Judges, Lenders, and the Bottom Line: Court-ing Firm Growth in India

Manaswini Rao

October 1, 2019

PRELIMINARY AND INCOMPLETE. PLEASE DO NOT CITE OR CIRCULATE.
Click here for the latest version.

Abstract

Courts are considered as an important institution in the functioning of markets. Yet, there is limited causal evidence showing this relationship. This paper estimates the causal effects of court performance on formal sector firm growth in India. I construct a robust measure of court performance using novel data comprising of the universe of 6 million case records over 9 years across 195 district courts and then match it to a dataset on registered, formal sector firms. For causal inference, I exploit plausible exogenous variation in judge occupancy, arising out of a system of judge rotations and existing vacancies, to instrument for the potentially endogenous court performance. I show that higher court performance positively affects lending behavior in local credit markets. This is because timely resolution of litigation supports lenders and acts as a deterrent against non-repayment to borrower firms. This, in turn, relaxes the credit constraints firms face, expanding production and improving profits.

[1]Contact: manaswini.rao@gmail.com, Department of Agricultural Resource Economics, University of California Berkeley.
I am indebted to my advisors Aprajit Mahajan, Betty Sadoulet and mentors Emily Breza and Arun Chandrasekhar for their constant guidance and feedback through this project. I thank Michael Anderson, Sam Asher, Alain de Janvry, Kwabena Donkor, Ben Faber, Fred Finan, Marco Gonzalez-Navarro, Larry Karp, Supreet Kaur, Erin Kelley, Ben Krause, Greg Lane, Megan Lang, Ethan Ligon, John Loeser, Jeremy Magruder, Ted Miguel, Matthew Pecenco, Jeffery Perloff, Jim Sallee, Bilal Siddiqi, Vaishnavi Surendra, David Zilberman, Shaoda Wang, and all participants at Development Workshop and Dev Lunch at U C Berkeley. A huge shout-out to Kishore Mandyam, Harish Narasappa, Surya Prakash, and members at DAKSH for help with court data extraction and insightful discussions. Special thanks to Suhrid Karthik, Vinay Venkateswaran, Madhav Thattai, and former members of the Indian judicial system who helped me understand the context better. 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

At the heart of Coase theorem (Coase (1960)) is well defined property rights and effective enforcement of contracts that enable welfare enhancing trade. Practically, this requires seamlessly functioning third party enforcers, such as the courts, and well written laws to enable clear interpretation of rights (Kornhauser and MacLeod (2010)). The difficulties in contracting and enforcement give rise to firms as organizations of individual agents engaging in economic production and allied activities (Grossman and Hart (1986)). North (1986) states that as organizations grow in complexity, third party enforcement becomes dominant in comparison to self-enforcement or social norms. This involves not just ensuring that the terms of the contract are adhered to and if not, reorganizing incentives to bring the alignment, but doing so in a timely fashion. Timely enforcement reduces uncertainty, the absence of which adds to transactions costs preventing effective contracting.

An anecdote presented in Dutta et al. (2019) describes how one single instance of delay in concluding litigation in India's highest court costed the public purse over USD 2.6 million towards payment of damages along with an additional USD 84000 towards litigation expenses in a suit between a foreign company and an Indian firm. As of July 2019, over 11 million cases (3 million civil cases) have been pending over 3 years across the district courts in India and close to 1.6 million cases pending in state High Courts (NJDG Dashboard [1]). In contrast, the United States has only about 60,000 civil cases pending as of March 2019 (FCMS, 2019 [2]). This implies that there are 10 times more pending civil cases per capita[3] in India relative to the United States. The implications of delayed justice administration are large, eroding the sense of basic rights and trust in markets. Acemoglu and Johnson (2005) show that enforcement of property rights have strong implications on long run growth and investment, whereas timely contract enforcement promotes financial intermediation and development of the formal financial sector. The World Bank's Doing Business indicators rank India below most countries, including neighboring South Asian nations, in the area of contract enforcement. A cross-country correlation between time to enforce contracts and GDP per capita shows strong negative relationship, indicating plausible costs of court delays.[4]

This paper examines the effectiveness of courts with regard to timeliness of dispute resolution and its importance in creating an enabling environment for firm growth. Specifically, I present the causal effects of district court [5] performance on the growth of formal sector firms in India, showing the role of credit markets as an important channel linking the two. The performance varies across district courts as well as over time, primarily due to fluctuations in judge occupancy, i.e. share of judge posts that are filled in a year. By exploiting a unique dataset on the universe of 6 million trial proceedings[6] active between 2010 and 2018 across 195 district courts in India, I construct a panel data on annual court performance

[1] `https://njdg.ecourts.gov.in/njdgnew/index.php`

[2] `https://www.uscourts.gov/federal-court-management-statistics-march-2019`

[3] Population in India and the United States was 1.339 billion and 325.7 million respectively in 2017 as per the World Bank and the United States Census Bureau.

[4] Figure 1 and Figure 2 in the appendix show these patterns.

[5] I focus on the District and Sessions Court, which is the court of first instance for commercial cases, civil cases with large monetary values, as well as, heinous criminal cases.

[6] These records contain granular detail including the court where the case is filed, various case-flow time stamps, nature of dispute, and litigant details.

reflecting the timeliness of the dispute resolution process, defined as a ratio between the number of cases resolved in a year and total workload, including the backlog of unresolved cases. However, even within a panel set-up, annual variations in court performance are likely endogenous if they are correlated with unobserved district specific time varying characteristics or are affected by firm specific dynamics. For example, districts with high growth markets may mechanically increase litigation as conflicts are more likely to occur in such a setting than in one with lower interactions, adding to the court's backlog. To address these endogeneity concerns, I exploit features of the Indian judiciary that provides quasi-random variation in judge occupancy, which I use as an instrument for court performance.

Since judges are a key input of the court production function, exogenous variation in the share of judges available at any given time strongly determines court performance. Specifically, this variation arises from a combination of judge rotation policy and existing vacancies that are orthogonal to firm growth. Judges at the district courts typically have a short tenure of under 2 years on an average and are transferred to districts where they haven't worked in the past. This assignment policy is determined centrally in each state by the respective state high court. Existing vacancies in any given district thus get shifted to a different district with annual rotations. This creates potential exogenous variation in the judge occupancy within a district court over time and is uncorrelated with ex-ante outcomes of firms' time varying characteristics as well as district specific dynamics. The first stage is strong, indicating that a one percentage point increase in judge occupancy increases court performance by 1 percent. In other words, 1 standard deviation increase in judge occupancy increases court performance by 0.25 of a standard deviation.

In order to explore the causal chain linking the effectiveness of courts as an institution on firm growth, I match the court dataset with a sample of registered, formal sector firms, at two levels. First, I match incumbent[7] firms by their registered office location to the corresponding district courts. Registered office location is also the corporate headquarters in many instances, and is likely to be the relevant jurisdiction where potential litigations involving the firm as the respondent are filed (Code of Civil Procedure, 1908). This creates a sample of firms for which the institution of courts matter, irrespective of whether or not they use the court for litigation. Second, I match firms at the level of individual trials in the court dataset, wherever the firm appears as either the petitioner or the respondent. [8] This allows me to estimate the direct effects of courts via litigation processes specific to such firms, again using judge occupancy as an instrument to shock the timeliness of the adjudication process specific to the firm. This allows me to answer why courts, as an institution, are important for firms by providing the intermediate links in the larger causal chain.

The data on firms matched to trials indicate that banks and other formal financial lenders are the primary users of district courts initiating litigation (filing petitions) against private individuals and plausibly informal enterprises. For example, close to 50 percent of the banks in the firm sample[9] find a match in

[7]Incorporated before 2010, the period of study.

[8]Petitioners are also called as plaintiff and respondents as defendants in different countries.

[9]This dataset contains the universe of all banks in India since banks needs to be registered both as an incorporation as well as with the country's central bank.

the trial dataset whereas the match rate is much lower for other non-financial firms (about 13 percent). A large fraction of cases involving lenders (about 20 percent) are execution petitions initiated by the lender, which are petitions to bring past judgements into force, indicating that these firms are clear winners in the associated litigation. Higher judge occupancy in courts with litigation involving banks increases the number of lending accounts in the corresponding district. Specifically, a 1 standard deviation increase in judge occupancy increases the number of lending accounts in a district by nearly 2 percent, which are mainly directed towards manufacturing and consumption loans. This is large considering that banks have around 350,000 loan accounts in a district on an average. On the other hand, judge occupancy negatively affects the annual production outcomes of non-financial firms that appear as respondents in the litigations. Close to 50 percent of trials involving firms are accident claims initiated by private individuals against a firm. Losing such trials as well as trials on debt defaults are likely to create setbacks for these firms. This suggests that higher judicial capacity supports banks in their lending outcomes and acts as a deterrent against non-repayment/breaking contractual obligations to non-financial firms.

Since banks and lenders are able to recover debts and increase lending in the local credit markets, I examine the subsequent effects on all incumbent firms in the local economy[10] using three sets of outcomes. First, I show that firms' borrowing from banks increase. There is also an increase in lending from other local lenders (i.e. Non-Banking Financial Corporations or NBFC) as well as inter-firm lending.[11] Second set of outcomes include input use in firm production process, covering labor expenditure, value of capital, and land. The third group of outcomes include annual sales revenue and profits net of taxes. I also estimate heterogeneous effects based on ex-ante wealth, i.e. asset size prior to 2010, to examine the effects on credit constrained firms that experience relaxing of these constraints from an increase in external lending.

I present these estimates in terms of elasticities in a log-log specification, to calculate the monetary value of court performance. Specifically, I find that a 1 percent increase in court performance increases profits by 0.26 percent and sales revenue by 0.1 percent, on an average. With an average baseline profit of approximately INR 184 million and sales revenue of INR 5452 million, this translates to gains of INR 0.48 million ($\approx$ USD 7000) in profits and INR 5.5 million (USD 78 K) in sales revenue. Reducing vacancy by adding one more judge in a district court increases judge occupancy by 5-6 percentage points.[12] By applying the first stage estimates, adding one more judge translates to a 5-6 percent increase in court performance. Therefore, profits increase by about INR 2.6 million (USD 37 K) on an average. With over 1000 formal sector firms in a given district on an average and a value added tax rate of 18 percent on basic manufacturing and services, the state could potentially earn close to INR 0.5 billion (USD 7 million) in taxes[13] in the short run from each district. Judges cost much less than this. The average annual salary of a district judge is under INR 1 million per annum, including all non-pecuniary benefits. Given that the annual budgetary outlay for law and justice is less than a tenth of a percent of total expenditure in 2019

[10] Those matched by their registered office location

[11] Firms typically engage in mutual lending via trade credit, subsidiary support, and other debt investments.

[12] A district court, on an average, has about 18 judge posts, of which about 77 percent is occupied.

[13] This is an approximate back of the envelope calculation to illustrate the magnitude of effects. The VAT system in India has provisions for input tax credit that may alter this figure.

[14], there is a justifiable reason for increasing the outlay to address the problem of judge vacancy.

Lastly, I conclude the analyses by examining the relationship between judge occupancy and legal reforms (which are primarily legislative measures) to circle back to the large question on legal institutions and economic development. I show that effective courts and laws are complementary, i.e. higher judge occupancy enhances the effects of reforms enacted as changes in local laws. Using the specific examples of industrial-labor reforms and overhauling of bankruptcy law, I show that higher judge occupancy increases firm growth when the laws clearly strengthen the rights of the corresponding firms.

This paper makes four broad contributions to the academic literature. First, it adds to the literature on institutions and economic development by using detailed micro-data, data science techniques, and causal inference to bridge the gap between cross-country literature and the emerging, micro-empirical literature on courts that was data constrained until recently. Economists have long been interested in understanding the role of institutions in promoting economic development (e.g. North (1991), Williamson (1998) with roots in theoretical work from earlier), some specifically examining legal and judicial institutions, including Djankov et al. (2003), Besley and Burgess (2004), Acemoglu and Johnson (2005), Nunn (2007), and others. Many of these view legal and judicial institutions together as a bundle. Though they are the two sides to a coin, there are important differences. These stem from the fact that legal institutions pertain to the rule of law which are created by the legislature in a democracy, whereas judicial institutions pertain to administering justice as per the laws. The latter encompasses the formal judiciary, i.e. the system of courts, that adjudicate within the ambit of the laws, as well as regulatory bodies (part of the executive) which oversee justice administration over a narrowly defined area of law or policy. By focusing on the functioning of the commonly used trial courts - district courts, in a large country like India and the effects of their functioning on firms, this paper illustrates the role of courts as an institution on firm growth.

Second, the paper examines the role of judicial capacity (judge occupancy) as one of the primary causes of variation in court performance. There are many reasons why court performance varies across space and time. These can be categorized into the following buckets: judge availability, procedural rules on trial processing, task management (managing the flow of the trials), and general administration of court activities (including managing clerical staff, infrastructure, other personnel). Judges are central to the functioning of courts since they are the main actors who resolve trials by interpreting applicable laws in light of the issue under dispute and evidence presented. How judges should administer and manage the trial proceedings are determined by procedural laws, which can itself add to trial length, holding all else constant. Using data from 109 countries, Djankov et al. (2003) show that procedural formalism is greater in countries with legal origins in civil law relative to common law, which leads to delays in adjudication and increases the likelihood of corruption. Dimitrova-Grajzl et al. (2012) study the determinants of court output in Slovenia showing that the demand for court services, namely new litigations, are the main drivers of court performance. In Yang (2016), the author shows judge vacancy in the US federal district courts as a resource constraint, that leads prosecutors to dismiss more criminal cases, lowering the extent

[14] https://www.theweek.in/news/india/2019/07/05/budget-2019-drastic-cut-in-allocation-for-law-and-justice.html

of incarceration.[15] Anderson (2018) shows that procedural norms arising from colonial history in common law jurisdictions in sub-Saharan Africa allowed co-existence of statutory courts with traditional courts. This lowered the strength of female property rights, leading to higher HIV incidence among women in such areas. I contribute to this literature by highlighting the importance of judicial capacity on the court performance by exploiting quasi random variation in judge assignment within each state that shifts existing vacancy to different locations at different times.

Third, this paper is one of the first attempts to study a large part of the causal chain linking the performance of courts with economic outcomes. Starting with the direct effects of courts via the timeliness of the litigation process on specific types of firms and markets, I subsequently link the results to the broad institutional effects on all firms within the corresponding jurisdiction. This contributes to the emerging micro-empirical literature that examines the functioning of courts and their effects on the economy. Many of these focus on reduced form effects of important reforms or events intended to ease the process of dispute resolution on the aggregate economy (Chemin (2009a), Chemin (2009b), Chemin (2012)) lender/borrower behavior (Visaria (2009), Ponticelli and Alencar (2016)), and firms (von Lilienfeld-Toal et al. (2012), Ahsan (2013), Ponticelli and Alencar (2016), Amirapu (2017) and Kondylis and Stein (2018)).The results are in general alignment with the earlier cross-country literature on institutions, showing that better court performance leads to greater access to credit, better firm outcomes, and GDP growth. Almost all of these papers are data constrained in studying the intermediate effects of the litigation process or examining the impact at a lower level of geographic aggregation. This is because digitization and availability of trial level data for public use was only made available recently with the launch of the e-courts website and mobile applications across the world. In fact, Kondylis and Stein (2018) digitize the case level data from their sample of courts themselves. Through this study, I contribute a rich dataset on district courts and their annual functioning, with an intent to relax the data constraints hitherto limiting researchers to study this field.

Finally, the paper adds to the vast literature on the development of credit markets, especially in the context of developing countries. Rajan and Zingales (1998), Banerjee (2003), Burgess and Pande (2005), and Banerjee and Duflo (2014) show that access to external finance through borrowing from formal/institutional lenders is important for firm growth. I argue that institutional lenders expand credit supply in environments with higher court performance, relaxing credit constraints that the firms experience and allowing them to expand production. This finding is in similar vein to Banerjee and Duflo (2014) where they show that firms are severely credit constrained by registering large responses to lending variations from banks arising out of changing policy priorities. I show that banks exercise their choice to litigate more frequently than other firms. Timely adjudication in favor of banks increases lending to all firms in the local credit markets, particularly to those in the manufacturing sector, and those with lower ex-ante asset size, enabling an expansion in production and profits.

[15] A vast literature examines the role of judicial inputs on crime outcomes in the United States. This literature relies on random assignment of cases to judges for identification, which is not the case in India or in most developing countries. However, none have examined the effects of judicial institutions, particularly courts on firms, as per my knowledge. Detailed case level data is also becoming available in the developed countries to interested researchers only recently and I am not aware of an equivalent large scale public data source as the Indian e-courts database elsewhere.

This paper has a strong and actionable policy implication. The current policy debate in India has mainly focused on the issue of large pendency of trials in courts without exploring the economic cost of court delays. Access to Justice Surveys by Daksh (2017) reports substantial costs borne by private individual litigants - around INR 500 per day on travel to courts and INR 850-900 in the form of forgone wages. I provide the numbers for formal sector firms by translating the causal estimates of the court performance into its monetary equivalent. The choice of instrument - judge occupancy - also indicates that these results are in line with popular clamor for filling vacancies. As mentioned above, adding one judge costs the state under INR 1 million per year, whereas the associated increase in tax revenue on increased firm profits in a district is estimated to be INR 0.5 billion on an average. The increase in tax revenues from improved business profits clearly justifies the costs of recruiting additional judges to fill existing vacancies and perhaps also allow other complementary expenditure on the district judicial system.

The rest of the paper is organized as follows. In section 2, I provide details on the context and data. In section 3, I detail the identification strategy and discuss the identifying assumptions to establish causal interpretation of the results. Section 4 presents descriptive statistics on litigating firms, providing stylized facts and evidence in favor of credit markets as one of the channels for the general equilibrium effects of court as important institutions. Section 5 lays down a theoretical framework linking court performance as a measure of institutional quality and firm growth through the credit market channel. Section 6 and 7 present results from estimating the reduced form and IV specifications on the sample of litigating firms and all firms, respectively. Section 8 examines the interplay between court output and legal reforms. Finally, I present the conclusions in section 9.

2 Measuring Court Performance and Matching Outcomes

Judiciary in India is a three tier unitary system, with Supreme Court at the apex followed by High Courts at the state level and finally the district court system with first instance courts for civil and criminal trials. Our research question concerns with the performance of courts called the District and Sessions Court (hereinafter called district court), which are typically the first point of contact for filing cases involving firms and oversee the functioning of all other courts within the district. [16] The district court is headed by the Principal District Judge (PDJ), who along with Additional District Judges (ADJ) preside over all litigation filed in the court. This court also acts as the court of appeal for all matters originating in lower levels of the district court system. The High Courts and the Supreme Court serve mostly appellate functions in the case of most civil and criminal suits with original jurisdiction mainly over constitutional matters or when representing organs of the government. The district courts system is the main institution responsible for administering justice and enforcing rule of law for day-to-day economic and social matters and therefore, forms the population of interest for this paper.

India has consistently ranked low in the World Bank's Doing Business ranking as well as ranking within contract enforcement. Even as its overall ranking has jumped from 142 in 2014 to 77 in 2018, the ranking under contract enforcement continues to remain poor at 163 in 2018. Figure 1 compares India with the

[16] This is determined by monetary and geographic jurisdiction of the case.

rest of the world across various Doing Business indices, showing dispute resolution as a key bottleneck. A simple cross-country correlation between log GDP per capita and log trial duration in courts shows a significant negative association (Figure 2). This serves as a strong motivation to explore the causal relationship between the effectiveness of courts as an institution on firm growth using micro data on litigations in India.

2.1 E-Courts Data

I construct the dataset on court variables by scraping publicly available case level records from 195 administrative districts from the E-Courts website. [17] Each record details case level meta data as well as proceedings from each hearing.[18] These districts were selected to ensure an overlap with registered formal sector firms in predominantly non-metropolitan districts. Table A.1 illustrates the sample states and the fraction of districts from each of these states covered in the dataset. Figure A.1 shows the availability of data through histograms on year of filing and year of resolution. Since the e-courts system came into full operation from 2010, I consider 2010-2018 as the period of study.

Constructing Court Output Measures From the case-level data, I construct court-level annual performance panel data. I define the main measure of annual court performance as the ratio between number of cases resolved in a calendar year and total active workload during that year, which I call the "disposal rate". The denominator is the sum of cases that are newly filed and those that are pending for decision in a given calendar year. I also calculate other measures of court performance reflecting timeliness of the adjudication process. These include what I call "speed", constructed as the ratio between number of cases resolved and number of new filings in a given year. I also consider the logarithmic transformation of the volume of new cases filed and resolved by court-year as measures of court demand and output, respectively. For the set of cases that have been resolved within the study period, I calculate the trial duration until resolution. However, this measure only accounts for the select cases that were resolved in the study period. Additional measures include the fraction of cases that are appeals from courts lower in the hierarchy and the fraction of cases that are dismissed without completing full trial.[19] All these measures, except duration, are highly correlated with disposal rate, as shown in Table A.4. I also construct an index using all these measures and check for robustness of the results using the index in place of disposal rate.

