Chilean and Mexican firms, we estimated two diff-in-diff models with differential trends: one with a firm-specific trend and the other with a country-specific macro trend. Both models yielded similar results. We found significant impacts on the supply of credit, the cost of debt, and the supply of secured, unsecured and long-term debt. No significant impacts were found for the level of short-term debt.

Keywords: Financing Policy; Bankruptcy; Law.

JEL Codes: G32; G33; K2.

1 – Introduction

This paper examines the effects of changes in an important institution that regulates the corporate environment: the bankruptcy law. We analyze how changes in bankruptcy law design impact firms' debt policy, focusing on the Brazilian experience with bankruptcy reform in 2005.

Historically, the Brazilian credit market was not an easy source of firm financing. The supply of private credit was notoriously tight compared with developed or even other developing countries. Information from the World Bank indicates that the Brazilian ratio of private credit to GDP was low (0.35) compared not only to the OECD countries (1.02), but also compared to the average value of Latin American and Caribbean countries (0.44).[1] Moreover, an important part of the available credit came -- and still comes -- from the state-owned National Bank for Economic and Social Development,[2] which finances a large share of non-housing investments at subsidized interest rates. The interest rate spread confirms this situation: the Brazilian spread (49%) is more than four times larger than the average spread in Latin American countries (11%) and more than twelve times larger than the average for OECD countries (3.87%).

One possible explanation for such a scenario is the obsolete procedures under the former Brazilian Bankruptcy Law. In Brazil, creditors historically had a low recovery rate from insolvent debtors, thus inhibiting the supply of credit and raising the interest rate spread.

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[1] All figures refer to the 1997-2002 period. Source: World Development Indicator database 2004.
[2] Banco Nacional de Desenvolvimento Econômico e Social (BNDES) in Portuguese.

Until the new legislation came into effect, the recovery rate of Brazilian creditors in case of bankruptcy was only 0.2%, while the average of Latin American and OECD countries was 26% and 72% respectively, according to Djankov et al. (2008).

The reform of the Brazilian Bankruptcy Law was intended to modify this scenario.[3] One of the most significant changes was to enhance the protection given to creditors, which was implemented through two channels: first, the new law increased their priority order to receive proceeds; and second, it allowed them to actively participate in the reorganization procedure. These changes are also expected to increase the efficiency of the bankruptcy system by reducing the cost and time of both reorganization and liquidation, leading to an increase in the value of distressed firms. Therefore, the new law not only makes creditors more likely to receive some of their credits, but it also probably increases the residual value of the bankrupt firm, elevating the creditors' recovery rates. Both of these effects tend to have a positive impact on the credit markets.

Several works formalize theories on private credit. Townsend (1979), Aghion and Bolton (1992), and Hart and Moore (1994, 1998) show that when lenders can more easily force repayment they are more willing to extend credit. Scott Jr (1977) theoretically addressed the relationship between capital structure and bankruptcy. When firms take on secured debt, they are not only giving a promise of future repayment, but also the right to the lender to be the first in order of priority in case of bankruptcy. Thus, the priority order defined by bankruptcy legislation has a significant value since it reduces the chance that debtors will not be repaid. This value affects the supply of credit and the cost of debt capital

[3]Gine and Love (2007) and Gamboa-Cavazos and Schneider (2007) studied the effects of bankruptcy reform in Colombia and Mexico, respectively.

and as a consequence firms' financing policies.

Findings on credit market development stress the important role of the legal protection of creditors and the efficiency of debt enforcement in supporting these markets (e.g., La Porta et al.,1997; La Porta et al.,1998; Djankov et al., 2007 and Djankov et al., 2008). Considering the effect of information on credit markets, Jappelli and Pagano (2000, 2002), Pagano and Jappelli (1993) and Sapienza (2002) showed the relevance of this factor in determining credit availability.

The current empirical literature stresses that creditor protection through the legal system is associated with a broader credit market in a monotone way: the higher the protection to creditors, the more developed the credit market is (e.g., La Porta et al.,1997 and Djankov et al., 2007). Araujo and Funchal (2006) showed how this result changes if the degree of punishment to debtors is the only determinant of creditors' protection. They found that higher levels of creditor protection will not provide a broader credit market. In fact, there is an intermediate level of protection that is optimal for the development of such market. In the present paper we show evidence, using the Brazilian Bankruptcy Reform as an experiment, that the positive relationship between creditor protection and credit market conditions is valid for countries whose laws do not guarantee the basic rights of creditors, such as Brazil. In addition to creditor protection arguments, Djankov et al. (2008) showed that the efficiency of debt enforcement -- measured by its cost, time and the asset disposition -- predicts debt market development. This issue will be addressed in our study as well, since one of the major goals of the reform was to improve the bankruptcy system's efficiency.

We follow a quasi-experimental approach, taking advantage of the bankruptcy reform in Brazil as an experiment. We compare the behavior of debt related variables of

Brazilian firms (our treatment group) with the behavior of the same variables of firms from Argentina, Chile and Mexico (our control group). This approach help us to control our analysis for shocks in the credit market common to these countries in the period when the new Brazilian Bankruptcy Law was being implemented, for example, a general increase in the demand for credit, usual in periods of economic growth or high global liquidity. It would be best if both groups display similar behavior on credit variables prior the bankruptcy reform.

