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Court Enforcement, Bank Loans and Firm Investment: Evidence from a Bankruptcy Reform in Brazil*

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Abstract

The Working Papers should not be reported as representing the views of the Banco Central do Brasil. The views expressed in the papers are those of the author(s) and not necessarily reflect those of the Banco Central do Brasil.

We exploit variation in the congestion of civil courts across Brazilian municipalities, together with a bankruptcy reform increasing secured creditors' protection, to estimate the effect of enforcement on firm access to finance, investment and size. We find that firms operating in municipalities with less congested courts experienced larger increase in the use of secured loans, as well as a larger increase in investment and value of output in the years after the reform. To establish the direction of causality, we use an instrumental variable strategy that exploits Brazilian state laws on judicial organization, and focus on differences in court congestion across otherwise similar neighboring municipalities located across judicial district borders within the same state. Together, the evidence indicates that differences in court enforcement affect the impact of financial reform on firm access to finance, investment and size.

Keywords: Judicial Efficiency, Financial Reform, Bankruptcy Law, Financial Frictions, Manufacturing Firms.

JEL Classification: G33, O16.

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I Introduction

There is a consensus among economists and policymakers that financial frictions are a major barrier to firm investment and thus to economic development (Banerjee and Duflo, 2005; World Bank, 2005). By limiting access to external finance, they can prevent firms from adopting more advanced technologies. In addition, they can hinder the reallocation of capital towards more productive projects, decreasing aggregate productivity.[1]

Weak protection of creditor rights in bankruptcy is one important source of financial frictions (La Porta et al., 1997; Demirgüç-Kunt and Maksimovic, 1998; Djankov et al., 2007). In many developing countries, for example, outdated bankruptcy laws often limit the effective ability of creditors to recover their claims from financially distressed firms, which in turn discourage lending. In an attempt to improve firms' access to external finance, emerging economies such as Brazil and China have recently introduced new bankruptcy laws increasing the legal protection of creditors.[2] One aspect often overlooked when assessing the potential benefits of these reforms is that, to be effective, they need proper and timely enforcement by courts. Judicial enforcement, however, is seldom well-functioning even in some advanced economies, and especially in developing countries where courts in charge of bankruptcy cases are characterized by limited expertise and long delays (Dakolias, 1999; Djankov et al., 2008). In such cases, even an otherwise desirable improvement in bankruptcy rules can prove ineffective.

In this paper we empirically assess the extent to which the effects of financial reform depend on the quality of court enforcement. We focus our analysis on Brazil for two reasons. First, Brazil undertook in 2005 a major bankruptcy reform aimed at increasing secured creditors' chances of recovering their claims when a firm is liquidated. Second, Brazilian judicial districts are highly heterogeneous in terms of efficiency. In some districts, cases are closed within time frames comparable to those observed in the United States. In others, the functioning of courts is undermined by the large number of pending cases. Crucially, Brazilian laws do not allow creditors or firms to choose the district in which to file a bankruptcy case. Therefore, when the new bankruptcy law entered into force, the efficiency of local courts became a key determinant of the ability of both creditors and firms to reap the benefits of the reform.

We collect data on Brazilian courts from monthly reports that judges and administrative staff submit to the National Justice Council (CNJ). We combine data on congestion of civil courts across Brazilian municipalities with data on bank loans to manufacturing firms from the Credit Information System of the Central Bank of Brazil and data on firm-level outcomes from a national manufacturing survey. For the subset of courts located in

[1] See, for example, Hsieh and Klenow (2009), Banerjee and Moll (2010), Buera et al. (2011) and Caselli and Gennaioli (2013).

[2] The China's new Enterprise Law entered into force in June of 2007, the new Brazilian Bankruptcy Law in June of 2005.

the state of Rio Grande do Sul, for which detailed case-level data is available, we show that congestion of civil courts strongly predicts time in court of bankruptcy cases. We find a robust negative relationship between court congestion and firm access to finance and investment. Municipalities with less congested courts experienced a higher increase in secured loans to manufacturing firms and higher increase in firm investment after the introduction of the new bankruptcy law.

These results cannot be interpreted as conclusive evidence of a causal link between court enforcement and firm-level outcomes. The congestion of civil courts is not randomly assigned across Brazilian municipalities, generating plausible concerns that regional sorting of firms or other municipality characteristics correlated with court congestion might drive the results. To establish the direction of causality we therefore propose an identification strategy that exploits Brazilian state laws on judicial organization. These laws establish minimum requirements for municipalities to become independent judicial districts. For each Brazilian municipality seat of a judicial district, we construct a measure of potential extra-jurisdiction equal to the number of neighboring municipalities that do not meet the requirements, therefore increasing the workload of existing courts. We argue that this measure of potential extra jurisdiction is a valid instrument for court congestion, in the sense that it strongly predicts congestion of civil courts and time in court for bankruptcy cases and, conditional on a set of neighbors' controls, it is uncorrelated with firm characteristics prior to the reform.

The results obtained with this identification strategy are consistent with the basic correlations in the data. The estimated coefficients on potential extra-jurisdiction can be used to quantify the elasticities of bank loans, firm investment and size to the efficiency of local courts. We find that municipalities with a one standard deviation lower potential extra-jurisdiction have, on average, 28.3% less congested civil courts, and experienced a 5% larger increase in secured loans per firm in the years under study. Firms in these municipalities experienced a 0.46 percentage points larger increase in investment as a share of their assets and a 2.3% larger increase in value of output.

We also present a set of additional results that lend support to the causal interpretation of our estimates and to the mechanism at play. First, as an alternative identification strategy, we show that we obtain similar results by restricting the sample to pairs of neighboring municipalities located across judicial districts borders within the same state. These municipalities have different levels of court congestion but are otherwise comparable in terms of observable characteristics. Second, we show that the effects on bank loans are larger for secured loans than for unsecured loans. This is consistent with the provisions of the new bankruptcy law, which assigned higher priority to secured creditors in liquidation while leaving the priority of unsecured creditors unchanged. Third, we show that the effects on firm investment are larger for firms operating in sectors that, for technological reasons, use more tangible assets. To the extent that firms operating in sectors with

higher levels of asset tangibility are more likely to finance themselves with secured debt, this evidence allows to more tightly link the results on bank loans with those on firm investment.

Finally, we show that all the main results are robust to a set of additional tests. First, we show that the estimated coefficients are robust to controlling for an additional set of initial municipality and neighbors' characteristics. Second, we show that the results are not driven by different pre-existing trends across municipalities with different levels of potential extra-jurisdiction. Third, we show that the estimated coefficients remain statistically significant when we allow standard errors to be spatially correlated at different geographical levels. Fourth, we show that the results are robust to an alternative measure of potential extra-jurisdiction that uses the number of firms initially located in neighboring municipalities that do not meet the requirements to be an independent judicial district as a proxy for additional workload of existing courts.

Related Literature:

There is a large literature in economics studying the relationship between legal protection of creditors and credit market development. In two seminal papers, La Porta, Lopez-de-Silanes, Shleifer and Vishny [1997, 1998] use cross-country data to document how both the strength of legal rules on creditor protection and the quality of their enforcement are conductive of larger and more developed capital markets. The literature that followed these seminal papers has studied the role of legal rules and quality of enforcement either exploiting cross-country differences (Djankov et al., 2003; Claessens and Klapper, 2005; Safavian and Sharma, 2007) or, when using micro-data in within country analysis, focusing on these two channels separately. In particular, one stream of this literature has focused on enforcement quality. For example, Visaria (2009) studies the effect of introducing specialized tribunals on loan repayment and cost of credit for Indian firms using loan-level data from a large Indian bank.[3] Another stream has focused on legal reforms aimed at increasing creditor protection. For example, Araujo et al. (2012) analyze the effect of the Brazilian bankruptcy law reform on the financing decisions of publicly traded Brazilian firms using as control group publicly traded firms in neighboring countries.[4] This paper sheds new light on the relationship between legal reforms and quality of enforcement by bringing the analysis of their interaction at the micro-level. Using variation across districts subject to the same national institutions, this paper overcomes most of the

[3]Other papers using within-country variation in judicial variables are Chemin (2012), which studies the impact of judicial reform on the lending and investment behavior of small firms in India; Jappelli et al. (2005), which exploits variation across Italian judicial districts to establish a relation between judicial efficiency and bank lending; and Laeven and Woodruff (2007), which studies how the quality of the legal system at the state level affects firm size in Mexico.

[4]See also: Gamboa-Cavazos and Schneider (2007) for Mexico, Lambert et al. (2007) for Russia, and Assunção et al. (2014) for Brazil. More recently, Rodano et al. (2011) and Campello and Larrain (2015) have introduced in their study of legal reforms an analysis of the differential impact of changes in legal rules across districts with different degrees of judicial efficiency.

common identification issues that arise in studies that exploit differences across countries, and provides, to the best of our knowledge, the first empirical evidence on how the quality of court enforcement can affect the impact of financial reform on both financial and real outcomes.

The paper is also related to the literature on the optimal design of bankruptcy procedures, which suggests that an excessive protection of creditor rights can lead to inefficient liquidation of viable firms (Aghion et al. 1992). This liquidation bias of creditors can affect firm capital structure decisions ex-ante, as well as their investment choices. Vig (2013) shows evidence consistent with this view in terms of financing decisions. Exploiting the introduction of a reform that allows faster repossession of collateral by secured creditors in India, he finds that stronger creditor rights induced lower use of secured debt.[5] Acharya and Subramanian (2009) and Acharya et al. (2011) find evidence consistent with this view in terms of investment decisions. They show that firms operating under more creditor friendly bankruptcy codes tend to reduce corporate risk-taking and invest less in innovative activity.[6] The results presented in this paper bring new evidence to this debate. We find that strengthening secured creditor protection leads to an increase in the use of secured debt by firms, as well as more investment and growth. An obvious caveat is that these results hold in the context of Brazil, a country where the recovery rate of secured creditors is relatively low by international standards even after the introduction of the bankruptcy reform described in this paper. In this context, a creditor bias toward liquidation is less likely to occur.

Finally, the paper is related to the growing literature on misallocation of resources across firms and its effects on aggregate productivity (Banerjee and Duflo 2005, Hsieh and Klenow 2009, Restuccia and Rogerson 2008). The main intuition of this literature is that frictions at firm level prevent the optimal allocation of labor and capital across firms, ultimately reducing aggregate TFP. The current consensus is that these frictions tend to be more severe in developing countries, and that removing them could substantially reduce productivity differences between developed and developing countries. Despite the importance of this question, there is little evidence on which frictions drive misallocation of resources and how they operate at the micro-level. This paper identifies one particular type of such frictions — the inefficiency of local judicial institutions — and shows how it can affect credit markets as well as firm investment and growth.

The rest of the paper is organized as follows. In section II we describe the Brazilian

[5]Similarly, exploiting changes in personal bankruptcy exceptions across states in the US, Severino et al. (2014) show that, in response to a decrease in creditor protection, households increase their holdings of unsecured debt.

