

# Institutional Factors of Credit Allocation: Examining the Role of Judicial Capacity and Bankruptcy Reforms

Manaswini Rao

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## Abstract

In this paper, I discuss the interaction between legal reforms in bankruptcy resolution and judicial capacity through the enforcement of creditor rights in trial courts on credit allocation in local markets. Poor creditor rights constrain the functioning of credit markets, that subsequently affects the availability of credit for productive uses. Can well-functioning courts facilitate the enforcement of creditor rights? How does this affect credit allocation? To study this, I use a difference in difference research design by comparing districts with high judge occupancy and those with low occupancy, before and after the 2016 national legislation on bankruptcy resolution in India that increased the rights of the creditors over stressed assets. There are three key findings. First, banks reduce lending towards unproductive uses such as lending to defaulting firms and increase lending based on capital efficiency in districts with better judicial capacity. Second, improved creditor rights coupled with better judicial capacity increases repayment. Third, banks are more likely to initiate and witness resolution of debt recovery related litigation in districts with better judicial capacity after the bankruptcy reform, suggesting that enforcement of creditor rights in well functioning trial courts plays an important complementary role. Finally, the paper concludes by examining credit misallocation, showing that good quality formal institutions are insufficient to fully address existing misallocation.

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<sup>1</sup>Contact: manaswini.rao@gmail.com, Department of Economics, University of California San Diego. I am indebted to my advisors Aprajit Mahajan, Elisabeth Sadoulet, and Frederico Finan for their constant guidance and feedback through this project. I thank Alain de Janvry, Marco Gonzalez-Navarro, Ethan Ligon, Jeremy Magruder, Matthew Pecenco, Carly Trachtman, Vaishnavi Surendra, and other workshop participants at UC Berkeley. I acknowledge the generous funding support from International Growth Centre (IGC), State Effectiveness Initiative and UC Berkeley Library for acquiring the Prowess database. All errors are my own.

# 1 Introduction

Economists have been interested in the role of institutions in explaining the current differences in economic growth and other development outcomes (La Porta et al. 1998; Djankov et al. 2007). A recurrent theme of analysis in development economics has been the role of misallocation of resources arising out of statutory provisions and regulations in driving the differences in economic outcomes across countries (Restuccia and Rogerson 2017). On the other hand, there is limited evidence on the interplay between institutions such as the judiciary and distortions generated by statutes and policies, and other factors generating misallocation of factors of production. In this paper, I address three key questions contributing to the literature on macro development and growth. First, do statutes or laws either strengthen or weaken the incentives in factor markets? Second, do well-functioning courts play a role in enforcing such statutes? Third, how do these two contribute to misallocation of credit in formal financial markets?

Statutes such as bankruptcy code protect the rights of creditors and other stakeholders over their ownership of capital and other factors of production provided by them. The strength of such rights determine the nature of production across countries, including the ownership structure of firms (La Porta et al. 1998). This also generates frictions in the financial market limiting access to credit for productive uses by firms and individuals (Djankov et al. 2007).

Merely the presence of statutes defining clear rights of ownership isn't sufficient. It requires a strong enforcement mechanism through well functioning judicial system. An institutional regime that combines protection of rights through necessary statutes and regulation along with strong enforcement mechanism through effective judicial capacity is considered optimal for economic progress (Glaeser and Shleifer 2003). Such complementary institutions are important to provide full effect to the rights envisaged by statutes, for example, in the case of bankruptcy reform in Brazil (Ponticelli and Alencar 2016). This is particularly important for financial sector, which not only requires a clear definition and protection of creditor rights but also swift enforcement of credit contracts. Other factors such as corporate governance structure of financial institutions, personnel incentives of bank officials, and market structure including state policies on credit allocation also play a critical role in the potential misallocation of credit. These could also interfere with the potency of the above two institutional factors in reducing misallocation and expansion of financial markets.

To study the role of institutions on credit allocation and aggregate credit supply and repayment rates, I exploit cross-sectional variation in judicial capacity in 195 district courts in India and a one time bankruptcy reform in 2016 using a difference in difference research design. The bankruptcy reform strengthened creditor rights by prioritizing payments to financial creditors during restructuring or liquidation process which was hitherto in favor of the borrowers. I measure judicial capacity as the average judge occupancy in district courts in years prior to the reform. Causal identification requires the assumption that credit allocation and repayment behavior trend similarly across districts with varying judicial capacities in the absence of the reform. I include district and state-year fixed

effects to account for any unobserved time-invariant and time-varying factors at these geographic levels. First, I examine credit allocation to firms based on their past default status and prior period factor productivities using detailed annual borrowing data from a sample of formal sector firms. Next, I examine aggregate number of loans and repayment rate at the district-level - local credit market - to examine how changes in the institutional environment affects market level outcomes. Finally, I examine the effect on credit allocation to the agriculture sector, which is considered a priority sector under the state's directed lending policy, to understand how institutions interact with potentially distortionary policies.

In support of the hypothesis informed by a simple of credit allocation in the presence of varying institutional quality and incentives faced by bank officials, I find that at baseline, average lending to defaulting firms - as classified based on their prior period credit rating by independent rating agencies - is twice as much as average lending to non-defaulting firms, suggesting that the incentives faced by bank officials likely play an important role in higher allocation in favor of such firms. This phenomena is generally referred to as "ever-greening" phenomena in the context of the banking sector in India. As the creditor rights improve post reforms, I find that the lending to defaulting firms significantly decreases. The decrease in lending is economically meaningful when restricting the sample to high judge occupancy districts but loses statistical significance. Further, the decrease is lower in magnitude in low judge occupancy districts relative to high capacity districts, I cannot reject the null hypothesis of equivalence. In all, I can conclude that an improvement in creditor rights decreases lending to known defaulter across districts with varying judicial capacities.

A second dimension of credit allocation I focus on is lending by ex-ante factor productivity. By classifying the sample of formal sector firms as above and below median by their prior period marginal revenue products of capital (MRPK) and labor (MRPL), I find that the banks allocate loans by MRPL and not by MRPK at baseline. However, the allocation increases in favor of high MRPK firms post reform in the pooled firms sample, which is driven by an increase in high judicial capacity districts. On the other hand, there is no change in lending to such firms in low capacity districts.

Next, I examine the overall local credit market-level (district-level) aggregate lending and repayment outcomes and how they respond to an improvement in creditor rights differentially by the underlying district judicial capacity. I find modest negative effects on overall lending as judge occupancy increases. When I restrict the bank sample to only public sector banks, I find no effects on aggregate lending. Public sector banks form 80% of the banking sector in India and are in the center of the bad loan (NPA) crisis. Therefore, I focus on these subset of banks in analyzing the overall market level effects. On the other hand, I find a significant increase in repayment, measured as a decrease in the total outstanding loans, across all banks as well as among public sector banks. The estimates imply that a one percentage point increase in the average prior period judge occupancy decreases outstanding loan by 0.5 %. This translates to an increase in repayment between 2.5-3 % in districts with one more available judge in the prior period. Disaggregating lending and repayment by the

sector, I find that the increase in repayment in better judicial capacity districts is mainly driven by the manufacturing sector whereas there is no effect either on lending to or repayment from the agriculture sector.

Finally, I study market level allocation to specific sectors such as the agriculture sector driven by directed lending policy to identify the role played by institutional factors in credit allocation. The results suggest that the allocation arising out of directed lending policies, measured as percentage of total credit limit allocated to the agriculture sector, decreases in low judicial capacity districts whereas it is unaffected in high judicial capacity districts. Percentage of loans due from the agriculture sector also follows a similar pattern, revealing a decrease in low judicial capacity districts. Using average judge occupancy in the prior period as a continuous measure of judicial capacity, the point estimates suggest that an increase in occupancy by one percentage point increases percentage lent and pending from the agriculture sector. This suggests that at lower judicial capacities, an improvement in both enforcement capacity and creditor rights increases credit allocation to the sector favored by state policy. Taken together with the results on credit allocation to formal sector firms, this suggests that institutions at least partially but not completely determine credit allocation and that judicial capacity play an important role in the enforcement of creditor rights and contracts. Further, state policies and other distortions continue to influence credit allocation that need to be examined along with the role of institutions.

To show how judicial institutions enforce creditor rights and credit contracts, I find that banks increase litigation through filing of new complaints in high judicial capacity districts immediately after the reform. In contrast, filing of new suits drop in low judicial capacity district. This likely indicates that banks, under the new regime with stronger rights, are more likely to identify delinquent borrowers by filing suits that would complement their subsequent filing of bankruptcy proceedings to recover their assets. Thus, the mechanism behind credit allocation and the functioning of local credit markets imply a complementary role played by judicial institutions.

This paper contributes to many strands of the academic literature. First, it provides micro-economic evidence on the role of judiciary and legal institutions in shaping credit market outcomes, supporting the cross-country literature on the important of institutions for financial markets ([La Porta et al. 1998](#); [Acemoglu and Johnson 2005](#); [Djankov et al. 2007](#)). To show this, I use first of its kind disaggregated trial-level data to identify judicial capacity at the level of local (district) trial courts and exploit one-time reform in bankruptcy process to demonstrate the complementary role played these two institutions in affecting credit allocation as well as local credit market response in a large, emerging economy like India.

Second, this adds to the literature on credit misallocation by identifying institutional factors of misallocation. Credit allocation to borrowers is determined by state lending and bailout policies ([Banerjee and Duflo 2014](#); [Giné and Kanz 2018](#)), and incentives faced by banking officials ([Cole et al. 2015](#)). Banks allocate more loans to larger or politically connected borrowers when faced with neg-

ative shocks (Khwaja and Mian 2008) in weaker bankruptcy regime (LilienfeldToal and Mookherjee 2016). This paper demonstrates that a stronger bankruptcy regime requires complementary investment in judicial capacity to reduce potential misallocation but isn't enough to completely eliminate all other sources of misallocation.

Third, the paper shows the importance of well-functioning courts for bankruptcy reform to have teeth. Statutes embodying legal rules protecting creditor and investors' interests is shown to be positively associated with a diverse and competitive credit markets (La Porta et al. 1998; Rajan and Zingales 1998), credit availability for firms (Vig (2013)) and subsequent expansion in firm production (Ponticelli and Alencar 2016) and trade (Paravisini et al. 2015). However, this requires timely enforcement of credit contracts for debt recovery (Visaria 2009) and creditor rights in the case of bankruptcy (Giné and Love 2010; Ponticelli and Alencar 2016). This paper provides evidence in support of enforcement of both contracts and creditor rights through a combination of legal reform and local judicial institutions that increases aggregate repayment rates in the local credit markets.