However, this is not a straightforward property to attain. And since the identification of average treatment effects using difference-in-difference estimation relies on the assumption that treatment and control units experience common trends (as emphasized by Angrist and Pischke (2009) and Blundell and Dias (2002)), the use of a traditional diff-in-diff method will not consistently estimate the average treatment effect on the treated. Because our sample contains firms from four different countries, assuming that all firms are subject to the same macro trend would be exceedingly unrealistic. In fact, differential trends might arise in the evaluation of the bankruptcy reform effect if treated and controls operate in different financial markets, which is exactly our case. For this reason, we use different approaches in our empirical estimation. This seems more adequate for the heterogeneity in our data set. These approaches rely on two different specifications, detailed in the third section: one with a firm-specific trend, and the other with a country-specific trend.

Our empirical results point to a significant reduction in the cost of debt (between 10% and 15% in relative terms) and an increase in the amount of total debt (30% approximately). The effect is more pronounced on long-term debt, while the effect on short-term debt is not statistically significant. Also, we find a reduction in the level of

unsecured debt and an increase in the amount of secured debt. Such reduction can be explained as a form of migration between the type of credit least benefited by the new law and the type of credit most benefited.

The remainder of the article is organized as follows: section two discusses the Brazilian bankruptcy reform; section three presents the empirical design; section four presents the data set and some descriptive statistics; section five reports the results; and section six concludes.

2 – The New Brazilian Bankruptcy Law

Most of the old legislation regulating the Brazilian bankruptcy procedure was enacted in 1945. Despite prescribing both liquidation and reorganization -- the later called concordata (composition with creditors) and intended to prevent or reduce the liquidation of viable enterprises -- in practice the insolvency process was ineffective in maintaining the value of the firms' assets and protecting creditors' rights in liquidation. The bankruptcy priority rule was specified in the following order: first, labor claims; second, tax claims; third, secured creditors' claims; and finally unsecured creditors' claims (including trade debts).

The process through which the assets were made available to creditors was also slow and highly ineffective, mainly because of procedural inefficiency, lack of transparency and the so-called succession problem, whereby tax, labor, and other liabilities were transferred to the buyer of an asset sold in liquidation. This liability transfer depressed the market value of an insolvent company's assets. In addition, the priority given to labor and tax claims had the pernicious effect of eliminating any protection to other creditors. The former reorganization procedure, the concordata, basically only postponed debt payment and did not lead to restructuring.

Figure 1 illustrates one of the dimensions of inefficiency that characterized the former bankruptcy procedures. For a comparative analysis, we use seven groups of countries: the Organization for Economic Cooperation and Development (OECD), Latin America and the Caribbean (LAC), the Middle East and North Africa (MENA), Europe and Central Asia (ECA), East Asia and the Pacific (EAP), South Asia (Sas) and sub-Saharan Africa (SSA).[4] Notice that the average time to close a business in Brazil was more than twice the average for the Latin America. This situation eroded the value of assets and thus lowered the amount received by creditors. The creditor recovery rate before the reform illustrates the final effect of an inefficient procedure with poor creditor protection. In Brazil, the recovery rate in case of bankruptcy was a mere 0.2% while the average for Latin American and OECD countries was 26% and 72%, respectively. Basically, the main reason for such low recovery was the priority order, since creditors ranked behind labor and tax claims. Thus, the remaining amount from the bankruptcy process used to pay creditors was usually insignificant or even nil.

Figure 1: **Average time involved in the Insolvency Proceeding for region (HERE)**

On June 9, 2005 the new legislation on bankruptcy (Law 11,101/05) came into effect. The new liquidation procedure introduced six key changes. First, labor credits are now limited to an amount equal to 150 times the minimum monthly wage. Second, secured credits are now given priority over tax credits. Third, unsecured credits are given priority above some of the tax credits. Fourth, the distressed firm may be sold (preferably as a

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[4]The Latin American and Caribbean block is composed of Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela.

whole) before the creditors' list is constituted, which can speed up the process and increase the value of the bankruptcy state. Fifth, tax, labor, and other liabilities are no longer transferred to the buyer of an asset sold in liquidation. Finally, any new credit extended during the reorganization process is given first priority in the event of liquidation.

The first two changes have had a direct impact on secured creditors' priority. Since under the former bankruptcy law, secured creditors came after all labor and tax claims, the priority given to secured creditors has increased significantly. The third one has increased unsecured creditors' priority. The fourth, fifth and sixth changes, in turn, are expected to increase the value of firms in bankruptcy and as a consequence the amount recovered by creditors. The more creditors expect to receive in an insolvency state, the less they will require firms to pay in the solvency state, thus reducing the cost of capital.

Brazil's new reorganization procedure was inspired by U.S. Chapter 11 of the Bankruptcy Code. Whereas the previous law did not permit any renegotiation between the interested parties, and only a few parties were entitled to recover their assets, now managers make a sweeping proposal for recuperation that must either be accepted by workers, secured creditors and unsecured creditors (including trade creditors) or the distressed firm will be liquidated. Creditors play a more significant role in the procedure than previously, including negotiating and voting for the reorganization plan.