[6]Similarly, Seifert and Gonenc (2012) find that firms tend to invest less in R&D activities in countries where creditors rights are stronger. On the other hand, Mann (2013) shows that court decisions strengthening the ability of secured creditors to seize patent collateral in default have a positive effect on firm borrowing and investment in R&D. On the same token, Brown et al. (2013) show that stronger legal rules on investor protection, by facilitating stock market development, foster R&D investment.

bankruptcy reform. In section III, we present a simple conceptual framework to guide the empirical analysis. In section IV we describe the data on the judicial system, bank loans and manufacturing firms. In section V, we discuss the identification strategy and present the empirical results. Finally, in section VI, we present a set of robustness tests.

II Bankruptcy Reform in Brazil

In this section we discuss the main changes to bankruptcy rules introduced in Brazil with the bankruptcy law reform of 2005. The new law had two main objectives. First, to increase the overall value recovered from insolvent firms that entered into bankruptcy. Second, to increase the recovery rate of secured creditors – such as banks providing loans guaranteed by some form of collateral. According to the Doing Business Database of the World Bank, at the time of the reform secured creditors could expect to recover 0.2 percent of their unpaid claims from an insolvent firm. In the same year, secured creditors in the United States could expect to recover 80.2 percent, in China 31.7 percent, and in India 24.6 percent.[7]

For the scope of this paper, we will focus on two major changes to bankruptcy rules introduced with the new law to achieve these objectives. First, the new law facilitated the sale of insolvent firms as a going concern – i.e. as an operating business. This was obtained by removing successor liability. Successor liability implied that, if a Brazilian firm was sold as a going concern during liquidation, tax and labor liabilities were transfered to the buyer. This dampened the market for insolvent firms encouraging the piecemeal sale of firms' assets. By removing successor liability, the new law aimed at increasing the total value recovered when selling insolvent firms as a whole or by business units. Second, the new law changed the order in which claims are paid when a firm is liquidated, giving higher priority to secured creditors at the expense of workers and the tax authority. This was obtained by introducing a cap on labor claims – which in Brazil have first priority in case of liquidation – and by giving secured creditors' claims priority over tax claims.[8]

Figure I shows the expected recovery rate of secured creditors in Brazil from 2004

[7]These estimates are based on the opinion of local expert surveyed by the Doing Business team. Local experts are presented with a standardized business case and asked to answer a questionnaire. Also, it should be noted that the business case refers to a company operating in the largest business city of the country (São Paulo for Brazil, New York City for the United States, Shanghai for China, Mumbai for India). Data is from http://www.doingbusiness.org/data (downloaded in September 2015) and refers to year 2005. To the best of our knowledge, Brazil has no official data on actual recovery rates of creditors in bankruptcy.

[8]The cap was set at 150 monthly minimum wages per employee, which in 2005 corresponded to around 16,500 USD per employee. The new law introduced other innovations not discussed in depth in this paper. For example, it introduced a new reorganization procedure based on the chapter 11 of the US Bankruptcy Code. The objective of the new reorganization procedure was to introduce a source of relief for firms in financial troubles but with a potential for recovery. The new procedure included the automatic put on hold of all litigations against the debtor (automatic stay), the use of creditors' committee and debtor in possession financing.

to 2012 as reported in the Doing Business Database. According to the local experts interviewed by the Doing Business team, the expected recovery rate of secured creditors had a discrete increase two years after the introduction of the reform, going from 0.4 in 2006 to 12.1 cents on the dollar in 2007. This is consistent with the legal changes introduced by the 2005 bankruptcy reform.

As a matter of fact, the rules on creditors' rights protection introduced in Brazil with the new law are similar to those in force in the United States. However, the difference in terms of secured creditors' recovery rate between the two countries remained large in the years after the reform. One potential explanation relies in the different level of efficiency of the judicial system between these two countries. In the United States, secured creditors can expect to be repaid in 1.5 years from the beginning of the insolvency procedure, in Brazil in 4 years.[9] In this sense, Brazil is an ideal laboratory to study the effect of the efficiency of the judicial system on bank lending and real firm level outcomes. First, because Brazilian laws establish that bankruptcy cases must be filed in the civil court that serves the area where the debtor's headquarters are located. Second, as we will show in section IV, Brazil offers vast cross-sectional variation in the efficiency of its judiciary.

III Conceptual Framework

This section presents a simple model illustrating the effects of a bankruptcy reform on firm access to finance, investment and size. The main intuition of the model is straightforward: a bankruptcy reform such as the one introduced in Brazil in 2005 increases the recovery rate of secured creditors, causing firm borrowing capacity to increase. For those firms that would find profitable but cannot afford to upscale their production technology, an increase in borrowing capacity increases investment and size. In this framework, we introduce heterogeneity in the efficiency of the judicial system across firms, and derive testable predictions for the empirical analysis.

The setup of the model is a closed-economy version of Bustos (2011). On the supply side, there is monopolistic competition. Each firm produces a different variety in a single industry under increasing returns to scale. Firms are heterogeneous in two dimensions: their initial level of productivity (φ) and the judicial district in which they operate, indexed by j. Firms draw their initial productivity from a known distribution.[10] Once firms observe their initial productivity, they decide whether to stay and produce or to exit the market. On the demand side, varieties enter into the consumer utility function, which is a standard CES with elasticity of substitution $\sigma > 1$. Labor is the only factor of

[9] Estimates refer to year 2012 and are based on the opinion of local expert surveyed for the Doing Business Database.

[10] Entry is disciplined by fixed set-up cost, expressed in terms of labor, that guarantees a finite number of entrants.

production, and location-specific wages are used as the numéraire.[11]

Firms can produce using two different technologies: a *low* technology, which features a low fixed initial cost, or a *high* technology, that reduces their marginal labor cost by a factor γ, but has a large initial fixed cost. Production under different technologies is described by the following total cost functions:

$$TC = \begin{cases} f + \frac{y}{\varphi} & \text{if technology } = low \\ \eta f + \frac{y}{\gamma\varphi} & \text{if technology } = high \ (\eta, \gamma > 1) \end{cases}$$

Under these assumptions, firm profits, which we denote by $\pi^L(\varphi)$ and $\pi^H(\varphi)$ depending on whether a firm uses the *low* or the *high* technology, are a positive function of firm initial productivity and a negative function of the judicial district-specific real wage. The zero profit condition for a firm that uses the low technology determines the productivity cutoff to stay in the market (φ^*). The equal profit condition between profits obtainable with the *low* and the *high* technology, determines the productivity cutoff above which firms find it profitable to switch to the high technology (φ^h).

We assume that the fixed cost that firms have to pay to adopt the *high* technology can not be financed using internal funds. Therefore, firms with initial productivity higher than φ^h must borrow ηf from competitive lenders, which we hereafter label "banks". We define $\bar{\pi}^H(\varphi)$ as gross profits, i.e. the profits that the firm obtains under the *high* technology without including the initial investment. Once gross profits are realized, the firm has to decide whether to repay its debt or default. In case of default, banks have the right to bring the firm to court and start a bankruptcy procedure. If bankruptcy is started, the firm is liquidated and creditors can recover up to a share λ_j of firm value ($\bar{\pi}^H(\varphi)$), while $(1 - \lambda_j)$ of firm value represents the deadweight loss arising from costs associated with inefficient asset disposition, bankruptcy proceedings, and debt collection. We define:

$$\lambda_j = \delta(1 - \psi_j) \tag{1}$$

The parameter δ in equation (1) captures the fraction of firm value that creditors can expect to recover under a certain national bankruptcy law. For example, δ will be higher if the national bankruptcy law facilitates the sale of bankrupt firms as a going concern rather than piecemeal.[12] The parameter ψ_j captures the fraction of firm value that is lost due to court congestion, and varies across districts.[13]

[11] Section A2 of the Appendix reports a detailed analysis of the model and all derivations.

[12] In this simple conceptual framework there is a single class of creditors: banks. If there were more classes of creditors, one could think of δ as capturing also the priority of banks with respect to workers and the tax authority in the order of repayment in case of liquidation.

[13] For simplicity, We assume that moving across judicial districts is infinitely costly for both firms and workers. The data shows that firm mobility is limited during the period under study. Within the sample of single-plant manufacturing firms with 30 or more employees used in the empirical analysis,

As in Hart (1995) and Hart and Moore (1994) we make the standard assumption that, as an alternative to liquidation, the parties can decide to renegotiate the debt contract, and that the bargaining power in this renegotiation is all in the hands of the debtor. In this renegotiation, the minimum that banks will accept is $\lambda_j \bar{\pi}^H(\varphi)$. Therefore, the firm will decide to repay its debt as long as:

$$\bar{\pi}^H(\varphi) - (1+r)b \geqslant (1-\lambda_j)\bar{\pi}^H(\varphi) \tag{2}$$

Where the left-hand side of equation (2) represents firm gross profits after repaying debt b, on which the firm pays an interest rate r. The right-hand side captures the share of firm value that is not transferred to creditors in renegotiation. Equation (2) pins down the maximum borrowing capacity of each firm, which, assuming that $r = 0$, is given by:

$$b(\varphi) = \lambda_j \bar{\pi}^H(\varphi) \tag{3}$$

Equation (3) shows that the maximum borrowing capacity of each firm depends on its initial productivity, the national bankruptcy rules and the efficiency of local courts. In addition, equation (3) determines which firms are financially constrained. In order to adopt the *high* technology, firms must borrow at least enough to pay ηf. Therefore: firms for which $b(\varphi) < \eta f$ are financially constrained. The equality $b(\varphi) = \eta f$ determines the productivity cutoff to be unconstrained (φ^u).[14]

This simple theoretical framework delivers predictions on the effect of a bankruptcy reform such as the one described in section II on firm outcomes. In particular, the removal of successor liability, which increases the probability of selling insolvent firms as a going concern, corresponds to an increase in δ. This will increase the overall share of firm value recovered in bankruptcy, as well as the bargaining power of creditors in renegotiation. The main empirical prediction of the model is that an increase in δ decreases the cutoff productivity to be unconstrained φ^u, allowing more firms to access bank loans, investing in the *high* technology and hiring more workers. Given equation (1), this effect is stronger for firms operating in judicial districts where courts are more efficient (lower ψ_j), while it is attenuated, or potentially completely offset, in judicial districts where courts are more congested (higher ψ_j).[15]

only 3.8% changed their location at least once between 2003 and 2008. In terms of migration of workers, although Brazil experienced large flows of working age population in the period under study, the sample of municipalities studied in this paper is characterized by urban centers that, on average, experienced inflows of migrants that are relatively small with respect to their initial population (net migration flow of 2% between 2000 and 2010).

[14]The existence of financially constrained firms in any given judicial district depends on the relationship between φ^h and φ^u. We will focus on the case in which $\varphi^h < \varphi^u$, which implies the existence of firms that are productive enough to be willing to update their technology but that cannot do it due to financial frictions. Parameter conditions for such firms to exist are detailed in section A2 of the Appendix.

[15]Section A2 of the Appendix reports the formal derivation of the cutoff productivities in equilibrium and the proofs of the model's empirical predictions.

IV Data

This section describes the four main data sources used in the paper. Data on the judicial system is from *Justiça Aberta*, a dataset of the National Justice Council covering all Brazilian courts, and from case-level data on bankruptcy cases from the State Tribunal of Rio Grande do Sul. Data on bank loans to manufacturing firms is from the Credit Information System of the Central Bank of Brazil. Finally, data on manufacturing firms is from the Annual Industrial Survey carried out by the IBGE, the Brazilian Institute of Statistics.