Firm-Specific Litigation Performance From the litigating firms' perspective, I measure the litigation burden at the firm level by each district court defined in a similar way to the disposal rate described above. Specifically, for each year in a given court, I calculate the fraction of pending cases involving a specific firm

[17] E-courts is a public facing e-governance program covering the Indian judiciary. While the setting up of infrastructure for the computerization of case records started in 2007, the public web-portals - www.ecourts.gov.in and https://njdg.ecourts.gov.in - went live in late 2014.

[18] The fields include date of filing, registration, first hearing, decision date if disposed, nature of disposal, time between hearings, time taken for transition between case stages, litigant characteristics, case issue, among other details. See sample case page in the appendix.

[19] These plausibly indicate the quality or "fairness" of the district courts but it is hard to assign a normative value. For example, appeals are not only made if the objective quality of a judgement was low but are also for strategic reasons such as not having to pay the damages. Therefore, I use disposal rate as my preferred measure of court performance in all the specifications because it doesn't suffer from selection and is also strongly correlated with all other measures of court performance, including the measures on quality.

that are resolved. Additionally, I also present the logarithmic transformation of firm-wise volume of new cases filed and resolved per year, as well as a combined index in a given court, as a measure of litigation specific "efficiency" for the respective firm.

Constructing Judge Occupancy The case data also contains information on which judge post (i.e. court hall within the district court) the case has been assigned to. The within-district universal nature of the dataset allows me to identify whether or not a particular judge post is occupied in a given year based on whether I observe cases being assigned to or resolved in that post. Under full occupancy, cases are assigned to and resolved by each judge post within the district court. From this, I calculate a measure of judge occupancy defined as the percentage of all available judge posts within the district court that are filled in a given year.

Summary Stats: Table 1 presents the summary statistics for the court variables. On an average, there are a total of 18 judge posts per district court, with an occupancy of 77 percent over the sample period. Average disposal rate is 14.3 percent, meaning that the district courts are only clearing 14.3 percent of their yearly workload. Average speed is 76.2, implying that 76.2 percent of all new filings are resolved that year. However, this measure is very widely distributed with a standard deviation of 102. On an average, 3312 new cases are filed and 3340 cases are resolved in a district court in a year. About 19 percent of cases are appeals from lower court judgements. Cases take 617 days to be resolved on an average, however, cases matched to firms take about 480 days for resolution. The distribution of case duration in both scenario have long right tails. These are the types of cases that take long for resolution and add to pendency.

2.2 Prowess Data

On the firms' side, I use Prowess dx academic dataset covering 49202 firms made available by the Center for Monitoring Indian Economy (CMIE). The data are collated from annual reports, stock exchanges, and regulator reports covering the universe of all listed companies ($\approx$ 5000 listed on Bombay and National Stock Exchanges) as well as a sample of unlisted public and private companies representing formal, registered firms [20]. The data represents "*over 60 percent of the economic activity in the organized sector in India, which although a small subset of all industrial activity, accounts for about 75 percent of corporate taxes and 95 percent of excise duty collected by the Government of India*" (Goldberg et al. (2010)). The firm specific variables include annual financials and various production outcomes. Annual financial data is available from 1986 in addition to details on firm characteristics including ownership type, NIC code, year of incorporation, registered entity type, and other such details. This dataset represents many sectors in addition to manufacturing, including finance, transport and logistics, construction, wholesale, mining and metal production, and business services including financial services. While the dataset does not include small and medium enterprises [21] and informal sector enterprises (not legally recognized as a firm), it provides sufficient details to enable matching with the court panel and trial dataset. Another source of firms data that is commonly used in literature, namely, Annual Survey of Industries dataset covers a sample

[20] Registered with the Ministry of Corporate Affairs.

[21] Small and Medium enterprises are registered with a separate ministry of MSME, are exempt from certain taxes and receive policy sops for production.

of all sizes of manufacturing enterprises with detailed annual data by establishment. However, this dataset is limited to the manufacturing sector alone and does not identify firm and establishment location other than the state. Other datasets on informal enterprises are available at approximately decadal frequency (Economic Census) or similar coarser frequency (e.g. NSS Enterprise Surveys, MSME Surveys) that are unable to complement the granularity of court data.

2.3 Other Complementary Datasets

In addition to the above two main datasets, I use ancillary datasets to obtain additional variables for the analyses. These include Indian central bank data[22] on district-wise annual credit and deposit details of commercial banks from 2010 to 2019, disaggregating lending by sectors. Additionally, I use population census data, district-wise annual agricultural[23] and crime data[24] for balance checks. Lastly, I scrape personal information on the Principal District Judge from each of the district court websites to create a panel dataset on judge tenure using their joining and leaving dates. This is used for additional robustness checks in support of the identification strategy.

2.4 Matching E-Courts and Firms

Matching firms by registered office district Of the 49202 firms in Prowess dataset, 28340 firms are in my sampling frame. These firms are registered across 428 districts, of which 161 match with the sample of districts in the e-courts data. This results in 13298 unique firms that are merged with the court-level panel data. 34 districts from the e-courts dataset result in zero match with any firms in the Prowess dataset.

Summary stats Table A.2 describes the firms that overlap with the sample of courts data and compares with those in other court districts not included in the sample. Those in the sample are comparable with others based on the type of entity, i.e. whether publicly listed or privately held, foreign enterprises, or other types of entities (including trusts, cooperatives, etc.). Manufacturing and the banking sectors are equally represented in the sample as the rest of the data. On the other hand, the firms in the sample are older (28 years), less likely to be government owned (both state and central), and less likely to be owned by business groups.[25] Additionally, a larger share of these firms are privately owned Indian firms representing the following sectors in greater share: non-banking finance companies (NBFC), transport and logistics, business services, commercial agriculture, and mining.

Matching firms with cases Further, because I know the identify of firms in both the datasets, I merge[26] them to obtain a litigating firm level panel dataset, disaggregated by the court of litigation. Overall, 6417

[22] These are available through the Reserve Bank of India data warehouse.

[23] Area and production statistics from the Ministry of Agriculture and Farmers Welfare available here: `https://aps.dac.gov.in`

[24] National Crime Records Bureau annual crime statistics http://ncrb.gov.in/

[25] Firms owned by government and business groups are mostly concentrated in metropolitan districts that are not in my sampling frame.

[26] I employ a nested approach to matching the case records with firms based on the recorded names, following heuristics as listed in the appendix

of 49202 firms (13 percent) have cases in the sample courts, with 6138 unique firms arising out of one-to-one match [27]. Of these, 4047 firms have cases that were filed within the study period (2010-2018), and hence are considered as the sample of litigating firms for subsequent analyses. The remaining 2000 firms have had cases prior to the study period, and given the roll-out timeline of the e-courts system, are likely to be a selected sample arising out of differing priorities on digitizing past cases. Table 2 describes the characteristics of all 6138 firms with cases in the sample courts and compares them to firms without cases in these courts. Note that, because firms can have cases anywhere depending on the case jurisdiction, the set of litigating firms that I consider for litigation level analyses are firms that have a case in any of the sample courts rather than firms with registered office in the court district. On an average, litigating firms are older (33 years), more likely to be a public limited company, more like to be government owned (stated owned enterprise), business group owned, and foreign owned. Among financial institutions, banks are litigation intensive, with close to 50 percent of all banks in the firm sample matched with the case dataset.

For each court where the matched firm appears as a litigant across one or more trials, I compute the performance measures as described above but specific to each litigant firm. I use the judge occupancy instrument for causally identifying the direct effects of litigation level "efficiency" on this set of firms.

3 Identification Strategy

I look at two fundamental questions concerning the role of courts, as a key judicial institution, in promoting firm growth. First, I address how the litigation process itself affects the outcomes of litigating firms. Second, I answer how court performance influences the activities of all incumbent[28] firms, irrespective of their litigation status, through general equilibrium effects. In all my analyses, the unit of observation is firm-district-year. For litigating firms, the court performance measures vary by firm-district-year whereas for all firms, the court performance measure varies at the district-year level. The empirical specification for estimating the relationship between court performance and firm outcome is as follows:

$$Y_{fdt} = \phi_d + \phi_{st} + \theta Court\ Performance_{dt} + \mathbf{X'}_f\Delta + \epsilon_{fdt} \tag{1}$$

where f indicates the firm in the district court d, in state s at year t. Y_{fdt} is the firm outcome of interest in year t and $Court\ Performance_{dt}$ is the court performance measure of the district court in year t. $\mathbf{X}_f$ is a vector of firm specific controls and ϵ_{fdt} is the idiosyncratic error. I account for all time-varying unobserved factors at the state level by including state-year fixed effects, δ_{st}, and time-invariant district unobserved characteristics by including district fixed effects, ϕ_d. However, the court performance measure, $Court\ Performance_{dt}$, is likely to be endogenous with firm outcomes if district courts in dynamic areas are more efficient due to improving infrastructure over time or more productive judges and staff selecting into such courts. Alternately, districts with greater concentration of high growth firms may mechanically have slower/inefficient courts if productive firms are more likely to litigate, potentially leading to causality

[27] About 300 firms appear as co-petitioners or co-respondents on these cases that I ignore at the moment.

[28] By incumbent firms, I mean those incorporated before the study period, i.e. before 2010. I focus on incumbent firms to ensure that the estimates are not confounded by endogenous firm entry.

running the other way. Therefore, I instrument $Court\ Performance_{dt}$ with judge occupancy, $Occup_{dt}$, which is the percentage of judge positions that are occupied (and correspondingly, not vacanct) in the district d in year t using 2SLS estimation strategy. The first stage estimating equation is as follows:

Using Judge Occupancy Shock as an Instrument:

$$Court\ Performance_{dt} = \gamma_d + \gamma_{st} + \psi Occup_{dt} + \mathbf{X'}_f \Pi + \nu_{fdt} \tag{2}$$

In all the empirical specifications, I cluster the standard error by district-year. This is because the choice of my instrument generates quasi-random variation at the district-year level, and so I cluster the standard errors at the level of treatment assignment (Cameron and Miller (2015), Bertrand et al. (2004)). As a robustness check, I also cluster by state-year and district to check for any spatial correlation across districts resulting from judge rotation and serial correlation between years within a district, respectively.

IV Assumptions: To express the causal effects in potential outcomes framework, let $Y_i(D, Z)$ be the potential outcome for unit i, given continuous endogenous explanatory variable - disposal rate - D_i and Z_i, the continuous judge occupancy rate instrument. For this approach to yield a causal estimate, the following assumptions need to be satisfied:

1. **First Stage and Monotonicity:** Figure 5 and Table 5 shows that the relationship between judge occupancy and disposal rate is strong and log-linear. A one percentage point increase in judge occupancy increases disposal rate by 1 percent. This is substantial given the mean baseline disposal rate is only 14 percent. Expressing this in terms of standard deviation (SD) in judge occupancy, 1 SD increase leads to 21 percent, or a 0.25 SD increase in disposal rate. The estimate is similar using the index instead of disposal rate as the measure of court performance. The remaining columns in Table 5 present other ways of measuring the same treatment, and with the exception of case duration and share dismissed, have significant positive coefficients on judge occupancy. Since all these measures are highly correlated with each other (Table A.4), I use log disposal rate as the preferred measure of court performance in all subsequent specifications. To enable the interpretation of the IV estimate as some form of weighted average of causal response/weighted LATE (Angrist and Imbens (1995)), the instrument needs to satisfy an additional assumption of monotonicity. Monotonicity assumption requires that the first stage potential outcomes $D_i(Z_i)$ are always increasing or decreasing in Z_i. The estimate is positive and of similar order of magnitude in different sub-samples drawn by litigation case-types (Figure 6 (right panel)) as well as in different sub-samples of district courts (Table 6). These patterns suggest that the monotonicity assumption likely holds. The interpretation of the 2SLS estimates as LATE implies that the estimated effects are applicable only for the "treatment compliers" in the sample. That is, judge occupancy has an effect on courts as an institution and subsequently on firm growth in district-years where court performance responds to a marginal change in judge occupancy. On the other hand, some district courts may already be working effectively irrespective of marginal changes in judge occupancy ("always-taker"), whereas for a few others, any marginal change in judge occupancy may have no effect on their disposal rate ("never-takers"). Therefore, the estimates presented here will refer to the causal effects on the sub-sample where disposal rate

responds to changes in judge occupancy. Table 6 indicates that all courts, except those in the top tercile in terms of total judge posts and population, are likely compliers.

2. **Independence and Exclusion Restriction:** I argue that the variation induced in the occupancy rate due to a combination of the judge rotation system and existing vacancies is orthogonal to firm and court performance potential outcomes. I provide two pieces of evidence in support of this claim. One pertains to the institutional feature of the Indian judiciary involving assignment of judges to district courts and the second features empirical evidence by testing for correlations between time varying district characteristics and pre-period firm outcomes respectively with judge occupancy. Specifically, I run the following specifications and test whether $\rho = 0$ and $\Omega = 0$.

$$District\ Char_{dt-s} = \nu_d + \nu_{st} + \rho Occup_{dt} + \eta_{dt};\ s > 0 \quad (3)$$

$$Y_{fdt-s} = \kappa_d + \kappa_{st} + \Omega Occup_{dt} + \mathbf{X'}_f\Gamma + \epsilon_{fdt};\ s > 0 \quad (4)$$

The first piece of evidence arises from the process of assigning judges to district courts. Specifically, the judges serve a short term between 1-2 years in their current seat and are subsequently transferred to a different district where they haven't worked in the past. Given the problem of vacancy of judges in district courts across India, which is nearly 25% [29] of all current positions, this system of rotation shifts the "vacancy" exogenously to different district courts every year. The rotation system is decided by the corresponding state High Court administrative committee. Specifically, the assignment process is as follows:

1. At the beginning of each year, the High Court committee creates a list of all judges completing their tenures (i.e. 1 - 2 years) in their current seat.

2. Each district judge is asked to list 3-4 preferred locations they would like to be transferred to and rank them based on their order of preference. They cannot include any district they have already served in the past in this rank ordered list.

3. District court judges are generally towards the end of their judicial career, i.e. close to retirement, and it is unlikely that they cover all of their preferred locations or stay in their preferred location for a long time. Location specific tenure is relatively shorter than the average length of trial.[30]

4. The judges are then matched to a district court based on this ranking, taking into consideration others' preferences, vacancies, and seniority.

While it is plausible that the ranking could be endogenous to district specific time varying characteristics, it is not certain that the judge would always get their preferred location. For example, if the same preference rank is also given by a more senior judge, then the district will be assigned to the senior judge. Further, if preferences are relatively constant over the tenure of the judge - for example, always

[29] https://www.livemint.com/news/india/india-s-next-generation-reforms-must-begin-in-courts-1560838699823.html

[30] For example, the average tenure of the head judge, for whom I was able to get tenure data, is about 18 months whereas the average trial duration is close to 21 months.

preferring hometown district or a city district over rural districts, then the judge will have to go down their rank list over the course of their career since they can't serve in the same district again. Therefore, this process can only violate the exogeneity assumption if judge preferences also simultaneously evolve along with outcomes of interest and if all judges always get their preferred location.

Figure A.4 shows that while judge occupancy is declining across all districts, i.e increasing vacancy over time, the levels are different across the districts in any given year. For example, Ludhiana and Patiala start off with 100% occupancy in 2010 whereas Gurdaspur and Moga start with 40%. Midway in the sample period - in 2014 - the occupancy in Ludhiana and Patiala reduce to 70%, whereas in Gurdaspur and Moga, it increases to 100% and 70% respectively. Additionally, permutation tests by simulating the rotation process for each year generates district specific distribution of occupancy that is statistically indistinguishable from the observed distribution.[31]

Using the example of Principal District Judges (PDJs) - the head judge of district courts - for whom I was able to get data on tenure and district assignments, I show that the average tenure is about 1.5 years (Figure A.5, top panel) and that the system of rotation leads to "gap days" before the successor judge takes charge (Figure A.5, bottom panel). This effect of rotation on vacancy is likely an underestimate since the courts do not remain without a head judge for long, but provides suggestive evidence on the relationship between the rotation system and creation of vacancy as a result. Further, I find that the tenure of PDJs is uncorrelated with district level time varying characteristics and annual firm outcomes, suggesting that the rotation system likely yields exogenous variation in judge tenure and consequently also occupancy. [32]

The second piece of evidence arises from testing the empirical specifications (3) and (4). I find that the judge occupancy is uncorrelated with prior period district level time varying characteristics such as agricultural sown areas (fraction of total area), and per capita crime variables (Table 3). Further, I also find that judge occupancy is uncorrelated with prior period firm outcomes (Table 4).

In the next section, I examine litigant characteristics and how litigation level efficiencies and demand for court services impact the firms based on their litigation pattern.

4 A Descriptive Analysis of Litigation Behavior

Many firms are often involved in multiple trials across different court districts arising out of differences in the jurisdiction of the disputes involved as well as its timing. While an individual or a firm has a choice to litigate or not, but conditional on deciding to litigate the location of the trial is determined by procedures laid down in the Codes of Civil/Criminal Procedure. Further, the Supreme Court of India condemns the practice of forum shopping, as detailed in the judgement of *Chetak Construction Ltd vs. Om Prakash and Ors, 1998*. In this section, I present descriptive statistics on the characteristics of litigating firms, who they litigate against, and the nature of disputes are they involved in.

[31] Kolmogorov-Smirnov test fails to reject the equality of distributions.

[32] Tables A.5 and A.6 in the appendix show this result.

4.1 Descriptive Statistics

Panels in Figure 4 show that commercial banks litigate intensively. I define litigation intensity as the fraction of firms in a specific sector that have one or more cases in the case dataset. In the banking sector, close to 50 percent of the banks have at least one case in the sample district courts. For firms in non-financial sector, this fraction is close to 13 percent (top left panel in the figure). Furthermore, in over 80 percent of the litigation, banks are the petitioners ("plaintiff"), i.e. originators of the suit. NBFCs also more likely to initiate litigation (over 60 percent) conditional on litigation choice, whereas firms in the non-financial sector are almost equally likely to appear on either side of the dispute. The bottom panel in Figure 4 show the broad nature of disputes under litigation. Specifically, banks and NBFCs are more likely to be engaged in contract arbitration, special civil petition pertaining to monetary instruments [33], and importantly in execution petitions. Execution petition is filed when the petitioner has judgement in their favor but require execution orders from the court to implement the judgement order. For example, when a lender wins a debt default case, they need to apply for an execution order to ensure a bailiff accompanies with them in taking possession of the pledged collateral.

These statistics reveal the following stylized facts on litigation behavior:

1. Financial sector is litigation intensive and are more likely to initiate litigation.
2. They use the district court systems for all manners of civil suits, especially those involving credit defaults and other types contract breaches (such as disputing insurance claims in accident cases).
3. These firms are most likely winners in the suits given the large share of execution petitions initiated by them.

On the other hand, non-financial firms face litigation against private individuals, presumably consumers (as with accident claims cases) as well as banks (as with credit default cases). Accident claims cases form close to 50 percent of all firm specific cases, where firms appear as a respondent against claims made by individuals. Timely adjudication of claims against such firms likely creates a deterrent against non-repayment of debts and likely leads to payment of damages when judgement goes against their favor.

Using these stylized facts, I build a simple model of credit behavior with repayment enforced through the possibility of litigation. The ensuing repayment equilibrium encourages lending by creditors, which increases input use and production among credit constrained firms and likely increases profits.

5 Conceptual Framework

The model adds to the set up in Banerjee and Duflo (2014) by considering a 2 player static game for lending decision in an environment with imperfect institutions, in a similar flavor as discussed in Besley and Coate (1995). Subsequently, I consider the effects on all firms in the local economy through an increase in borrowing from external lenders (i.e. banks).

[33] Filed under Negotiable Instruments Act.

5.1 A Simple Model of Credit Markets with Enforcement Costs

I consider a representative Lender-Borrower game where Borrower needs amount $B = E - W$ to invest in a project with returns $F(E)$, where E is the total expenditure on the project and W is the exogeneous funds/initial wealth that the borrower owns. They need an additional $B = E - W$ to start the project, without which the project cannot start. The Lender can lend B with returns R but does so if

$$RB - \phi m(\gamma) \geq \phi B \tag{5}$$

where ϕ is the opportunity cost of capital (or the market return on capital in a competitive credit market) and $m(\gamma)$ is the monitoring cost incurred by the Lender, which is a function of court performance γ. Higher the γ, better the court. Therefore, this leads to the assumption that $m(\gamma) > 0, m_\gamma < 0$, that is the Lender incurs a positive monitoring costs if they decide to lend but the cost is decreasing in γ.

Once the Lender lends B, the Borrower invests the amount in their project and decides to repay or not once the project returns are realized. The Borrower repays if

$$F(E) - RB \geq F(E) - \eta E \tag{6}$$

where η is the share of project expenditure that is used for evasion.

The timing of the game where the Lender and Borrow decide on their strategies are as follows, which is depicted as an extensive form game below.

T0 Lender decides to lend or not lend. If they do not lend, then the payoffs are $(\phi B, 0)$, where the Lender earns returns from the external credit market while the Borrower cannot start their project.

T1 Borrower decides to repay or not. If Borrower does not repay, then the Lender can choose to initiate litigation against the Borrower or not.

T2 Lender decides to litigate or not, filing a complaint against the Borrower for default in the court of relevant jurisdiction.