As a consequence of the bankruptcy reform, in 2006 the creditor recovery rate increased to 12% in Brazil, while the average of Latin American and OECD countries remained stable (29% and 67%, respectively), and it is still growing, reaching 17% in 2009. Also, the average time to close a business in Brazil has fallen from ten to four years, which

tends to reduce depreciation of assets.[5] All these factors point to a potential effect on the supply side of debt, since creditors' conditions have improved with the bankruptcy reform. These changes are expected to have an impact on each of the variables we focus in the rest of this paper.

3 – Empirical Design

In this section we present the framework used to estimate the effect of the new Brazilian Bankruptcy Law (henceforth referred to as NBBL) on six different variables: (1) total cost of debt; (2) short-term debt; (3) long-term debt; (4) total debt; (5) secured debt; and (6) unsecured debt.

To do that, we compare outcome variables from a group of firms that were affected by this institutional change to a group of firms unaffected by the new legislation. The former is the treatment group and contains only Brazilian firms. The latter is the control group and includes only non-Brazilian firms.

A great part of the literature on program evaluation is spent on establishing the counterfactual capable of producing a viable identification strategy and a good control group. This effort is necessary because one rarely encounters an ideal natural experiment environment, in which cross-section units are found in the treatment group by accident. Indeed, our problem would be much simpler if firms were randomly selected to be regulated by the NBBL. In that case, it would suffice to compare the value of credit-related variables for firms in the experimental group with the value of the same variables for firms in the control group. However, since compliance with the new law is mandatory for almost

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[5]Source: Doing Business 2010, World Bank.

all Brazilian firms,[6] the selection rule we would like to be random is in fact deterministic, and we are forced to choose different techniques to estimate the impact of the new law.

The two methods we employ are variations of a common approach to deal with this problem. They both include among the explanatory variables in a regression an indicator variable that separates control and treatment group and whose coefficient is estimated via OLS and measures the impact of the treatment. In the next three subsections we detail the specification and estimation methods used in this paper.

3.1 - A model with firm-specific trend

The first empirical specification we adopt is a panel data model, with fixed effects and a firm-specific trend. We apply to each of the dependent variables the following model:

$$y_{ist}(0) = \alpha_t + X_{it}\Gamma + \eta_i + \delta_i t + \lambda_s + u_{ist} \tag{1}$$

$$y_{ist}(1) = \alpha_t + \beta + X_{it}\Gamma + \eta_i + \delta_i t + \lambda_s + u_{ist} \tag{2}$$

For each variable considered, the index i indicates the cross-section dimension and the index t indicates the time-series dimension. The subscript s is reserved for the firm's country of origin.

The first term in equation (1), $y_{ist}(0)$, is the outcome variable when firm i not affected by the NBBL at period t. The second term, α_t, is the time-dependent intercept term; Γ, is the $k \times 1$ coefficients matrix and X_{it} is a $1 \times k$ matrix containing the k

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[6]Law 11,101/05 does not apply to financial institutions, insurance companies, credit unions, state-owned and controlled companies, private pension entities and some others.

covariates we use as controls, to capture some firm heterogeneity concerning the size of firm's assets, its profitability, and so forth[7]. The last three terms are the firm fixed-effects control terms (η_i), which account for all time-invariant unobservable firm-specific factors; a heterogeneous linear trend (δ_i); a country-specific effect (λ_s); and the idiosyncratic error term (u_{ist}).

This specification has the advantage of allowing for a great deal of heterogeneity among firms of different countries (through the parameter λ_s) or even among firms within the same country (through the incidental parameter η_i). And the fact that it also contemplates different trends for firms within each group implies a specification that is general enough to allow a different trend for each firm, and not only for those from the same country.

The difference between equations (1) and (2) is the presence of the parameter we are interested in estimating, denoted by β in equation (2). We can use dummy variables to transform the empirical model formed by these two equations into a single-equation regression model:

$$y_{ist} = \beta D_{it} + X_{it}\Gamma + \eta_i + \delta_i t + \lambda_s + \sum_{\tau=01}^{06} \alpha_\tau D_t^\tau + u_{ist} \tag{3}$$

In this formulation, D_{it} is the indicator variable, which equals one if firm i is

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subject to the NBBL at period t and equals zero otherwise; and the variables D_t^τ, for $\tau \in \{01, 02, ..., 07\}$ are the six dummies (one for each time period and the constant), which indicate whether $t = \tau$.

Since we wish to consistently estimate β, we subtract from equation (3) the analogous equation for $t - 2$. By doing that, we eliminate both η_i and λ_s, arriving at the differenced form of the equation:

$$\Delta y_{ist} = \beta \Delta D_{it} + \Delta X_{it} \Gamma + \widetilde{\delta}_i + \sum_{\tau=03}^{07} \widetilde{\alpha}_\tau D_t^\tau + \varepsilon_{ist} \tag{4}$$

In this equation, we have $\widetilde{\delta}_i := 2\delta_i$; $\widetilde{\alpha}_\tau := \alpha_\tau - \alpha_{\tau-2}$ (for $\tau \in \{03, ..., 07\}$); and $\varepsilon_{ist} = \Delta u_{ist} = u_{ist} - u_{ist-2}$. Then, we estimate the differenced equation using the within estimator. Notice that in this specification the diff-in-diff parameter β represents the average change in the trend of the dependent variable for the treated firms. If such parameter is significant, it means that the NBBL brought a variation in the path of the financing policy.