The dataset *Justiça Aberta* records data on pending cases, new cases, sentences and number of judges for all courts in Brazil. Data is collected monthly through a standard questionnaire administered by the National Justice Council and filled out by judges and the administrative staff of each court.[16] We focus our analysis on judicial variables from civil courts of first instance, since these are the courts that deal with bankruptcy cases. We construct, for each civil court, a measure of congestion equal to the number of pending cases at the beginning of the year divided by the number of judges working in that court over the same year.[17] For judicial districts that have two or more civil courts of first instance, we take a weighted average of court congestion using the number of pending cases as weights. Finally, twelve judicial districts encompassing large cities have courts specialized in bankruptcy cases. Where these courts exist, we assign to the judicial district their measure of court congestion.[18]

Data from *Justiça Aberta* is available from January 2009, after the introduction of the new bankruptcy law. To deal with this issue, we also use case-level data provided by the State Tribunal of Rio Grande do Sul (TJRS).[19] This dataset covers all bankruptcy cases filed in Rio Grande do Sul between January 2000 and July 2014. Importantly, this dataset provides, for each case, the date in which it was filed, the date in which it was closed as well as the name of the judicial district. With respect to *Justiça Aberta*, the TJRS dataset has two advantages. First, it allows to construct a measure of time in court at judicial district level that is predetermined with respect to the introduction of the new bankruptcy law. Second, it allows to construct a measure of time in court specifically

[16] Data from *Justiça Aberta* used in this paper is publicly available and can be downloaded from www.cnj.jus.br.

[17] A similar measure is used in Dakolias (1999). The *Justiça Aberta* questionnaire does not monitor the work practice of judges. Therefore, we do not observe whether judges start working on cases in the order they enter into the court or whether they give priority to new cases. Coviello et al. (2014) show that work practices, and in particular how workers deal with pending tasks, can influence their productivity.

[18] Judicial districts with specialized courts are: Belo Horizonte, Brasilia, Campo Grande, Curitiba, Fortaleza, Juiz de Fora, Novo Hamburgo, Porto Alegre, Rio de Janeiro, São Paulo, Uberaba, and Vitoria. In the empirical analysis we control for the presence of bankruptcy courts in a judicial district before the reform entered into force by adding a dummy to the equation to be estimated.

[19] The state of Rio Grande do Sul is located in the South macro-region of Brazil, has a population of 10,187,842 inhabitants (Population Census, IBGE, data refer to year 2000) and accounts for 6.9% of Brazilian GDP (Regional Accounts Statistics, IBGE, data refer to year 2000).

for bankruptcy cases. The main disadvantage, of course, is that any inference from the estimates obtained using the TJRS data will be specific of Rio Grande do Sul courts. Table I, Panel A, reports summary statistics of the main judicial variables used in the paper. As the table shows, the average time to close a bankruptcy case across municipalities in Rio Grande do Sul was 3.9 years in the pre-reform period, with a standard deviation of 1.6 years. Figure II shows the relationship between time in court for a bankruptcy case and the measure of court congestion from the *Justiça Aberta* dataset. Each observation in this Figure is a municipality in Rio Grande do Sul, and observations are weighted by the number of bankruptcy cases. As the Figure shows, municipalities with courts that have a higher number of pending civil cases per judge in 2009 tended to be slower in dealing with bankruptcy cases in the pre-reform period.[20]

Data on loans to manufacturing firms is from the Credit Information System (*Sistema de Informações de Crédito*, or SCR) of the Central Bank of Brazil.[21] This dataset includes information on all loans above 5,000 Brazilian Reals (BRL) issued by financial institutions operating in Brazil.[22] Information on each loan is transmitted monthly and includes both the type of operation being financed with the loan, and the loan characteristics. Crucially for the purpose of this paper, the Credit Information System provides information on the location of the borrower, identified by the code of the municipality where the firm is registered, as well as the sector of operation. We focus our analysis on bank loans to manufacturing firms that are aimed at financing firm investment, that are not part of directed credit programs, and that are secured by collateral.[23] As Panel A in Table I shows, we start from a sample of 77,303 secured loans to manufacturing firms originated between 2003 and 2008. The average loan size is around 38,000 BRL (all monetary variables are in real terms and expressed in 2000 BRL), with an average annual interest rate of 26.4%.

Data on real outcomes at firm-level is from the Annual Industrial Survey (PIA) carried out annually by the Brazilian Institute of Statistics (IBGE). This survey is designed to monitor the performance of Brazilian firms operating in the manufacturing sectors.[24] The population of firms eligible for the survey includes all firms with more than 5 employees

[20]Table A1 in the Appendix shows the estimated coefficients on backlog per judge for the same outcomes of Figure II. It shows that this relationship is not only strongly significant but also economically meaningful. The coefficient in column 2, for example, indicates that a 1 log point difference in backlog per judge corresponds to a 0.188 log points difference (0.43 of a standard deviation) in years in court for bankruptcy cases prior to the reform.

[21]The collection and manipulation of the data were conducted exclusively by the staff of the Central Bank of Brazil.

[22]This threshold has been changed over time, but it has been stable at 5,000 BRL for the period analyzed in this paper: from January 2003 to December 2008.

[23]Section A3 of the Appendix reports the codes of the loan types identified as firm investment, which have been identified in cooperation with the Central Bank of Brazil Research Department.

[24]We focus our analysis on firms in the manufacturing sector as defined by the sector classification CNAE 1.0 (sectors 15 to 37) and CNAE 2.0 (sectors 10 to 33). The same codes are used to identify the sector of operation of borrowers in the Credit Information System.

registered in the national firm registry (CEMPRE, or *Cadastro Central de Empresas*). The survey is constructed using two strata: the first stratum includes a representative sample of firms having between 5 and 29 employees (the sampling stratum, or *estrato amostrado*) and the second stratum includes all firms having 30 or more employees (the Census stratum, or *estrato certo*). To ensure representativity at municipality level, in the empirical analysis we use only firms in the Census stratum, which are surveyed with probability one. In addition, in order to precisely link court jurisdiction to firm level outcomes, we restrict the sample to single-plant firms and to firms that do not change their location during the period under study. The first restriction excludes potential confounding effects coming from other establishments of the same firm. The second restriction excludes potential confounding effects coming from firms that, upon the introduction of the reform, might strategically relocate to districts with faster courts in order to benefit from easier access to external finance. The final sample is composed by 13,129 unique firms and 65,744 firm-year observations in the period between 2003 and 2008. Table I, Panel A, reports summary statistics of firm characteristics including: number of workers, value of output, investment — which includes acquisitions of new machineries, equipment, land, buildings and vehicles — and total book value of assets. Figure A2 in the Appendix shows the geographical distribution of this sample across Brazilian municipalities.

V Empirics

The conceptual framework presented in section III suggests that, following the bankruptcy reform of 2005, firms located in judicial districts with less congested courts should experience larger access to bank loans, as well as larger increase in investment and size. We start by reporting the basic correlations between court congestion and the outcomes of interest in section V.A. These correlations, however, are not informative of the causal relationship between these variables. In section V.B we then present an identification strategy that attempts to establish the direction of causality.

V.A Basic Correlations in the Data

In this section we document how court congestion relates to changes in bank loans, firm investment and firm size. The basic form of the equation to be estimated is:

$$y_{ijt} = \alpha_i + \alpha_t + \beta \left(\log \left(\frac{backlog}{judge} \right)_j \times post_t \right) + \varepsilon_{ijt} \tag{4}$$

where y_{ijt} is an outcome that varies across firms and time, the subscript i identifies firms, and the subscript j identifies the municipality where the firm is located. The dummy $post_t$ captures the timing of the reform. We focus our analysis on the years 2003 to 2008. We define the years 2003 and 2004 as the pre-reform period ($post_t = 0$), and the

years 2005 to 2008 as the post-reform period ($post_t = 1$).[25] The variable $\log\left(\frac{backlog}{judge}\right)_j$ measures court congestion and it is defined as the natural logarithm of total number of civil cases divided by number of judges in municipality j.[26] The interaction term between court congestion and $post_t$ captures how changes in firm-level outcomes differ across firms located in districts with different levels of court congestion between the pre and the post reform periods. Firm fixed effects (α_i) and time fixed effects (α_t) capture the two main effects of the interaction.

To deal with serial correlation in the error term, we implement one of the solutions proposed by Bertrand et al. (2004). Instead of estimating equation (4) in levels, we collapse the data in two periods, one including the years before (2003 and 2004) and the other including the years after the introduction of the new bankruptcy law (2005 to 2008), and estimate equation (4) in first differences:

$$\Delta y_{ij} = \Delta\alpha + \beta \log\left(\frac{backlog}{judge}\right)_j + \Delta\varepsilon_{ij} \tag{5}$$

where Δy_{ij} is the change in outcome y between the years before and the years after the introduction of the new bankruptcy law, and it is defined as:

$$\Delta y_{ij} = \frac{1}{4}\sum_{t=2005}^{2008} y_{ijt} - \frac{1}{2}\sum_{t=2003}^{2004} y_{ijt} \tag{6}$$

Finally, we take an average of Δy_{ij} across firms within each municipality j and estimate equation (5) at municipality level as follows:

$$\Delta y_j = \Delta\alpha + \beta \log\left(\frac{backlog}{judge}\right)_j + \Delta\varepsilon_j \tag{7}$$

Table I, Panel B, reports summary statistics of the main outcomes of interest of the empirical analysis at municipality level. The final sample is composed by 831 municipalities, where we observe manufacturing firms surveyed in PIA both in the years before and in the years after the reform, and for which judicial variables, outcome variables, and control variables are available.[27] Table II reports the correlation matrix between outcome variables used in the empirical analysis.

[25] The loan-level data from the Credit Information System is available starting from 2003. The Annual Industrial Survey is available up to 2009, which we exclude to avoid any potential effect of the international financial crisis on the estimates. Results are robust to assigning to year 2005 to the pre-reform period.

[26] As discussed in section IV, this measure of court congestion refers to the year 2009, the first year for which data is available for all Brazilian judicial districts, and it is used here as a time-invariant proxy for court congestion. However, judicial outcomes might also be affected by the reform. The identification strategy presented in section V.B deals with this issue by exploiting differences in potential extra-jurisdiction assigned to courts prior to the introduction of the new law.

[27] In order to take into account the fact that municipalities borders have, in some cases, changed over time, and new municipalities have been created out of splitting or merging old ones, the empirical analysis is conducted at the level of Área Mínima Comparável (AMC), or "smallest comparable areas". These are aggregations of municipalities constructed by the Brazilian Statistical Institute (IBGE) that can be consistently compared over time.The AMC used in this paper have been constructed by the IBGE as

V.A.1 Bank Loans and Real Firm-level Outcomes

Table III reports OLS estimates of equation (7) for three main outcomes: number of secured loans per firm, firm investment and firm size. The first outcome is measured as the log of total number of secured loans whose recipients are manufacturing firms located in a given municipality, divided by the number of manufacturing firms in that municipality. The second outcome is firm investment, which is defined as total value of investment in year t divided by total book value of assets in year $t-1$. Investment includes acquisitions of machineries and equipment, land and buildings, vehicles and other acquisitions from third parties. The third outcome is firm size, measured as the log of total value of production.