T3 Once the Lender decides to litigate, nature reveals two possible outcomes - Lender wins with probability $p \in (0, 1)$, or loses with probability $1 - p$.

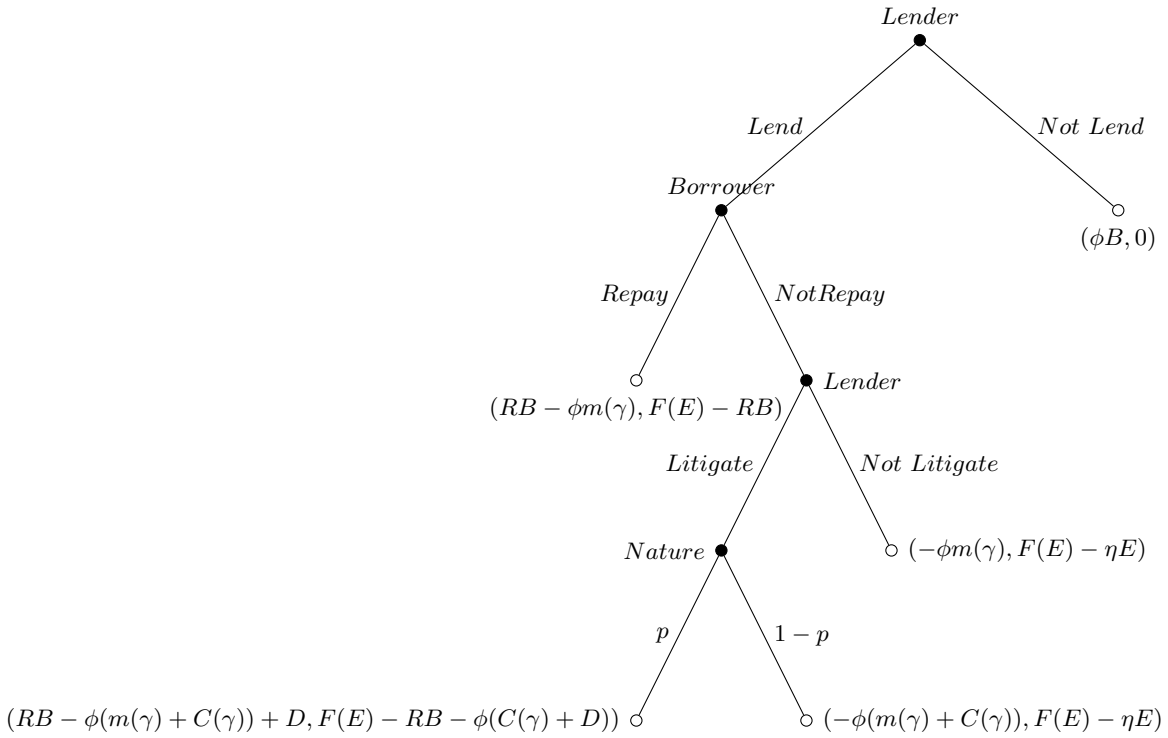
(a) If the Lender wins, they receive a payoff of $RB - \phi m(\gamma) - \phi C(\gamma) + D$, where $C(\gamma) > 0, C_\gamma < 0$, is the litigation cost as a function of court performance γ and D is the additional damages that the court orders the Borrower to pay the Lender. The Borrower receives a payoff of $F(E) - RB - D$

(b) If they lose, the Lender receives a payoff of $-\phi m(\gamma) - \phi C(\gamma)$ whereas the Borrower gets $F(E) - \eta E$.

(c) The expected payoff from the decision to litigate for the Lender is $p(RB + D) - \phi(m(\gamma) + C(\gamma))$ and for the Borrower is $F(E) - (1 - p)\eta E - p(RB + \phi(C(\gamma) + D))$

Conditions for Repayment: By backward induction, the following conditions need to be met for $\{Lend, Repay\}$ to be an equilibrium solution. First, litigation needs to be a (weakly) dominant strategy for the Lender, for which the below inequality needs to hold. If the litigation costs are substantial, then the Lender will choose not to litigate.

$$p(RB + D) - \phi C(\gamma) \geq 0 \tag{7}$$



Repaying will be the Borrower's (weakly) dominant strategy if

$$F(E) - RB \geq F(E) - (1-p)\eta E - p(RB + \phi(D + C(\gamma))) \tag{8}$$

$$\implies RB \leq \eta E + \frac{p\phi}{1-p}(D + C(\gamma)) \tag{9}$$

$$\implies R \leq \eta \frac{E}{B} + \frac{p\phi}{1-p}\frac{D + C(\gamma)}{B} \tag{10}$$

This also yields lending strategy for the Lender where they cap the amount lent/borrowed B to ensure repayment:

$$\implies (R - \eta)E \leq RW + \frac{p\phi}{1-p}(D + C(\gamma)) \tag{11}$$

$$\implies B + W \leq \frac{R}{R-\eta}W + \frac{p\phi}{1-p}\frac{D + C(\gamma)}{R-\eta} \tag{12}$$

$$\implies B \leq \frac{\eta}{R-\eta}W + \frac{p\phi}{1-p}\frac{D + C(\gamma)}{R-\eta} \tag{13}$$

Together with the Lender's participation constraint in (1), above sets the limits on total borrowing B, to ensure $\{Lend, Repay\}$ as an equilibrium solution.

$$R^* B^* = \phi B^* + \phi m(\gamma) \tag{14}$$

$$B^* = \frac{\phi}{R^* - \phi} m(\gamma) \tag{15}$$

where R^* satisfies the equality in (6). Using expression for B^* from (11) in equality in (6), the expression for R^* is

$$R^* = \Big(\frac{\eta m(\gamma) - A}{\phi m(\gamma) - A}\Big)\phi \tag{16}$$

$$\text{where } A \equiv \eta W^* + \frac{p\phi}{1-p}(D + C(\gamma)) \tag{17}$$

Assuming that the borrowing constraint (9) binds, (9) and (11) give the relationship between the Borrower wealth W, and interest rate R as:

$$\frac{\phi}{R - \phi} m(\gamma) = \frac{\eta}{R - \eta} W + \frac{p\phi}{1-p} \frac{D + C(\gamma)}{R - \eta} \tag{18}$$

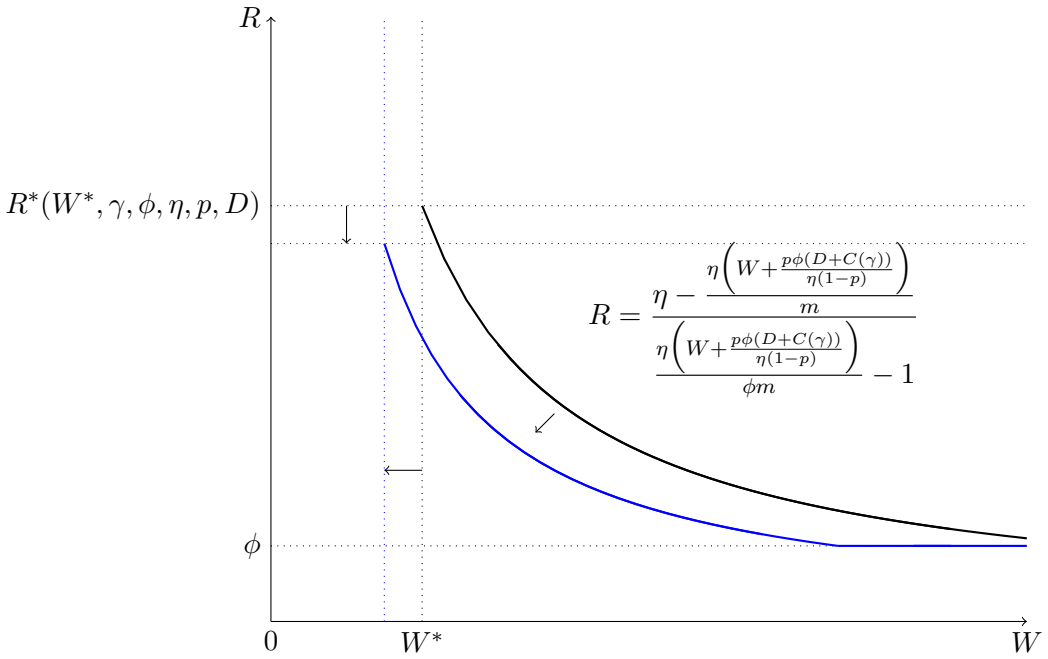
$$\implies W = \frac{\phi(R - \eta)}{\eta(R - \phi)} m(\gamma) - \frac{p\phi}{1-p} \frac{D + C(\gamma)}{\eta} \tag{19}$$

$$\text{where } W^* \equiv \frac{\phi(R^* - \eta)}{\eta(R^* - \phi)} m(\gamma) - \frac{p\phi}{1-p} \frac{D + C(\gamma)}{\eta} \tag{20}$$

Finally, using the litigation constraint of (3) gives the expressions for R^* and W^*, as functions of evasion parameter η, win probability p, damages D from litigation, and court performance γ.

$$R^* = \phi\Big(1 + \frac{p\phi m(\gamma)}{\phi C(\gamma) - p\phi m(\gamma) - pD}\Big) \tag{21}$$

$$W^* = m(\gamma) + \frac{(\phi - \eta)(\phi - C(\gamma))}{\phi \eta p} - \frac{p\phi}{1-p} \frac{D + C(\gamma)}{\eta} \tag{22}$$



Assumption 1:

1. $\phi C(\gamma) > p(\phi m(\gamma) + D)$. This implies that the Lender's cost of litigating is strictly greater than the expected value of the sum of monitoring costs and the damages awarded by the court in the event of winning the case. This ensures that the damages awarded by courts are not high to always choose litigation.

2. $C_\gamma > \text{Max}\{pm_\gamma, \frac{m_\gamma}{\frac{\phi-\eta}{\phi\eta p} + \frac{p\phi}{\eta(1-p)}}\}$. Since $C_\gamma, m_\gamma < 0$, this implies that the monitoring costs decrease more with an increase in court performance, γ, than litigation costs.

3. $\eta < \phi$. This implies that the evasion rate is lower than the returns in the competitive credit market. This ensures that the Borrower still has an incentive to default even when the interest rate $R \approx \phi$.

Proposition 1: Credit Market Response to Court Performance As court performance, γ, increases, the credit market response varies as follows:

1. Effects on W^* is negative. That is, when the evasion rate is higher than the returns in the competitive credit market, an improvement in court performance lowers the threshold of wealth required for lending.

2. Effects on R^* is negative. Under parts (1) and (2) of Assumption 1, an improvement in court performance lowers the maximum interest rate charged by the Lender.

3. Interest rate R decreases with an increase in γ for every value of the Borrower wealth, W. That is the interest curve shifts inward.

Proof: Differentiating (17), (18), and (15) with respect to γ yields the expressions for $\frac{\partial R^*}{\partial \gamma}$, $\frac{\partial W^*}{\partial \gamma}$ and $\frac{\partial R}{\partial \gamma}$ as follows:

$$\frac{\partial R^*}{\partial \gamma} = \underbrace{\frac{p\phi^2}{\phi C(\gamma) - p\phi m(\gamma) - pD}}_{\text{+ve from A1.1}} \Big(\overbrace{m_\gamma}^{\text{-ve}} - \frac{m(\gamma)\overbrace{(\phi C_\gamma - p\phi m_\gamma)}^{\text{+ve from A1.2}}}{\phi C(\gamma) - p\phi m(\gamma) - pD} \Big) < 0$$

$$\frac{\partial W^*}{\partial \gamma} = \overbrace{m_\gamma}^{\text{-ve}} - \Big(\underbrace{\frac{\phi - \eta}{\phi\eta p} + \frac{p\phi}{\eta(1-p)}}_{\text{-ve from A1.2}} \Big) \overbrace{C_\gamma}^{\text{-ve}} < 0$$

$$\frac{\partial R}{\partial \gamma} = -\Big(\frac{(\eta - \phi T_1) + \phi(T_1 - 1)}{(T_1 - 1)^2} \Big) \frac{\partial T_1}{\partial \gamma} \text{ from rewriting (15) in terms of R and } \frac{\partial W}{\partial \gamma} = 0$$

$$T_1 \equiv \frac{\eta}{\phi m(\gamma)} \Big(W + \frac{p\phi}{1-p} \frac{D + C(\gamma)}{\eta} \Big)$$

$$\frac{\partial T_1}{\partial \gamma} = \frac{p}{1-p} \frac{\Big(\overbrace{-(D + C(\gamma))m_\gamma + m(\gamma)C_\gamma}^{\text{+ve from A1.2}} \Big)}{m^2(\gamma)} > 0$$

$$\implies \frac{\partial R}{\partial \gamma} > 0$$

5.2 General Equilibrium Effects

In this section, I model the spill-over or the general equilibrium effects of credit market response to changes in court performance. Additionally, the model also accounts for alternate channels of effects of court performance on the production process in an economy, for example through transaction costs (monitoring costs, m, as introduced earlier). Let F be a representative firm with production function $Q = Q(X_1, X_2)$ where $Q(.)$ is twice differentiable, quasi-concave, and cross partials $Q_{X_1X_2} = Q_{X_2X_1} \geq 0$. Further assume that the firm is price taker. The firm's problem is to maximize their profits as follows:

$$\text{Max}_{X_1, X_2} \big(\Pi = pQ(X_1, X_2) - w_1X_1 - w_2X_2 - \phi m(\gamma) \big) \tag{23}$$

$$s.t\ w_1X_1 + w_2X_2 + \phi m(\gamma) \leq W + B(\gamma)$$

where w_1 and w_2 are the unit costs of inputs X_1 and X_2. $m(\gamma)$ is the monitoring costs arising in a setting with court performance γ, as defined in the section above. W is the exogenous initial level of assets or wealth. $B(\gamma, .)$ is the borrowing from credit markets at a particular return, $R(\gamma, .)$, which are determined as in the Lender-Borrower set-up above.

Proposition 2: General Equilibrium Effects of Court Performance As court performance, γ, increases, the firm responds as follows:

1. Optimal input use increases for credit constrained firms.

2. For credit constrained firms, increase in γ increases production output whereas the effects on optimal profits is ambiguous. The welfare effects for such firms depends on the difference between increase in borrowing limits, reduction in monitoring costs and an increase in input costs.

3. For credit unconstrained firms, profits increase through decrease in monitoring costs.

Proof In this set-up, court performance affects the firms' optimization problem through both monitoring costs - since the firm has to incur costs in setting up production - as well as through credit availability. To recap, I assumed a fixed monitoring cost as a decreasing function of court performance, γ, i.e. $m_\gamma < 0$ and further that the available credit expands at a lower interest rate with an increase in γ, i.e. $B_\gamma > 0$. Further, by second order condition, $Q_{x_1x_1}Q_{x_2x_2} - Q_{x_1x_2}Q_{x_2x_1} > 0$.[34]

Constrained Optimization:

$$\begin{aligned}
\mathcal{L} &= pQ(X_1, X_2) - w_1X_1 - w_2X_2 - \phi m(\gamma) + \lambda\big(W + B(\gamma) - w_1X_1 - w_2X_2 - \phi m(\gamma)\big) \\
&\text{FOC:} \\
\frac{\partial \mathcal{L}}{\partial X_1} &= pQ_{x_1} - w_1 - w_1\lambda = 0 \\
\frac{\partial \mathcal{L}}{\partial X_2} &= pQ_{x_2} - w_2 - w_2\lambda = 0 \\
\frac{\partial \mathcal{L}}{\partial \lambda} &= W + B(\gamma) - w_1X_1 - w_2X_2 - \phi m(\gamma) = 0
\end{aligned}$$

I solve above using Implicit Function Theorem where X_1, X_2, λ are endogenous variables and γ as the exogenous variable to the firm's problem. Solving requires application of Cramer's Rule with the following as main steps:

$$\begin{aligned}
Det[J] &= 2pw_1w_2\underbrace{Q_{x_1x_2}}_{+\text{ve}} - p(w_2^2\underbrace{Q_{x_1x_1}}_{\text{-ve}} + w_1^2\underbrace{Q_{x_2x_2}}_{\text{-ve}}) > 0 \\
\frac{\partial X_1}{\partial \gamma} &= -\frac{Det[J_{x_1}]}{Det[J]} = -\frac{p\overbrace{(B_\gamma - \phi m_\gamma)}^{+ve}(w_1\overbrace{Q_{x_2x_2}}^{\text{-ve}} - w_2\overbrace{Q_{x_1x_2}}^{+\text{ve}})}{Det[J]} > 0 \\
\frac{\partial X_2}{\partial \gamma} &= -\frac{Det[J_{x_2}]}{Det[J]} = -\frac{p\overbrace{(B_\gamma - \phi m_\gamma)}^{+ve}(w_2\overbrace{Q_{x_1x_1}}^{\text{-ve}} - w_1\overbrace{Q_{x_2x_1}}^{+\text{ve}})}{Det[J]} > 0 \\
\frac{\partial \lambda}{\partial \gamma} &= -\frac{Det[J_\lambda]}{Det[J]} = -\frac{p^2\overbrace{(B_\gamma - \phi m_\gamma)}^{+ve}(\overbrace{Q_{x_1x_1}Q_{x_2x_2}}^{+\text{ve}} - \overbrace{Q_{x_2x_1}Q_{x_1x_2}}^{+\text{ve}})}{Det[J]} < 0
\end{aligned}$$

Finally, an application of the envelope theorem enables examining how the value function changes with the exogenous court performance, γ. Specifically, I find:

[34] Determinant of the Hessian is positive.

$$
\begin{aligned}
\frac{dV(\gamma)}{d\gamma} &= \frac{\partial \Pi^*}{\partial \gamma} + \lambda \frac{\partial g^*(\gamma)}{\partial \gamma} \text{ where } g(.) \text{ is the constraint} \\
\frac{\partial \Pi^*}{\partial \gamma} &= \underbrace{(pQ_{x_1} - w_1)}_{\text{In competitive factor markets, this is 0}} \frac{\partial X_1^*}{\partial \gamma} + \underbrace{(pQ_{x_2} - w_2)}_{\text{In competitive factor markets, this is 0}} \frac{\partial X_2^*}{\partial \gamma} - \phi m_\gamma > 0 \\
\frac{\partial g^*}{\partial \gamma} &= \underbrace{(B_\gamma - \phi m_\gamma)}_{\text{marginal benefit}} - \Big(\underbrace{w_1 \frac{\partial X_1^*}{\partial \gamma} + w_2 \frac{\partial X_2^*}{\partial \gamma}}_{\text{marginal cost}} \Big)
\end{aligned}
$$

$\frac{\partial g^*}{\partial \gamma} > 0$ if increase in marginal benefits from an improvement in institutional output exceeds marginal cost, in which case, the value of the objective increases. If the condition is not true, then the welfare effects is potentially ambiguous.

5.3 Key Tests

The model leads to the following key tests to empirically examine using the data:

H1: Firm borrowing from banks increases with an increase in court output.

H2: Borrowings increase for firms with smaller ex-ante asset size (wealth threshold for borrowing decreases).

H3: Sales and input use increase with an increase in court output, in particular among firms with smaller ex-ante asset size.

H4: Profits increase with an increase in court output for firms with larger ex-ante asset size.

6 Effects of Court Performance on Litigating Firms

In this section, I examine the direct effects of court performance on firms that are involved in litigation. These firms go through costly litigation process and the losing side suffers additional losses through payment of damages. I separate the analysis by examining the effects on banks and the subset of non-financial firms that appear as a respondent.

The ideal experiment to estimate the causal effects of litigation delays in a specific district would involve the trials to be randomly assigned across years where in some years courts are faster (or slower) than counterfactual years in resolving the same trial. I use judge occupancy as an instrument to induce quasi-random variation in firm specific disposal rate.

Estimating specifications

$$O_{lcdt} = \delta_d + \delta_{st} + \delta_c + \beta Lit\ Efficiency_{lcdt} + \upsilon_{lcdt} \tag{24}$$

$$Lit\ Efficiency_{lcdt} = \alpha_d + \alpha_{st} + \alpha_c + \lambda Occupancy_{dt} + \xi_{lcdt} \tag{25}$$

where O_{lcdt} is the outcome of litigating firm l, with trials of type c in district court d, state s and year t. $Lit\ Efficiency_{lcdt}$ is the timeliness of the trial processing of firm l's trials in the district court that experiences a judge shock $Occupancy_{dt}$.

6.1 First Stage: Judge Occupancy and Firm Specific Disposal Rate

Table 7 presents the first stage estimates of judge occupancy for all litigating firms, including those in non-financial sector. The relationship is positive and statistically significant. I note a 0.13 percent increase in new cases filed, a 0.3 percent increase in firm specific disposal rate, and 0.12 percent increase in the index for every 1 percentage point increase in judge occupancy. This translates to 3, 6, and 3 percent increase in the respective litigation metrics for 1 SD increase in judge occupancy.