Finally, the paper is well-timed for policy action. By using recent data from 2010-2018, the paper provides policy lessons to address the ongoing banking crisis in India. The discussion surrounding the bankruptcy environment and addressing the problem of NPAs only refer to the role played by the higher judiciary - High Courts and Supreme Courts - in interpreting the constitutionality of the new bankruptcy law and provide jurisprudential clarification for its implementation. On the other hand, early detection and redressal of debt non-repayment through ordinary trial courts in key to provide timely diagnosis of any troubles in the health of local credit markets before they become a national-level problem. For this, investment in building the capacities of local courts is apposite.

Rest of the paper is structured as follows. Section 2 describes the banking sector and the evolution of creditor rights and enforcement mechanism in India. I describe the datasets and variables used in Section 3. Section 4 sketches a simple model of credit allocation to draw testable hypotheses on credit allocation as a function of bankruptcy regime and local enforcement capacity, which I estimate using empirical strategy laid out in Section 5. In section 6, I present and discuss the results and conclude in section 7.

## 2 Banking in India

The banking sector in India is characterized by a dominant share of public sector banks for commercial operations - Scheduled Commercial Banks or SCBs, regulated by the Reserve Bank of India, as well as Regional Rural Banks and cooperative banks with operations primarily directed towards agriculture, regulated by NABARD. The state has always played a key role in the evolution of the sector through varying systems of controls on the sector's operation including nationalization or the dominant public ownership as mentioned earlier but also controls over lending operations through priority sector lending norms as well as liquidity and cash reserves requirement (Demetriades and

Luintel 1996).

Despite economic liberalization of the 1990s, lending controls in the form of priority sector lending continues even till this date. These norms are not limited to public sector banks but also apply to any bank registered for operations in India including private sector and foreign banks. The priority sector largely consists of the agriculture sector including agro-industries as well as small and medium enterprises (SME) that have a state mandated loan allocation close to 40% of all lending by banks. Lending to this sector has also frequently encountered bail-outs by the government as political agenda, eroding timely repayment behavior (Gine and Kanz, 2018). [Figure 1](#) depicts directed lending to priority sector (Panel A) and public sector enterprises (Panel B), disaggregated by public sector and private sector banks. Public sector banks have a large share of lending exposed to these directed lending norms in contrast to private banks. Additionally, many large corporate loans made prior to the global financial crisis of 2008 has turned bad in its aftermath, with banks only starting to recognize them as bad loans or non-performing assets (NPA) as told by Raghuram Rajan in his speech as the RBI governor in 2016.

Typically, a fraction of all lending goes bad, i.e. don't get repaid and the banks are unable to recover. This happens when the debtor becomes insolvent after facing significant negative shock(s) or is untraceable. In developed countries such as the United States, the percentage of total lending that is deemed as a NPA is typically under 1% as per the [Federal Reserve](#). Even during the height of the 2008-2010 financial crisis, the total NPA was slight above 3%. In contrast, the NPAs in India have historically been over 2% and steadily increasing since 2012, peaking to slightly above 11% (Panel A [Figure 1](#)). Panel B [Figure 2](#) plots log value of NPA from 2005 to 2018. These show that the NPAs have been increasing with peaking post reform and showing a declining trend starting 2017.

Easy debt recovery and bankruptcy process play an important role in keeping NPA in check. This requires both unambiguous laws as well as strong enforcement institutions that enable timely recovery of unpaid debt by facilitating restructuring or liquidation of delinquent borrowers.

## 2.1 Bankruptcy Process

The bankruptcy process in India until 2016 favored debtor and shareholder rights over creditor rights during either restructuring or liquidation proceedings. The 2016 Insolvency and Bankruptcy Code (IBC 2016) is a new consolidated law on bankruptcy process that provides for a market based mechanism for time-bound bankruptcy resolution, either through restructuring or liquidation, and at the same time strengthening the rights of the creditors, particularly financial creditors including banks and financial institutions, in the recovery of non-performing assets (NPA) - any unpaid debt - from the debtor.

[Figure 3](#) provides the timeline of the reform. Up until 2016, codes governing bankruptcy proceedings were fragmented across many statutes. Company Law, which lays down the rules governing incorporated entities, was amended in 2013 in an attempt to streamline the process. An all-en-

compassing bankruptcy statute under IBC was tabled in the Parliament in the winter session of 2015, passed and became a law by May 2016. The first set of bankruptcy resolutions were passed in 2017 that heralded a new regime of debtor-creditor relation. These events divide the time period into pre-reform period when the rights of financial creditors were weak and post-reform when the creditors were made key stakeholders in resolving debt defaults, particularly large scale corporate debt defaults, to decide on restructuring or liquidation as the appropriate next step.

## **2.2 Role of the Judiciary in Bankruptcy**

The judiciary, along with specific adjudicating authority (National Company Law Tribunal or NCLT) under IBC 2016, are responsible for implementing the code and for providing clarity over both the process and outcomes for debtors and creditors. In addition to providing interpretation of the law, the judiciary, especially ordinary trial courts, are important in recognizing a loan as a non-performing asset or classify a debtor as delinquent through litigation initiated by the creditors.

Up until the 2016 reform, debt recovery related cases were either filed in local district courts or in specialized Debt Recovery Tribunals (DRT) depending on the monetary limit of the debt claim. The reform set up an adjudication system (NCLT) outside of the formal judicial system to enable creditors and debtor firms to initiate bankruptcy proceedings in the event of non-payment of large corporate loans that require either liquidation or restructuring of firms. However, insolvency proceedings related to liabilities from criminal offense, fraud and family disputes, personal insolvency, anti-trust and intellectual property, and property related disputes such as tenancy and eviction continue to be litigated within the formal judiciary including trial courts until now. Additionally, financial creditors such as banks and financial institutions can claim their ownership of securitized assets during liquidation process by filing claims under laws specific to financial creditors within the ordinary trial courts and DRTs. Therefore, formal judicial institutions play an important and complementary role in the enforcement of creditor rights under the new bankruptcy regime.

## **2.3 Banker's Incentives**

In addition to institutions governing enforcement of credit contracts, other sources of potential credit misallocation arise from poor monitoring and incentives of bank officials. Since employees of public sector banks are tenured officials, who are subject to frequent transfers to different branch locations, their incentives to sanction loans do not align with the objective for efficient credit allocation but rather to maximize their own personal incentives (i.e. career concerns).

## **3 Data**

In this section, I describe the datasets I use for the analyses. I combine district-level bank credit operations data aggregated across all Scheduled Commercial banks with district-level judicial capacity data that I assembled by scraping publicly available case records across 195 District and

Session Courts in India. In addition, I use formal sector firm balance sheet and borrowing data from Prowess to examine access to credit from formal financial institutions for firms and credit allocation based on past default status as well as ex-ante marginal revenue product of labor and capital. I describe each of these datasets in detail below.

### 3.1 Credit Outcomes

The main outcomes pertain to how banks allocate credit across various needs and whether and how the allocation process changes due to changes in the judicial capacity in the corresponding local credit market, i.e. district. To study this, I use district-level credit summary data over 2010-2018 period across all Scheduled Commercial Banks as provided by the Reserve Bank of India (RBI). This dataset contains annual summary on total number of loan accounts, total outstanding loan amount, and total sanctioned credit limit. The summary is disaggregated by the sector of allocation as well as by whether the region is rural or urban.

#### 3.1.1 Formal Sector Firm Borrowing

In order to examine credit allocation to specific firms, I use CMIE Prowess dataset to study long term borrowing by formal sector firms from banks. Since the dataset also provides annual credit rating and other balance sheet information on total assets and labor expenditure, I classify firms based on their ex-ante (i.e. prior to bankruptcy reform) default status based on credit rating as well as their ex-ante marginal revenue product of capital and labor (MRPK and MRPL) for the subset of manufacturing firms, respectively. These classifications enable analyses to test presence of credit misallocation and how misallocation varies by judicial capacity after the reform.

I compute MRPK and MRPL by assuming Cobb-Douglas production function for the subset of formal sector firms in manufacturing following [Bau and Matray \(2019\)](#). The assumptions regarding the functional form of production and exogeneity of output and factor prices enables computation of MRPK and MRPL as sales revenue per unit of asset value and sales revenue per unit of wage expenditure. As the firm level data is available from 1986, I use period prior to 2010 to classify firms as high MRPX ( $X \in \{K, L\}$ ) and low depending on whether their average marginal product across 1986-2009 is above or below median within a specific production sector as per the corresponding 2 digit NIC code.

### 3.2 Judicial Capacity

In order to understand banks' credit allocation patterns by the judicial capacity of the corresponding local credit market, I classify districts as low capacity or high capacity if the average judge occupancy in the district courts in the years prior to the reform are below or above median value, respectively. I also use the average prior period judge occupancy continuous variable to examine variation in judicial capacity in-lieu of the dummy variables. I calculate judge occupancy using data from case records across the universe of trials active between 2010-2018 in 195 District and Session courts. Each of the case record indicates the judge name or the court room where the case is pending. This



allows me to create aggregate measures of court performance at the level of a court-room and also help identify which court-rooms are vacant for at least a year or more. In the absence of publicly available judge roster with dates of joining and retirement/separation for every court served, this approach generates the incidence of vacancy in the absence of roster data. The vacancy figures thus generated match with the aggregate vacancy numbers mentioned in the Law Commission of India reports, government documentation, and media reports.

## 4 Model: Credit Allocation

In this section, I sketch a simple two-period model on credit allocation in an environment dominated by the presence of the public sector in the banking system. The system creates an incentive against detection and reporting of loan defaults for the bank officials, who continue to provide fresh loans to the potential defaulter to prevent labeling the past loan as default. This extends the model in [Banerjee and Duflo \(2014\)](#) by making the incentive of bailout by the bank official (default avoidance) as a function of institutional quality.

I consider a representative bank official, who has  $L$  units of credit to allocate to borrowers in each period. Borrowers are of two types in the population - Type  $H$  with a share  $\phi$  in the population and Type  $L$  constituting the remaining  $1 - \phi$ . Type  $H$  borrower has a deterministic production function with probability of success,  $s_H = 1$  whereas type  $L$  face a non-zero probability of production failure  $1 - s$  such that  $s_L = s < 1$ . The borrower type is unknown to both bank official and borrower in the initial period, which gets revealed with the outcome of production. So in the first round of allocation, the official equally distributes total credit  $L$  equally among the borrowers such that each borrower gets  $l$  units of credit.