Column 1 of Table III shows that municipalities with less congested courts experienced a larger increase in secured loans per firm. In column 2 we add controls that capture the potential importance of initial levels of economic development, financial development and industrialization for the impact of the new bankruptcy law. These controls are: income per capita, bank branches per 100,000 inhabitants and manufacturing share in local value added, all observed in the year 2000. In addition, we add a dummy variable capturing the existence of (at least) one court specialized in bankruptcy cases in the municipality. Controlling for initial characteristics and existence of bankruptcy courts does not affect the relationship between court congestion and secured loans: the estimated coefficient is stable and statistically significant. The magnitude of this relationship is economically meaningful. The standardized beta coefficient of the estimate reported in column 2 implies that a one-standard deviation difference in court congestion is associated with 0.14 standard deviation difference in the number of secured loans per firm.

Next, we analyze the relationship between court congestion and real firm-level outcomes. In columns 3 and 4 of Table III the outcome variable is firm investment over assets. The coefficient on court congestion is negative and significant, suggesting that firms operating under less congested courts experienced larger increases in investment since the reform was implemented. In column 4, we show that adding the same set of initial municipality characteristics as in column 2 and a dummy for bankruptcy courts does not affect the precision or the size of the coefficient on court congestion.[28] The stan-

geographical units that can be compared from 1991 to nowadays. Currently, Brazil has 5565 municipalities, that can be matched to 4620 AMCs using correspondences provided by the IBGE. In the Credit Information System and the Annual Industrial Survey, firms are identified by the code of the municipality where they are registered. Using correspondences between municipalities and AMCs we matched data at loan level from the Credit Information System and at firm level from the Annual Industrial Survey to AMC identifiers. In the *Justiça Aberta* and the TJRS dataset instead, the geographical identifier is the judicial district. Using official documentation provided by state tribunals, we manually mapped each judicial district to the municipalities it includes. Since judicial districts usually encompass one or more municipalities, judicial variables are converted to AMC level by taking a weighted average across municipalities in the same AMC (notice that municipalities from different judicial districts can be part of the same AMC), where the weights are constructed using population data from the 2000 Population Census. In what follows, we will use the terms AMC or municipality interchangeably.

[28]Notice that, net of the effect of court congestion and other municipality characteristics, the estimated coefficient on the bankruptcy court dummy is negative and marginally significant when the outcomes are

dardized beta coefficient of the estimate reported in column 4 implies that a one-standard deviation difference in court congestion is associated with 0.12 standard deviation difference in firm investment as a share of assets. Columns 5 and 6 of Table III show the relationship between court congestion and firm size. The model predicts that average firm size should increase relatively more in less congested judicial districts in the aftermath of the reform.[29] The basic correlations in the data are mixed regarding this prediction: the estimated coefficients on court congestion are negative but not statistically different from zero.

V.B The Effect of Court Congestion on Financial and Real Firm-level Outcomes

In this section we present an identification strategy that attempts to establish the causal effect of court congestion on bank loans and real firm-level outcomes. The evidence presented in section V.A.1 shows that firms located in districts with less congested courts experienced a larger increase in secured loans and investment after the introduction of the new bankruptcy law. These results are consistent with the mechanism presented in the model: the effect of stronger creditors' protection on lending and investment depends on the quality of local court enforcement. However, these results are not informative of the causal relation between court congestion and financial and real firm-level outcomes. First, the measure of court congestion is observed after the introduction of the reform. Therefore, one alternative explanation is that judicial districts with better institutions anticipated the importance of enforcement for the success of the reform and reduced court congestion by, for example, hiring more judges. As a consequence, in these judicial districts, we observe both larger increase in bank financing and firm investment, and lower court congestion in the post reform period. This alternative explanation is still consistent with court enforcement being an important factor for the success of the reform, but raises concerns about other characteristics of judicial districts with better institutions driving the results. Second, the results might be biased by endogenous sorting of firms across municipalities before the introduction of the reform. In column 1 of Table IV we show the correlation between court congestion and firm and municipality characteristics in the pre-reform period. Firms in municipalities with more congested courts display larger access to secured loans, invest more as a share of their assets, are larger and more

secured loans per firm and firm size, while it is not statistically different from zero for firm investment. These results suggest that firms in municipalities with specialized courts did not experience larger increase in access to secured loans, investment and size with the introduction of the new law. As reported in section IV, these courts are present in a handful of state capitals and large cities. Therefore, their geographical location is correlated with other unique municipality characteristics, and the estimated coefficients reported in Table III cannot be interpreted as evidence of a causal link between existence of specialized courts and firm level outcomes.

[29] This is because, in these districts, more firms relax their borrowing constraints and adopt a more productive technology.

productive. In addition, municipalities with more congested courts display, on average, higher levels of economic and financial development. These correlations suggest a potential bias in the OLS estimates. First, larger and more productive firms are initially located in municipalities with higher court congestion. If these firms are better at taking advantage of the new law in order to borrow and invest more, this correlation will bias downward the OLS estimates. Second, there is a positive correlation between court congestion and the depth of the local market in which firms are likely sold in case they go bankrupt. Since one of the provisions of the new law was to facilitate the sale of bankrupt firms as a going concern, this will also bias downward the OLS estimates presented in Table III.

In this section we attempt to establish the direction of causality. We propose an identification strategy that exploits the timing of introduction of the new law and differences in potential extra-jurisdiction of courts dealing with bankruptcy cases. This identification strengthens the results presented in section V.A.1 in two dimensions. First, the measure of potential extra-jurisdiction is pre-determined with respect to the introduction of the new bankruptcy law. Second, the measure of potential extra-jurisdiction depends only on neighboring municipalities' characteristics and, conditional on a set of neighboring municipalities' controls, it is uncorrelated with firm characteristics prior to the reform.

Let us first discuss how we construct the measure of potential extra-jurisdiction. Starting from the 1970s, and mostly after the approval of the 1988 Federal Constitution, Brazilian states introduced laws to organize the territorial subdivision of their judiciary.[30] These laws established minimum requirements that a municipality has to satisfy in order to become seat of a judicial district. Minimum requirements are expressed in terms of observable characteristics such as: the number of inhabitants, the number of voters in the last election, the area in squared kilometers, the number of judicial cases originated in a municipality, the amount of tax revenues, or a combination of the above characteristics. Crucially, jurisdiction over municipalities that do not satisfy these requirements is assigned to the courts of one of its territorially contiguous municipalities. Therefore, courts in municipalities that become seats of judicial districts are the potential recipients of cases originated in neighboring municipalities that do not. Figure III shows the geographical location and potential extra-jurisdiction of the municipalities seat of judicial districts used in the empirical analysis.[31]

We exploit differences in potential extra-jurisdiction of courts as a source of cross-

[30]The 1988 Constitution officially assigns to State Tribunals the right to propose laws establishing or altering the territorial organization of the judicial system (Art. 96).

[31]Table A2 in section A4 of the Appendix reports the minimum requirements in each state in Brazil, along with the article of the law stating the requirement. Notice that only the administration of judicial cases is reassigned, while all other administrative and political prerogatives granted by the Brazilian federative system remain with the municipal government. Courts are defined as "potential" recipients of cases originated in neighboring municipalities because, when a municipality that does not satisfy the requirements share its borders with more than one municipality that does, the law does not specify which one should become the recipient of its cases.

sectional variation in the intensity of the bankruptcy reform. This measure is equal to the number of territorially contiguous municipalities that do not satisfy the requirements to become a judicial district. More formally, the baseline empirical specification used in this section is:

$$\Delta y_j = \Delta\alpha + \gamma(\textit{Pot. Extra-Jur.})_{j,2000} + \delta N_{j,2000}^{neighbors} + \Delta\eta_j \tag{8}$$

where Δy_j is an outcome defined as in section V.A, and $(\textit{Pot. Extra-Jur.})_{j,2000}$ is the measure of potential extra-jurisdiction described above.[32] Finally, we add to the main specification a control for the total number of neighbors of each municipality, to avoid geographical factors — such as coastal location – biasing the estimates on potential extra-jurisdiction.

This empirical strategy relies on two assumptions. First, that the number of judges, staff and other resources did not adjust to the additional workload of cases originated in neighboring municipalities. If that is the case, potential extra-jurisdiction is a good predictor of court congestion. We test this assumption in section V.B.1. Second, it relies on the assumption that potential extra-jurisdiction is exogenous with respect to the outcomes of interest. One concern is that potential extra-jurisdiction might be correlated with initial firm characteristics or, more generally, with the overall level of development across Brazilian regions. To assess the extent of this concern, in column 2 of Table IV we report estimated differences in terms of firm and municipality characteristics across municipalities with different levels of potential extra-jurisdiction after controlling for the total number of neighbors and a set of neighbors' characteristics. As the table shows, there are no substantial or statistically significant differences in terms of use of secured loans, firm size, productivity and level of investment over assets in the pre-reform period. Also, the size of the differences in terms of initial municipality characteristics is considerably attenuated. However, since these differences are still significant, in what follows we add to equation (8) the set of municipality characteristics presented in Table IV and show that the estimated coefficients are stable when we allow for differential trends across municipalities with different initial characteristics.

In the following sections we show the results obtained using potential extra-jurisdiction as main independent variable. First, section V.B.1 studies the relationship between potential extra-jurisdiction and efficiency of the judicial system. Then, section V.B.2 shows how this measure affects financial and real firm-level outcomes.

[32]The data used to construct this measure is from the 2000 Population Census.

V.B.1 The Effect of Potential Extra-Jurisdiction on Court Congestion and Time in Court for Bankruptcy Cases

In this section we study whether the measure of potential extra-jurisdiction is a good predictor of court congestion and time in court for bankruptcy cases. In principle, state tribunals could adjust the ability of courts to deal with additional workload by hiring more judges. If this was the case, the number of neighboring municipalities that could potentially be added to a judicial district should not affect the congestion of its courts.

The first two columns of Table V report the results of estimating equation (8) when the outcome variable is court congestion. The estimated coefficient on potential extra-jurisdiction is positive and significant, indicating that a larger potential jurisdiction increases court congestion. In column 2 we include the same set of municipality controls used in Table III, as well as neighbors' observable characteristics. As the Table shows, including these controls does not affect the precision of the estimated coefficient on potential extra-jurisdiction, which actually increases in size. The effect implied by the estimated coefficients is large: a one-standard deviation increase in potential extra-jurisdiction is associated with a 0.3 standard deviation increase in court congestion.

Next, we test the relationship between potential extra-jurisdiction and the efficiency of the judiciary as measured by the average time in court for bankruptcy cases. As discussed in section IV, this measure is only available for municipalities in the state of Rio Grande do Sul. The last two columns of Table V report the results of estimating equation (8) when the outcome of interest is time in court for bankruptcy cases measured as the log of number of years in court. The estimated coefficient on potential extra-jurisdiction is positive and significant, indicating that a larger jurisdiction increases time in court for bankruptcy cases. In column 4 we show that the estimated coefficient is robust to controlling for municipality and neighbors observable characteristics. In terms of magnitude, the coefficient reported in column 4 implies that a one-standard deviation increase in potential extra-jurisdiction is associated with a 0.4 standard deviation increase in time in court for bankruptcy cases.