Table 8 presents the results of this first stage relationship for litigating banks in the sample. Specifically, one percentage point increase in judge occupancy in a given year at a district court increases number of new suits by 0.74 percent, increases firm specific disposal rate by 0.5 percent, and overall litigation specific performance index by 0.4 percent. Increasing judge count in the district count by one is equivalent an increase in occupancy rate by 5.5 percentage points, which translates to increasing the number of cases filed, firm specific disposal rate, and index, by 4, 3, and 2 percent, respectively. In terms of standard deviations (SD) of judge occupancy, 1 SD increase translates to an increase in new cases filed by 16 percent, firm specific disposal rate by 10 percent, and index by 8 percent.

An ongoing trial likely puts a hold on productive use of assets, plausibly affecting the production (or lending in the case of banks) process itself. For example, bank lend less until they have recovered part of their loans under default, which take time until the corresponding litigations are concluded. In the case of small-scale input suppliers, litigation will likely put a halt to their production process until the court resolves their dispute, for example, over delayed payment from the buyer firms. I discuss the causal effects of litigation level performance of courts on the litigating banks and firms below.

6.2 Effects on Litigating Banks

Using district level annual data on the number of loan accounts and outstanding loan amounts across commercial banks, I note a positive and statistically significant reduced form effect of judge occupancy on total number of loan accounts in column 3, Table 9. Specifically, one percentage point increase in judge occupancy increases the number of loan accounts by 0.085 percent. That is, for an increase in judge count by 1 judge, the number of loan accounts increases between 0.4 - 0.5 percent or a 1 SD increase in judge occupancy leads to an increase in number of loan accounts by approximately 2 percent. Given the average number of loan accounts in a district in a year is about 340,000, the estimate implies an increase by 6800 new loan accounts for 1 standard deviation increase in judge occupancy. Breaking this down by sector of lending as in Table 10, the increase mainly comes from increased lending to manufacturing and end-consumers (i.e. home loans, vehicle loan). 2SLS estimates using the litigation index is 0.25, which is the elasticity of number of loan accounts with respect to timeliness of adjudication.

On the other hand, Table 11 shows that the total outstanding loan amount does not increase substantially or significantly. This suggests the plausibility that banks are lending to more borrowers but are not substantially increasing the overall outlay within the district.

The pattern of effects on banks at the district level reveals that improved court performance support banks in their lending operations by expanding the number of borrowers they would lend to.

6.3 Effects on Litigating Non-Financial Firms

In this section, I examine the effects on non-financial respondent firms presented in Table 12. The reduced form effects of judge occupancy has a negative effect on the firm's production outcomes. Particularly, an increase in the occupancy lowers firm profits and also lowers input use of these litigating firms. Judgement against a respondent is likely to induce loss as the respondent has to not just pay the damages as ordered in the judgement but also incur all transaction costs associated with the litigation process itself. Therefore, getting sued in a court is potentially damaging for non-financial firms and can be used by banks as strategic choice to improve their repayment behavior.

7 Effects of Court Performance on All Firms in the Local Economy

In this section, I present the results from testing the hypotheses arising out of the credit market model. Correspondingly, I examine firm's annual borrowings, sales revenue, profits net of taxes, input use - wage bill, and number of employees where reported. I transform all outcome variables and the explanatory variables - disposal rate - into their logarithmic equivalent so that we can interpret the outcome in terms of elasticity. Where logarithmic transformation is not feasible - i.e. when the values are 0 or negative such as in the case of profits, I use inverse hyperbolic sine transformation without changing the interpretation of the coefficients. All baseline raw outcome measures are reported in INR million, adjusted to inflation.

Mapping back to the four key hypotheses presented earlier, I discuss the effects of courts on incumbent firm outcomes, starting with borrowing and lending behavior and subsequently discussing the effects on input use and firm production - sales and profits net of taxes. Further, I show the effects by ex-ante asset size distribution of the firms to test the hypotheses on credit constrained firms.

Borrowing from Banks: Figure 7 and row 1 of Table 13 show the reduced form and 2SLS estimates on all co-located firm and figure 8 shows the estimates by ex-ante asset size distribution. I find that borrowing from banks increase with an increase in judge occupancy, with a lag of 2 years. Total borrowing from banks increases by 0.5 percent for every 1 percentage point increase in judge occupancy or by 11 percent for 1 SD increase in judge occupancy. The 2SLS coefficients imply an elasticity of 0.4, i.e. a 1 percent increase in disposal rate increases borrowing by 0.4 percent.

Lending by Local Lenders: I examine the lending behavior among other non-banking financial firms, NBFCs, as well as inter-firm lending (including trade credit and loans to subsidiaries) by firms in rows 2-3 of Table 13, and Figure 9. NBFCs increase their lending by 1.3 percent for 1 percentage point increase in

judge occupancy. In terms of SD, this implies that lending increases by 27 percent for every 1 SD increase in judge occupancy. Inter-firm lending also responds positively to an improvement in judicial capacity and court performance. In response to judge occupancy, inter-firm lending increases by 2.4 percent for every 1 percentage point increase.

The comparative statics following the credit market implications of institutional quality showed that credit constrained firms borrow to expand production by increasing input use to optimal levels. However, due to both increase in production and an increase in expenditure on inputs, the effects on profits on such firms are a-priori unclear. On the other hand, credit unconstrained firms are likely to experience an increase in profits from reduced transaction costs.

Firm Input Use: In this paragraph, I turn to input use that include annual wage bill and employee headcount [35]. Figure 10 and Table 14 show reduced form and 2SLS estimates of judicial capacity and court performance on firms' input use. I note positive effects on labor use, both wage bill and headcount (although headcount is imprecisely estimated). I find no substantive effects on the value of plants and machinery. This suggests that firms increase labor intensive production, plausibly by adding more workers, but likely do not incur capital expansion. Specifically, wage bill increases by 0.4 percent for 1 percentage point increase in judge occupancy and by 0.2 percent for 1 percent increase in disposal rate. In terms of standard deviations of explanatory variables, wage bill increases by 8.4 percent for 1 SD increase in judge occupancy.

Firm Sales Revenue and Profits: The reduced form estimates of judge occupancy on firm sales revenue as shown in the left panel of Figure 11 is positive but imprecise. However, the 2SLS estimates in the right panel imply a positive and statistically significant effect of court performance. The elasticity suggests that the sales increases by 0.1 percent for 1 percent increase in disposal rate. The panels in Figure 12 depicts the estimates for profits. The reduced form and 2SLS estimates indicate a 0.5 percent and 0.26 percent increase in profits for 1 percentage point increase in judge occupancy and 1 percent increase in disposal rate, respectively.

Heterogeneity by Ex-Ante Wealth In order to show heterogeneity by ex-ante wealth endowment (i.e. asset size) of firms as per the model proposition, I categorize firms into those below median of ex-ante asset size (an indicator of being credit constrained) and those above median. Figure 8 shows that the borrowings increase for firms with lower ex-ante wealth but shows no effect on those above median. This supports the proposition that improved judicial capacity and court performance lowers the wealth threshold for borrowing. I also find suggestive positive effects on sales revenue for firms with smaller ex-ante asset size as indicated in Figure 13, supporting the proposition that credit constrained firms experience an expansion in production. Whereas profits increase among ex-ante wealthier firms as seen in Figure 14.

Summarizing effects on co-located firms These results indicate that the shocks to judge occupancy results in credit market response over the next 1-2 years by increasing access to credit to credit constrained

[35] where available; firms are not mandated to disclose number of workers but all publicly listed firms do

firms. It also increases profits among wealthier firms by lowering transaction costs in an improved environment with better contract enforcement. While there could be many channels through which courts can influence firms such as improved property rights, the dataset lends itself to testing the importance of credit markets under the contract enforcement hypotheses.

8 Interaction Between Courts and Legal Reforms

This section of the paper connects back to the big question on institutions and development. Courts are but one component of legal institutions, which includes laws and regulations framed by the legislature and policies by the executive. Glaeser and Shleifer (2003) make an efficiency based comparative analysis of litigation vs. regulation based institutional regimes to identify which of the two, or a combination of the two emerge as the optimal choice in a given context. India is a regulatory state, where the courts function to administer justice as per the laws and are expected to play a complementary role in achieving the objectives enshrined in the laws. In this context, courts with low judicial capacity may diminish the effectiveness of any progressive reform. For example, Besley and Burgess (2004) discuss the effects of labor-industrial dispute regulation in India on manufacturing sector, showing that regulation favoring labor rights reduced manufacturing profits, employment, and increased urban poverty. What happens when courts are effective under such a system? On the one hand, any litigation under pro-labor legal environment could likely favor the labor side in a dispute, so higher judicial capacity could magnify the results as in Besley and Burgess (2004). On the other hand, because disputes are resolved quickly with better courts, an improved trust in market based contracts could increase firm profits if firms subvert formal employment and hire temporary workers in response to pro-labor reforms as in Chaurey (2015). I examine this empirically by testing whether judge occupancy affects firm outcomes in the context of a pro-labor industrial environment.

I also study the interaction between judge occupancy and bankruptcy reform on firm outcomes using the 2016 overhaul of bankruptcy procedure under the newly legislated Insolvency and Bankruptcy Code. This is closely related to Ponticelli and Alencar (2016) where they show lower court capacity diminishes the effects of bankruptcy reforms because the enforcement of creditor rights are weak in such a context. Both these contexts, i.e. industrial dispute resolution and bankruptcy laws, provide a change in the legal environment arising out of the respective legal reforms. This provides an opportunity to study the complementarities between the effectiveness of courts and overall strengthening or weakening of rights under different legal regimes.

8.1 Does Judicial Incapacity limit Industrial-Labor Reform?

I use Besley and Burgess (2004) classification of Indian states as pro-industry, pro-labor, and neutral with respect to their industrial-labor dispute regulations. In their study, the authors show that states that regulate laws in favor of labor rights experience lower manufacturing profits and employment, and a consequent increase in urban poverty. I expand their findings by studying the interaction of the regulatory environment with judicial capacity on all formal sector firms, including those in the manufacturing. The empirical specification is as follows:

$$Y_{fdt} = \delta_d + \delta_{st} + \gamma_1 Judge\ Occp_{dt} \text{ x } Pro\ Industry_s + \gamma_2 Judge\ Occp_{dt} \text{ x } Pro\ Labor_s + \gamma_3 Judge\ Occp_{dt} + \mathbf{X}_f \Delta + \epsilon_{fdt} \quad (26)$$

where Y_{fdt} is outcome of incumbent firm's f, with registered office location in district d under the ambit of industrial-labor laws of state s. $Judge\ Occp_{dt}$ is the measure of judicial capacity in district d, year t. $Pro\ Industry_s$ and $Pro\ Labor_s$ are dummy variables indicating whether a state has regulations in favor of business-owner rights or in favor of labor-rights. The leave-out group are states with neutral legislations, i.e. favoring neither business owners or labor rights. To account for all time invariant district level and time varying state level unobserved characteristics, I include district and state-year fixed effects. Finally, I account for firm specific characteristics including age, and sectoral dummies.

Effects across all sectors Pooling firms across all sectors, as shown in table 15, I find positive and significant effects of improved judge occupancy on profits net of taxes in both pro-industry and pro-labor states while a negative but insignificant effects in neutral states. However, I cannot reject the null that improved judge occupancy differentially affects pro-industry relative to pro-labor states. Specifically, a one percentage point increase in judge occupancy increases profits by 2.6 percent in pro-industry states and by 1.8 percent in pro-labor states. On the other hand, improved judge occupancy has negative effects on wage bill in pro-industry (significant at 10%) and pro-labor states (imprecise) whereas a positive effect in neutral states. The estimates imply that a one percentage point improvement in judge occupancy lowers wage bill by 0.6 percent, 0.3 percent and increases by 0.75 percent in pro-industry, pro-labor, and neutral states respectively. For a sample of firms that disclose employee headcount, I find positive effects of improved judge occupancy on employment in pro-industry showing an increase of 2.5 percent for every percentage point increase in judge occupancy. Employment also increases by 2.2 percent in pro-labor states whereas decreases by 1.9 percent in neutral states.

Effects on manufacturing sector Focusing on firms in the manufacturing sector alone as in table 16, I find similar direction and magnitude of results, with profits increasing with an improvement in judge occupancy in both pro-industry and pro-labor states whereas decreasing profits in neutral-states. The effects are similar on wage bill, whereas the I find no significant effects on employment (in terms of headcount).

These results suggest that higher judge occupancy leads to improved firm profits but lower wage bill when the laws strengthen the rights of either business-owners or labor in a state. On the other hand, improved judge occupancy has the opposite effect when laws are enacted in a neutral manner. In the next section, I examine the complementarity in the context of bankruptcy reforms.

8.2 Does Judicial Incapacity Limit Bankruptcy Reform?

India enacted an overarching reform addressing the process of bankruptcy in 2016 by introducing Insolvency and Bankruptcy Code to strengthen creditor's rights. The policy focus of this reform was to enable

business environment and aid creditor's recovery of bad loans by easing the process of liquidation and/or reinvestment in defaulting companies. Therefore, this reform should likely have a positive effect on the overall credit markets, improve the outcomes for banks, which may then get passed on to borrowers. However, any positive effects may be mitigated by low judge occupancy, especially if the precursors to bankruptcy proceedings involve civil suits pertaining to debt contracts. In order to study this complementary between judge occupancy and the bankruptcy reform, I employ a difference in difference identification strategy by comparing the differences in firm outcomes in ex-ante high judge occupancy (i.e. measured before the passing of the reform) districts with those with lower occupancy across the reform period. I define ex-ante high judge occupancy as those districts that are in the top 25th percentile of the pre-reform judge occupancy levels.

$$\begin{aligned} Y_{fdt} = \alpha_{st} + \beta_1 High\ Judge\ Occp_d \text{ x } Post_t \text{ x } Year_t + \beta_2 High\ Judge\ Occp_d \text{ x } Post_t \\ + \beta_3 High\ Judge\ Occp_d \text{ x } Year_t + \beta_4 High\ Judge\ Occp_d + \mathbf{X}_f\Gamma + \nu_{fdt} \end{aligned} \tag{27}$$

where Y_{fdt} is outcome of incumbent firm's f, with registered office location in district d. $High\ Judge\ Occp_d$ is the dummy indicating whether district d is in the top quartile of judge occupancy in the pre-reform period. $Post_t$ is the dummy indicating whether year t is post reform; $Post_t = 1$, for $t > 2016$ and 0 otherwise. $Year_t$ indicates the difference between year t and 2010. The leave-out group includes districts not in the top quartile of pre-reform judge occupancy. To account for all time varying state level unobserved characteristics, I include state-year fixed effects. Finally, I account for firm specific characteristics including age, and sectoral dummies. Since the "treatment" group varies at the district level only, I cluster the standard errors by district. I also estimate a variant of the above specification but in levels, interacted with bank dummy $Bank_{fd}$, i.e. whether a given firm f in district d is a bank or not.

$$\begin{aligned} Y_{fdt} = \alpha^0_{st} + \beta^0_1 High\ Judge\ Occp_d \text{ x } Post_t \text{ x } Bank_{fd} + \beta^0_2 High\ Judge\ Occp_d \text{ x } Post_t \\ + \beta^0_3 Bank_{fd} \text{ x } Post_t + \beta^0_4 High\ Judge\ Occp_d \text{ x } Bank_{fd} \\ + \beta^0_5 High\ Judge\ Occp_d + \beta^0_6 Bank_{fd} + \mathbf{X}_f\Gamma^0 + \nu^0_{fdt} \end{aligned} \tag{28}$$

Effects across all firms I find no pre-trends in the high judicial capacity districts, enabling causal inference from the above estimation strategy. Examining the estimates in the first specification with the pooled sample of firms in Table 17, I find that sales revenue is 1.4 log points higher in better judge occupancy districts post reform but this advantage dissipates over time. Other than sales revenue, I find no significant effects on wage bill, employment, capital or land use, and profits.

Effects on banks Results for banks in Table 18 show that they experience an improvement in profits by 4.2 log points post reforms in high judge occupancy districts relative to banks in low occupancy districts. However, they make lower income from financial services, have lower wage bill and likely hire less relative to banks in low capacity districts. A plausible explanation for this result is that the banks are able to

recover bad loans, which would have otherwise had to be written off as a loss in their profit-loss statement. Under higher judge occupancy post reforms, it is likely that these debts are recovered, posting a profit. On the other hand, the lower income could indicate less lending to potentially bad borrowers. Finally, since employees in banks are mainly engaged in financial services, including monitoring loans, lower wage bill could likely indicate a potential reduction in monitoring costs. This is suggestive that judicial capacity is likely an important complement to legislative or policy reforms.

In both examples above, I find that courts play a complementary role to legal reforms aimed at strengthening the rights of certain groups. Therefore, one must also take into account existing judicial capacities when implementing legal reforms focused on strengthening the rights or the contracting environment.

9 Conclusion

This paper estimates the causal effects of court performance measured as the rate at which trials are resolved on formal sector firm growth. Judge occupancy is an important factor determining the effectiveness of courts as an institution for the enforcement of contracts. Higher judge occupancy increases local lending by banks and other lending organizations. Using the universe of case level micro-data filed at 195 district courts between 2010 and 2018, I show that the current state of disposal rate is abysmally low and around 25 percent of judge posts are vacant on an average. Increasing judge occupancy by 1 percentage point increases the court output by 1 percent. In terms of judge headcount, adding an extra judge increases court output by 6 percent.

Courts as an institution are important for firm growth and I provide evidence in favor of credit market channel as one of the important channels. This is because banks litigate more intensively compared to any other type of firm, and are also more likely to initiate litigation as petitioners. The types of petitions they bring also clearly indicate that the lenders win the trials. In such a context, improved litigation experience increases the extent of loans made by banks, targeting manufacturing and consumption. On the other hand, timely resolution of litigation has a negative effect on respondent non-financial firms, suggesting that the lenders could exercise their choice to litigate to induce repayment in the local credit markets.

Indeed, as hypothesized, I note that all firms with registered office in the court district borrow more from banks, particularly those with smaller ex-ante asset size indicating that the wealth threshold for borrowing drops. Banks' lending is also supplemented by increased lending from other financial institutions such as the NBFCs as well as inter-firm lending. A flush of credit relaxes credit constraints firms face, leading to an expansion in production. Profits also increase, specifically for credit unconstrained firms, for whom improved institutional environment likely lowers transaction costs.

This indicates that the problem of vacancy in district courts has serious economic repercussions. This is consistent with the current demand by legal experts for addressing the issue of vacancy as well as expanding recruitment to strengthen the district judiciary. Given the benefits in the form of firm growth, the state will be able to recover the costs of hiring additional human resource from the increase in tax

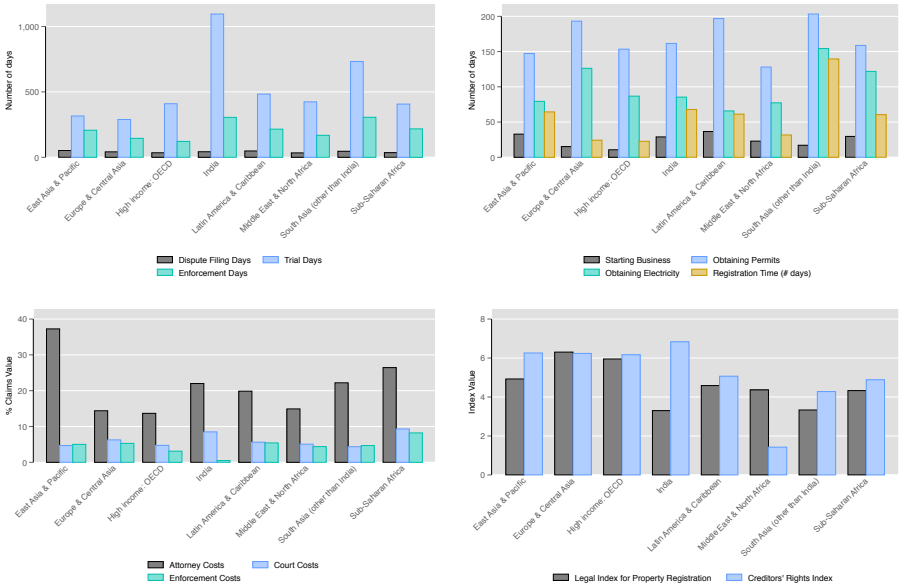
collection from improved firm profits. This paper makes a strong policy case for increasing the budgetary allocation to the judicial sector from the current allocation of 0.01 percent of national expenditure.

Finally, the functioning of courts are complementary to legal reforms. Using two specific examples, namely bankruptcy resolution and industrial-labor policies, this paper shows that low judicial capacity hinders the effects of the reforms that intend to strengthen the rights of certain groups - creditors, business owners, or labor as examined. Therefore, strengthening judicial institutions requires not just having a strong legal framework in terms of laws and policies, but also timely implementation of justice in the form of well functioning courts.

The scope of this paper is limited to the outcomes of firms in registered, formal sector, whereas a large share of production and employment in India is in the informal sector. It is likely that the effects of courts may be heterogeneous depending on informality, including selection into informality. Further, informal sector firms may use extra-legal justice administration institutions for production processes. More research is required to examine the interplay between formal and informal justice administration institutions and selection into formal sector for production.