At the end of period 1, the official receives a signal that the borrower is of type  $H$  conditional on observed production success. This signal probability is  $S_H = \frac{\phi}{\phi + (1-\phi)s}$ . Among type  $L$  borrowers,  $(1 - \phi)(1 - s)$  fail. In period 2, the official can either declare loan provided to type  $L$  as default and face a penalty  $P_1(l, \Gamma)$  or provide fresh loan for  $L$  to continue production, which would lead to a bigger default at the end of period 2 with probability  $1 - s$ . Penalty in period 1 is a function of loan size,  $l$ , and local court quality  $\Gamma$ , such that  $\frac{\partial P_1}{\partial \Gamma} > 0$ , i.e. well functioning courts generate a larger penalty and  $\frac{\partial P_1}{\partial l} > 0$ . The official will bail out type  $L$  borrower by lending  $l_L$  in period 2 such that  $sf(l_L - l) \geq l_L$ , where  $l$  due from period 1 is paid out of  $l_L$  and the rest put into production. Rationality implies that  $l_L^* = sf(l_L^* - l)$ , that is, the official lends the minimum amount to type  $L$  borrower to hedge the risk of default at the end of period 2. Therefore, the official compares the option of bailing the period 1 defaulter by declaring a default, which costs him  $P_1(l, \Gamma)$ . So, bailing will be the dominant strategy if the penalty from default at the end of period 2 is less than the penalty from default at the end of period 1. Penalty in period 2 has an additional institutional parameter,  $\Theta$  - a measure of creditor (bank's) rights in the form of redressal through bankruptcy process, and is much larger in magnitude,  $P_2 \gg P_1$ . Further  $\frac{\partial P_2}{\partial \Gamma} > 0$ ,  $\frac{\partial P_2}{\partial \Theta} > 0$  and  $\frac{\partial^2 P_2}{\partial \Gamma \partial \Theta} > 0$ .

That is, penalty in period 2 is higher due to the complementary effects of default detection through courts as well as protection of creditor rights under bankruptcy reform.

$$(1-s)P_2(l_L^*, \Theta, \Gamma) \leq P_1(l, \Gamma)$$

$$P_2(l_L^*, \Theta, \Gamma) \leq \frac{P_1(l, \Gamma)}{1-s}$$

Assuming that the penalty can be expressed as a share of the loan amount,  $P_1(l, \Gamma) = lP_1(\Gamma)$  and  $P_2(l_L^*, \Theta, \Gamma) = l_L^*P_2(\Theta, \Gamma)$ . Therefore, the bailout loan can be expressed as:

$$l_L^* \leq \frac{lP_1(\Gamma)}{(1-s)P_2(\Theta, \Gamma)} \quad (1)$$

The right hand side of the above expression for period 2 bailout loan varies both the quality of local courts,  $\Gamma$ , as well as the overall environment of creditor rights  $\Theta$ . The bankruptcy reform increases  $\Theta$  where as higher judge occupancy (lower judge vacancy) increases  $\Gamma$ . Without further assumptions on the functional form of the penalty functions, I get the following results:

**Result 1:** The bailout loan,  $l_L^*$ , decreases as both institutional parameters  $\Theta$  and  $\Gamma$  increase, i.e.  $\frac{\partial l_L^*}{\partial \Theta \partial \Gamma} < 0$ . That is, bailout lending is lower to type  $L$  borrowers in credit markets (districts) with higher judicial capacity after the bankruptcy reform.

**Proof**

$$\frac{\partial l_L^*}{\partial \Theta \partial \Gamma} = \frac{l}{1-s} \left( \frac{-1}{P_2^2} \frac{\partial P_1}{\partial \Gamma} \frac{\partial P_2}{\partial \Theta} - \frac{P_1}{P_2^2} \frac{\partial^2 P_2}{\partial \Theta \partial \Gamma} + \underbrace{\frac{2P_1}{P_2^3} \frac{\partial P_2}{\partial \Gamma} \frac{\partial P_2}{\partial \Theta}}_{\rightarrow 0} \right) < 0$$

**Result 2:** In the absence of strong creditor rights through the bankruptcy reform, the effect of higher judicial capacity on bailout loan is ambiguous or likely positive.

**Proof**

$$\frac{\partial l_L^*}{\partial \Gamma} = \frac{l}{1-s} \left( \frac{1}{P_2} \frac{\partial P_1}{\partial \Gamma} - \frac{P_1}{P_2^2} \frac{\partial P_2}{\partial \Gamma} \right) > \text{ or } < 0$$

**Implication** Given this framework, the following section presents the empirical strategy to test the hypotheses on credit allocation generated by the above results. Specifically, I examine whether lending to “riskier” borrowers diminishes after the bankruptcy reform in districts with better judicial capacity.

## 5 Empirical Strategy

India enacted an overarching reform addressing the process of bankruptcy to strengthen creditor’s rights. The policy focus of this reform was to enable business environment and aid creditors’ recovery of bad loans by easing the process of liquidation and/or reinvestment in defaulting companies. This departs from the then extant bankruptcy regulation by providing greater rights to the creditors rather than to the borrowers and their shareholders. Improved creditor rights requires complementary improvement in the local judicial capacity that enables faster debt recovery and helps recognize stressed assets in a timely fashion. An important measure of judicial capacity is the percentage of judge seats that are occupied and not vacant. Since judges are central to the judicial production function, availability of judges is an indicator of trials progressing within the adjudication process.

In this section, I present empirical strategies to estimate the effect of an improvement in institutional environment on credit allocation based on borrower characteristics as well as overall credit market outcomes including total number of loans and loan repayment.

### 5.1 Credit Allocation

An important aspect of improved creditor rights is that the credit markets should function more efficiently from the perspective of credit allocation. The banking sector in India is subject to policy directive to reserve 40% of total lending to the “priority sector”, as defined by government policy. This sector includes all agricultural loans, consumption loans towards low cost housing and education, and loans to small and medium enterprises based on asset size. Evidence thus far suggest that such a policy itself leads to misallocation of credit (von Liliensfeld-Toal et al. 2012; Banerjee and Duflo 2014). Additionally, the banking sector in India has been facing increased number of non-performing assets (NPA) from unchecked lending to finance long term infrastructure in the early years of the 21st century in the run-up to the global financial crisis (Rajan 2016). In order to understand the evolution of credit allocation when part of institutional failures are addressed, I examine bank lending to formal sector firms categorized by their pre-period default status based on credit rating and marginal factor productivity, in a difference in difference research design.

#### 5.1.1 Lending to Firms by Past Default

I examine bank lending to formal sector firms using Prowess dataset which provides firm level panel data on annual borrowing from banks. Additionally, the data also provides credit rating of the borrower firms, which I use to classify whether a firm defaulted on borrowing in the period prior to the reform - a measure of “riskiness” of the borrower. In the following specification, I compare bank lending between defaulting firms relative to non-defaulters before and after the reform.

$$Y_{fdt} = \delta_d + \delta_{st} + \beta_1 \text{Default}_{fd} \times \text{Post}_t + \beta_2 \text{Default}_{fd} + \mathbf{X}_{fd} \Gamma + \epsilon_{fdt} \quad (2)$$

where  $Y_{fdt}$  represents bank lending to firm  $f$  registered in district  $d$  in year  $t$ . Firms are classified as defaulters with  $Default_{fd} = 1$  if their credit rating indicates past default, and as non-defaulter otherwise.  $Post_t$  is the dummy indicating whether year  $t \geq 2016$  (i.e. period after reform), defined as  $Post_t = 1$ , for  $t > 2016$  and 0 otherwise. To account for any unobserved time-invariant differences in district characteristics that could influence whether or not a district has above median judge occupancy, I include district fixed effects  $\delta_d$ . To account for all time varying state level unobserved characteristics, such as changes in state policies and macro-economic indicators correlated with high judge occupancy, I include state-year fixed effects  $\delta_{st}$ . In addition, I include firm level characteristics vector,  $\mathbf{X}_{fd}$ , that contains age, age-squared, and sectoral dummies.  $\epsilon_{fdt}$  is the idiosyncratic error term. Since the “treatment” varies at the district level only, I cluster the standard errors by district. Additionally, I also compare lending to such firms in subsets of districts characterized by high and low judicial capacities, equivalent of triple differences design.

$$\begin{aligned}
Y_{fdt} = & \delta_d + \delta_{st} + \beta_1 Default_{fd} \times High\ Judge\ Occp_d \times Post_t + \beta_2 Default_{fd} \times Post_t \\
& + \beta_3 High\ Judge\ Occp_d \times Post_t + \beta_4 Default_{fd} \times High\ Judge\ Occp_d \\
& + \beta_5 Default_{fd} + \mathbf{X}_{fd}\Gamma + \epsilon_{fdt}
\end{aligned} \tag{3}$$

In addition to variables common to equation 1,  $High\ Judge\ Occp_d = 1$  represents districts with above median judge occupancy in the prior period. I exclude districts that are close to 50th percentile in order to create groups that are distinct in their judicial capacities.

In order to test the complementary role of judicial capacity in enforcing creditor rights influencing credit allocation, I examine whether the coefficient  $\beta_1 = 0$  in equation 2 above. A negative coefficient implies that lending to defaulting firms decreases more in better judicial capacity districts post reform. This test examines whether the banks efficiently allocate credit by reducing lending to defaulting firms. Coefficient  $\beta_2$  of equation 2 or coefficient  $\beta_1$  of equation 1 estimates the effect of reform on bank lending to defaulting firms after the reform. Finally  $\beta_2$  of equation 1 or  $\beta_4$  of equation 2 estimates borrowing by defaulting firm prior to the reform.  $\beta_2 > 0$  and  $\beta_4 > 0$  suggests presence of credit misallocation as it implies higher lending by banks to defaulting firms, consistent with the “ever-greening” phenomena employed by bank officials incentivized to prevent detection of defaults.

In these specifications, the underlying identifying assumption for causal inference requires that the lending to defaulting firms trend similarly to non-defaulting firms in the absence of the reform and variation in judicial capacity. I test whether I observe any significant departure in trends prior to the reform period since I don’t observe the counterfactual outcomes to actually test for this assumption after the reform. An insignificant pre-trend or parallel trend between the two groups in the prior period is a suggestive evidence in support of the identifying assumption.

### 5.1.2 Lending to Firms by Factor Productivity

A key ramification arising out of weak creditor rights and local enforcement capacity is credit misallocation. For example, directed lending policies constrain creditors in lending based on maximizing marginal factor productivity by requiring lending to certain type of borrowers. Further, skewed incentives of bank officers, specially in public sector banks, that excessively penalizes them for any defaults in their portfolio leads to the above mentioned “ever-greening” phenomena, worsening credit misallocation in addition to poor rights and enforcement.