Overall, the results presented in this section suggest that state tribunals do not adequately adjust resources to the extra-jurisdiction assigned to courts. The measure of potential extra-jurisdiction is a good predictor of both the congestion of civil courts and the average time in court for bankruptcy cases. The magnitude of this effect is meaningful and the estimated coefficients are robust to controlling for municipality and neighbors' observable characteristics.

V.B.2 The Effect of Potential Extra-Jurisdiction on Bank Loans, Firm Investment and Output

In this section we study the effect of potential extra-jurisdiction on financial and real firm-level outcomes. Table VI reports the results of estimating equation (8) for three outcome variables: number of secured loans per firm, firm investment over assets and firm size, all defined as in section V.A.1. For each outcome, the first column reports the estimates controlling only for the total number of neighbors of each municipality, the second column reports the estimates including municipality and neighbors' observable characteristics.

First, we focus on the number of secured loans per firm. The results indicate that municipalities with lower potential extra-jurisdiction experienced a larger increase in the number of secured loans per firm. This is consistent with the basic correlation presented in Table III. Next, we study the effect of potential extra-jurisdiction on firm level outcomes. The estimated coefficients indicate that firms located in municipalities with lower potential extra-jurisdiction experienced a larger increase in both investment and size. The point estimates do not change in size or precision when we add controls, confirming that the results are not driven by differential trends across municipalities with different initial characteristics.

The estimates discussed above can be used to compute the elasticity of the outcome variables to differences in the efficiency of the judicial system. These elasticities are computed as the ratio of the estimated coefficients on potential extra-jurisdiction when the outcomes are secured loans per firm, firm investment and firm size, and the estimated coefficient on potential extra-jurisdiction when the outcome is court congestion.[33]

Let us start by discussing the elasticity of secured loans per firm to court congestion. Using the more conservative estimates, i.e. those that include all municipality and neighbors controls, the elasticity of secured loans per firm to differences in court congestion is equal to -0.178.[34] The size of this elasticity implies that municipalities with a 1 percent lower court congestion experienced a 0.178 percent larger increase in the number of secured loans per firm. To illustrate the magnitude of this elasticity, consider two municipalities that are one standard deviation apart in terms of potential extra-jurisdiction. The municipality with a one standard deviation lower potential extra-jurisdiction had 28.3% less congested civil courts, and experienced a 5% larger increase in secured loans

[33]These elasticities are computed in the same way as a Wald estimator in an instrumental variable setting with a binary instrument, where the estimated coefficients reported in Table V can be interpreted as the first stage coefficients, while the estimated coefficients reported in Table VI as the reduced form coefficients.

[34]This is the ratio of the estimated coefficient on potential extra-jurisdiction reported in column 2 of Table VI divided by the estimated coefficient on potential extra-jurisdiction reported in column 2 of Table V. The same estimated coefficient is obtained with an instrumental variables regression. Table A3 in section A4 of the Appendix reports the IV coefficients for the three main outcomes of interest along with their standard errors and the first stage F-statistics.

per firm in the years under study. This corresponds to 12.6% of a standard deviation in the change of secured loans per firm between the pre-reform and the post-reform years.

Similarly, and for purely illustrative purposes given the different samples on which these coefficients are estimated, one can compute this elasticity by using the number of years in court for bankruptcy cases. In this case, the elasticity of secured loans per firm to differences in years in court is equal to -0.482.[35] Again, to illustrate the magnitude of this elasticity, consider two municipalities that are one standard deviation apart in terms of potential extra-jurisdiction. The municipality with a one standard deviation lower potential extra-jurisdiction was 13% faster in closing bankruptcy cases in the pre-reform years, and experienced a 6.5% larger increase in secured loans per firm with the introduction of the reform (16.3% of a standard deviation). In terms of standardized effects, the economic magnitudes obtained using time in court for bankruptcy cases in the first stage are similar to those obtained using court congestion.

The elasticities of firm investment and firm output to differences in the efficiency of the judicial system can be computed in a similar way. The elasticity of firm investment over assets to court congestion is equal to -1.606 and for firm output is equal to -0.083.[36] Again, to illustrate the magnitude of these elasticities, consider two municipalities that are one standard deviation apart in terms of potential extra-jurisdiction. The municipality with a one standard deviation lower potential extra-jurisdiction had 28.3% less congested civil courts, and firms in this municipality experienced a 0.46 percentage points larger increase in investment over assets (18.4% of a standard deviation) and a 2.3% larger increase in firm output (13.4% of a standard deviation) with the introduction of the reform.

The size of these elasticities is significantly larger than the basic correlation coefficients reported in Table III. When the outcome is secured loans per firm, for example, the elasticity to court congestion is, depending on the controls included, between 2 and 3 times larger than the correspondent OLS coefficient. This is not surprising since, as discussed in section V.B, the fact that municipalities with higher court congestion are initially more industrialized and financially developed as well as characterized by the presence of larger and more productive firms is expected to bias downward the OLS estimates.

Taken together, the estimates presented in Table VI are consistent with the basic correlations in the data and with the main predictions of the conceptual framework. In particular, they indicate that the effects of an increase in creditors' rights protection on financial and real firm-level outcomes depend on the efficiency of the judicial system.

[35] This is the ratio of the estimated coefficient on potential extra-jurisdiction reported in column 2 of Table VI divided by the estimated coefficient on potential extra-jurisdiction reported in column 4 of Table V.

[36] The first number is the ratio of the estimated coefficient on potential extra-jurisdiction reported in column 4 of Table VI divided by the estimated coefficient on potential extra-jurisdiction reported in column 2 of Table V. The second number is the ratio of the estimated coefficient on potential extra-jurisdiction reported in column 6 of Table VI divided by the estimated coefficient on potential extra-jurisdiction reported in column 2 of Table V.

Municipalities with less congested courts experienced larger increase in secured loans to manufacturing firms, as well as in investment and size of manufacturing firms.

VI Additional Results and Robustness Checks

VI.A Municipality-pairs

In this section we show that the results presented in section V.A.1 are robust to restricting the sample to neighboring municipality-pairs with different levels of court congestion. We adopt a methodology similar to Dube et al. (2010), Heider and Ljungqvist (2015) and Severino et al. (2014) which exploit variation within county-pairs located across state borders in the US to capture potential omitted variables with geographic proximity. In our setting, court congestion varies at municipality level and not at state-level. Therefore, we exploit variation within municipality-pairs located across judicial district borders in the same state in Brazil. To this end, we estimate the following equation:

$$\Delta y_{jp} = \Delta\alpha + \alpha_p + \beta \text{HC}_j + \Theta X_{j,2000} + \Delta\varepsilon_{jp} \tag{9}$$

where Δy_{jp} is the average log change of firm level outcomes defined as in equation (6) in municipality j, and p identifies the municipality pair. The variable HC_j is a dummy identifying the municipality with higher court congestion within each pair. To the extent that the ranking of court congestion across municipalities within each pair has not changed over time, this specification also mitigate concerns about using a measure of court congestion that is only observed in the post-reform period and could therefore be affected by the reform itself.

The identifying assumption is that the court congestion dummy is uncorrelated with the error term after controlling for municipality characteristics and municipality-pair fixed effect α_p.[37] To assess potential correlation between the court congestion dummy and observables, in column 3 of Table IV we compare municipalities with different levels of court congestion within each pair in terms of both firm and municipality initial characteristics. As shown, municipalities with higher court congestion within each pair do not display large or statistically significant differences with respect to municipalities with lower court congestion, lending support to the identification assumption. In all specifications we nonetheless add the same set of municipality controls ($X_{j,2000}$) used in section V.A.1 and show that the coefficients of interest either increase or are unaffected with their inclusion.

Table VII reports the results of estimating equation (9) when the outcomes of interest are: number of secured loans per firm, firm investment over assets and firm size. There are 452 municipalities in our sample that are seats of judicial districts and share the borders

[37] Equation (9) is estimated in first differences at firm level, restricting the sample to firms that do not change their location between the years before and the years after the reform. This implies that it implicitly controls also for firm and municipality fixed effects.

with at least another seat within the same state, for a total of 483 municipality pairs. Also notice that firm level outcomes Δy_{jp} can enter multiple times in the estimation whenever the municipality where the firm is located is part of multiple pairs.

The estimated coefficients on the dummy HC_j are negative and strongly significant for secured loans per firm and investment over assets. The magnitudes of these estimates indicate that municipalities with lower court congestion within each pair experienced, on average, a 5.4% higher increase in secured loans per firm, and a 0.78 percentage points higher increase in investment over assets. Differently from Table III, the coefficient on HC_j is negative and statistically significant when the outcome is firm value of output and we add municipality controls. The magnitude of this coefficient indicate that firms in municipalities with lower court congestion within each pair experienced, on average, a 2.3% higher increase in value of output.

These results are consistent with the basic correlations presented in section V.A.1 and, to the extent that geographical proximity captures unobservable municipality characteristics, indicate that court congestion affected the impact of the new bankruptcy law on secured loans, firm investment and firm output.

VI.B Additional Controls

In this section we test the robustness of the estimates presented in section V.B.2 to the inclusion of additional municipality and regional characteristics.

To control for different levels of industrialization across regions, and, in particular, for the presence of manufacturing clusters, we report the results presented in Tables V and VI controlling for average manufacturing share in local value added across neighboring municipalities. To control for different levels of human capital and population at municipality level, we also add controls for initial level of literacy rate and total population.

Another concern is that potential extra-jurisdiction might be correlated with municipality geographical characteristics. For example, municipalities in the interior of the country or located far from major urban centers might display both higher levels of potential extra-jurisdiction and lower gains from the reform. To address this concern we add controls for distance to the coast and distance from State capitals (as a proxy for major urban centers).

Table A4 in the Appendix reports the results of estimating equation (8) including these additional controls. For each outcome, we present the results in three columns. In the first column we include average manufacturing share in local value added across neighboring municipalities. In the second column, we include population and literacy rate at municipality level. In the third column, we include the geographical controls of distance to the coast and distance to State capitals. As shown, the estimated coefficients on potential extra jurisdiction are robust to the inclusion of these controls. In terms of their absolute value, the point estimates increase when the outcomes are court congestion

and secured loans per firm, while they partly decrease for firm investment over assets and firm value of output. Overall, the estimates presented in Table A4 indicate that the results reported in Tables V and VI are not driven by differential trends across areas with different initial levels of industrialization, human capital, population, distance to the coast or to major urban centers.

VI.C Pre-Existing Trends

In this section we show that the results presented in section V.B.2 are robust to controlling for pre-existing trends. One potential concern is that municipalities with lower potential extra-jurisdiction were already experiencing faster increase in secured loans, firm investment and firm size before the introduction of the new bankruptcy law. If that is the case, our estimates might be capturing different long term trends across these municipalities instead of the differential effect of judicial efficiency at the outset of the reform.