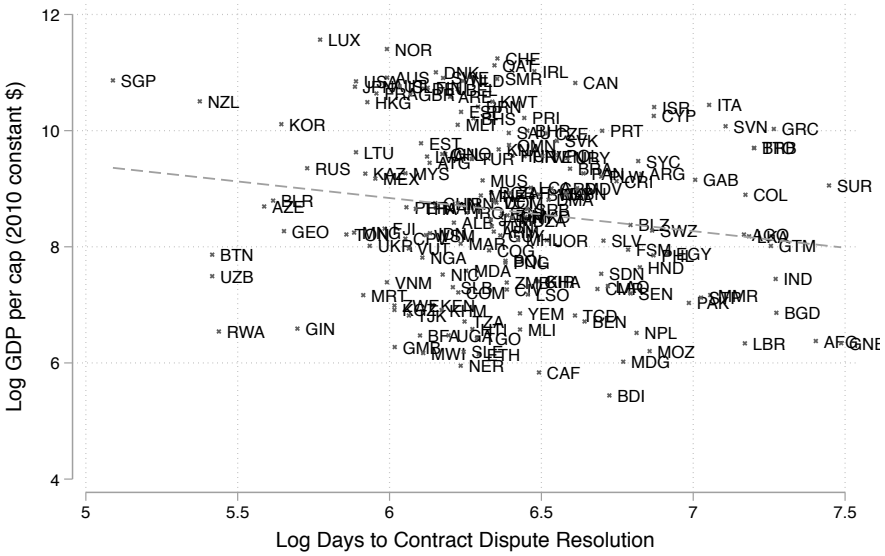
10 Figures

Figure 1: World Bank Doing Business Survey Database



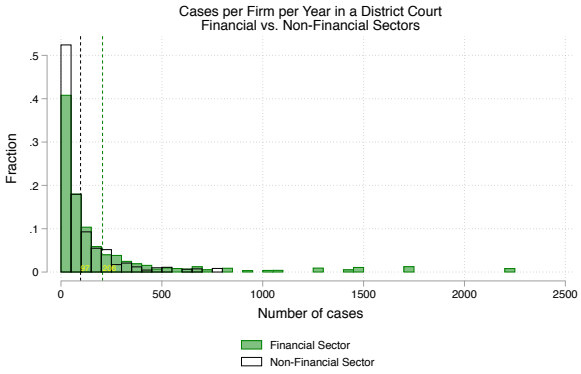
Notes: Data source: Doing Business database, World Bank. All contract enforcement variables are calculated from the perspective of the court of first instance.

Figure 2: GDP per capita and Contract Enforcement



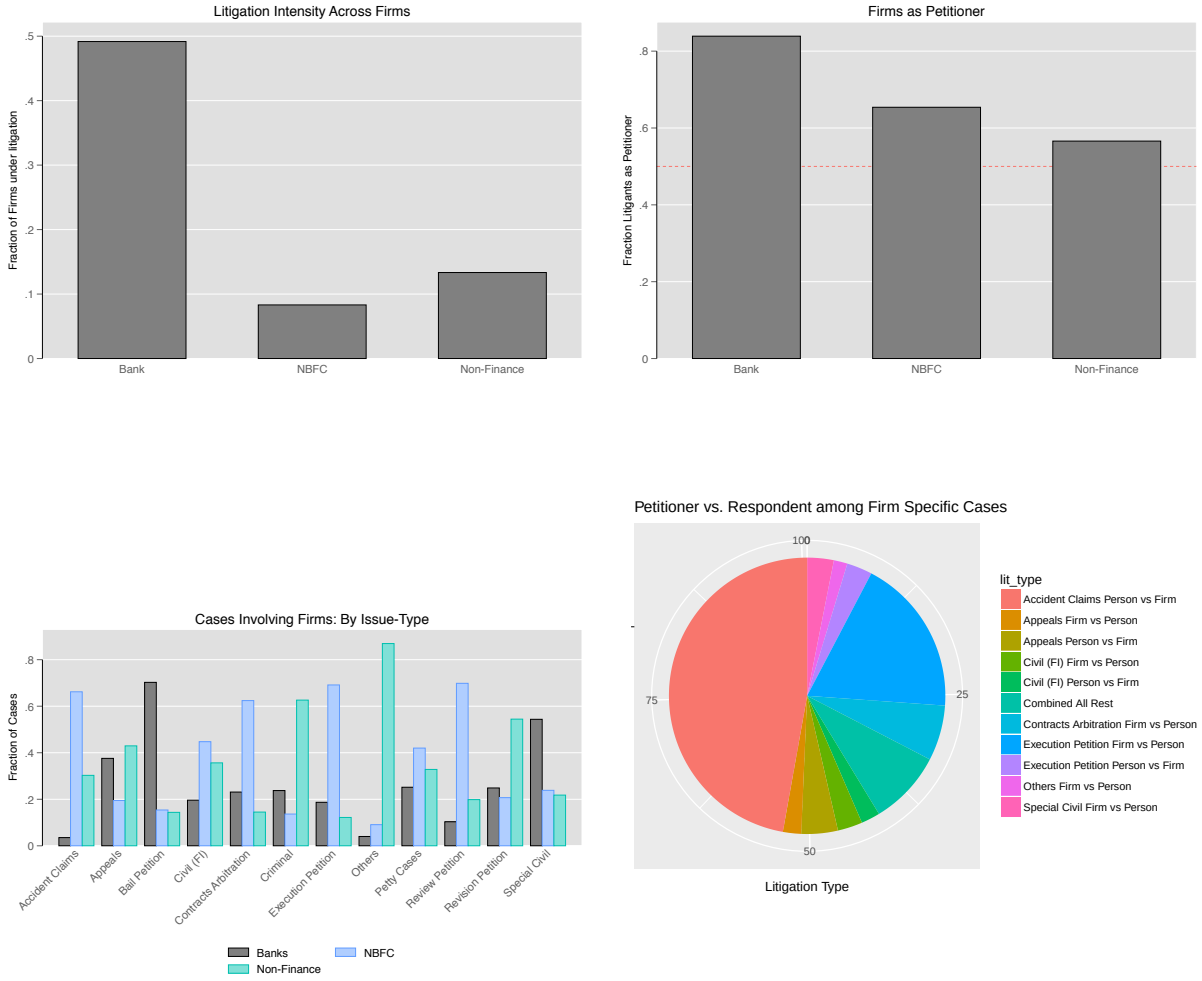
Notes: Data source: Doing Business and WDI databases, World Bank. All contract enforcement variables are calculated from the perspective of the court of first instance.

Figure 3: Distribution of Cases per Litigating Firm



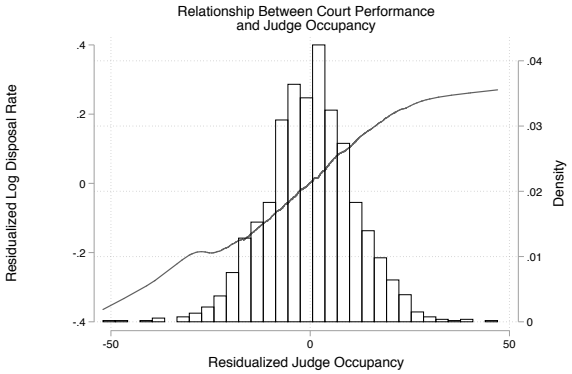
Notes: Above graphs show the distribution of number of cases per litigating firm across district courts during the sample period. Some firms, such as banking and insurance firms, have a large number of cases across different courts in the sample.

Figure 4: Litigation Intensity by Firm Type



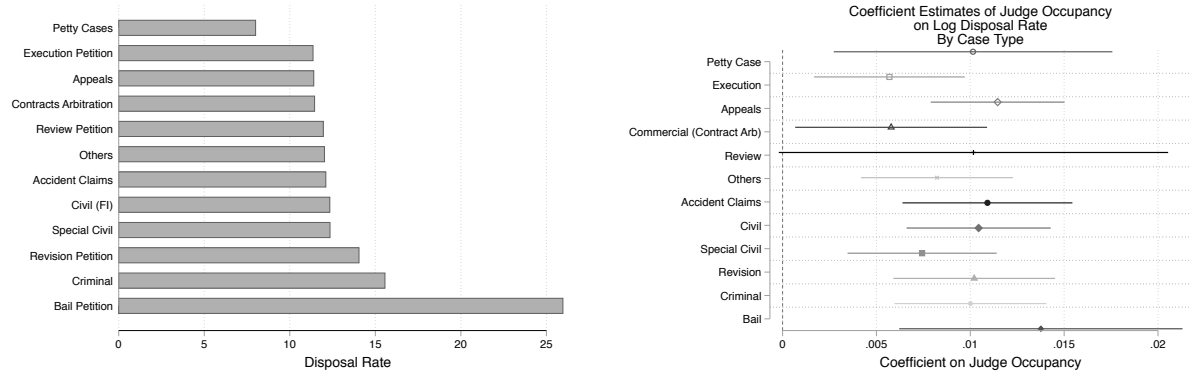
Notes: Top-Left panel shows that match rate between the firm sample in the universe of cases in sample courts. Top-Right panel shows the distribution of the matched firm by whether they are the petitioner or respondent to the litigation(s). Bottom left panel shows the distribution of the issue-types of cases involving the firms. Financial firms (i.e. banks and NBFCs) are more likely to be engaged in civil and contractual litigation whereas non-financial firms are likely engaged in other types of cases (likely fraud under criminal investigation). Bottom right shows the distribution of petitioner-respondent-issue type within firm specific cases.

Figure 5: Court Performance and Judge Occupancy: First Stage



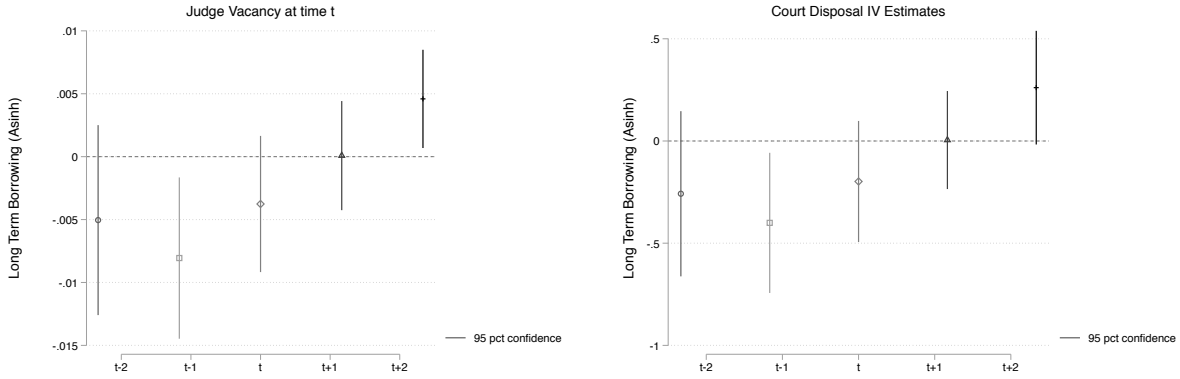
Notes: Above graph shows log-linear relationship between disposal rate and judge occupancy, after controlling for district, year, and state year fixed effects.

Figure 6: Court Performance and Judge Occupancy: Estimates Across Case-Types



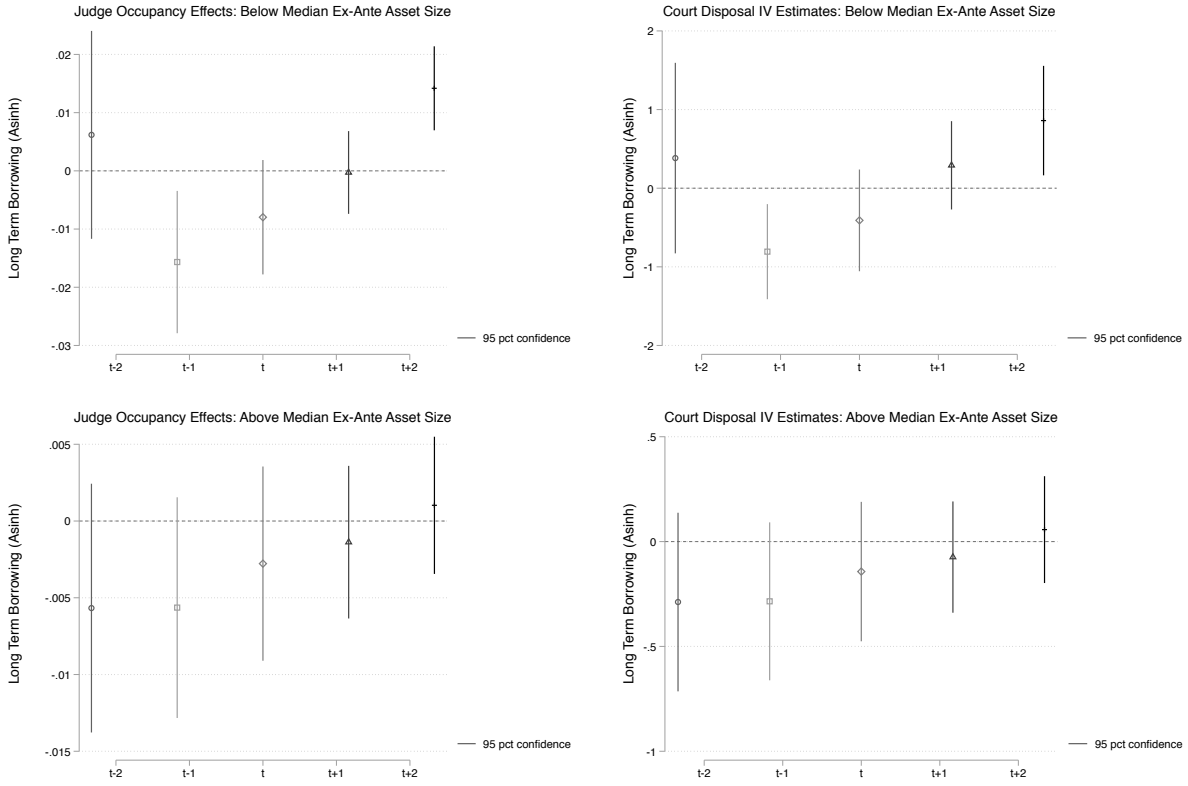
Notes: All standard errors are clustered by district-year.

Figure 7: Effects on Firm's Borrowing from Banks



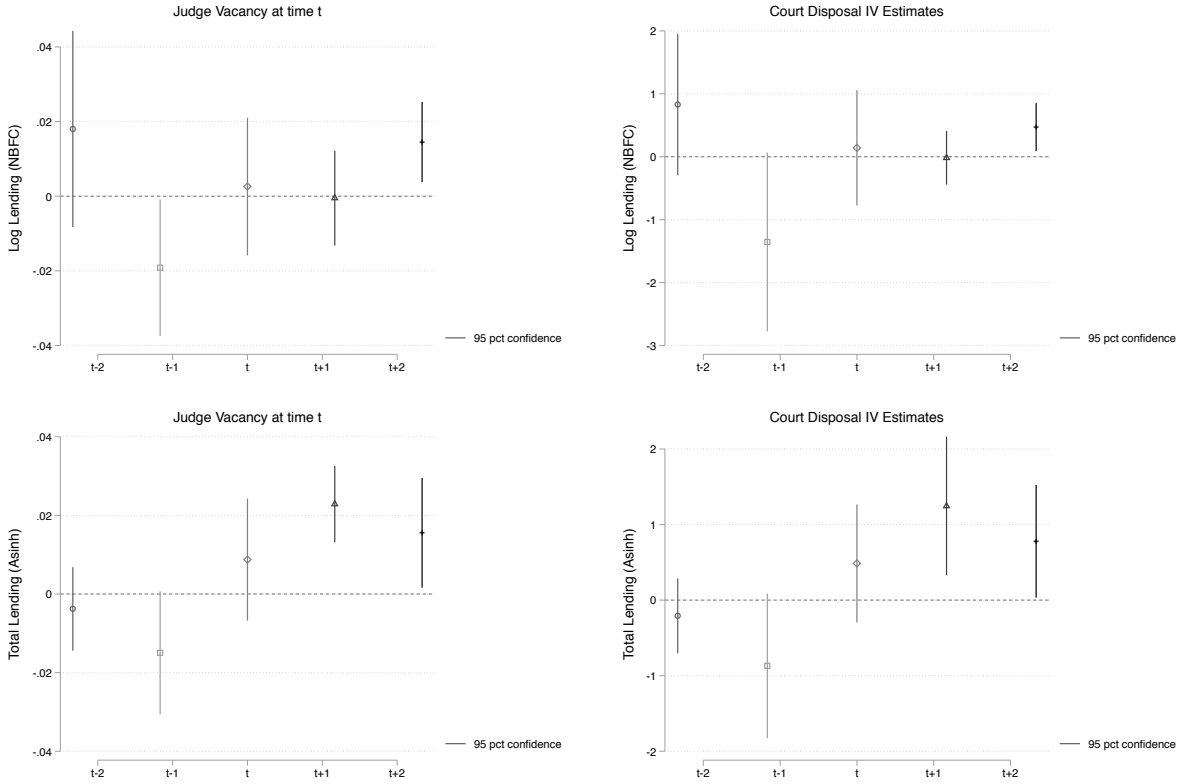
Notes: All standard errors are clustered by district-year.

Figure 8: Heterogeneous Effects of Court Output by Asset Size: Borrowings



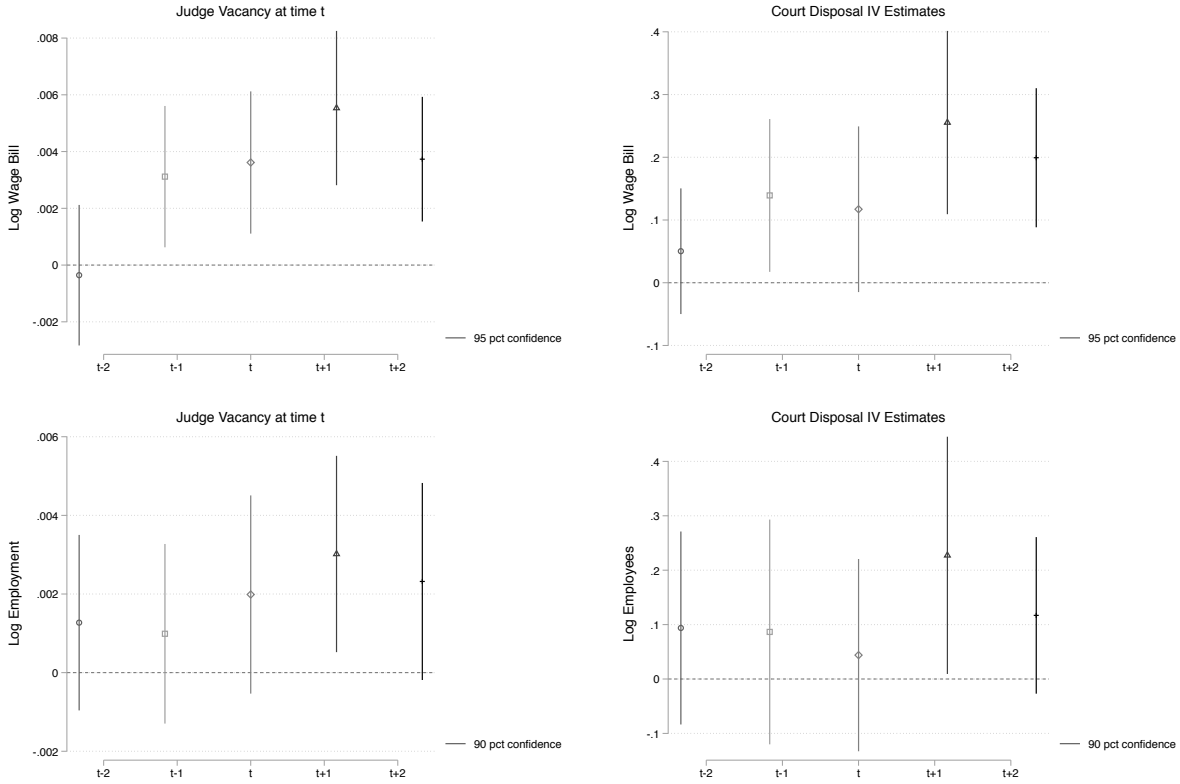
Notes: All standard errors are clustered by district-year.

Figure 9: Lending by Firms Located in Court Jurisdiction



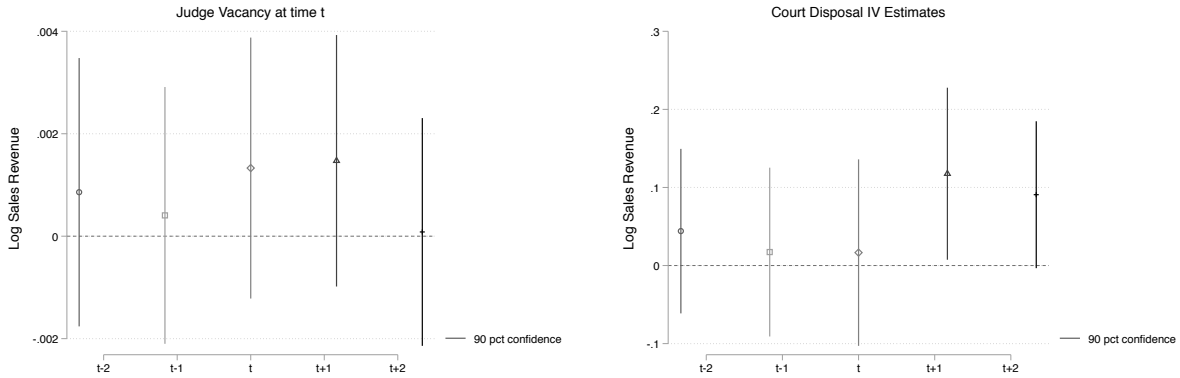
Notes: Standard errors clustered by district-year. The sample includes NBFCs (top) and lending firms (bottom) whose registered offices are co-located in the same district as the corresponding court.