3.2 – A model with country-specific trend

In the second approach we switch from a firm-specific trend to a country-specific trend. As in the previous model, the terms α_t, η_i, Γ and X_{it} are all present in this new specification and they all have the same meaning as before. However, we replace the firm-specific linear trend we had in the previous model (δ_i) with a macro trend term (c_s) that equally affects every firm from the same country.

The model is similar to the first one. We still control for the same covariates listed before, and the parameter of interest we wish to estimate is still β.

Nonetheless, this new specification leads to a different regression equation. To write it we need a new set of dummy variables and choose to use an alternative notation to indicate the firm's country of origin. To each country with firms in our sample we assign a number between one and four, and denote by D_s^1, D_s^2, D_s^3 and D_s^4 the indicator variables, which equal one if s, the number of the country of origin of the firm in question, is the same as their respective superscript number, and zero otherwise. Using these dummy variables we can write the regression equation in the following manner:

$$y_{ist} = \beta D_{it} + X_{it}\Gamma + \eta_i + t\sum_{j=1}^{4} c_j D_s^j + \sum_{j=1}^{4} \lambda_j D_s^j + \sum_{\tau=01}^{06} \alpha_\tau D_t^\tau + u_{ist} \tag{5}$$

In this equation, D_{it} is the dummy variable that indicates if the firm i in period t is subject to the NBBL; D_s^j, for $j = 1,2,3,4$, are the four dummy variables that indicate the firm's country of origin;[8] c_j, for $j = 1,2,3,4$ is the macro linear trend; λ_j, for $j = 1,2,3,4$, is the country-specific effect.

Once again we wish to run an OLS regression to estimate the parameter of interest. First we eliminate the time-constant unobservable η_i by subtracting from equation (5) the analogous equation for period $t-2$. This will eliminate not only the time-constant

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[8]For any $j \in \{1,2,3,4\}$, if $s = j$, then $D_s^j = 1$. Otherwise, $D_s^j = 0$.

unobservable term, but also the time-invariant observable λ_s. We are left with the following differenced equation, which we can directly estimate by OLS:

$$\Delta y_{ist} = \beta \Delta D_{it} + \Delta X_{it} \Gamma + \sum_{j=1}^{4} \widetilde{c}_j D_s^j + \sum_{\tau=03}^{07} \widetilde{\alpha}_\tau D_t^\tau + \varepsilon_{ist} \qquad (6)$$

In this equation, we have $\widetilde{c}_j := 2c_j$ (for $j = 1,2,3,4$); $\widetilde{\alpha}_\tau := \alpha_\tau - \alpha_{\tau-2}$ (for $\tau \in \{03,...,07\}$); and $\varepsilon_{ist} = \Delta u_{ist} = u_{ist} - u_{ist-2}$. As before, the diff-in-diff parameter β represents a change in the trend of the debt variable, but in this case an average change in the country trend.

3.3 – Non-Brazilian firms as counterfactual

To establish a necessary counterfactual to identify the effect of the NBBL, we need a set of firms capable of emulating the behavior of Brazilian firms that were not influenced by the new legislation. Our group of choice is composed of firms from three different Latin American countries: Argentina, Chile and Mexico. Of course, we expect to find both differences and commonalities between firms from different countries. Regarding the differences, our hope is that they can, to a great extent, be explained by the heterogeneity our specification allows for.

As to the commonalities, we expect the Argentine, Chilean and Mexican credit markets to have significant similarities to the Brazilian credit market. Latin American is a region with a weak history of creditor protection and low credit recovery rates. Also, the four countries have civil law systems, which, as pointed out by Djankov et al. (2008), correlate with inefficient bankruptcy outcomes, higher interest rates and longer bankruptcy

procedures, leading to more depreciated assets and lower recovery rates. When controlled by the appropriate covariates and the fixed-effects both in level and trend (when the specification so indicates), we expect these commonalities to play in our favor, satisfying the standard exogeneity assumptions, as stated by Wooldridge (2002), making these non-Brazilian firms an adequate control group for our empirical exercise.

Regarding different macro trends that possibly affect firms from different countries, we take advantage of the period of relative stability the region has experienced during the 12 the years covered by our sample. Latin America is a region with a long history of economic turmoil. During the 1980s and 1990s, many Latin American countries faced a variety of severe crisis with significant economic consequences. And although some of them in fact originated abroad, most can be traced back to the region's own weaknesses. In the past decade, however, this scenario has considerably changed, partially on account of the global commodities boom and, for some countries, partially because of sound economic policies.[9]

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[9]Since 2002, when Brazil experienced a confidence crisis caused by fears that the newly-elected government would favor unorthodox economic policies, the country has entered a stability cycle not seen in recent decades. From 2003 to 2007, the country have experienced a period without significant political or economic distress, and even the international financial crisis of 2008 and 2009 had an smaller impact on Brazil than on some developed countries, such as the U.S. and Britain. (Source: Brazilian Central Bank Report)