To test whether credit allocation by banks respond to incentives altered by the institutional features, I examine annual lending to formal sector manufacturing firms based on their factor productivity - an alternate measure of borrower “riskiness”. I classify firms based on their ex-ante marginal revenue product of labor (MRPL) or high marginal revenue product of capital (MRPK) using data from period prior to the reform. The idea is that firms with better factor productivity are less likely to default on loans. In order to empirically examine the hypotheses laid out in the model section, I employ difference in difference specification as before:

$$Y_{fdt} = \delta_d^{prod} + \delta_{st}^{prod} + \beta_1^{prod} MRPX_{fd} \times Post_t + \beta_2^{prod} MRPX_{fd} + \mathbf{X}_{fd} \Gamma^{prod} + \epsilon_{fdt}^{prod} \quad (4)$$

where  $Y_{fdt}$  represents bank lending to firm  $f$  registered in district  $d$  in year  $t$ . Firms are classified as relatively efficient with  $MRPX_{fd} = 1$ ,  $X \in \{L, K\}$  if the firm is above median in the distribution of marginal revenue product of labor or capital within the district and 2-digit industry group in the period prior to the reform. The remaining terms are the same as in equation 1. Further, as before, I also compare lending to such firms in subsets of districts characterized by high and low judicial capacities, equivalent of triple differences design.

$$\begin{aligned} Y_{fdt} = & \delta_d^{prod} + \delta_{st}^{prod} + \beta_1^{prod} MRPX_{fd} \times High\ Judge\ Occp_d \times Post_t + \beta_2^{prod} MRPX_{fd} \times Post_t \\ & + \beta_3^{prod} High\ Judge\ Occp_d \times Post_t + \beta_4^{prod} MRPX_{fd} \times High\ Judge\ Occp_d \\ & + \beta_5^{prod} MRPX_{fd} + \mathbf{X}_{fd} \Gamma^{prod} + \epsilon_{fdt}^{prod} \end{aligned} \quad (5)$$

Coefficient  $\beta_1^{prod}$  of equation 1 and coefficient  $\beta_2^{prod}$  of equation 2 estimate the effect of reform on bank lending to factor efficient firms after the reform.  $\beta_2^{prod}$  of equation 1 or  $\beta_4^{prod}$  of equation 2 estimates borrowing by efficient firm prior to the reform.  $\beta_2^{prod} < 0$  and  $\beta_4^{prod} < 0$  suggests presence of credit misallocation as it implies lower lending by banks to more efficient firms. As before, I test the complementary role of judicial capacity by examining whether the coefficient  $\beta_1^{prod} = 0$  in equation 2 above. A positive coefficient implies that lending to efficient firms increases more in better judicial capacity districts post reform.

Given the design, causal inference requires that the lending to more efficient firms trend similarly

to less efficient firms in the absence of the reform and variation in judicial capacity. I test for any violation in trends being parallel in the period prior to the reform as a suggestive test for the identifying assumption.

## 5.2 Credit Market Level Outcomes

The reform should likely have a positive effect on the overall credit markets by improving debt recovery for banks. To show that any reforms aimed at improving creditor rights requires complementary improvement in local judicial capacity, I compare districts with higher judge occupancy in the prior period with districts with lower judge occupancy before and after the reform in a standard difference in difference research design. The empirical specification is as follows:

$$Y_{dt} = \alpha_d + \alpha_{st} + \gamma Judge\ Occp_d \times Post_t + \zeta_{dt} \quad (6)$$

where  $Y_{dt}$  is district-level credit market outcomes, including total number of loans and total outstanding loan amount reflecting unpaid debt.  $Judge\ Occp_d$  is a continuous variable denoting the percentage of judge seats that are occupied on average in district  $d$  in the pre-reform period.  $Post_t$  is a dummy indicating post reform period. I include two-way fixed effects by including district fixed effects -  $\alpha_d$ , and state-year fixed effects -  $\alpha_{st}$ .  $\epsilon_{dt}$  represents the idiosyncratic error term. I cluster the standard errors by district.

The sign and magnitude of the coefficients  $\gamma$  indicate the effect of the reform on bank lending and outstanding (unpaid) debt when judicial capacity, measured as the average prior period judge occupancy, increases by one percentage point. This coefficient represents the complementary role of judicial capacity with respect to the overall credit market when creditor rights improve. When the outcome is outstanding loans,  $\gamma < 0$  indicates an improvement in repayment behavior as a result of better judicial capacity and improved creditor rights.

Additionally, I examine the market level outcome by bank-type, especially lending and repayment to public sector banks. As mentioned earlier, the public sector banks in India constitute close to 80% of the banking sector and has an overwhelming share of NPA. Therefore, examining credit outcomes among public sector banks is important to infer about the role of bankruptcy reform and judicial capacity in addressing the NPA problem.

Finally, as before, I examine pre-trends in outcome measures by the district judicial capacity as a suggestive test for the validity of the identifying assumption for causal inference.

### 5.2.1 Lending by Economic Sector

Lastly, I examine the credit market level outcomes by the sector of lending, grouped as agriculture sector and non-agricultural sectors for productive loans. I exclude lending outcomes made for consumption purposes such as personal loans, housing loans, etc. Agriculture sector in India is

categorized as priority sector for lending purposes and has been subject to many bail-outs by the government, leading to high rates of defaults (Giné and Kanz 2018). Since priority sector lending norms dictate that at least 18% of all lending be directed to the agriculture sector, an efficient allocation conditional on this policy would imply that lending to the agriculture sector should likely be capped at 18% or minimize allocation in excess of 18%.

$$Y_{dt}^k = \alpha_d^k + \alpha_{st}^k + \phi Judge\ Occpd \times Post_t + \zeta_{dt}^k \quad (7)$$

As before,  $Y_{dt}^k$  includes credit market level loan outcomes specific to non-consumption sector  $k$ . Additionally, with outcome constructed as percentage of total lending to sector  $k$ , the hypothesis testing for no change in credit allocation to the agriculture sector post reforms would imply  $\phi = 0$ .  $\phi > 0$  implies that the agriculture sector experiences an increase in its share of the total credit relative to non-agricultural production sectors. This could potentially indicate a misallocation if the allocation is not based on which sector has a higher marginal production of capital.

## 6 Results

In this section, I discuss the results from the analysis based on the empirical strategy laid out in the previous section. I begin by examining credit allocation by banks to firm borrowers by firm characteristics, showing that allocation improves as a result of the bankruptcy reform. The improvement is more pronounced in districts with better judicial capacity. Following allocation based on borrower characteristics, I present the results of overall credit market response at the level of a district by examining the effect on total lending and repayment at the market level. I find that repayment significantly improves after the reform in better judicial capacity districts and find a modest decline in lending. I break down the results by public sector banks as well as by sectoral allocation of productive loans at the market level. Finally, I provide suggestive evidence to show that the improvement in credit market and allocation efficiency is driven by improved capacity of local judicial institutions through increased filing of litigation as well as higher rate of dispute resolution.

### 6.1 Credit Allocation

In this section, I discuss credit allocation by banks to a sample of formal sector firms from Prowess dataset based on whether the firm defaulted in the past as well as by firms' ex-ante marginal revenue product of labor and capital. This tests the hypotheses that the allocative efficiency improves when institutional quality - combination of credit rights and judicial capacity - improves, although I cannot conclude whether improvement in institutional quality is sufficient to eliminate misallocation entirely.

### 6.1.1 Lending by Borrowing Firms' Characteristics

Panel A [Figure 4](#) represents the data visually and Column 1 [Table 1](#) presents the difference in difference estimates on annual borrowing by formal sector firms from banks by their past default status. At baseline, banks lend more - almost twice as much - to defaulting firms relative to non-defaulters likely consistent with the “ever-greening” hypothesis resulting from the incentive structure faced by the bank officials. However, this declines post reform whereas lending to non-defaulting firms marginally improves. This decline in lending to defaulting firms is robust to accounting for unobserved time-invariant firm specific characteristics by including firm fixed effects (Column 2 [Table 1](#)), with point estimates fairly stable. The estimates suggest that the lending to past defaulters decreases between 28-35 percent post reform.

Columns 3 and 4 [Table 1](#) present the estimates in subsets of districts characterized by judicial capacity. The estimates and pattern in data as seen in Panel B [Figure 4](#) are similar to that of the pooled sample but loses precision. The estimates are marginally lower in low judicial capacity districts although I fail to reject the equivalence of the estimate with that from high judicial capacity district sub-sample.

Next, I examine credit allocation by manufacturing firms' prior-period factor productivity. [Table 2](#) and [Table 3](#) present the estimates on bank borrowing by firms' MRPK and MRPL, respectively. [Figure 5](#) represents the data visually. At baseline, banks lend more to firms with low MRPK. In particular, firms with low MRPK are lent twice as much as firms with high MRPK at baseline. On the other hand, the differential based on MRPL is smaller, with high MRPL firms borrowing about 25% more than low MRPL firms at baseline. However, after the reform, lending increases to firms with higher MRPK, suggesting that banks begin to respond to the firms' capital productivity when their rights are stronger. Specifically, borrowing increases by 15-20% among high MRPK firms after the reform. The estimates are stable even after accounting for firm fixed effects (Column 2 [Table 2](#)). Borrowing by high MRPL firms decline after reform although the estimate reduces in magnitude and loses precision with firm fixed effects (Columns 1 and 2 [Table 3](#)).

The increase in lending to high MRPK firms is largely driven by higher judicial capacity districts whereas there is no significant change in low judicial capacity districts (Columns 3 and 4 [Table 2](#)). However, the decline in lending to high MRPL firms is likely driven by low judicial capacity districts whereas the decline is modest and statistically insignificant in high judicial capacity districts (Columns 3 and 4 [Table 3](#)).

The analysis suggests that banks become careful in credit allocation after the reforms, especially if the firm is a past defaulter, in which case the lending decreases consistently across all districts across the distribution of judicial capacities. At the same time, the evidence suggests that the allocative efficiency likely improves as banks increase lending to high MRPK firms but only in districts with better judicial capacity.



## 6.2 Credit Market Outcomes

In this section, I present the results on overall credit market (district-level) outcomes on aggregate lending by banks and loan repayment. An improvement in creditor rights and judicial capacity should have a positive impact on the overall credit market in addition to allocation behavior discussed earlier. The key outcome to measure this improvement is the extent of repayment of outstanding loan, which I find increases substantially post reform.

Panel A [Figure 6](#) and [Table 4](#) presents the difference in difference estimates on total number of bank loans and amount outstanding at the district-level. I find that total number of loans declines by 4% in high judicial capacity districts whereas increases by 3% in low judicial capacity districts after the reform. Using the average prior period judge occupancy variable, total number of accounts decline by 0.3 percent after the reform when judge occupancy increases by 1 percentage points. At the same time, outstanding loans decline by 4-6 % in high judicial capacity districts whereas it increases by 6% in low judicial capacity districts.

For the subset of banks that belong to the public sector, outstanding loans decline in districts with better judicial capacity after the reform whereas there is no significant effect on total loans. Panel B [Figure 6](#) represents the event-study estimates of bankruptcy reform in high judicial capacity districts for public sector banks. Columns 1 and 4 [Table 5](#) presents the estimates by prior period judge occupancy. As with the pooled sample, outstanding loans by public sector banks declines considerably post reform with improvement in judicial capacity. Specifically, outstanding loan decreases by 0.5 % after the reform for every 1 percentage point increase in district judge occupancy. On the other hand, total number of loans does not change meaningfully or in a statistically significant fashion among this subset of banks.