To check whether potential extra-jurisdiction predicts firm-level outcomes before the bankruptcy reform was implemented, we run a falsification test assuming that the reform was implemented in 2003 instead of 2005. Then, we estimate an equation in first differences that is similar to equation (8), but where we define the years 2001 and 2002 as pre-reform period, and the years 2003 and 2004 as post-reform period.[38]

Table A5 in Section A4 of the Appendix reports the results of this falsification test for two outcomes: firm investment over assets and firm output. Since data from the Credit Information System is only available from 2003, we cannot perform the same test for secured loans per firm. The estimated coefficient on potential extra jurisdiction when the outcome is firm investment is small and not statistically different from zero, indicating that there are no pre-existing trends in firm investment. When the outcome is firm output, instead, the estimated coefficient on firm size is positive and significant. This indicates that potential extra-jurisdiction had an opposite effect on firm size in the 2001 to 2004 period with respect to the period considered in Table VI. Overall, the results presented in Table A5 indicate that the estimates of the effect of potential extra-jurisdiction on real firm-level outcomes are not driven by pre-existing trends.

To test that the timing of the effect of potential extra-jurisdiction on firm investment and size is consistent with the introduction of the new bankruptcy law in 2005, we estimate the following specification:

[38] The variable investment over assets is defined as investment in year t divided by assets in year $t-1$. Therefore, for this specification, we use data from the Annual Manufacturing Survey from 2000 to 2004.

$$
\begin{aligned}
y_{jt} &= \alpha_j + \alpha_t + \sum_{t=2001}^{2008} \gamma_t (\textit{Pot. Extra-Jur.}_{j,2000} \times year_t) \\
&+ \sum_{t=2001}^{2008} \Psi_t (X_{j,2000}^{neighbors} \times year_t) + \sum_{t=2001}^{2008} \Theta_t (X_{j,2000} \times year_t) + \eta_{jt}
\end{aligned}
$$

where y_{jt} is an outcome of interest for municipality j in year t, α_j and α_t are, respectively, municipality and year fixed effects and $\sum_{t=2001}^{2008} (\textit{Pot. Extra-Jur.}_{j,2000} \times year_t)$ is the summation over a set of interaction terms between the measure of potential extra-jurisdiction at municipality level and yearly dummies. Notice that we include in this specification the same set of municipality and neighbors' controls used in Table VI, all interacted with yearly dummies.

In Figure IV we plot the estimated γ_t coefficients along with their 95% confidence intervals for firm investment and firm size. As shown, the effect of potential extra-jurisdiction on firm investment is small and not significant for the years before the introduction of the reform, while it becomes negative and significant starting from 2005. A similar pattern is observed when the outcome is firm output.

VI.D Effects on Secured Loans, Unsecured Loans, and Firm Investment by Sectoral Asset Tangibility

In this section we present two additional results that lend support to the mechanism at work. First, we test if the effect of potential extra-jurisdiction on bank loans depends on whether loans are secured by collateral. By facilitating the sale of bankrupt firms as a going concern, the new law aimed at increasing the overall value of firms in bankruptcy, potentially benefiting both secured and unsecured creditors. In addition, the new law gave to secured creditors higher priority in the order of repayment, while the priority of unsecured creditors was left unchanged. Therefore, we expect the effect of potential extra-jurisdiction on bank loans to be larger for secured than for unsecured loans. Second, we test if the effect of potential extra-jurisdiction on firm investment depends on the level of asset tangibility of the sector in which the firm operates. We expect this effect to be larger for firms operating in sectors that, for technological reasons, use more tangible assets, since these firms are more likely to finance themselves with secured debt.

In column 2 of Table VIII we report the results of estimating equation (8) when the outcome variable is the number of unsecured loans per firm in a given municipality. For comparability, in column 1 we report the results of the same regression on the number of secured loans per firm from Table VI. The estimated coefficients indicate that municipalities with lower potential extra-jurisdiction experienced a larger increase in secured loans but no significantly different change in unsecured loans. One potential explanation for

the lack of an effect on unsecured loans is that, even after the reform, the recovery rate of secured creditors was low by international standards (less than 20 cents on the dollar). Therefore, if courts abide by the absolute priority rule, unsecured creditors most likely did not benefit from an increase in the overall value of bankrupt firms in the post-reform period.

Next, to more precisely test the link between lending and investment, we study whether the effect of potential extra-jurisdiction on firm investment is stronger for firms operating in sectors that, for technological reasons, use more tangible asset. The rationale is that such firms are more likely to use these assets as collateral when applying for a loan, and are therefore more likely to be the same firms that benefited from the increase in secured lending.

We use the industry tangibility measure proposed by Braun (2003), which is constructed using data on US firms from the Compustat Annual Industrial Files.[39] In the same spirit of Rajan and Zingales (1998), under the assumption that US firms operate at the technological frontier in each sector, this measure allows to identify an industry's technological need for certain types of assets regardless of country-specific industry characteristics. For consistency with the rest of the paper, we perform this analysis at municipality level and estimate the following equation:

$$\begin{aligned} \Delta y_j &= \Delta\alpha + \gamma_1 (\textit{Pot. Extra-Jur.})_{j,2000} \times \textit{Tangibility}_j \\ &+ \gamma_2 (\textit{Pot. Extra-Jur.})_{j,2000} + \gamma_3 \textit{Tangibility}_j + \delta N_{j,2000}^{neighbors} + \Delta\eta_j \end{aligned} \tag{10}$$

We define $Tangibility_j$ as the weighted average of asset tangibility across manufacturing sectors in municipality j, where the weights are equal to the number of firms operating in each sector in that municipality in the pre-reform period.[40] The coefficient of interest in equation (10) is γ_1, which captures to what extent the effect of potential extra-jurisdiction on firm investment depend on asset tangibility.

The results of estimating equation (10) are reported in column 3 of Table VIII. The estimated coefficient shows that firms located in municipalities with lower potential extra-jurisdiction experienced a larger increase in investment, and that this effect is larger for firms operating in sectors with higher asset tangibility. This result is consistent with the differential effect of potential extra-jurisdiction on secured and unsecured loans shown in columns 1 and 2. To the extent that firms operating in sectors with higher asset tangibility

[39] Industry tangibility is equal to the median ratio of net property, plant and equipment over book value of asset for all US-based active companies contained in the Compustat Annual Industrial Files during the period 1986-1995.

[40] For example, suppose that a municipality has 20 manufacturing firms, half of them operating in the food processing industry (tangibility = 0.378), the other half in the manufacture of leather products (tangibility = 0.091). This municipality will be assigned a level of asset tangibility of $(0.378 \times 0.5) + (0.091 \times 0.5) = 0.235$.

are more likely to finance themselves with secured debt, these results lend support to the hypothesis that manufacturing firms receiving new secured loans are the same that invest more in the post reform period.

VI.E Spatial Correlation

The map presented in Figure III suggests that the measure of potential extra-jurisdiction is spatially correlated across municipalities. In this section we show that the estimates presented in Table VI are robust when we allow residuals to be correlated within geographical areas that encompass multiple municipalities.

In Table A6 we report the coefficients on potential extra jurisdiction showed in Table VI, and then compute standard errors clustered at different levels of aggregation. The first row below the coefficients reports the robust standard errors presented in Table VI for comparison. In the rows below we report standard errors clustered at increasingly larger levels of spatial aggregation. The standard errors reported in the second row below the estimated coefficients are clustered at micro-region level, and those in the third-row are clustered at meso-region level.[41] Table A6 shows that the standard errors of the estimated coefficients on potential extra-jurisdiction are either stable or slightly larger when we allow residuals to be correlated at larger levels of aggregation. However, the estimated coefficients on the main outcomes of interest remain significant at the 1 percent level.

VI.F Additional Outcome Variables: Loan Size, Interest Rate and Labor Productivity

In this section we study the effect of potential extra-jurisdiction on three additional outcome variables: average loan size, interest rate and labor productivity. Average loan size is calculated as the total initial value of all secured loans granted to firms in a given municipality divided by total number of secured loans; interest rate is the average yearly interest rate on secured loans, and labor productivity is total value of output divided by number of workers in efficiency units.

Table IX reports the results of estimating equation (8) for these three outcomes. The coefficient on potential extra-jurisdiction when the outcomes is average loan size is positive and significant. This indicates that municipalities with lower potential extra-jurisdiction experienced a decrease in average size of loans to manufacturing firms. This pattern is consistent with an increase in the number of firms taking secured loans in the aftermath of the reform, whereby new firms accessing external finance get smaller loans. The estimated coefficient on potential extra-jurisdiction when the outcome is average interest rate on

[41] Micro-regions and meso-regions are divisions of the Brazilian territory encompassing multiple municipalities used by the IBGE for statistical purposes. Brazil has 558 micro-regions and 137 meso-regions.

secured loans is positive but not statistically different from zero. Finally, we study the effect of potential extra-jurisdiction on labor productivity. The model predicts that firms in municipalities with less congested courts should experience a larger increase in labor productivity. Consistently with this prediction, the estimated coefficient on potential extra jurisdiction is negative and significant. To assess the magnitude of this estimate, we compute the elasticity of labor productivity to court congestion as in section V.B.2. This elasticity is equal to -.026, and implies that firms in a municipality with a one standard deviation lower potential extra-jurisdiction experienced a 0.7% larger increase in labor productivity (6% of a standard deviation) with the introduction of the reform.[42]

VI.G Alternative Definition of Potential Extra-Jurisdiction

In this section we propose an alternative definition of potential extra-jurisdiction. In section V.B we defined potential extra-jurisdiction as the number of territorially contiguous municipalities that do not satisfy the requirements to become a judicial district. The rationale of this measure is to capture the additional workload of cases generated outside a municipality. One potential concern is that this measure does not capture the fact that larger territorially contiguous municipalities are likely to generate more cases than smaller ones. To address this concern, we show that all our results are robust to using the number of firms initially located in territorially contiguous municipalities that do not satisfy the requirements to become a judicial district as a proxy for the additional workload of cases generated outside the municipality. Table A7 reports the results of this robustness test when the outcomes are: court congestion, secured loans per firm, investment over assets and firm value of output. As shown, the point estimates of the coefficients on this alternative measure of potential extra-jurisdiction have the same sign as those reported in Tables V and VI, are of similar size and are precisely estimated.

VII Conclusions

In this paper, we empirically assess how the quality of court enforcement shapes the impact of a financial reform on firm access to finance, investment and size. To identify this effect, we exploit the introduction of a pro-creditor bankruptcy reform and the variation in court congestion across Brazilian municipalities. To establish the direction of causality, we propose an identification strategy that exploits Brazilian state laws, which establish minimum requirements for municipalities to become independent judicial districts. We construct a measure of potential extra-jurisdiction that is equal to the number of neighboring municipalities that do not qualify to become an independent judicial dis-

[42]The elasticity is computed as the ratio of the estimated coefficient on potential extra-jurisdiction reported in column 6 of Table IX divided by the estimated coefficient on potential extra-jurisdiction reported in column 2 of Table V.

trict, increasing the congestion of existing courts. We show that this measure of potential extra-jurisdiction is strongly correlated with the level of court congestion across Brazilian courts and, conditional on a set of controls, is uncorrelated with initial firm characteristics. We find that municipalities with lower potential extra-jurisdiction experienced higher increase in secured loans to manufacturing firms, and higher increase in firm investment and output after the introduction of the reform. These findings are consistent with a simple conceptual framework in which heterogeneously productive firms must borrow to finance their investment in technology adoption, and where financial frictions depend on both national laws on creditor protection and quality of local court enforcement.