Argentina -- that has a history of external vulnerability -- faced, from the mid-nineties to the beginning of the following decade, repeated economic shocks from crisis in Mexico (1994), Asia (1997), Russia (1998) and Brazil (1999). In 2002, after years of economic turmoils, the country was forced to abandon the one-to-one parity it had established between the local currency and the American dollar, and announced a US$150 billion sovereign default on its debt. The Argentine economy hit its lowest point. However, since then, Argentina has definitely improved in some fronts, helped by the undervalued local currency and the upward trend in international commodities prices. And although the improvements have come along with a somewhat unstable political reality and in inflation rates high enough for the local government to be accused of tampering the official price indexes, the Argentine economy is far from the near-collapse scenario it has seen in the past and have been shown some stability in recent years. And the external shocks that periodically shake the country's economy in the nineties are no longer a reality. (Source: Argentine Central Bank Report)

Chile is a country in which government has a limited role in the management of the economy. Its recent history is an exception to the rule of bad economic policies in Latin America. During most of the 1990's Chilean economy showed great strength, with high growth rates. The beginning of the subsequent decade, however, came with the worsening of the world economy, specially in the aftermath of September 11th. This economic downturn, led by the economies of the U.S., Europe and Japan, had an important impact in

This relative stability plays in our favor by reducing the variance of the macro shocks. This is true as long as the average macro effects that affect the dependent variables of our model remain unchanged in pretreatment and post-treatment periods. And although macro shocks affecting only some of these countries -- or affecting some countries more severely than others -- tend to harm our estimates, there is no reason to expect these effects to be meaningful, on average, given the number of countries we have in our sample and the number of time periods.

4 – Data Set and Descriptive Statistics

Our sample contains firm-specific accounting data on 603 firms, from 2001 to 2007, disregarding observations from financial institutions, since their financial policy differs strongly from the firms of the others sectors and they are not subject to the NBBL. About half of these firms (300) are Brazilian and belong to the treatment group; the rest of them belong to the control group, which is divided as follows: 99 firms are Mexican, 71 are Argentine, and the remaining 133 are Chilean firms. We consider as firm debt the balance sheet short-term and long-term debt. We also have information on debt with different collateral characteristics: the amount of unsecured debt refers to debts without collateral, and the amount of secured debt refers to those with collateral. We also collected

countries like Chile, but soon after the Chilean economy recovered, boosted by the boom in the commodities prices. During this first decade of the century, the country has seen a few general elections, but the major parties seem to agree on merits of the economic policies that have secured the country's economic stability. (Source: Chilean Central Bank Report)

Finally, we turn to the Mexican economy. The geographic proximity and economic ties between the United States and Mexico have contributed to increasing the level of exports, but also made the Latin American country much vulnerable to downturns of the American economy. The crisis of 2000 and 2001 harmed the Mexican economy, that had, like most Latin American economies, to deal with a smaller inflow of foreign capital and a drop in the exports. Mexican GDP fell 0.3 percent that year, although inflation remained low and interest rates drop to a level that for long had not been seen. The years of 2002 and 2003 were a period of moderate growth for the Mexican economy, but it kept recovering in the following years, until the most recent international financial crisis. (Source: Mexican Central Bank Report)

information on the price of debt, which we refer to as cost of borrowing and display in percentage terms. We used fiscal-year-end information of firms on their total assets, price-to-book ratio, return on assets and earnings before interest and taxes (EBIT) to control our analyses. The data were obtained from Capital IQ-Standard and Poor's.

Table 1 presents the sample mean and median values for the dependent variables of firms from both the treatment and the control groups, and in both the pretreatment and the post-treatment periods. Each variable -- with the exception of cost of borrowing, which appears in percentage terms -- is presented by applying natural logarithms.[10]

The descriptive statistics in Table 1 are aligned with the expected effects of the new Brazilian Bankruptcy Law on credit variables. Both the mean and median show a decline in the cost of credit for Brazilian firms, while the cost for the control group remains stable. For the amount of credit, there is a more pronounced increase for the Brazilian firms. At first sight, these numbers indicate a possible shift in the supply of credit in Brazil. Despite the increase in almost all measures of credit quantity, indicating a potential expansion of demand, the fact credit only became cheaper in Brazil illustrates a possible supply-side shock. Our empirical design allows us to control for a possible expansion in the amount of credit not driven by the NBBL.

Specifically for the cost of credit, the mean values are much higher than the median values, indicating that some extreme values have an impact on sample averages. However, it should be noticed that this asymmetric property is common to most of the variables in both the control and the treatment group, and in both the pretreatment and post-treatment

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[10]All variables were winsorized at the level of 5%. The winsor procedure is commonly used to treat the outliers' problem.

periods.

Tabela 1: **Descriptive Statistics (HERE)**

It should also be noticed that we included 2005 in the pretreatment period, although the NBBL came into effect in early June of that year. By adding 2005 to the pretreatment period, we make the assumption that the effects of the NBBL were felt only as of 2006. However, it is likely that the first impacts of the new legislation were already felt by the end of that year. Nonetheless, our approach serves not only the methodology we employ, but is also a conservative one. Any potential early effects of the NBBL increase the pretreatment values of firms in the treatment group, adding some degree of robustness to any significant results we might find. And although it somehow might underestimate the real effect of the law, it reduces the probability of a type I error when we test whether the NBBL had no impact on the credit market.