Figure 10: Effects on Labor-Use



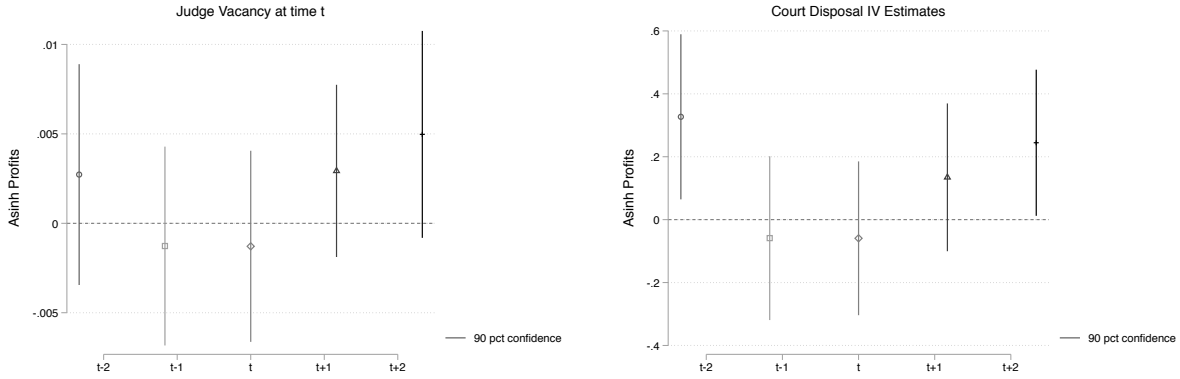
Notes: Standard errors clustered by district-year. The sample includes all firms whose registered offices are co-located in the same district as the corresponding court.

Figure 11: Effects on Sales



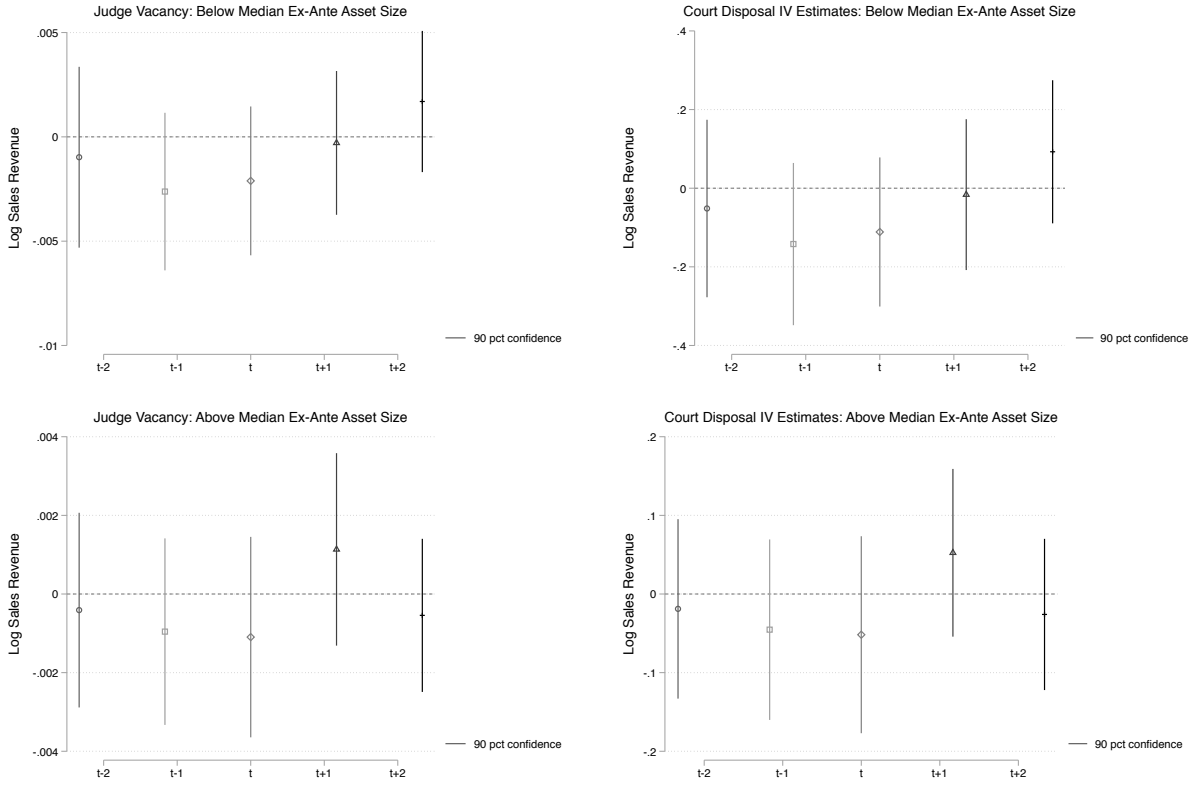
Notes: Standard errors clustered by district-year. The sample includes all firms whose registered offices are co-located in the same district as the corresponding court.

Figure 12: Effects on Profits



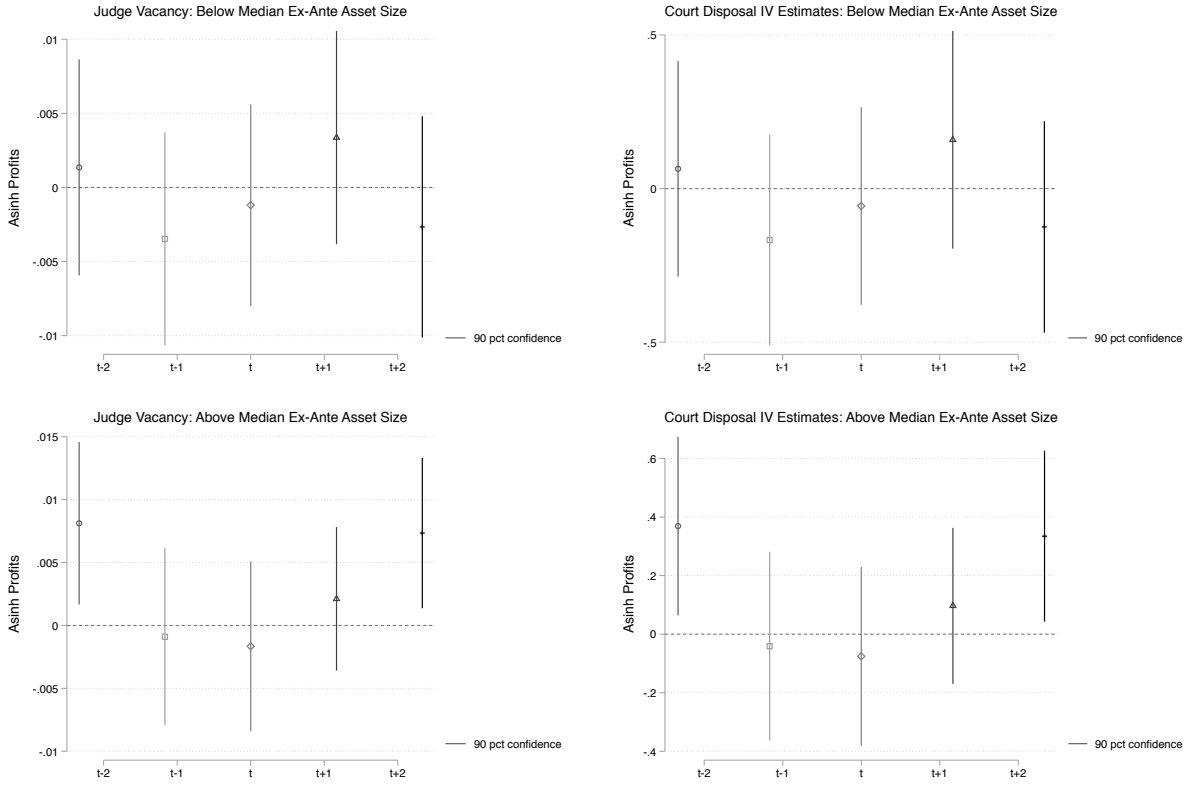
Notes: Standard errors clustered by district-year. The sample includes all firms whose registered offices are co-located in the same district as the corresponding court.

Figure 13: Heterogeneous Effects of Court Output by Asset Size: Sales



Notes: All standard errors are clustered by district-year.

Figure 14: Heterogeneous Effects of Court Output by Asset Size: Profit



Notes: All standard errors are clustered by district-year.

11 Tables

Table 1: E-Courts Variables: Summary Statistics

	(1)				
	Observations	Mean	Std Dev	Min	Max
Court-level Output					
Total Judge Posts	1755	18	19	1	108
Percent Judge Occupancy	1723	77	21	10	100
Disposal Rate	1755	14	12	0	86
Speed	1723	76	102	0	2580
No. Filed	1723	3312	3712	1	34427
No. Resolved	1504	3341	3693	1	37994
Percent Lower Court Judgement Appealed	1723	19	16	0	100
Percent Cases Dismissed	1504	22	17	0	100
Case Duration	1498	617	497	0	5135

Notes:

Table 2: Description of Firms with Cases in Sample Court Districts

	(1)				
	Not in Court (Mean)	Not in Court (SD)	In Court (Mean)	In Court (SD)	P-Value
Firm Age (yrs)	24.375	15.598	33.346	20.943	0.0000
Entity Type:					
Private Ltd	0.396	0.489	0.279	0.448	0.0000
Public Ltd	0.593	0.491	0.704	0.457	0.0000
Govt Enterprise	0.001	0.025	0.001	0.026	0.9425
Foreign Enterprise	0.004	0.059	0.002	0.048	0.1202
Other Entity	0.007	0.084	0.015	0.120	0.0000
Ownership Type:					
Privately Owned Indian Co	0.709	0.454	0.632	0.482	0.0000
Privately Owned Foreign Co	0.026	0.159	0.043	0.204	0.0000
State Govt Owned Co	0.009	0.094	0.033	0.179	0.0000
Central Govt Owned Co	0.009	0.094	0.029	0.166	0.0000
Business Group Owned Co	0.247	0.431	0.263	0.441	0.0060
Finance vs. Non-Finance:					
Non Finance Co	0.782	0.413	0.844	0.363	0.0000
Non Banking Finance Co	0.215	0.411	0.137	0.343	0.0000
Banking Co	0.003	0.053	0.019	0.137	0.0000
Broad Industry:					
Trade, Transport, and Logistics	0.150	0.357	0.165	0.371	0.0015
Construction Industry	0.082	0.275	0.100	0.300	0.0000
Business Services	0.338	0.473	0.226	0.418	0.0000
Commercial Agriculture	0.020	0.142	0.025	0.155	0.0339
Mining	0.023	0.150	0.035	0.184	0.0000
Manufacturing	0.386	0.487	0.450	0.497	0.0000
Not in Court	43064				
Firms in Court	6138				

Notes: All firms in the table above are those registered in any of the sample court districts. Firms can be involved in cases either in its home district or in any other district based on the case jurisdiction.

11.1 Balance Tables

Table 3: Balance on district time-varying characteristics

	(1) Percent Judge Occupancy	(2) Percent Judge Occupancy
Disposal Rate (t-1)	0.00646	
	(0.0251)	
Disposal Rate (t-2)	-0.0361	
	(0.0282)	
Num Filed (t-1)	-6.695	
	(4.273)	
Num Filed (t-2)	-6.595	
	(4.075)	
Num Resolved (t-1)	-5.265	
	(6.573)	
Num Resolved (t-2)	-8.816	
	(6.806)	
Pct Sown Area (t-1)		0.000216
		(0.000206)
Pct Sown Area (t-2)		0.000443**
		(0.000201)
Per cap Crime (t-1)		0.000469
		(0.000364)
Per cap Crime (t-2)		0.000405
		(0.000380)
P-value(joint test)	0.580	0.790

Standard errors in parentheses
* $p < 0.1$, ** $p < .05$, *** $p < 0.01$
Notes: All standard errors are clustered at the district-year level.

Table 4: Balance on firm outcomes

	(1) Percent Judge Occupancy	(2) Percent Judge Occupancy
Borrowing (t-1)	-0.00758*	
	(0.00441)	
Borrowing (t-2)	-0.000903	
	(0.00522)	
Sales (t-1)		0.000451
		(0.00156)
Sales (t-2)		0.00103
		(0.00159)
Profit (t-1)		0.00229
		(0.00371)
Profit (t-2)		0.00210
		(0.00373)
Wage Bill (t-1)		0.00307**
		(0.00126)
Wage Bill (t-2)		-0.0000648
		(0.00125)
Employees (t-1)		-0.0000317
		(0.00154)
Employees (t-2)		-0.000454
		(0.00169)
P-value(joint test)	0.66	0.46

Standard errors in parentheses
* $p < 0.1$, ** $p < .05$, *** $p < 0.01$
Notes: All standard errors are clustered at the district-year level.

11.2 Tables: First Stage Effects of Judge Occupancy on Court Performance

Table 5: First Stage: Judge Occupancy and Overall Court Output

	(1) Log Disposal Rate	(2) Log Speed (Outflow/Inflow)	(3) Log New Filing	(4) Log New Disposed	(5) Log Case Duration at Disposal	(6) Log Share Dismissal	(7) Log Appeal	(8) Index
Percent Judge Occupancy	0.00978***	0.00682***	0.0169***	0.00964***	0.000726	-0.000679	0.00172	0.00745***
	(0.00182)	(0.00217)	(0.00165)	(0.00228)	(0.00148)	(0.00183)	(0.00153)	(0.00231)
Observations	1714	1714	1714	1485	1478	1485	1714	1478
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State x Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dependent Variable (Raw)	14.33	76.22	3312.2	3340.6	616.8	21.76	19.09	0
F-Stat	28.81	9.880	104.8	17.86	0.240	0.140	1.270	10.43
R-Squared	0.750	0.830	0.910	0.850	0.660	0.670	0.690	0.790

Standard errors in parentheses
* $p < 0.1$, ** $p < .05$, *** $p < 0.01$
Notes: All standard errors are clustered at the district-year level.

Table 6: First Stage: By sub-groups of district courts

	(1) All	(2) Court Size tercile 1	(3) Court Size tercile 2	(4) Court Size tercile 3	(5) Pop. Density tercile 1	(6) Pop. Density tercile 2	(7) Pop. Density tercile 3
Judge Occupancy	0.00978***	0.0118***	0.0112***	0.00701**	0.00895***	0.0151***	0.00607*
	(0.00182)	(0.00324)	(0.00272)	(0.00351)	(0.00239)	(0.00389)	(0.00331)
Observations	1714	544	619	539	539	542	549
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State x Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Stat	28.81	13.25	16.88	3.990	14	15.13	3.370
Adj R-Squared	0.700	0.740	0.680	0.710	0.710	0.600	0.780
Complier Ratio	1	1.210	1.140	0.720	0.920	1.550	0.620

Standard errors in parentheses
* $p < 0.1$, ** $p < .05$, *** $p < 0.01$
Notes:

11.3 Tables: Litigating Firms

Table 7: First Stage: Judge Occupancy and Litigation Performance of All Firms' Cases

	(1) Log Num Filed	(2) Log Num Resolved	(3) Log Disposal Rate (Firm Specific)	(4) Speed Index
Judge Occupancy	0.00129**	-0.0000253	0.00277*	0.00120**
	(0.000592)	(0.000724)	(0.00154)	(0.000600)
Observations	191227	191227	83264	83264
District Fixed Effects	Yes	Yes	Yes	Yes
Case Type Fixed Effects	Yes	Yes	Yes	Yes
Other fixed effects	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year
Mean Dependent Variable	1068.2	1067.8	42.82	0
SD Dependent Variable	51421.1	39952.6	43.81	1.400
Mean Explanatory Var	74.84	74.84	74.84	74.84
F-Stat	4.740	0	3.250	3.980
Adj R-Squared	0.100	0.130	0.250	0.210

Standard errors in parentheses

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

Notes: Standard errors clustered by district-year. The sample of firms above are all litigating firms (including banks) found in the court sample.

Table 8: First Stage: Judge Occupancy and Litigation Performance of Banks' Cases

	(1) Log Num Filed	(2) Log Num Resolved	(3) Log Disposal Rate (Firm Specific)	(4) Speed Index
Judge Occupancy	0.00741***	0.000358	0.00481	0.00373***
	(0.00196)	(0.00206)	(0.00313)	(0.00141)
Observations	7948	7948	4757	4757
District Fixed Effects	Yes	Yes	Yes	Yes
Case Type Fixed Effects	Yes	Yes	Yes	Yes
Other fixed effects	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year
Mean Dependent Variable	14469.7	14469.7	46.55	0
Mean Explanatory Var	74.21	74.21	74.21	74.21
F-Stat	14.38	0.0300	2.360	7.040
Adj R-Squared	0.400	0.420	0.300	0.400

Standard errors in parentheses

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

Notes: Standard errors clustered by district-year. The sample of firms above are all litigating banks found in the court sample.

Table 9: Effects of Bank Specific Litigation Performance: Total Loan Accounts

	(1) Log Total Accounts (OLS)	(2) Log Total Accounts (2SLS)	(3) Log Total Accounts (RF)
Resolution Index	0.000792	0.247*	
	(0.00116)	(0.143)	
Judge Occupancy (lagged)			0.000848**
			(0.000329)
Observations	4279	4279	4279
District Fixed Effects	Yes	Yes	Yes
Case Type Fixed Effects	Yes	Yes	Yes
Other fixed effects	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year
Mean Dependent Variable	341497.9	341497.9	341497.9
F-Stat	0.470	3.010	6.640
Adj R-Squared	0.980	-5.160	0.980

Standard errors in parentheses

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

Notes: All standard errors are clustered at the district-year level. Above specification focuses only on Scheduled Commercial Banks, for which the data is provided by the Reserve Bank of India.

Table 10: Effects of Bank Specific Litigation Performance: Sector Specific Loan Accounts

	(1) Log Manufacturing Accounts	(2) Log Consumer Accounts	(3) Log Agri Accounts
Judge Occupancy (lagged)	0.00211**	0.00110**	0.000350
	(0.000948)	(0.000431)	(0.000391)
Observations	4158	4158	4158
District Fixed Effects	Yes	Yes	Yes
Case Type Fixed Effects	Yes	Yes	Yes
Other fixed effects	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year
Mean Dependent Variable	11037.6	114576.6	170249.9
F-Stat	4.930	6.520	0.800
Adj R-Squared	0.930	0.970	0.980

Standard errors in parentheses

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

Notes: All standard errors are clustered at the district-year level. The data used here is provided by the Reserve Bank of India.

Table 11: Effects of Bank Specific Litigation Performance: Loan Amount

	(1) Log Loan Outstanding (OLS)	(2) Log Loan Outstanding (2SLS)	(3) Log Loan Outstanding (RF)
Resolution Index	0.00115	-0.0867	
	(0.00131)	(0.134)	
Judge Occupancy (lagged)			-0.000297
			(0.000435)
Observations	4279	4279	4279
District Fixed Effects	Yes	Yes	Yes
Case Type Fixed Effects	Yes	Yes	Yes
Other fixed effects	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year
Mean Dependent Variable	11901.2	11901.2	11901.2
F-Stat	0.760	0.420	0.470
Adj R-Squared	0.980	-0.710	0.980

Standard errors in parentheses

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

Notes: All standard errors are clustered at the district-year level. Above specification focuses only on 27 Scheduled Commercial Banks. The data used here is provided by the Reserve Bank of India.

Table 12: Judge Occupancy Effect on Respondent Non-Fin Firms' Production

	(1) Log Revenue from Sales	(2) Log Wage Bill	(3) Log Workers	(4) Asinh Profits	(5) Log Land Value	(6) Log Plant Value
Judge Occupancy	-0.00272	-0.00206	-0.00198	-0.0154**	-0.00364*	-0.00409
	(0.00177)	(0.00162)	(0.00146)	(0.00627)	(0.00196)	(0.00256)
Observations	12186	12248	6379	12431	10815	11779
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Case Type Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Other fixed effects	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year	State, Year, State-Year
Mean Dependent Variable	297846.6	14569.7	31.59	7340.3	12574.1	98607.7
F-Stat	2.360	1.620	1.830	6.030	3.450	2.550
Adj R-Squared	0.120	0.100	0.110	0.0800	0.100	0.140

Standard errors in parentheses

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

Notes: Standard errors clustered by district-year. The sample of firms above are the litigating respondent firms found in the court sample that are other than NBFCs or banks (i.e. financial firms).