One important question is to what extent the results presented in this paper are informative outside Brazil. When comparing debt enforcement procedures across countries, Djankov et al. (2008) rank (pre-reform) Brazil in the lowest quintile in terms of overall efficiency of its bankruptcy procedure, along with other South American countries such as Uruguay, Paraguay, and Ecuador and other lower middle-income countries such as Indonesia, Turkey and Ukraine. In this sense, the experience of Brazil should be read as informative for countries that are introducing legal reforms in environments characterized by particularly inefficient enforcement institutions.

Finally, this paper informs the debate on the sequencing of economic reforms. Caselli and Gennaioli (2008), for example, advocate that financial reforms — such as bankruptcy law reforms — should be prioritized, because they favor the reallocation of resources to their more talented users. This paper makes the case that an efficient judiciary is a necessary precondition for firms to benefit from these reforms. This is important especially in developing economies, which often tend to "follow the rich ones and introduce elaborate bankruptcy procedures" that their courts can hardly enforce in a timely manner (Djankov et al., 2008, p.1146). Finding the right balance between promoting necessary changes in legal rules and investing to make the judicial institutions in charge of enforcing them more efficient is one of the major challenges faced by governments in developing countries.

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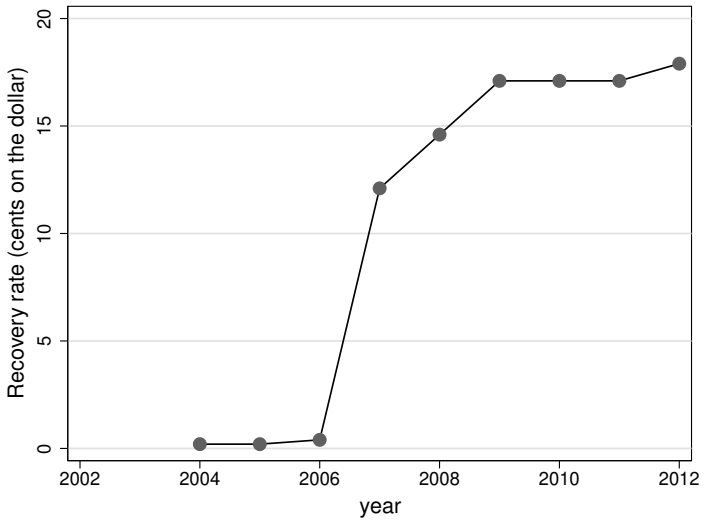
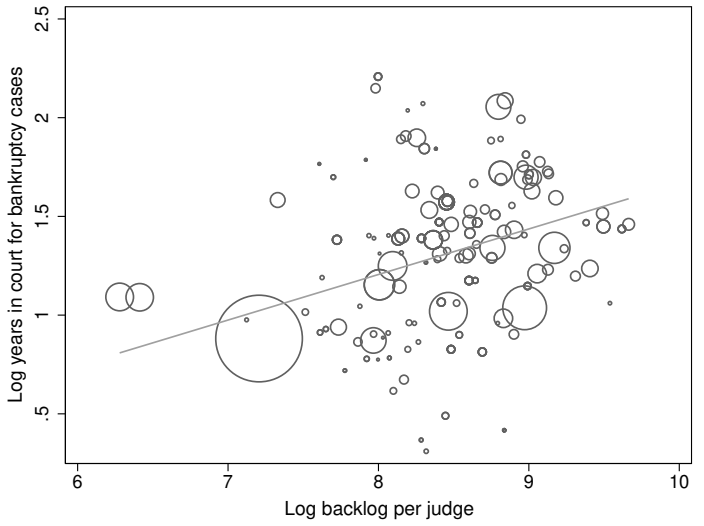
Figures

Figure I: Recovery Rate of Secured Creditors



Notes: Recovery rate is the cents on the dollar that secured creditors can expect to recover from an insolvent firm according to a panel of insolvency practitioners. Data is from the Doing Business database of the World Bank.

Figure II: Congestion of Civil Courts and Time in Court for Bankruptcy Cases



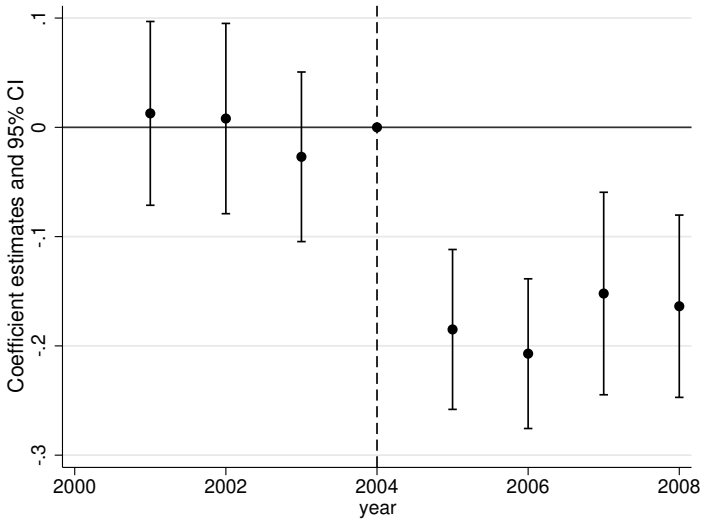
Notes: N=214. Sample is restricted to municipalities in Rio Grande do Sul. Observations are weighted by number of bankruptcy cases started between January 2000 and May 2005.

Figure III: Municipalities Seat of Judicial Districts and Potential Extra-Jurisdiction

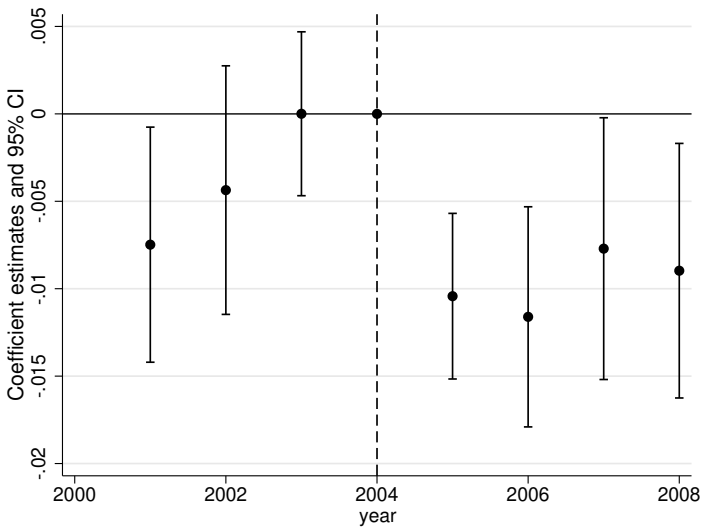
Notes: The Figure shows the geographical distribution of municipalities seat of judicial districts used in the empirical analysis (in light gray) and of their territorially contiguous municipalities that do not meet the requirements to be an independent judicial district (in dark gray). Data shown separately for each macro-region.

Figure IV: The Effect of Potential Extra-Jurisdiction on Firm Investment and Firm Size
Pre-Existing Trends

(a) Investment over Assets



(b) Log Value of Output



Notes: The dashed vertical line indicates the last year of the pre-reform period (2004). All regressions include a full set of baseline municipality controls and neighboring municipality controls interacted with year dummies as well as municipality and year fixed effects. Standard errors used to construct confidence intervals are clustered at municipality level. The excluded interaction is the one with year 2004.

Tables

Table I: Summary Statistics

Variable Name	Mean	Median	St.Dev.	N
Panel A				
Judicial district characteristics:				
Log backlog per judge	8.073	8.094	0.755	831
Log years in court for a bankruptcy case	1.274	1.381	0.460	214
Years in court for a bankruptcy case	3.928	3.980	1.621	214
Loan characteristics:				
Loan size (th BRL)	37.588	20.445	107.072	77,303
Interest rate (percentage points)	26.352	26.612	5.290	77,303
Firm characteristics:				
Number of workers (units)	88.579	56.000	308.372	65,744
Value of output (th BRL)	5,020.030	1,229.336	23,208.195	65,744
Investment (th BRL)	204.775	0.000	1,445.840	65,744
Total Assets (th BRL)	4,213.622	655.120	80,265.412	65,744
Panel B				
Financial outcomes:				
Δ log (secured loans/firm)	0.470	0.484	0.402	831
Δ log (unsecured loans/firm)	-0.531	-0.576	0.329	831
Δ log (avg loan size)	-0.227	0.002	0.919	831
Δ (avg interest rate)	0.520	0.514	5.414	831
Real outcomes:				
Δ investment over assets (in pct points)	-0.154	0.186	2.477	831
Δ log (output)	0.083	0.118	0.175	831
Δ log (output per worker)	0.081	0.092	0.115	831
Panel C				
Municipality characteristics:				
Potential Extra-Jurisdiction	3.819	4.000	2.697	831
Number of Neighbors	6.875	7.000	2.218	831
Log monthly income per capita	5.522	5.568	0.392	831
Bank branches for 100,000 inhabitants	11.879	10.556	6.932	831
Industry share in local GDP	0.267	0.230	0.145	831
Literacy rate	0.897	0.915	0.065	831
Log population	10.958	10.856	1.024	831
Neighboring municipalities controls:				
Log monthly income per capita	5.363	5.436	0.42	831
Log area in squared km	6.343	6.088	1.044	831
Industry share in local GDP	0.216	0.196	0.103	831

Notes: Panel A: Data on time in court for bankruptcy cases is only available for municipalities in the state of Rio Grande do Sul, which explain the lower number of observations (N=214). All monetary variables are expressed in real terms (2000 BRL). Panel B: Changes are calculated between the years before and the years after the reform as described in section V.A. Observations are weighted by the number of firms in each municipality. Panel C: Municipality and Neighboring municipality characteristics are observed in the year 2000. See Section A3 of the Appendix for a detailed description of each variable.

Table II: Correlation Matrix

Variable Name	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Δ log(secured loans/firm)	1.000						
(2) Δ log (unsecured loans/firm)	0.155 [0.000]	1.000					
(3) Δ investment over assets	0.093 [0.008]	-0.041 [0.239]	1.000				
(4) Δ log (output)	0.153 [0.000]	0.108 [0.002]	0.108 [0.002]	1.000			
(5) Δ log (output per worker)	0.091 [0.009]	0.043 [0.219]	0.075 [0.032]	0.693 [0.000]	1.000		
(6) Δ log (avg loan size)	0.022 [0.533]	0.090 [0.010]	-0.085 [0.014]	-0.085 [0.014]	-0.051 [0.145]	1.000	
(7) Δ (avg interest rate)	-0.125 [0.000]	0.046 [0.187]	-0.005 [0.895]	0.007 [0.838]	-0.020 [0.570]	-0.131 [0.000]	1.000

Notes: Correlation coefficients between outcome variables at municipality level, N=831. Significance levels reported in brackets.