5 – Results

This section presents the results we found regarding the effect of the new bankruptcy law on firms' credit access. Both models were estimated through ordinary least squares with robust standard errors and clustering our observations in eight different sets: one for each country in the pretreatment periods, and one for each country in the post-treatment periods.[11]

First, we analyze its impact on the cost of debt, as shown in Table 2. Our variable of interest is the difference of the cost of debt. We need to consider the different trends

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[11]The results change marginally using robust standard errors without cluster.

between treatment and control groups discussed before, so we run two distinct specifications: column 1 reports the results when we use country fixed effects on the trend to capture the country-specific trend, and column 3 reports the results using firms' fixed effect on the trend to capture the firm-specific trend. Both results show that the new bankruptcy law brought a reduction in the cost of debt financing, with a magnitude between 4% and 6%. In relative terms, it represents a reduction of 10% to 15%, since the average cost was 38% in the pre-treatment period (see Table 1). This result could be caused by an increase in the recovery rate of creditors in case of corporate insolvency. Since the new law improved the level of creditor protection and the efficiency of bankruptcy procedures, creditors now have a higher chance of recovering a larger portion of the loan. And the more creditors expect to receive in the insolvency state, the less they will require firms to pay in the solvency state, thus reducing the cost of debt.

Table 2: **Panel Regression with fixed effects**: **Cost of Debt (kd) (HERE)**

Table 3 presents the effect of the new law on the amount of credit. Column 1 and 3 indicate a statistically significant impact on the aggregate amount of credit received by Brazilian firms after the new law. The diff-in-diff coefficient points to a positive effect of between 0.233 and 0.294 on the dependent variable. Since our dependent variable is the difference of the logarithm of total credit, it already represents the percentage variation. Thus, the new law increases the total amount of credit by about 23% to 30% for treated firms, when compared to the period prior to the new law.

Both results (in Tables 2 and 3) are aligned with a positive shift on the supply of credit, and in equilibrium they indicate a reduction in the cost of debt and an increase in the total

amount of credit.

Table 3: **Panel Regression with fixed effects**: **Total Amount of Credit (HERE)**

Having shown the positive general effect of the new bankruptcy law, we now go deeper and analyze the dynamics of the different types of credit. We do this by splitting the amount of credit in terms of maturity (short-term and long-term credit) and collateral characteristics (unsecured and secured credit). Tables 4 and 5 report the effect of the new law.

First, in Table 4, Panels A and B show that the new Brazilian Bankruptcy Law had a positive and significant impact on the long-term credit of Brazilian firms, while there is no such evidence for short-term credit. The diff-in-diff coefficient is between 0.328 and 0.348, pointing to an increase of approximately 35% in the long-term debt of the treated firms, when compared to the pre-new law period. Notice that the aggregate effect shown in Table 3 is only significant because of the long-term credit. Such effect could be explained as a consequence of a reduction in the interest rate charged by secured creditors, which is more correlated to long-term credit. The reform did not have any effect on the level of short-term credit, probably because the changes in unsecured creditors' protection were smaller.

Table 4: **Panel Regression with fixed effects**: **long term and short term Credit (HERE)**

Turning our analysis to the collateral characteristics, Table 5, Panels A and B, report the results for secured and unsecured credit, respectively. The new Brazilian Bankruptcy Law had a positive and significant impact on secured credit, and a negative and significant effect on unsecured credit. For secured credit, the diff-in-diff coefficient is between 1.58 and 1.64, pointing to a strong increase in secured debt for the treatment group when

compared to the pre-new law period.[12] On the other hand, the diff-in-diff coefficient of unsecured credit is negative between -0.41 and -0.50.

This effect could be explained by the changes of the new bankruptcy law. The secured creditors were more benefited by the new law than unsecured creditors since they had a larger improvement in their priority order. While secured creditors improved from fourth in priority to second, just behind labor claims (limited to 150 times the minimum monthly wage), unsecured creditors were only moved above some tax claims. The negative effect on unsecured credit can be explained by a substitution of demand for credit from unsecured to secured credit.

Table 5: **Panel Regression with fixed effects**: **secured and unsecured credit** (**HERE**)

In summary, the new law provides a positive shift in the supply of credit, mainly due an increased recovery rate by creditors in case a firm defaults. The new law improves creditors' protection and the efficiency of bankruptcy procedures, giving creditors a higher chance to recover a larger part of the loan. The more creditors expect to receive in the insolvency state, the less they will require firms to pay in the solvency state, thus reducing the cost of debt. This result is empirically confirmed, since we found a reduction of between 4% and 6% in the cost of debt. The lower price encourages firms to increase their debt financing. Also, we found a positive effect on the amount of credit, which increased by about 30%. The reduction in the cost of credit and the increase in its amount are aligned with the supply-side shift argument. Long-term credit increased almost 35%, while there was no impact on short-term credit. The effect was also different when we considered

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[12]It is important to note that we have reduced data available for secured credit, and this may be distorting our results.

collateral characteristics. We found a positive effect on secured credit and a reduction in unsecured credit, pointing to a substitution of demand from unsecured credit to secured credit.