11.4 Tables: All Firms

Table 13: Court Performance and All Firm Intermediate Outcomes

	(1) Observations	(2) OLS	(3) 2SLS	(4) Reduced Form
Borrowing from Bank	9297	0.0257	0.385*	0.00502**
		(0.0350)	(0.208)	(0.00227)
Total Lending	227	0.212***	0.979**	0.0238***
		(0.0738)	(0.428)	(0.00557)
NBFC Lending	611	0.0819	1.163*	0.0127**
		(0.136)	(0.602)	(0.00548)
Year Fixed Effects		Yes	Yes	Yes
Court-State Time Fixed Effects		Yes	Yes	Yes
Court District FE		Yes	Yes	Yes
Firm Controls		Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The row headers indicate the dependent variable and the columns 2 - 3 provide the coefficients on lagged disposal rate (by 1-2 years) from OLS and 2SLS estimations respectively, and column 4 provides the reduced form coefficients on lagged judge occupancy (by 1-2 years). All standard errors are clustered at the district-year level.

Table 14: Court Performance and All Firm Outcomes

	(1) Observations	(2) OLS	(3) 2SLS	(4) Reduced Form
Log Revenue from Sales	20028	-0.0323	0.0976*	0.000264
		(0.0248)	(0.0569)	(0.00135)
Asinh Profit	24009	0.00309	0.256*	0.00528
		(0.0479)	(0.143)	(0.00357)
Log Wage Bill	21846	0.0245	0.202***	0.00381***
		(0.0161)	(0.0569)	(0.00112)
Log Employees	4067	-0.0158	0.0441	0.000756
		(0.0366)	(0.148)	(0.00281)
Log Land Value	16238	-0.0181	0.0249	0.000473
		(0.0138)	(0.0571)	(0.00120)
Log Plant Value	18122	-0.0266	-0.0318	-0.00207*
		(0.0167)	(0.0643)	(0.00112)
Year Fixed Effects		Yes	Yes	Yes
Court-State Time Fixed Effects		Yes	Yes	Yes
Court District FE		Yes	Yes	Yes
Firm Controls		Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The row headers indicate the dependent variable and the columns 2 - 3 provide the coefficients on lagged disposal rate (by 2 years) from OLS and 2SLS estimations respectively, and column 4 provides the reduced form coefficients on lagged judge occupancy (by 2 years). All standard errors are clustered at the district-year level.

11.5 Tables: Interaction b/w Courts and Legal Reforms

Table 15: Judicial Capacity and State Industrial-Labor Policy: All Sectors

	(1) Log Revenue from Sales	(2) Log Wage Bill	(3) Log Employees	(4) Asinh Profits	(5) Log Land Value	(6) Log Plant Value
Pro-Industry State x Judge Occupancy	-0.000927	-0.00627**	0.0249***	0.0261***	-0.00478*	-0.0000304
	(0.00408)	(0.00307)	(0.00929)	(0.00985)	(0.00271)	(0.00350)
Pro-Labor State x Judge Occupancy	0.000761	-0.00307	0.0217**	0.0184*	-0.0000172	0.000329
	(0.00427)	(0.00315)	(0.00864)	(0.00957)	(0.00292)	(0.00369)
Percent Judge Occupancy (t-2)	0.000338	0.00755***	-0.0194**	-0.0126	0.00170	-0.00218
	(0.00366)	(0.00259)	(0.00785)	(0.00793)	(0.00206)	(0.00319)
Observations	20028	21846	4067	24009	16238	18122
Court-State Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Court District FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dependant Var (Raw)	5,452.3	417.184	2.374	184.404	309.087	2,888.56
F-Stat	296.82	430.33	60.51	61.25	66.65	299.46
Adj R-Squared	.24	.26	.3	.05	.12	.23
Control	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The time-frame considered here is between 2010 and 2018 since the start of the e-courts program. The court measures are lagged by 2 years. All dependent (financial) variables are in million INR. All standard errors are clustered at the district-year level. The dummies categorization states as pro-labor, pro-industry, or neutral is from Besley and Burgess, 2004. Of the 15 states in my sample, 4 states are pro-labor, 6 are pro-industry, and 4 neutral.

Table 16: Judicial Capacity and State Industrial-Labor Policy: Manufacturing

	(1) Log Revenue from Sales	(2) Log Wage Bill	(3) Log Employees	(4) Asinh Profits	(5) Log Land Value	(6) Log Plant Value
Pro-Industry State x Judge Occupancy	-0.00504	-0.0101***	0.00130	0.0314**	-0.00933***	-0.00732**
	(0.00406)	(0.00360)	(0.00795)	(0.0145)	(0.00360)	(0.00297)
Pro-Labor State x Judge Occupancy	-0.00690*	-0.00595*	-0.0000713	0.0164	-0.00343	-0.00605*
	(0.00412)	(0.00349)	(0.00761)	(0.0126)	(0.00358)	(0.00319)
Percent Judge Occupancy (t-2)	0.00506	0.00959***	0.00313	-0.0195*	0.00278	0.00410*
	(0.00345)	(0.00291)	(0.00592)	(0.0106)	(0.00297)	(0.00233)
Observations	10794	10897	2278	11622	10062	10987
Court-State Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Court District FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dependant Var (Raw)	6,559.27	350.512	1.757	139.738	275.386	3,585.61
F-Stat	49.12	116.32	35.91	20.48	56.42	59.75
Adj R-Squared	.1	.17	.19	.05	.13	.14
Control	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The time-frame considered here is between 2010 and 2018 since the start of the e-courts program. The court measures are lagged by 2 years. All dependent (financial) variables are in million INR. All standard errors are clustered at the district-year level. The dummies categorization states as pro-labor, pro-industry, or neutral is from Besley and Burgess, 2004. Of the 15 states in my sample, 4 states are pro-labor, 6 are pro-industry, and 4 neutral.

Table 17: Judicial Capacity and Bankruptcy Reform: All Firms Excluding Banks

	(1)	(2)	(3)	(4)	(5)	(6)
	Log Revenue from Sales	Log Wage Bill	Log Employees	Asinh Profits	Log Land Value	Log Plant Value
High Judge Occp x Trend x Post	-0.259**	-0.0703	0.00452	0.139	-0.0152	-0.130
	(0.112)	(0.0600)	(0.177)	(0.401)	(0.130)	(0.101)
High Judge Occp x Post	1.377***	0.357	-0.339	-0.591	0.189	0.698
	(0.523)	(0.301)	(0.989)	(2.026)	(0.663)	(0.524)
High Judge Occp Trend	0.0213	-0.0295	0.0550	-0.0962	-0.00561	-0.0000776
	(0.0545)	(0.0333)	(0.136)	(0.0890)	(0.0219)	(0.0297)
High Judge Occupancy	-0.272	-0.298*	-0.317	-0.205	-0.450**	-0.161
	(0.198)	(0.174)	(0.595)	(0.352)	(0.203)	(0.159)
Observations	19572	21218	3641	23372	15847	17719
Court-State Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Court State FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dependant Var (Raw)	5,307.01	341.951	1.983	131.198	298.629	2,786.36
F-Stat	146.97	184.93	93.32	294.9	20.68	58.42
Adj R-Squared	.2	.23	.29	.02	.05	.19
Control	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The time-frame considered here is between 2010 and 2018 since the start of the e-courts program. Raw dependent (financial) variables are in million INR. All standard errors are clustered at the district level. Districts are categorized as ex-ante high judge occupancy based on judge occupancy prior to the reform.

Table 18: Judicial Capacity and Bankruptcy Reform: Banks

	(1)	(2)	(3)	(4)
	Log Inc Fin. Srvcs	Log Wage Bill	Log Employees	Asinh Profits
Banks x High Judge Occp x Post	-1.001***	-0.980**	-1.207	4.225*
	(0.273)	(0.386)	(0.913)	(2.201)
Banks x Post	0.130	0.0370	0.824***	-5.446**
	(0.141)	(0.113)	(0.128)	(2.129)
High Judge Occp x Post	-0.0919	-0.106	-0.175	-0.129
	(0.0781)	(0.0912)	(0.278)	(0.220)
Bank Dummy x High Judge Occp	-0.107	-0.225	-0.987	-5.295***
	(0.723)	(0.608)	(0.896)	(1.672)
High Judge Occupancy	-0.206	-0.377***	-0.161	-0.455**
	(0.153)	(0.138)	(0.304)	(0.216)
Banking Co	7.384***	5.748***	4.883***	6.738***
	(0.611)	(0.530)	(0.510)	(0.482)
Observations	19477	21347	3752	23501
Court-State Time Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Court State FE	Yes	Yes	Yes	Yes
Mean Dependant Var (Raw)	104,062	9,915.96	14.045	7,873.62
F-Stat	151.46	233.47	69.56	347.21
Adj R-Squared	.14	.25	.33	.03
Control	Firm Level Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The time-frame considered here is between 2010 and 2018 since the start of the e-courts program. Raw dependent (financial) variables are in million INR. All standard errors are clustered at the district level. Districts are categorized as ex-ante high judge occupancy based on judge occupancy prior to the reform.

A Appendix

A.1 Describing Outcome Variables

Intermediate outcomes: Borrowing/Lending These variables depict the intermediate steps linking court output to credit markets.

1. **Bank Lending:** Bank lending variables are obtained from RBI data on district wise number of loan accounts and total outstanding loan amount (in INR Crore) annually aggregated across 27 scheduled commercial banks (national level banks).

2. **Bank Deposits:** Details on saving and term deposits also from RBI data on district wise number of deposit accounts (in thousands) and total deposited amount (in INR Million) annually aggregated across the national level banks.

3. **Total Lending and Advances by NBFC:** Total loans and advances (in INR million) made by NBFCs with registered office in the court district as available in Prowess data.

4. **Inter-Firm Lending:** Total loans and advances (in INR million) made by non-financial firms to other firms that are either subsidiaries or in supply-chain or as investment as available in Prowess data.

5. **Total Bank Borrowings:** Long term (over 12 months) borrowings (in INR million) from banks by non-financial firms reported in Prowess data.

6. **Total Borrowing by Securitization:** Above long term borrowings variables separated into secured (collateralized) and unsecured borrowing.

Impact variables: Following variables represent inputs, production, and profits mapping onto firm's profit maximization.

1. **Annual revenue from sales:** This variable captures income earned from the sales of goods and non-financial services, inclusive of taxes, but does not include income from financial instruments/services rendered. This reflects the main income for non-financial companies.

2. **Revenue from financial services (for lenders):** This variable is the revenue earned from financial services, i.e. lending services, which can be the main service provided by the firm as in the case of banks, NBFCs, or as ancillary service in the form of trade or subsidiary credit. This is not captured under the sales variable above.

3. **Profits net of taxes:** I generate this variable by subtracting total income and total expenditure inclusive of tax to obtain profits net of taxes.

4. **Total wage bill:** This captures total payments made by the firm to all its employees, either in cash or kind. This includes salaries/wages, social security contributions, bonuses, pension, and other parts of the contract with employees.

5. **Total employed labor:** This variable is not directly available in the Prowess dataset. I generate it by dividing total wage bill and total wage bill per employee. This variable is only available for large companies that disclosure their employment details. Firms that do disclosure this, do so for all years. Together with wage bill, this variable represents the quanta of labor use in the production process.

6. **Net value of plants and machinery:** This incorporates reported value of plants and machinery used in production net of depreciation/wear and tear.

7. **Net value of land assets:** The variable reports the value of the firm's real estate holdings net of depreciation. Some firms require physical real estate footprint for carrying out production processes, for example, as in manufacturing. However, the dataset does not include details on space in order to separate changes in valuations from that arising from changes in price vs. changes in actual space acquired/sold.

A.2 Matching Firms with Case Data

I follow the steps below to match firms with cases in the e-courts database:

1. Identify the set of cases involving firms on either sides of the litigation (i.e. either as a petitioner, or as a respondent, or as both) using specific naming conventions followed by firms. Common patterns include firm names starting with variants of "M/S", ending with variants if "Ltd", and so on. This produces about 1.2 million cases, or 20% of the universe of cases that involve a firm.

2. Create a set of unique firms appearing in above subset of case data. I note that same firm appears as a litigator in more than one district, both as a petitioner or as a respondent. This is because the procedural laws pertaining to civil and criminal procedures determine where a specific litigation can be filed based on the issue under litigation.

3. Map firm names as they appear in the case data in step 2 with firm names as they appear in Prowess dataset using common patterns with the aid of regular expressions. This takes care of extra spaces, punctuation marks, as well as common spelling errors such as interchanging of vowels. Further, I also account for abbreviations. For example, "State Bank of India" appears in the case dataset as "State Bank of India", "SBI", S.B.I", and similar variants. I map all these different spellings to the same entity "State Bank of India".

4. Ensure not to categorize cases as belonging to firms when firm names are used as landmark in the addresses of individual litigants. To do this, I detect words such as "opposite to" "above", "below", "near", and "behind". These adverbs are often used in describing landmarks. I excludes were firm names are preceded by such adverbs.

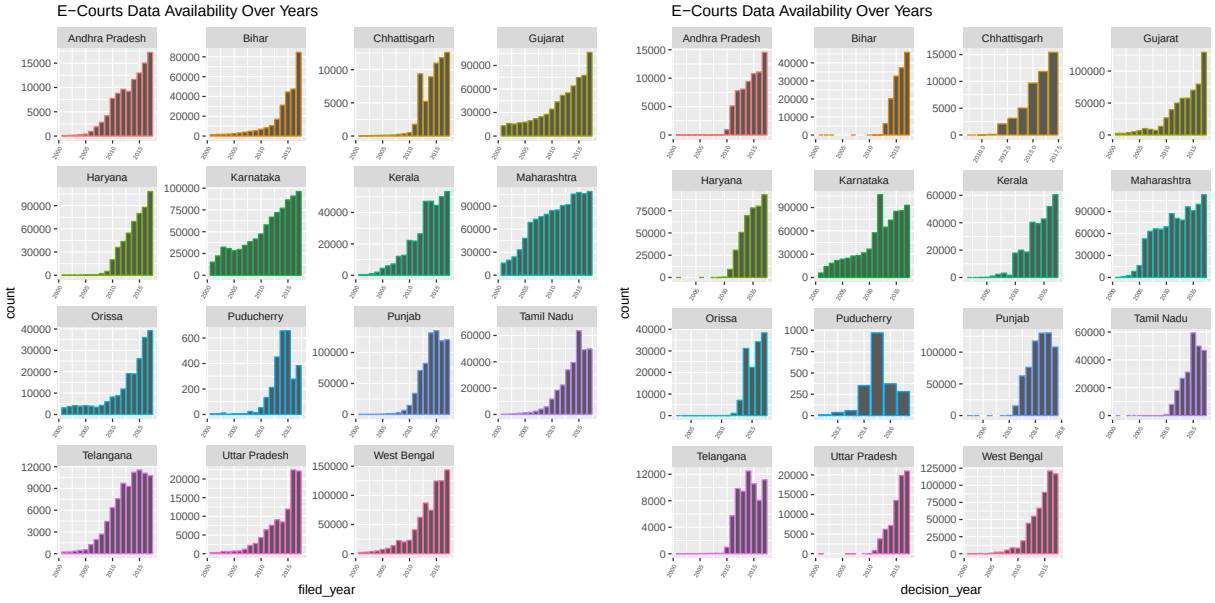
5. Create primary key as the standardized name, from step 3 to match with both case as well as firm datasets.

6. When more than one firm match with a case, that is when there are multiple entities involved as either petitioners or respondents, I select one matched firm at random. These many-to-one matches

are about 5% of the matches. In future, I plan to modify my algorithm to allow these types of scenarios.

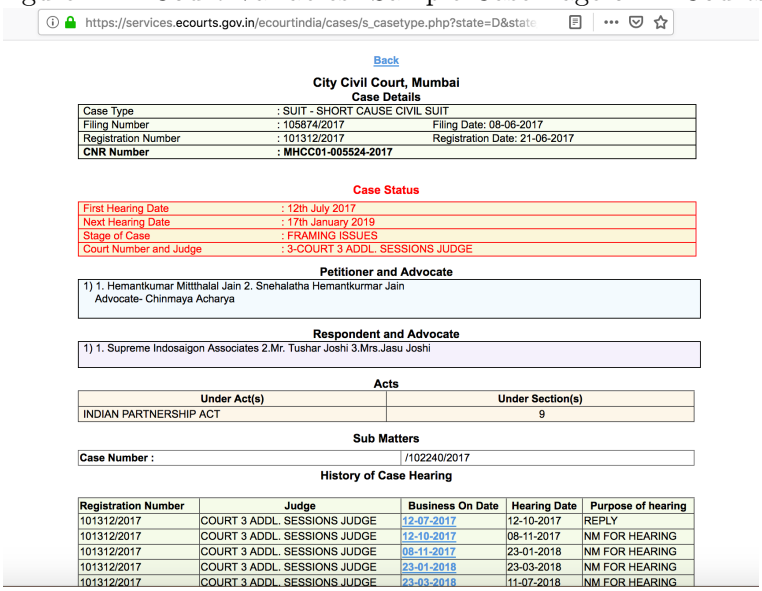
A.3 Appendix: Figures

Figure A.1: Data Availability



Notes: Above graphs show the histograms of cases by year of filing and year of disposal in this study's e-courts sample database. From these, we infer the correct period for analysis is between 2010 and 2018, when the universe of data from court functioning is available.

Figure A.2: Court Variables: Sample Case Page on E-Courts



https://services.ecourts.gov.in/ecourtindia/cases/s_casetype.php?state=D&state

Back

City Civil Court, Mumbai
Case Details

Case Type	: SUIT - SHORT CAUSE CIVIL SUIT	
Filing Number	: 105874/2017	Filing Date: 08-06-2017
Registration Number	: 101312/2017	Registration Date: 21-06-2017
CNR Number	**: MHCC01-005524-2017**	

Case Status

First Hearing Date	: 12th July 2017
Next Hearing Date	: 17th January 2019
Stage of Case	: FRAMING ISSUES
Court Number and Judge	: 3-COURT 3 ADDL. SESSIONS JUDGE

Petitioner and Advocate

1) 1. Hemantkumar Mittthalal Jain 2. Snehalatha Hemantkumar Jain
Advocate- Chinmaya Acharya

Respondent and Advocate

1) 1. Supreme Indosaigon Associates 2.Mr. Tushar Joshi 3.Mrs.Jasu Joshi

Acts

Under Act(s)	Under Section(s)
INDIAN PARTNERSHIP ACT	9

Sub Matters

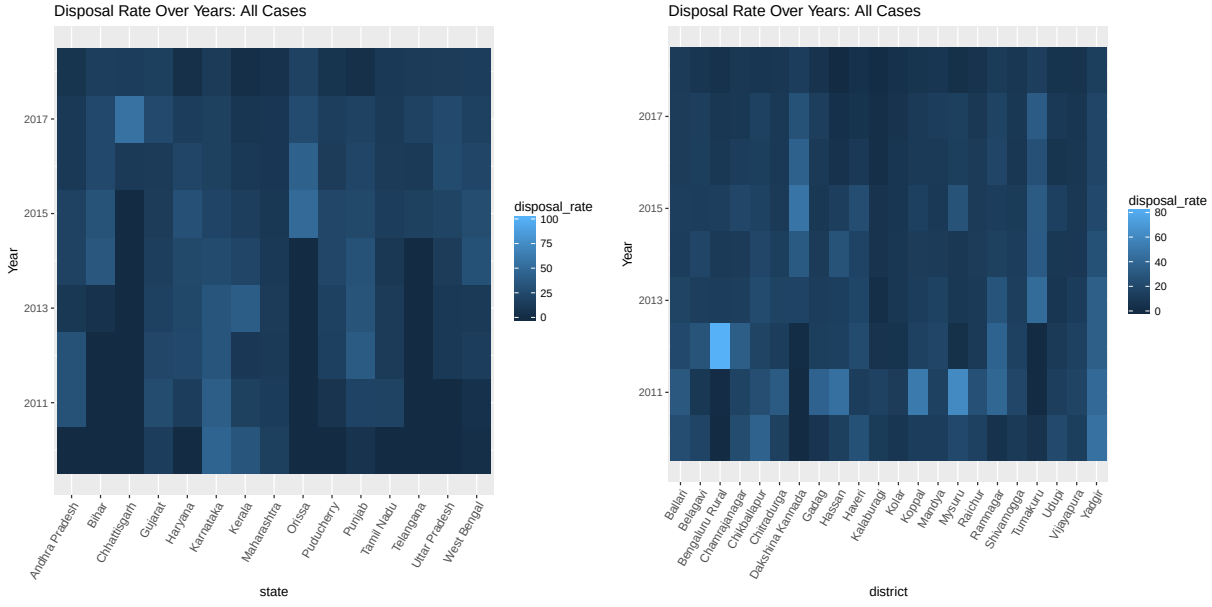
Case Number :	/102240/2017

History of Case Hearing

Registration Number	Judge	Business On Date	Hearing Date	Purpose of hearing
101312/2017	COURT 3 ADDL. SESSIONS JUDGE	12-07-2017	12-10-2017	REPLY
101312/2017	COURT 3 ADDL. SESSIONS JUDGE	12-10-2017	08-11-2017	NM FOR HEARING
101312/2017	COURT 3 ADDL. SESSIONS JUDGE	08-11-2017	23-01-2018	NM FOR HEARING
101312/2017	COURT 3 ADDL. SESSIONS JUDGE	23-01-2018	23-03-2018	NM FOR HEARING
101312/2017	COURT 3 ADDL. SESSIONS JUDGE	23-03-2018	11-07-2018	NM FOR HEARING

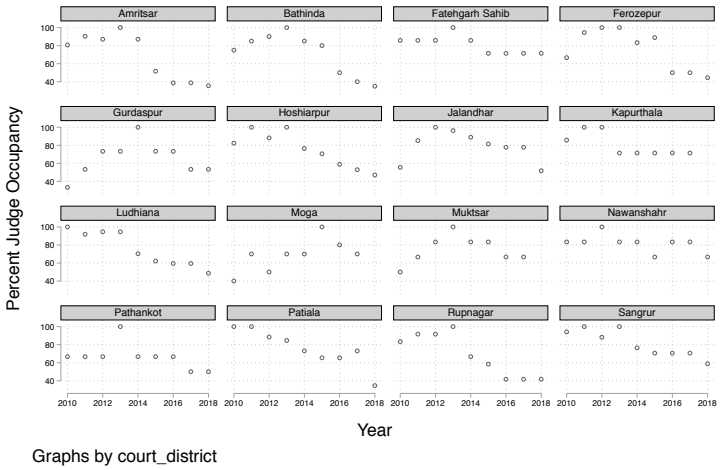
Notes: Note that these fields represent meta data of the case. Detailed description of cases are only available for a subset of resolved cases as they are made available by the respective courts. So, my dataset contains rich details on case attributes but no details on judgement.