Table III: Basic Correlations in the data:
Secured Loans per Firm, Firm Investment and Firm Size

Dependent Variables:	$\Delta \log(\frac{\text{Secured Loans}}{\text{N Firms}})$		$\Delta(\frac{\text{Investment}}{\text{Assets}})$		$\Delta \log(\text{Output})$	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Backlog per Judge	-0.059***	-0.057***	-0.301***	-0.304***	-0.005	-0.009
	[0.018]	[0.019]	[0.093]	[0.099]	[0.010]	[0.009]
Bankruptcy Court		-0.144*		0.231		-0.066*
		[0.075]		[0.220]		[0.040]
Log Income per Capita		0.104*		0.793**		0.049**
		[0.058]		[0.311]		[0.023]
Bank Branches per 100,000 inhab.		-0.007**		-0.045**		-0.003*
		[0.004]		[0.021]		[0.002]
Manufacturing Value Added Share		-0.110		0.052		0.062
		[0.155]		[0.776]		[0.070]
Observations	831	831	831	831	831	831
Adjusted R-squared	0.019	0.028	0.012	0.019	0.000	0.013

Notes: Observations are weighted by the number of firms in each municipality. Changes in explanatory variables are calculated between the years before (2003-04) and the years after the reform (2005-2008) as described in section V.A. Municipality characteristics are observed in the year 2000. Robust standard errors reported in brackets. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table IV: Comparing Municipalities

	Log Backlog per Judge	Potential Extra-Jurisdiction	High Congestion dummy
Firm characteristics:			
Secured loans per firm (log)	0.062*	0.017	0.012
	[0.036]	[0.012]	[0.035]
Investment over assets	0.010**	0.002	-0.000
	[0.004]	[0.002]	[0.005]
Value of output (log)	0.166***	-0.006	-0.060
	[0.038]	[0.013]	[0.065]
Value of output per worker (log)	0.132***	-0.009	-0.015
	[0.028]	[0.010]	[0.042]
Number of workers (log)	0.028*	0.001	-0.029
	[0.017]	[0.006]	[0.038]
Municipality characteristics:			
Avg monthly income per capita (log)	0.111***	0.019***	-0.027
	[0.020]	[0.005]	[0.025]
Bank branches per 100,000 inhabitants	1.416***	1.023***	-0.182
	[0.320]	[0.110]	[0.461]
Manufacturing share in local GDP	0.045***	0.004**	0.014
	[0.006]	[0.002]	[0.009]
	N AMC = 831	N AMC = 831	N pairs = 483

Notes: Column 1 reports estimated coefficients from regressing each firm and municipality characteristic on a constant and the measure of court congestion. Column 2 reports estimated coefficients from regressing each firm and municipality characteristic on the estimated residuals from a regression of potential extra-jurisdiction on a constant, the total number of neighboring municipalities and the following neighbors' observable characteristics: average income per capita, average area in squared km, average manufacturing share in local GDP. Column 3 reports the estimated coefficients from regressing each firm and municipality characteristic on a constant and a dummy identifying the municipality with higher backlog per judge within each pair. In column 3 the sample is restricted to 483 neighboring municipality pairs with different levels of court congestion and located across judicial district borders in the same state. In all columns: firm characteristics are averages at municipality level across firms in the same municipality in the pre-reform period, and municipality characteristics are observed in the year 2000.

Table V: The Effect of Potential Extra-Jurisdiction on Judicial Efficiency:

Court Congestion and Time in Court for Bankruptcy Cases

Dependent Variables:	Log Backlog per Judge		Log Years in Court	
	(1)	(2)	(3)	(4)
Potential Extra-Jurisdiction	0.072***	0.104***	0.056**	0.038**
	[0.028]	[0.025]	[0.024]	[0.017]
Number of Neighbors	-0.100***	-0.093***	-0.067**	-0.033
	[0.014]	[0.014]	[0.033]	[0.023]
Bankruptcy Court		0.323		
		[0.719]		
Log Income per Capita		-0.262		-0.293**
		[0.205]		[0.128]
Bank Branches per 100,000 inhab.		-0.010		-0.005
		[0.011]		[0.003]
Manufacturing Value Added Share		1.769***		0.272
		[0.396]		[0.263]
Log Avg Income per Capita Neighbors		0.737***		0.215
		[0.257]		[0.253]
Log Avg Area Neighbors		0.032		0.002
		[0.063]		[0.046]
Observations	831	831	214	214
Adjusted R-squared	0.247	0.364	0.145	0.236

Notes: Observations are weighted by the number of firms in each municipality in columns 1 and 2, and by number of bankruptcy cases started between January 2000 and May 2005 in each municipality in columns 3 and 4. Municipality characteristics are observed in the year 2000. Robust standard errors reported in brackets. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. No dummy for bankruptcy court is included in column 4 because only one municipality has specialized courts in this sample.

Table VI: The Effect of Potential Extra-Jurisdiction on Financial and Real Outcomes: Secured Loans per Firm, Firm Investment and Firm Size

Dependent Variables:	$\Delta \log(\frac{\text{Secured Loans}}{\text{N Firms}})$		$\Delta(\frac{\text{Investment}}{\text{Assets}})$		$\Delta \log(\text{Output})$	
	(1)	(2)	(3)	(4)	(5)	(6)
Potential Extra-Jurisdiction	-0.013**	-0.018***	-0.175***	-0.167***	-0.007***	-0.009***
	[0.006]	[0.007]	[0.032]	[0.033]	[0.002]	[0.003]
Number of Neighbors	0.006***	0.007**	0.057***	0.060***	0.002**	0.001
	[0.002]	[0.004]	[0.016]	[0.017]	[0.001]	[0.001]
Bankruptcy Court		-0.201**		0.037		-0.090*
		[0.088]		[0.360]		[0.047]
Log Income per Capita		0.212***		0.653		0.050
		[0.082]		[0.408]		[0.032]
Bank Branches per 100,000 inhab.		-0.002		-0.028		-0.002
		[0.003]		[0.022]		[0.002]
Manufacturing Value Added Share		-0.053		-0.260		0.045
		[0.143]		[0.730]		[0.068]
Log Avg Income per Capita Neighbors		-0.143*		-0.168		-0.034
		[0.078]		[0.358]		[0.032]
Log Avg Area Neighbors		0.071***		0.133		-0.015
		[0.022]		[0.098]		[0.009]
Observations	831	831	831	831	831	831
Adjusted R-squared	0.010	0.057	0.042	0.042	0.011	0.026

Notes: Observations are weighted by the number of firms in each municipality. Changes in explanatory variables are calculated between the years before (2003-04) and the years after the reform (2005-2008) as described in section V.A. Municipality characteristics are observed in the year 2000. Robust standard errors reported in brackets. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table VII: The Effect of Potential Extra-Jurisdiction on Financial and Real Outcomes: Territorially Contiguous Municipality-Pairs

Dependent Variables:	$\Delta \log(\frac{\text{Secured Loans}}{\text{N Firms}})$		$\Delta(\frac{\text{Investment}}{\text{Assets}})$		$\Delta \log(\text{Output})$	
	(1)	(2)	(3)	(4)	(5)	(6)
High Congestion	-0.053***	-0.054***	-0.674***	-0.784***	-0.015	-0.023**
	[0.017]	[0.021]	[0.229]	[0.254]	[0.011]	[0.011]
Bankruptcy Court		-0.040		2.535***		-0.037
		[0.095]		[0.884]		[0.040]
Log Income per Capita		-0.067		-0.577		-0.041
		[0.083]		[0.947]		[0.042]
Bank Branches per 100,000 inhab.		-0.000		-0.039		-0.002
		[0.004]		[0.043]		[0.002]
Manufacturing Value Added Share		-0.202		-4.265**		0.006
		[0.171]		[1.803]		[0.094]
Adjusted R-squared	0.436	0.434	0.106	0.127	0.228	0.234
N pairs	470	470	483	483	483	483

Notes: Observations are weighted by the number of firms in each municipality. Changes in explanatory variables are calculated between the years before (2003-04) and the years after the reform (2005-2008) as described in section V.A. Municipality characteristics are observed in the year 2000. Robust standard errors reported in brackets. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table VIII: Secured Loans, Unsecured Loans and Firm Investment by Sectoral Asset Tangibility

Dependent Variables:	$\Delta \log(\frac{\text{Secured Loans}}{\text{N Firms}})$	$\Delta \log(\frac{\text{Unsecured Loans}}{\text{N Firms}})$	$\Delta(\frac{\text{Investment}}{\text{Assets}})$
	(1)	(2)	(3)
Potential Extra-Jurisdiction	-0.018***	0.004	-0.118**
	[0.007]	[0.006]	[0.051]
Tangibility			0.107
			[0.267]
Potential Extra-Jurisdiction × Tangibility			-0.116*
			[0.068]
Number of Neighbors	0.007**	-0.007***	0.064***
	[0.004]	[0.003]	[0.017]
Bankruptcy Court	-0.201**	0.031	0.098
	[0.088]	[0.103]	[0.374]
Log Income per Capita	0.212***	0.038	0.594
	[0.082]	[0.059]	[0.402]
Bank Branches per 100,000 inhab.	-0.002	-0.000	-0.030
	[0.003]	[0.003]	[0.022]
Manufacturing Value Added Share	-0.053	0.258**	-0.209
	[0.143]	[0.117]	[0.720]
Log Avg Income per Capita Neighbors	-0.143*	-0.211***	-0.138
	[0.078]	[0.061]	[0.360]
Log Avg Area Neighbors	0.071***	-0.067***	0.137
	[0.022]	[0.019]	[0.098]
Observations	831	831	831
Adjusted R-squared	0.057	0.062	0.046

Notes: Observations are weighted by the number of firms in each municipality. Changes in explanatory variables are calculated between the years before (2003-04) and the years after the reform (2005-2008) as described in section V.A. Municipality characteristics are observed in the year 2000. Robust standard errors reported in brackets. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table IX: The Effect of Potential Extra-Jurisdiction on Additional Outcomes

Loan Size, Interest Rate and Labor Productivity

Dependent Variables:	$\Delta \log$(Avg loan size)		Δ(Avg interest rate)		$\Delta \log(\frac{\text{Output}}{\text{Workers}})$	
	(1)	(2)	(3)	(4)	(5)	(6)
Potential Extra-Jurisdiction	0.072***	0.085***	0.057	0.093	-0.002*	-0.003*
	[0.020]	[0.023]	[0.081]	[0.087]	[0.001]	[0.002]
Number of Neighbors	-0.111***	-0.108***	0.094***	0.096**	0.001	0.001
	[0.012]	[0.013]	[0.026]	[0.042]	[0.000]	[0.001]
Bankruptcy Court		-0.035		0.259		-0.020
		[0.248]		[1.245]		[0.022]
Log Income per Capita		-0.149		0.084		0.012
		[0.183]		[1.015]		[0.021]
Bank Branches per 100,000 inhab.		-0.016*		0.028		-0.002*
		[0.009]		[0.054]		[0.001]
Manufacturing Value Added Share		-0.633		3.714**		-0.096**
		[0.415]		[1.868]		[0.041]
Log Avg Income per Capita Neighbors		0.335*		0.859		-0.008
		[0.178]		[0.928]		[0.020]
Log Avg Area Neighbors		0.024		0.304		-0.002
		[0.050]		[0.241]		[0.006]
Observations	831	831	831	831	831	831
Adjusted R-squared	0.347	0.360	0.005	0.012	0.001	0.011

Notes: Observations are weighted by the number of firms in each municipality. Changes in explanatory variables are calculated between the years before (2003-04) and the years after the reform (2005-2008) as described in section V.A. Municipality characteristics are observed in the year 2000. Robust standard errors reported in brackets. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.