Examining the outcomes by the sector of lending for productive uses grouped as agriculture and non-agri sectors, I find that the reduction in outstanding loans is mainly been driven by improved repayment by non-agri sector borrowers. Although repayment also improves among agriculture sector loans, the estimates are statistically insignificant and or lower magnitude. [Figure 7](#) presents the event study estimates by the sectors respectively. Columns 2-3 and 5-6 of [Table 5](#) presents the difference in difference estimates by average prior period district judge occupancy. The estimates imply that outstanding loans to non-agriculture sector decreases by 0.74 % after reform for every one percentage point increase in judge occupancy, whereas the decline in outstanding loans to agriculture sector is estimated as 0.09 % reduction for marginal improvement in the underlying judicial capacity.

The results taken together suggest that an improvement in the institutional quality that strengthens creditor rights and enforcement ability by local judicial institutions helps improve local credit market outcomes. This improvement is mainly driven by an improvement in repayment behavior, especially among non-agriculture sector borrowers of public sector banks. On the other hand, there is no significant change in total lending suggesting that good quality institutions improve the functioning

of local credit markets.

### **6.2.1 Priority Sector Lending**

Creditor rights detailed in bankruptcy laws and the quality of enforcement in local courts are not the only institutional factors affecting credit allocation and the overall functioning of the local credit markets. Banks in India are closely regulated by the Reserve Bank of India and given the large role played by public sector banks in the entire banking sector, both allocation and overall credit markets are significantly influenced by public policies, particularly with respect to directed lending to specific sectors termed as the priority sector. While creditor rights improved with the reform, the priority sector lending norms remain, which likely affect the efficiency of credit allocation.

Panel A [Figure 8](#) and Columns 1-3 of [Table 6](#) present the estimates on percent allocation of total credit line in a district to the agriculture sector. Average share of lending to the agriculture sector is over 40%, which is much higher than the stipulated 18% norm under the priority sector rules. However, since the districts in my sample are predominantly rural, this is likely driven by greater demand for agricultural loans relative to production loans for non-agriculture sector. As creditor rights improve after the bankruptcy reform, I note that the share of lending declines considerably in low judge capacity districts whereas it remains stable in high judge capacity districts.

Percentage share of the agriculture sector of total outstanding loan also shows a similar pattern, where the share declines in low judicial capacity district after the reform and remains stable in high capacity districts. Panel B [Figure 8](#) and Columns 4-6 of [Table 6](#) present these results. This suggests that improved creditor rights and enforcement capacity of local courts likely increase the implementation of the priority sector lending norms as dictated by the state policy. This may lead to credit misallocation if lending is not based on maximizing the marginal value of credit. Therefore, while an improvement in some institutions may have beneficial effects on the credit market outcomes and credit allocation within the manufacturing sector, presence of other factors could still prevent efficient allocation of credit.

### **6.3 Mechanism: Increase in Debt Litigation**

An important mechanism behind the change in lending and repayment behavior faced by bank is their willingness to recognize bad loans as non-performing assets by filing debt recovery litigation in the corresponding court. Once bad loans are recognized but ordinary dispute resolution doesn't yield complete recovery, the bankruptcy reform enables the lender to initiate either liquidation or restructuring process in the bankruptcy court, which is the National Company Law Tribunal (NCLT). NCLT benches are only present in large urban districts and currently there are 15 benches across the countries. However, not all default cases end up in the bankruptcy courts and therefore, banks rely predominantly on the more accessible ordinary trial courts within their district. Well functioning trial courts through their timely resolution of case backlog encourages banks to file suits

for debt recovery. This also enables timely repayment of all outstanding loans.

Panel A [Figure 9](#) presents suggestive evidence indicating that banks are more likely to initiate debt related litigation in courts with better judicial capacity immediately following the reform. On the other hand, they are less likely to initiate trial proceedings in low judicial capacity districts (Panel B). [Table 7](#) presents the difference in difference estimates. The results suggest that an increase in judicial capacity measured as prior period average judge occupancy increases both new filing and trial resolution post reform by 0.25-0.27 % for every one percentage point increase in judge occupancy. Alternately, this means that filing and resolution increases by 9-12 % in high judge occupancy district whereas filing decreases by 21 % and resolution by 13% in low judge occupancy districts.

One explanation for this one time spike observed in the graphs is that recognition of bad loans was given importance in the wake of the bankruptcy reform because until then, the bank officials faced a negative incentive for defaults in their portfolio. Recognizing bad loans was driven by a policy directive by the Reserve Bank of India in addressing the NPA problem requiring banks to mark loans with past due installments as NPA, which would then be addressed under the new bankruptcy law. Once loans are marked as defaults, the bank officials can initiate the recovery proceedings through both judicial and non-judicial means. The latter involves using recovery or collection agents rather than the judicial process. The results suggest that well functioning courts likely encourage banks to use judicial processes.

## 7 Conclusion

This paper provides evidence in support of the complementary role judicial institutions play in enforcing creditor rights and debt contracts on the credit allocation as well as in the functioning of local credit markets through an improvement in aggregate repayment of outstanding debts. To show this, I exploit cross-sectional variation in district judicial capacity, measured as average judge occupancy in district courts in period prior to a legal reform strengthening creditor rights, and a one-time change in bankruptcy law that put creditors above all other stakeholders in bankruptcy proceedings. Using this difference in difference research design, I find that banks reduce lending to firms known for past defaults after the reform and differentially increase lending to firms with higher MRPK in districts with better judicial capacity. Further, I note that overall repayment of outstanding loan increases with judicial capacity, driven by increased repayment of production loans by the non-agriculture sector. However, judicial capacity is not sufficient to address potential misallocation arising from other sources including legitimate policy and incentive structure.

A key mechanism through which local courts with better capacity affect the observed credit allocation and higher repayment rates is through timely enforcement of on-going trials as well as by enabling banks to file new suits pertaining debt recovering. This shows that local courts play an

important role in the functioning of markets, specifically for the financial sector, in addition to the important role played by the higher judiciary in interpreting laws and providing directions for their implementation. This is particularly important in the context of bankruptcy framework, where local enforcement capacity leads to better credit allocation and increases repayment when the relative strength of creditor rights improve.

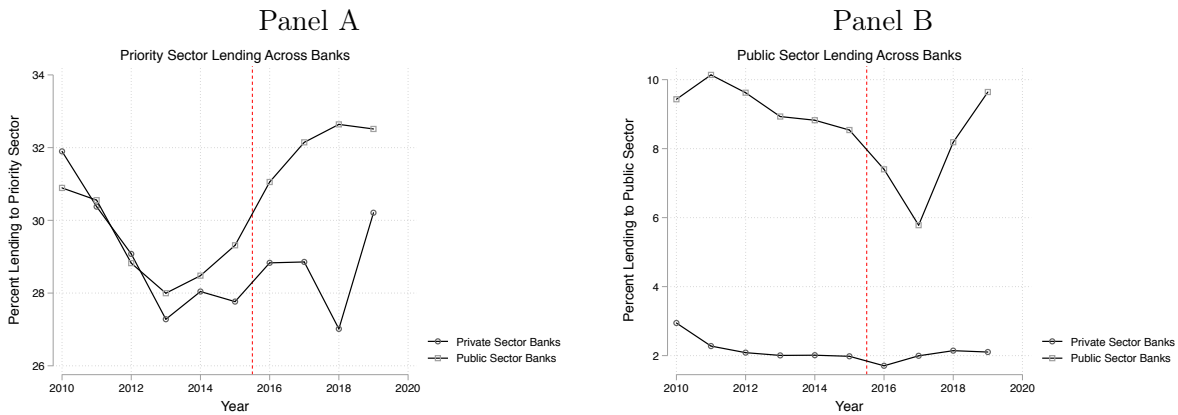
The literature examining the role of judicial institutions in the functioning of financial markets is relatively sparse, particularly empirical studies using disaggregated data to generate both cross-sectional as well as time-series variation in institutional quality. This paper thus provides micro-economic evidence on the role of courts in supporting local credit markets after an improvement in creditor rights through a reform in the bankruptcy process in India. The findings support the early cross-country literature on the importance of legal and judicial institutions for the development of financial markets and availability of credit. In addition, it shows that an improvement in rights and enforcement capacity reduces potential misallocation but does not completely eliminate.

Given the ongoing crisis in the banking sector in India, the timing of this paper is apt. Since I use recent data and institutional reforms for the analysis, the paper presents key evidence to enable a discussion surrounding the direction of further reforms. This includes significant investment in increasing the capacities of the sub-national judiciary and encouraging debate beyond the role of higher judiciary with respect to interpretation and directions for implementing the bankruptcy law.

Since the timing of the reform is fairly recent, the paper provides short and medium run effects on credit outcomes. As the law is further amended to remove ambiguities pertaining to the rights of the different stakeholders and directions for implementation becomes clear, the long run effects maybe different. These could have ramifications on what types of firms are liquidated and what types are restructured through re-investment, and therefore left for future research as and when such data becomes available.

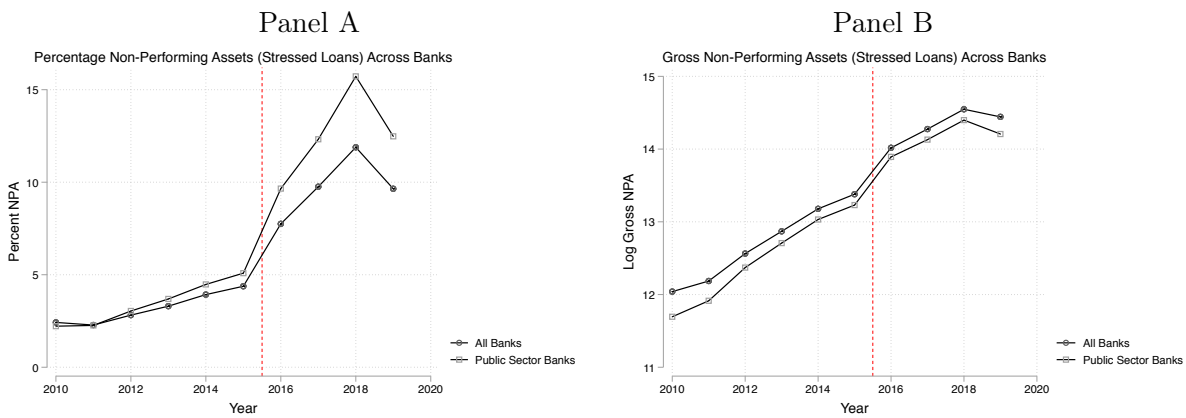
## 8 Figures

Figure 1: Directed Lending by Banks



Notes: The figures above plot the percentage of total lending across India towards priority section (Panel A) and towards public sector borrowing (Panel B) respectively.