6 – Concluding remarks

The enactment in 2005 of new bankruptcy legislation in Brazil aimed, among other goals, to improve creditors' protection and the bankruptcy system's efficiency in case of corporate debtor insolvency. The previous law was considered to have numerous flaws concerning not only the priority rule, but also the timing of liquidation, the succession problem, the influence of creditors in reorganization procedures and so forth. Many of these issues have been addressed by the new law and, because of that we would expect to see some developments in the credit market.

These empirical consequences of the new Brazilian Bankruptcy law were investigated in the research that led to this paper, and the results were laid out in the previous section. Our approach was to identify and estimate the effect of the new law starting from two different model specifications, both intended to make more flexible the common trend difference-in-difference identification hypothesis. Our regressions, unlike the standard diff-in-diff estimation, contained different trends for different firms (in the first specifications we tried) or different macro trends for firms from different countries (in the second specification we adopted). We estimated both models through ordinary least squares methods with robust standard errors and clustered observations, for six different dependent variables related to the firm debt structure and cost. Our results indicate substantial evidence of improvements in the cost of debt financing for both specifications adopted. We

found a drop of 4% to 6%, depending on the model of choice. Regarding the amount of credit supplied, we also found a significant increase -- from 23% to 30% approximately -- regardless of the empirical model of choice. Our analysis of different debt maturities showed a significant increase in the amount of long-term credit -- an impact of approximately 35% -- no but such effect was found on short-term credit. These results are also valid no matter the model of choice. Finally, when looking at debt with and without collateral requirements, we also found significant results, and for both of our variables of interest. The signal of the variation, however, was not the same. We found an increase in the amount of secured credit and a decrease in the level of unsecured credit. Once again, these results do not depend on the model specification.

The most straightforward interpretations of these results are of a shift in the supply of credit, a movement that was probably caused by the legal changes in the bankruptcy procedures, leading to an increase on the supply of credit and a decrease in the cost of debt. These results are in line with the theoretical literature in the field. For countries in which creditor protection is extremely low -- as was Brazil before enactment of the new law in early 2005 -- measures to increase this protection tend to correlate to lower costs and higher supply of credit, as well as an increase in the supply of collateralized lines of credit. Our results show significant improvements in the credit market, which were, since the beginning of the debates in the Brazilian Congress, the main motivation behind the introduction of new bankruptcy legislation.

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Tabela 1: Descriptive Statistics

Period berore the New Bankruptcy Law (2001-2005)				
	Mean		Median	
	Treatment	Control	Treatment	Control
cost of credit	38%	12%	25.65%	7.52%
total credit	3.84	4.03	3.95	4.15
short-term credit	1.50	2.06	1.45	2.23
long-term credit	3.35	3.88	3.39	3.91
secured credit	3.40	2.76	3.71	3.01
unsecured credit	3.75	4.11	3.95	4.52
Period after the New Bankruptcy Law (2006-2007)				
	Mean		Median	
	Treatment	Control	Treatment	Control
cost of credit	26%	13%	15.90%	7.90%
total credit	4.45	4.20	4.49	4.53
short-term credit	2.28	2.19	2.29	2.45
long-term credit	3.96	4.22	4.01	4.48
secured credit	3.77	2.53	3.97	3.20
unsecured credit	3.72	3.92	4.06	4.27

Table 2: Panel Regression with fixed effects: Cost of Debt (kd)

This table presents the results of panel clustered robust regressions of the firms' cost of debt on the diff-in-diff variable that is represented by the interaction between the dBrazil variable, which is represented by a dummy variable codified as 1 for Brazilian firms and 0 for non-Brazilian firms, with the BANKRUPTCY LAW variable (d_BL), which is represented by a dummy variable codified as 1 after 2005 and 0 otherwise. We control for firms specific variables as size (assets in logs), market-to-book ratio (MTB), return on assets (ROA) and EBIT. Cost of debt is winsorized at 5%.

Panel A: Panel Regression with fixed effects: Cost of Debt

Dependent Variable: Δ_kd

	Coefficient	P-Value	Coefficient	P-Value
Intercept	-1.090	0.781	-3.830	0.202
d_BL*dBrazil	-6.080	0.024	-4.590	0.032
$\Delta\_logAssets$	-2.790	0.262	-0.139	0.942
Δ_MTB	-0.147	0.181	-0.232	0.136
Δ_ROA	0.147	0.224	0.056	0.409
Δ_Ebit	0.0007	0.0610	0.002	0.312
Firms' fixed effects	No		Yes	
Country fixed effects	Yes		No	
Year fixed effects	Yes		Yes	
Observations	1303		1303	
R-Square	0.06		0.04	

Table 3: Panel Regression with fixed effects: Total Amount of Credit

This table presents the results of panel clustered robust regressions of the firms' amount of credit on the diff-in-diff variable that is represented by the interaction between the dBrazil variable, which is represented by a dummy variable codified as 1 for Brazilian firms and 0 for non-Brazilian firms, with the BANKRUPTCY LAW variable (d_BL), which is represented by a dummy variable codified as 1 after 2005 and 0 otherwise. We control for firms specific variables as size (assets in logs), market-to-book ratio (MTB), return on assets (ROA) and EBIT.