Figure 2: NPA in Indian Banks



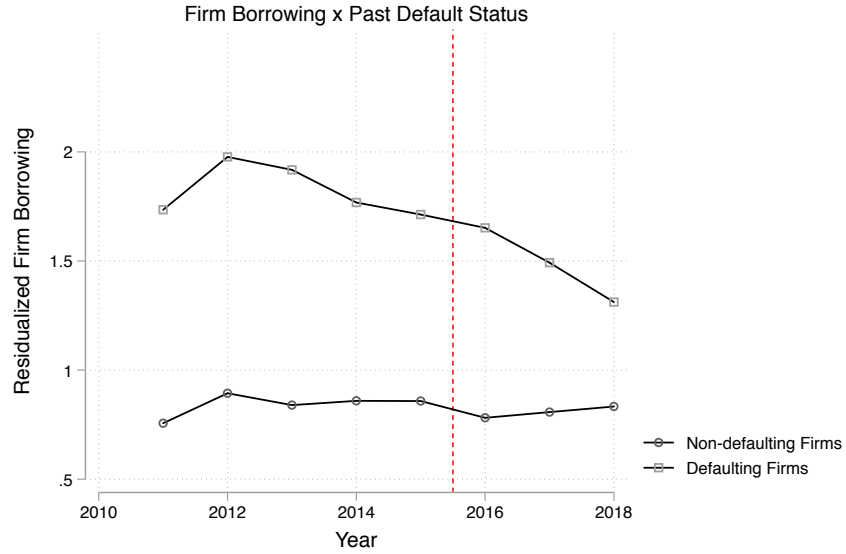
Notes: The figures above plot the percentage of total lending across India that turned into NPA (Panel A) and overall growth of Gross NPA (Panel B) respectively.

Figure 3: Timeline of Bankruptcy Reform

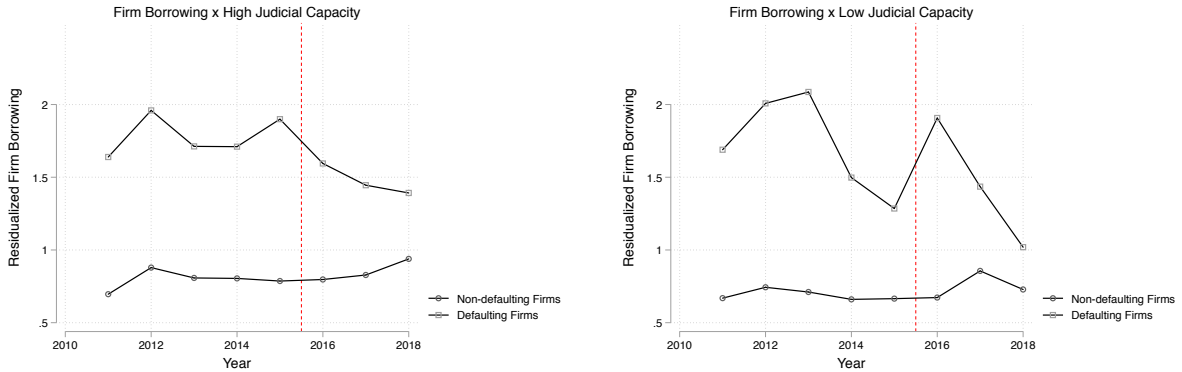


Figure 4: Firm Borrowing from Banks: Judge Occupancy x Bankruptcy Reform

Panel A: All Districts

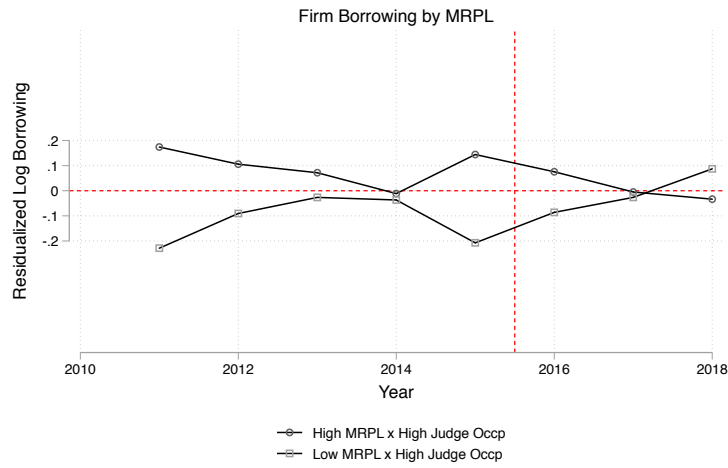


Panel B: By District Judicial Capacity

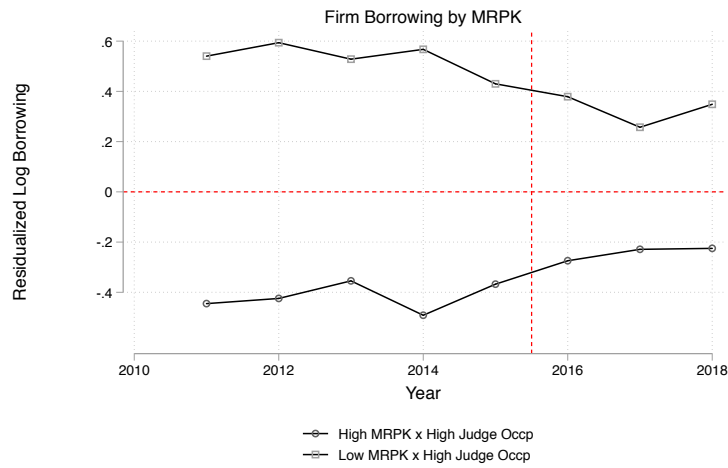


Notes: The figures above depict residualized firm borrowing by factor productivity of firms before and after bankruptcy reform (Panel A). Panel B presents the residualized means by cross-sectional differences in judicial capacities of the firms' home districts.

Figure 5: Firm Borrowing from Banks by MRPX : Judge Occupancy x Bankruptcy Reform  
 Panel A: By Firm MRPL

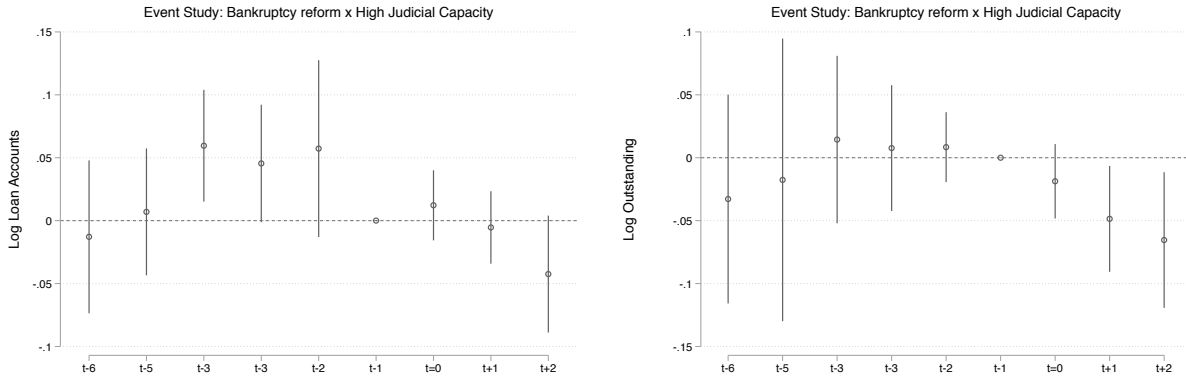


Panel B: By Firm MRPK

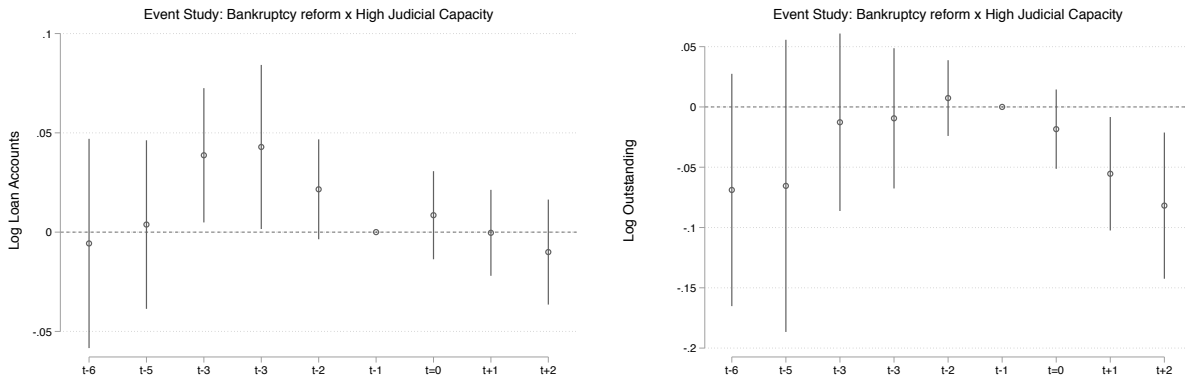


Notes: The figures above show residualized firm borrowing by default status of firms before and after bankruptcy reform. Panel A presents firm grouping by their marginal revenue product of labor. Panel B presents firm grouping by their marginal revenue product of capital.

Figure 6: Credit Market Outcomes: Judge Occupancy x Bankruptcy Reform  
 Panel A: All Banks



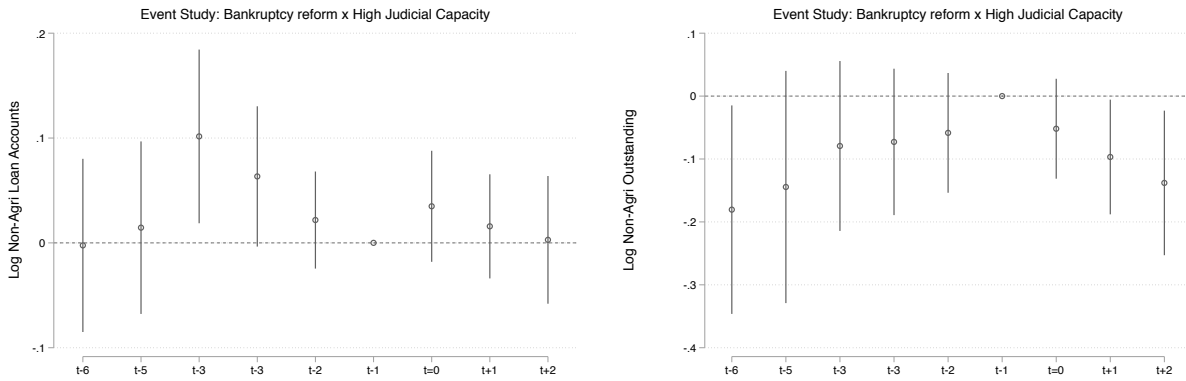
Panel B: Public Sector Banks



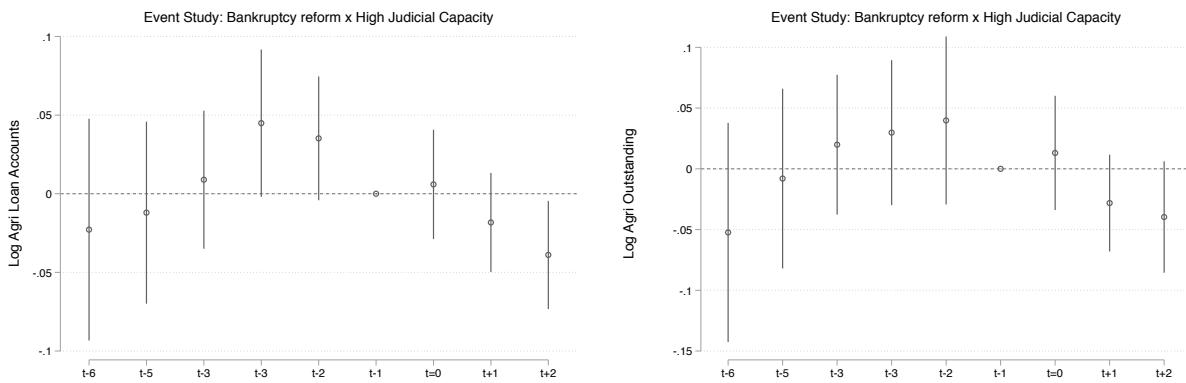
Notes: The figures present the event-study estimates of the bankruptcy reform on total lending and outstanding loans across all banks (Panel A) and by public sector banks (Panel B) in high judicial capacity districts.