Panel Regression with fixed effects: Amount of Credit

Dependent Variable: $\Delta\_log(total\ credit)$

	Coefficient	P-Value	Coefficient	P-Value
Intercept	-0.183	0.008	-0.187	0.009
d_BL*dBrazil	0.233	0.004	0.294	0.007
Δ_logAssets	1.429	0.000	1.583	0.000
Δ_MTB	0.002	0.603	-0.001	0.043
Δ_ROA	-0.006	0.119	-0.001	0.043
Δ_Ebit	0.0000	0.0910	0.000	0.009
Firms' fixed effects	No		Yes	
Country fixed effects	Yes		No	
Year fixed effects	Yes		Yes	
Observations	917		917	
R-Square	0.22		0.22	

Table 4: Panel Regression with fixed effects:long term and short term Credit

This table presents the results of panel clustered robust regressions of the firms' amount of short term and long term credit on the diff-in-diff variable that is represented by the interaction between the dBrazil variable, which is represented by a dummy variable codified as 1 for Brazilian firms and 0 for non-Brazilian firms, with the BANKRUPTCY LAW variable (d_BL), which is represented by a dummy variable codified as 1 after 2005 and 0 otherwise. We control for firms specific variables as size (assets in logs), market-to-book ratio (MTB), return on assets (ROA) and EBIT.

Panel A: Panel Regression with fixed effects: Short term Credit

Dependent Variable: Δ_log(short term credit)

	Coefficient	P-Value	Coefficient	P-Value
Intercept	-0.083	0.426	-0.187	0.087
d_BL*dBrazil	0.021	0.841	0.238	0.096
Δ_logAssets	1.040	0.001	1.216	0.001
Δ_MTB	0.050	0.101	0.044	0.100
Δ_ROA	-0.052	0.017	-0.036	0.052
Δ_Ebit	0.0000	0.6200	0.000	0.542
Firms' fixed effects	No		Yes	
Country fixed effects	Yes		No	
Year Fixed Effects	Yes		Yes	
observations	588		588	
R-Square	0.09		0.07	

Panel B: Panel Regression with fixed effects: long term credit

Dependent Variable: Δ_log(long term credit)

	Coefficient	P-Value	Coefficient	P-Value
Intercept	-0.128	0.287	-0.209	0.191
d_BL*dBrazil	0.328	0.000	0.348	0.003
Δ_logAssets	1.296	0.000	1.257	0.001
Δ_MTB	0.011	0.059	0.013	0.053
Δ_ROA	-0.002	0.325	-0.005	0.682
Δ_Ebit	0.0000	0.1800	0.000	0.559
Firms' fixed effects	No		Yes	
Country fixed effects	Yes		No	
Year fixed effects	Yes		Yes	
Observations	1207		1207	
R-Square	0.18		0.17	

Table 5: Panel Regression with fixed effects: secured and unsecured credit

This table presents the results of panel clustered robust regressions of the firms' amount of secured and unsecured credit on the diff-in-diff variable that is represented by the interaction between the dBrazil variable, which is represented by a dummy variable codified as 1 for Brazilian firms and 0 for non-Brazilian firms, with the BANKRUPTCY LAW variable (d_BL), which is represented by a dummy variable codified as 1 after 2005 and 0 otherwise. We control for firms specific variables as size (assets in logs), market-to-book ratio (MTB), return on assets (ROA) and EBIT.

Panel A: Panel Regression with fixed effects: Secured Credit

Dependent Variable: $\Delta\_log(secured\ credit)$

	Coefficient	P-Value	Coefficient	P-Value
Intercept	0.420	0.422	-0.319	0.445
d_BL*dBrazil	1.587	0.013	1.642	0.000
$\Delta\_logAssets$	-0.121	0.901	-0.617	0.331
Δ_MTB	0.007	0.238	-0.043	0.087
Δ_ROA	-0.021	0.372	-0.039	0.021
Δ_Ebit	0.0000	0.9170	-0.001	0.063
Firms' fixed effects	No		Yes	
Country fixed effects	Yes		No	
Year Fixed Effects	Yes		Yes	
observations	192		192	
R-Square	0.09		0.18	

Panel B: Panel Regression with fixed effects: Unsecured Credit

Dependent Variable: $\Delta\_log(unsecured\ credit)$

	Coefficient	P-Value	Coefficient	P-Value
Intercept	-0.182	0.084	-0.130	0.369
d_BL*dBrazil	-0.410	0.004	-0.504	0.001
$\Delta\_logAssets$	1.280	0.002	1.689	0.000
Δ_MTB	-0.008	0.005	-0.006	0.149
Δ_ROA	-0.010	0.355	-0.057	0.001
Δ_Ebit	0.0000	0.0940	0.000	0.649
Firms' fixed effects	No		Yes	
Country fixed effects	Yes		No	
Year fixed effects	Yes		Yes	
Observations	1038		1038	
R-Square	0.09		0.08	

Figure 1: Average time involved in the Insolvency Proceeding for region