Figure 7: Credit Market Outcomes by Sector: Judge Occupancy x Bankruptcy Reform  
 Panel A: Production Loans (Non-Agri)

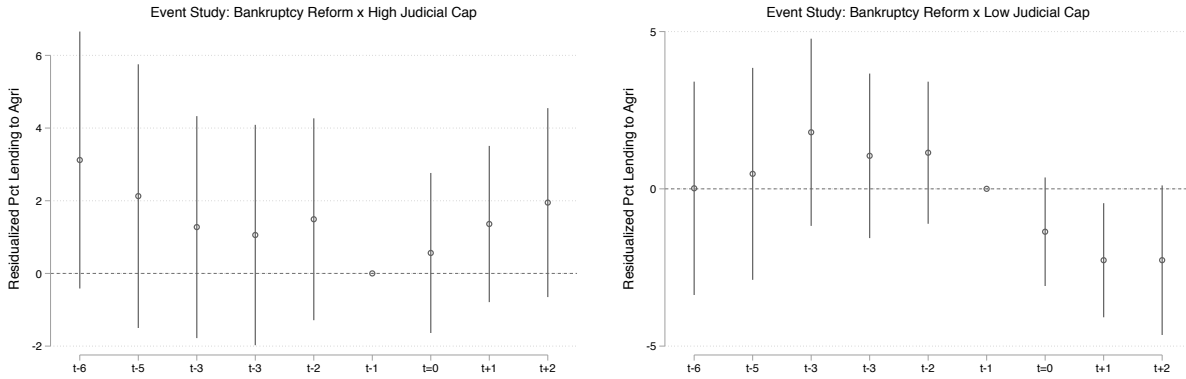


Panel B: Agriculture Sector Loans

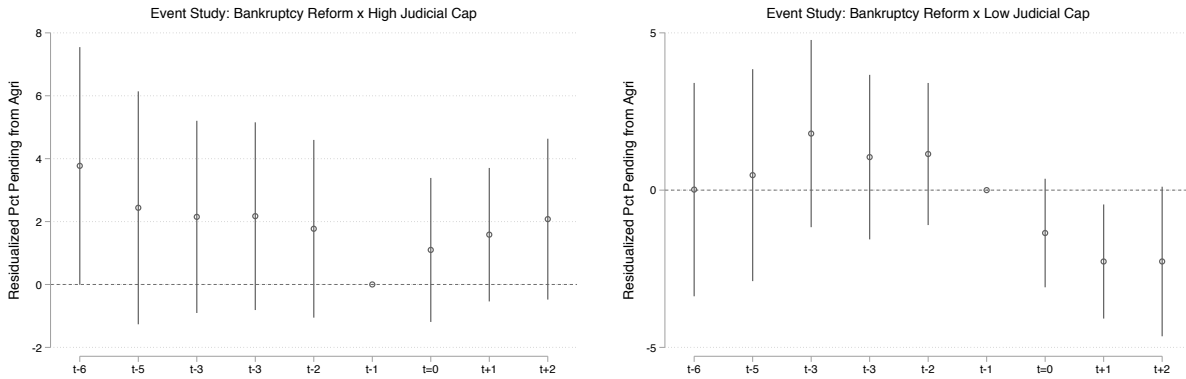


Notes: The figures present the event-study estimates of the bankruptcy reform on total lending and outstanding loans to non-agriculture sector (Panel A) and to agriculture sector (Panel B) in high judicial capacity districts.

Figure 8: Bank Lending to Agri Sector: Judge Occupancy x Bankruptcy Reform  
 Panel A: Percent Total Lending to Agri Sector



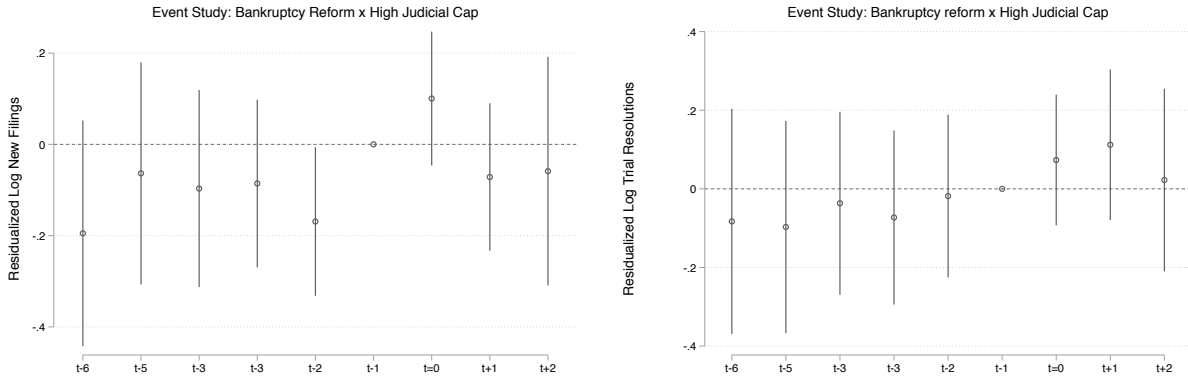
Panel B: Percent Total Outstanding From Agri Sector



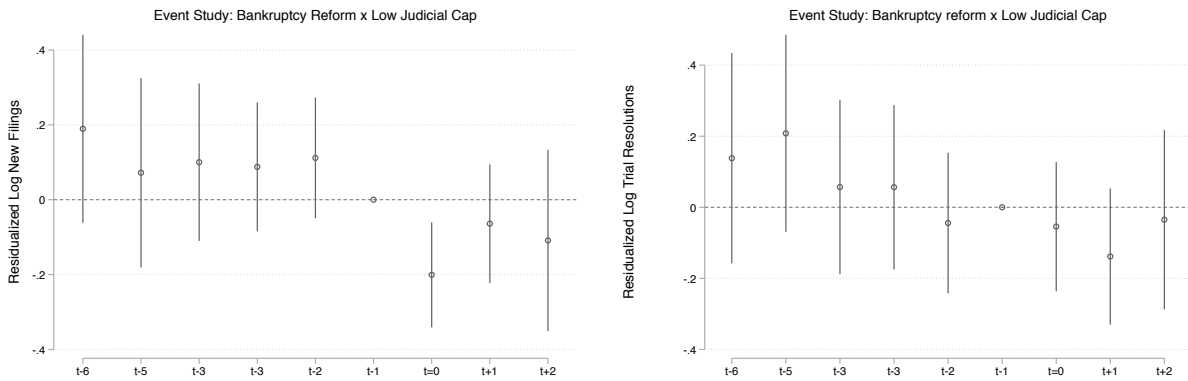
Notes: The figures present the event-study estimates of the bankruptcy reform on percentage of all lending (Panel A) and outstanding loans (Panel B) for the agriculture sector by underlying judicial capacity of the districts. Since agriculture sector is classified as a priority sector, the percentage lending represent credit allocation to the agriculture sector and percentage pending represents the percentage of all outstanding dues from the sector.

Figure 9: Bank Litigation: Judge Occupancy x Bankruptcy Reform

Panel A: High Judicial Capacity



Panel B: Low Judicial Capacity



Notes: The figures show the event study estimates on the number of new filing and resolution of trials pertaining to the banking sector in the corresponding district courts, grouped by their prior-period judicial capacity. High judicial capacity districts are those with over median ex-ante judge occupancy within the state whereas low judicial capacity districts are those below the median occupancy within the same state.

## 9 Tables

Table 1: Bankruptcy Reform: Firm Borrowing from Banks

|                  | Dep Var: Asinh Firm Borrowing from Banks |                      |                                   |                                  |
|------------------|------------------------------------------|----------------------|-----------------------------------|----------------------------------|
|                  | (1)                                      | (2)                  | (3)                               | (4)                              |
|                  | All Firms                                | All Firms            | Firms in High<br>Jud Cap District | Firms in Low<br>Jud Cap District |
| Defaulter x Post | -0.276**<br>(0.136)                      | -0.341***<br>(0.125) | -0.350<br>(0.298)                 | -0.243<br>(0.263)                |
| Past Defaulter   | 1.042***<br>(0.135)                      | 0<br>(.)             | 1.069***<br>(0.174)               | 1.118***<br>(0.352)              |
| Observations     | 34842                                    | 34588                | 10462                             | 5546                             |
| District FE      | Yes                                      | Yes                  | Yes                               | Yes                              |
| Firm FE          | No                                       | Yes                  | No                                | No                               |
| State-Year FE    | Yes                                      | Yes                  | Yes                               | Yes                              |
| Firm Controls    | Yes                                      | Yes                  | Yes                               | Yes                              |
| Mean Dep Var     | 1.512                                    | 1.512                | 1.434                             | 1.434                            |
| SD Dep Var       | 2.718                                    | 2.718                | 2.620                             | 2.620                            |
| Adj R-Squared    | 0.100                                    | 0.600                | 0.100                             | 0.110                            |

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < .05$ , \*\*\*  $p < 0.01$

Notes: The table above reports difference in differences estimates of bankruptcy reform introduced in 2016 on bank borrowing by firm status as a past defaulter. A firm is categorized as a defaulter based on their ex-ante credit ratings, indicating default on repayments. All standard errors are clustered at the district level.

Table 2: Credit Allocation within Manufacturing Sector: By MRPK

|                  | Dep Var: Asinh Firm Borrowing from Banks |                     |                                   |                                  |
|------------------|------------------------------------------|---------------------|-----------------------------------|----------------------------------|
|                  | (1)                                      | (2)                 | (3)                               | (4)                              |
|                  | All Firms                                | All Firms           | Firms in High<br>Jud Cap District | Firms in Low<br>Jud Cap District |
| High MRPK x Post | 0.200**<br>(0.0935)                      | 0.146**<br>(0.0613) | 0.370**<br>(0.154)                | -0.0284<br>(0.273)               |
| High MRPK        | -0.900***<br>(0.0754)                    | 0<br>(.)            | -1.019***<br>(0.118)              | -0.823***<br>(0.213)             |
| Observations     | 14076                                    | 13580               | 4120                              | 2474                             |
| District FE      | Yes                                      | Yes                 | Yes                               | Yes                              |
| Firm FE          | No                                       | Yes                 | No                                | Yes                              |
| State-Year FE    | Yes                                      | Yes                 | Yes                               | Yes                              |
| Firm Controls    | Yes                                      | Yes                 | Yes                               | Yes                              |
| Mean Dep Var     | 5.107                                    | 5.107               | 4.973                             | 4.973                            |
| SD Dep Var       | 2.554                                    | 2.554               | 2.470                             | 2.470                            |
| Adj R-Squared    | 0.230                                    | 0.870               | 0.210                             | 0.300                            |

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < .05$ , \*\*\*  $p < 0.01$

Notes: The table above reports difference in differences estimates of bankruptcy reform introduced in 2016 on bank borrowing by firm's marginal revenue product of capital (MRPK). Firms are classified into High and Low MRPK firms based on whether the firm is above or below median MRPK within their two digit industry in the period prior to the reforms. All standard errors are clustered at the district level.

Table 3: Credit Allocation within Manufacturing Sector: By MRPL

|                  | Dep Var: Asinh Firm Borrowing from Banks |                     |                                   |                                  |
|------------------|------------------------------------------|---------------------|-----------------------------------|----------------------------------|
|                  | (1)                                      | (2)                 | (3)                               | (4)                              |
|                  | All Firms                                | All Firms           | Firms in High<br>Jud Cap District | Firms in Low<br>Jud Cap District |
| High MRPL x Post | -0.221**<br>(0.104)                      | -0.0431<br>(0.0550) | -0.105<br>(0.272)                 | -0.341*<br>(0.172)               |
| High MRPL        | 0.241***<br>(0.0842)                     | 0<br>(.)            | 0.261<br>(0.159)                  | 0.382**<br>(0.176)               |
| Observations     | 14076                                    | 13580               | 4120                              | 2474                             |
| District FE      | Yes                                      | Yes                 | Yes                               | Yes                              |
| Firm FE          | No                                       | Yes                 | No                                | Yes                              |
| State-Year FE    | Yes                                      | Yes                 | Yes                               | Yes                              |
| Firm Controls    | Yes                                      | Yes                 | Yes                               | Yes                              |
| Mean Dep Var     | 5.107                                    | 5.107               | 4.973                             | 4.973                            |
| SD Dep Var       | 2.554                                    | 2.554               | 2.470                             | 2.470                            |
| Adj R-Squared    | 0.210                                    | 0.870               | 0.180                             | 0.280                            |

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < .05$ , \*\*\*  $p < 0.01$

Notes: The table above reports difference in differences estimates of bankruptcy reform introduced in 2016 on bank borrowing by firm's marginal revenue product of labor (MRPL). Firms are classified into High and Low MRPL firms based on whether the firm is above or below median MRPL within their two digit industry in the period prior to the reforms. All standard errors are clustered at the district level.

Table 4: Bankruptcy Reform DID Estimates: Banks Lending

|                                     | (1)<br>Log<br>Total Accounts | (2)<br>Log<br>Total Accounts | (3)<br>Log<br>Total Accounts | (4)<br>Log<br>Outstanding | (5)<br>Log<br>Outstanding | (6)<br>Log<br>Outstanding |
|-------------------------------------|------------------------------|------------------------------|------------------------------|---------------------------|---------------------------|---------------------------|
| High Judge Occp x Post              | -0.0386*<br>(0.0228)         |                              |                              | -0.0424<br>(0.0346)       |                           |                           |
| Low Court Prod x Post               |                              | 0.0283<br>(0.0244)           |                              |                           | 0.0566*<br>(0.0315)       |                           |
| Judge Occp (pre period mean) x Post |                              |                              | -0.00295*<br>(0.00155)       |                           |                           | -0.00473**<br>(0.00223)   |
| Observations                        | 4772                         | 4772                         | 4772                         | 4772                      | 4772                      | 4772                      |
| District FE                         | Yes                          | Yes                          | Yes                          | Yes                       | Yes                       | Yes                       |
| State-Year FE                       | Yes                          | Yes                          | Yes                          | Yes                       | Yes                       | Yes                       |
| Mean Dep Var                        | 13.15                        | 13.15                        | 13.15                        | 9.573                     | 9.573                     | 9.573                     |
| SD Dep Var                          | 0.830                        | 0.830                        | 0.830                        | 1.030                     | 1.030                     | 1.030                     |
| Adj R-Squared                       | 0.980                        | 0.980                        | 0.980                        | 0.980                     | 0.980                     | 0.980                     |

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < .05$ , \*\*\*  $p < 0.01$

Notes: The table above reports difference in differences estimates of bankruptcy reform introduced in 2016 across districts with above and below median judge occupancy on banks' lending (number of loan accounts and total outstanding). All standard errors are clustered at the district level.

Table 5: Bankruptcy Reform: Public Sector Banks Lending

|                                     | (1)<br>Log Total<br>Accounts | (2)<br>Log Non-Agri<br>Accounts | (3)<br>Log Agri<br>Accounts | (4)<br>Log All<br>Outstanding | (5)<br>Log Non-Agri<br>Outstanding | (6)<br>Log Agri<br>Outstanding |
|-------------------------------------|------------------------------|---------------------------------|-----------------------------|-------------------------------|------------------------------------|--------------------------------|
| Judge Occp (pre period mean) x Post | -0.00136<br>(0.00115)        | -0.00194<br>(0.00287)           | -0.000923<br>(0.00141)      | -0.00490**<br>(0.00237)       | -0.00743*<br>(0.00383)             | -0.000884<br>(0.00161)         |
| Observations                        | 4772                         | 4772                            | 4772                        | 4772                          | 4772                               | 4772                           |
| District FE                         | Yes                          | Yes                             | Yes                         | Yes                           | Yes                                | Yes                            |
| State-Year FE                       | Yes                          | Yes                             | Yes                         | Yes                           | Yes                                | Yes                            |
| Mean Dep Var                        | 12.83                        | 10.91                           | 12.20                       | 9.328                         | 8.308                              | 8.042                          |
| SD Dep Var                          | 0.758                        | 0.785                           | 0.900                       | 0.966                         | 1.303                              | 0.787                          |
| Adj R-Squared                       | 0.990                        | 0.950                           | 0.980                       | 0.980                         | 0.960                              | 0.970                          |

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < .05$ , \*\*\*  $p < 0.01$

Notes: The table above reports difference in differences estimates of bankruptcy reform introduced in 2016 by average prior period judge occupancy of the district court on public sector banks' lending and recovery outcomes. All standard errors are clustered at the district level.

Table 6: Bankruptcy Reform: Credit Allocation to Agriculture Sector

|                                     | (1)                | (2)                 | (3)                 | (4)               | (5)                 | (6)                 |
|-------------------------------------|--------------------|---------------------|---------------------|-------------------|---------------------|---------------------|
|                                     | Percent Lending    | Percent Lending     | Percent Lending     | Percent Pending   | Percent Pending     | Percent Pending     |
| High Judge Occp x Post Reform       | -0.0309<br>(1.475) |                     |                     | -0.223<br>(1.362) |                     |                     |
| Low Court Prod x Post Reform        |                    | -2.713**<br>(1.281) |                     |                   | -2.523**<br>(1.165) |                     |
| Judge Occp (pre period mean) x Post |                    |                     | 0.183**<br>(0.0785) |                   |                     | 0.141**<br>(0.0691) |
| Observations                        | 4772               | 4772                | 4772                | 4772              | 4772                | 4772                |
| District FE                         | Yes                | Yes                 | Yes                 | Yes               | Yes                 | Yes                 |
| State-Year FE                       | Yes                | Yes                 | Yes                 | Yes               | Yes                 | Yes                 |
| Mean Dep Var                        | 41.84              | 41.84               | 41.84               | 45.77             | 45.77               | 45.77               |
| SD Dep Var                          | 22.17              | 22.17               | 22.17               | 22.65             | 22.65               | 22.65               |
| Adj R-Squared                       | 0.920              | 0.920               | 0.920               | 0.940             | 0.940               | 0.940               |

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < .05$ , \*\*\*  $p < 0.01$

Notes: The table above reports difference in differences estimates of bankruptcy reform introduced in 2016 across districts with above and below median judge occupancy on banks' credit allocation to and loan recovery from the agricultural sector (considered a priority sector under directed state lending policy). All standard errors are clustered at the district level.



Table 7: Bankruptcy Reform: Bank Litigation

|                                     | (1)                   | (2)                | (3)                  | (4)                  | (5)               | (6)                |
|-------------------------------------|-----------------------|--------------------|----------------------|----------------------|-------------------|--------------------|
|                                     | Log Filed             | Log Filed          | Log Filed            | Log Resolved         | Log Resolved      | Log Resolved       |
| Judge Occp (pre period mean) x Post | 0.000241<br>(0.00605) |                    |                      | 0.00275<br>(0.00679) |                   |                    |
| High Judge Occp x Post              |                       | 0.0867<br>(0.0800) |                      |                      | 0.116<br>(0.0801) |                    |
| Low Court Prod x Post               |                       |                    | -0.206**<br>(0.0843) |                      |                   | -0.127<br>(0.0811) |
| Observations                        | 5087                  | 5087               | 5087                 | 5087                 | 5087              | 5087               |
| District FE                         | Yes                   | Yes                | Yes                  | Yes                  | Yes               | Yes                |
| Case-Type FE                        | Yes                   | Yes                | Yes                  | Yes                  | Yes               | Yes                |
| State-Year FE                       | Yes                   | Yes                | Yes                  | Yes                  | Yes               | Yes                |
| Mean Dep Var                        | 1.590                 | 1.590              | 1.590                | 1.540                | 1.540             | 1.540              |
| SD Dep Var                          | 1.460                 | 1.460              | 1.460                | 1.460                | 1.460             | 1.460              |
| F-Stat                              | 0                     | 1.180              | 5.980                | 0.160                | 2.120             | 2.460              |
| Adj R-Squared                       | 0.340                 | 0.340              | 0.340                | 0.410                | 0.410             | 0.410              |

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < .05$ , \*\*\*  $p < 0.01$

Notes: The table above reports difference in differences estimates of bankruptcy reform introduced in 2016 across districts with above and below median judge occupancy on banks' litigations in trial courts. All standard errors are clustered at the district level.

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