Figure A.3: Distribution of Disposal Rate: An Example



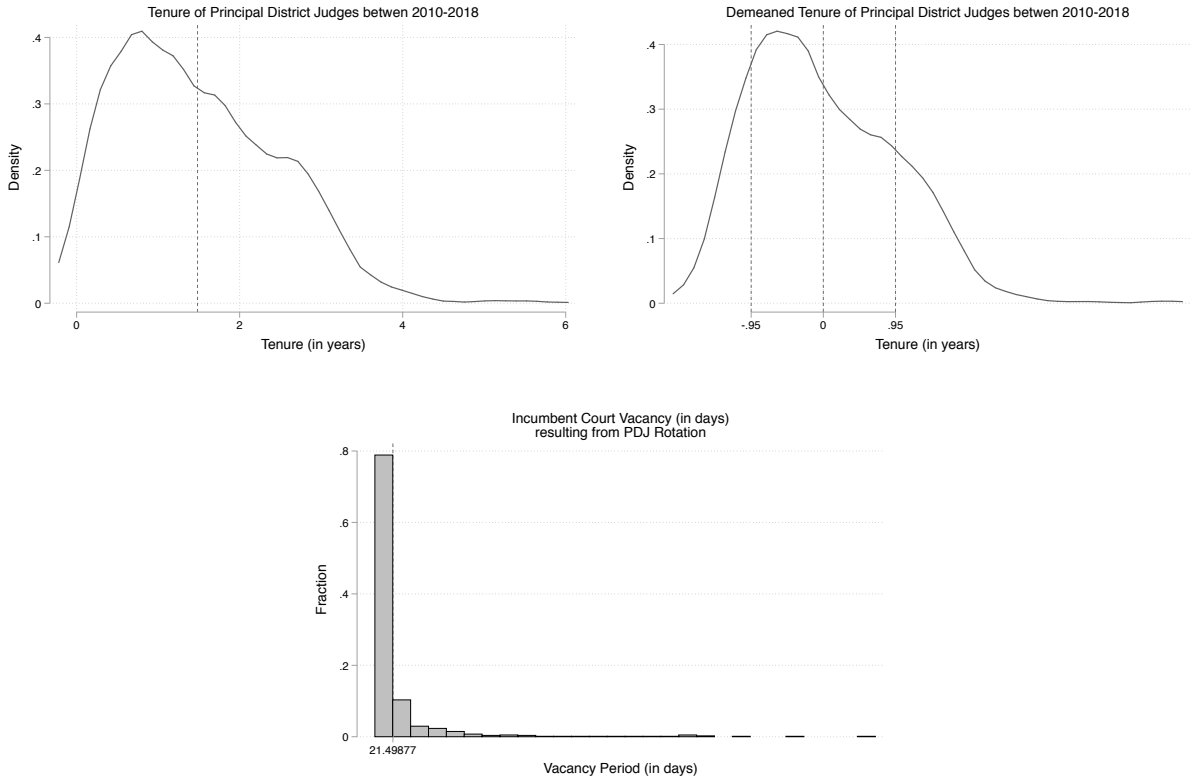
Notes: Above graphs show the distribution of disposal rate across states over time and across districts over time for an example state.

Figure A.4: Distribution of Judge Occupancy



Notes: Above graphs show the distribution of judge occupancy across districts for an example state.

Figure A.5: Judge Tenure: An Example of Principal District Judge



Notes: Above graphs show the distribution of turn-around and tenure of the highest position in the District and Session Court - the Principal District Judge.

A.4 Appendix: Tables

Table A.1: Study E-Courts Sample District Coverage

State	Districts in Sample	Total Districts in State	Fraction (Districts)
Andhra Pradesh	6	13	0.46
Bihar	17	39	0.44
Chhattisgarh	6	19	0.32
Gujarat	21	26	0.81
Haryana	16	21	0.76
Karnataka	22	30	0.73
Kerala	11	14	0.79
Maharashtra	16	35	0.46
Orissa	17	30	0.57
Punjab	17	20	0.85
Tamil Nadu	27	32	0.84
Telangana	3	10	0.3
Uttar Pradesh	4	71	0.06
West Bengal	13	19	0.68

Notes: Total districts from 2011 Census. The number of districts has changed since but the number of District and Sessions Courts in our sample and their jurisdictions haven't changed since 2011. Note that the sample takes into account formation of new state of Telangana from Andhra Pradesh in 2014, as reflected in the overall E-Courts database. However, the number of districts remain unchanged, with 10 districts of undivided Andhra Pradesh coming under Telangana.

Table A.2: Description of Firms Registered in Sample Court Districts

	(1)				
	Sample Mean	Sample SD	Not in Sample Mean	Not in Sample SD	Difference (p-val)
Number of firms per district	1854.135	1946.777	1447.903	1121.478	0.000
Firm Age (yrs)	27.996	18.818	24.777	14.894	0.000
Entity Type:					
Private Ltd	0.353	0.478	0.352	0.478	0.893
Public Ltd	0.641	0.480	0.642	0.479	0.848
Govt Enterprise	0.000	0.017	0.001	0.033	0.016
Foreign Enterprise	0.000	0.012	0.000	0.008	0.493
Other Entity	0.006	0.076	0.005	0.069	0.243
Ownership Type:					
Privately Owned Indian Co	0.750	0.433	0.717	0.450	0.000
Privately Owned Foreign Co	0.025	0.157	0.026	0.160	0.623
State Govt Owned Co	0.015	0.122	0.019	0.136	0.017
Central Govt Owned Co	0.008	0.091	0.012	0.108	0.003
Business Group Owned Co	0.201	0.401	0.226	0.418	0.000
Finance vs. Non-Finance:					
Non Finance Co	0.789	0.408	0.831	0.375	0.000
Non Banking Finance Co	0.208	0.406	0.166	0.372	0.000
Banking Co	0.003	0.053	0.003	0.050	0.675
Broad Industry:					
Trade, Transport, and Logistics	0.150	0.357	0.139	0.346	0.011
Construction Industry	0.054	0.226	0.086	0.280	0.000
Business Services	0.300	0.458	0.282	0.450	0.001
Commercial Agriculture	0.031	0.173	0.025	0.157	0.006
Mining	0.033	0.179	0.028	0.165	0.014
Manufacturing	0.432	0.495	0.439	0.496	0.194
Companies in Study Sample	13298				
Companies Not in Study Sample	15042				
Districts without Companies in Prowess	34				

Notes: “Not in Sample" excludes Delhi and Mumbai, which are the two largest cities in India also appearing among top global cities. For better comparison, firms in my study sample need to be compared with those registered in similar districts not in my sample. Finally, all firms considered for analysis are those incorporated before 2010.

Table A.3: Description of Firms by Litigant Type

	(1)								
	Petitioner Only	SD	Respondents Only	SD	Both	SD	Petitioner vs. Both	Respondent vs. Both	Only Pet. vs. Only Resp.
Firm Age (yrs)	33.124	19.972	30.120	18.342	38.069	24.158	0.0000	0.0000	0.0000
Entity Type:									
Private Ltd	0.288	0.453	0.317	0.466	0.215	0.411	0.0000	0.0000	0.0000
Public Ltd	0.702	0.458	0.667	0.471	0.757	0.429	0.0002	0.0000	0.0000
Govt Enterprise	0.000	0.000	0.001	0.034	0.001	0.024	0.3228	0.5045	0.8439
Foreign Enterprise	0.000	0.000	0.003	0.052	0.004	0.062	0.0088	0.5149	0.0920
Other Entity	0.010	0.100	0.011	0.106	0.024	0.152	0.0017	0.0015	0.0001
Ownership Type:									
Privately Owned Indian Co	0.701	0.458	0.677	0.468	0.501	0.500	0.0000	0.0000	0.0000
Privately Owned Foreign Co	0.040	0.195	0.045	0.206	0.045	0.208	0.3933	0.9077	0.6245
State Govt Owned Co	0.019	0.137	0.019	0.137	0.066	0.249	0.0000	0.0000	0.0000
Central Govt Owned Co	0.015	0.120	0.020	0.141	0.054	0.225	0.0000	0.0000	0.0000
Business Group Owned Co	0.226	0.418	0.239	0.427	0.334	0.472	0.0000	0.0000	0.0000
Finance vs. Non-Finance:									
Non Finance Co	0.842	0.364	0.879	0.326	0.796	0.403	0.0003	0.0000	0.0000
Non Banking Finance Co	0.150	0.357	0.113	0.317	0.156	0.363	0.6467	0.0000	0.0044
Banking Co	0.007	0.082	0.007	0.086	0.048	0.214	0.0000	0.0000	0.0000
Broad Industry:									
Trade, Transport, and Logistics	0.155	0.362	0.181	0.385	0.153	0.360	0.8781	0.0166	0.1008
Construction Industry	0.085	0.279	0.097	0.296	0.119	0.324	0.0008	0.0235	0.0016
Business Services	0.233	0.423	0.199	0.399	0.256	0.436	0.1110	0.0000	0.0002
Commercial Agriculture	0.028	0.166	0.023	0.149	0.024	0.152	0.3969	0.8146	0.7816
Mining	0.029	0.169	0.036	0.185	0.040	0.195	0.0895	0.4703	0.1910
Manufacturing	0.469	0.499	0.465	0.499	0.409	0.492	0.0003	0.0002	0.0000
Petitioner Only	1770								
Respondents Only	2558								
Both	1810								

Notes: All firms in the table above are those registered in any of the sample court districts. Firms can be involved in cases either in its home district or in any other district based on the case jurisdiction. A firm is coded as petitioner only if the firm appears only as a petitioner in the sample court data. Similarly for respondent only. Firms that appear as petitioner as well as respondent are coded as "Both".

Table A.4: Correlations Between the Measures of Overall Court Output

	(1)						
	Log Disposal Rate	Log Speed Firm	Log Number Filed	Log Number Disposed	Log Case Duration	Log Share Dismissed	Log Appeal
Log Disposal Rate	1.00						
Log Speed Firm	0.92***	1.00					
Log Number Filed	0.65***	0.67***	1.00				
Log Number Disposed	0.69***	0.84***	0.75***	1.00			
Log Case Duration	-0.07**	0.14***	-0.08**	0.03	1.00		
Log Share Dismissed	0.25***	0.22***	0.11***	0.21***	-0.06*	1.00	
Log Appeal	0.09***	0.10***	0.14***	-0.10***	0.10***	0.08**	1.00
Observations	1755						

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: All measures except duration are highly correlated with the disposal rate measure.

A.5 Appendix: Tables Testing Tenure Independence

Table A.5: District Time-Varying Outcomes and Judge Tenure

	(1)	(2)	(3)	(4)	(5)
	Log Pop Density	Log % Sown Area (t-1)	Log % Sown>1(t-1)	Log Crime per cap (t-1)	Log Bailable Crime per cap (t-1)
PDJ Tenure	-0.0271	-0.00436	-0.0171	0.0331	0.116
	(0.0277)	(0.00582)	(0.0407)	(0.0383)	(0.105)
Observations	319	224	224	103	103
District Fixed Effects	No	Yes	Yes	Yes	Yes
Other Fixed Effects	State, State-Year FE	State, State-Year FE	State, State-Year FE	State, State-Year FE	State, State-Year FE
F-Stat	0.950	0.560	0.180	0.750	1.210
Adj R-Squared	0.600	0.980	0.950	0.950	0.820
Mean Dep Var	534.6	54.22	25.95	0.00214	0.000362
SD Dep Var	327.3	19.61	27.21	0.00135	0.000273

Standard errors in parentheses

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

Note: All standard errors are clustered at the district-year level.

Table A.6: Independence: Past Firm Outcomes and Judge Tenure

	(1) Log Sales (t-1)	(2) Asinh Profit (t-1)	(3) Log Wage Bill (t-1)	(4) Log Plant Value (t-1)	(5) Log Land Value (t-1)
Log Judge Tenure (PDJ)	-0.119	-0.300	0.0520	-0.0981	0.0319
	(0.107)	(0.202)	(0.0704)	(0.0917)	(0.0961)
Observations	1856	2278	2021	1874	1852
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Court-State Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
Court District FE	Yes	Yes	Yes	Yes	Yes
F-Stat	51.3	57.65	116.24	17.62	15.55
Adj R-Squared	.27	.07	.28	.2	.1

Standard errors in parentheses

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

Note: All standard errors are clustered at the district-year level.

Table 7: Robustness Check Firm Borrowing: Clustering by State-Year

	(1) Observations	(2) OLS	(3) 2SLS	(4) Reduced Form
Borrowing from Bank	9297	0.0257	0.385	0.00502**
		(0.0366)	(0.237)	(0.00240)
Total Lending	227	0.212**	0.979*	0.0238***
		(0.0863)	(0.514)	(0.00638)
NBFC Lending	611	0.0819	1.163	0.0127*
		(0.170)	(0.738)	(0.00685)
Year Fixed Effects		Yes	Yes	Yes
Court-State Time Fixed Effects		Yes	Yes	Yes
Court District FE		Yes	Yes	Yes
Firm Controls		Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The row headers indicate the dependent variable and the columns 2 - 3 provide the coefficients on disposal rate from OLS and 2SLS estimations respectively, and column 4 provides the reduced form coefficients on judge occupancy. All standard errors are clustered at the state-year level.

Table 8: Robustness Check Firm Borrowing: Clustering by District

	(1) Observations	(2) OLS	(3) 2SLS	(4) Reduced Form
Borrowing from Bank	9297	0.0257	0.385	0.00502*
		(0.0435)	(0.251)	(0.00296)
Total Lending	227	0.212*	0.979**	0.0238***
		(0.120)	(0.349)	(0.00791)
NBFC Lending	611	0.0819	1.163	0.0127*
		(0.139)	(0.774)	(0.00641)
Year Fixed Effects		Yes	Yes	Yes
Court-State Time Fixed Effects		Yes	Yes	Yes
Court District FE		Yes	Yes	Yes
Firm Controls		Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The row headers indicate the dependent variable and the columns 2 - 3 provide the coefficients on disposal rate from OLS and 2SLS estimations respectively, and column 4 provides the reduced form coefficients on judge occupancy. All standard errors are clustered at the district level.

Table 9: Robustness Check Firm Outcomes: Clustering by State-Year

	(2) OLS	(3) 2SLS	(4) Reduced Form
Log Revenue from Sales	-0.0323	0.0976*	0.000264
	(0.0338)	(0.0585)	(0.00157)
Asinh Profit	0.00309	0.256*	0.00528
	(0.0497)	(0.139)	(0.00380)
Log Wage Bill	0.0245	0.202***	0.00381***
	(0.0183)	(0.0540)	(0.00132)
Log Employees	-0.0158	0.0441	0.000756
	(0.0392)	(0.137)	(0.00248)
Log Land Value	-0.0181	0.0249	0.000473
	(0.0160)	(0.0532)	(0.00131)
Log Plant Value	-0.0266	-0.0318	-0.00207*
	(0.0222)	(0.0714)	(0.00115)
Year Fixed Effects	Yes	Yes	Yes
Court-State Time Fixed Effects	Yes	Yes	Yes
Court District FE	Yes	Yes	Yes
Firm Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The row headers indicate the dependent variable and the columns 2 - 3 provide the coefficients on disposal rate from OLS and 2SLS estimations respectively, and column 4 provides the reduced form coefficients on judge occupancy. All standard errors are clustered at the state-year level.

Table 10: Robustness Check Firm Outcomes: Clustering by District

	(2) OLS	(3) 2SLS	(4) Reduced Form
Log Revenue from Sales	-0.0323	0.0976	0.000264
	(0.0390)	(0.0700)	(0.00172)
Asinh Profit	0.00309	0.256	0.00528
	(0.0539)	(0.175)	(0.00456)
Log Wage Bill	0.0245	0.202***	0.00381***
	(0.0211)	(0.0690)	(0.00145)
Log Employees	-0.0158	0.0441	0.000756
	(0.0417)	(0.194)	(0.00358)
Log Land Value	-0.0181	0.0249	0.000473
	(0.0161)	(0.0818)	(0.00166)
Log Plant Value	-0.0266	-0.0318	-0.00207
	(0.0210)	(0.0796)	(0.00136)
Year Fixed Effects	Yes	Yes	Yes
Court-State Time Fixed Effects	Yes	Yes	Yes
Court District FE	Yes	Yes	Yes
Firm Controls	Firm Level Controls	Firm Level Controls	Firm Level Controls

Standard errors in parentheses

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

Notes: The row headers indicate the dependent variable and the columns 2 - 3 provide the coefficients on disposal rate from OLS and 2SLS estimations respectively, and column 4 provides the reduced form coefficients on judge occupancy. All standard errors are clustered at the district level.

References

Acemoglu, D. and Johnson, S. (2005). Unbundling Institutions. *Journal of Political Economy*, 113(5):949–995.

Ahsan, R. N. (2013). Input tariffs, speed of contract enforcement, and the productivity of firms in India. *Journal of International Economics*, 90(1):181–192.

Amirapu, A. (2017). Justice delayed is growth denied: The effect of slow courts on relationship-specific industries in India. Working Paper 1706, School of Economics Discussion Papers.

Anderson, S. (2018). Legal Origins and Female HIV. *American Economic Review*, 108(6):1407–1439.

Angrist, J. D. and Imbens, G. W. (1995). Identification and Estimation of Local Average Treatment Effects. Working Paper 118, National Bureau of Economic Research.

Banerjee, A. V. (2003). *Contracting Constraints, Credit Markets, and Economic Development*, volume 3 of *Econometric Society Monographs*, page 1?46. Cambridge University Press.

Banerjee, A. V. and Duflo, E. (2014). Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program. *The Review of Economic Studies*, 81(2):572–607.

Bertrand, M., Duflo, E., and Mullainathan, S. (2004). How Much Should We Trust Differences-In-Differences Estimates? *The Quarterly Journal of Economics*, 119(1):249–275.

Besley, T. and Burgess, R. (2004). Can Labor Regulation Hinder Economic Performance? Evidence from India. *The Quarterly Journal of Economics*, 119(1):91–134.

Besley, T. and Coate, S. (1995). Group lending, repayment incentives and social collateral. *Journal of Development Economics*, 46(1):1–18.

Burgess, R. and Pande, R. (2005). Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment. *American Economic Review*, 95(3):780–795.

Cameron, A. C. and Miller, D. L. (2015). A Practitioner's Guide to Cluster-Robust Inference. *Journal of Human Resources*, 50(2):317–372.

Chaurey, R. (2015). Labor regulations and contract labor use: Evidence from Indian firms. *Journal of Development Economics*, 114:224–232.

Chemin, M. (2009a). Do judiciaries matter for development? Evidence from India. *Journal of Comparative Economics*, 37(2):230–250.

Chemin, M. (2009b). The impact of the judiciary on entrepreneurship: Evaluation of Pakistan's "Access to Justice Programme". *Journal of Public Economics*, 93(1-2):114–125.

Chemin, M. (2012). Does Court Speed Shape Economic Activity? Evidence from a Court Reform in India. *The Journal of Law, Economics, and Organization*, 28(3):460–485.

Coase, R. H. (1960). The Problem of Social Cost. *The Journal of Law & Economics*, 3:1–44.

Daksh (2017). Access to Justice Survey, 2017 – An Introduction.

Dimitrova-Grajzl, V., Grajzl, P., Sustersic, J., and Zajc, K. (2012). Court output, judicial staffing, and the demand for court services: Evidence from Slovenian courts of first instance. *International Review of Law and Economics*, 32(1):19–29.

Djankov, S., La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (2003). Courts. *The Quarterly Journal of Economics*, 118(2):453–517.

Dutta, P., Hans, M., Mishra, M., Patnaik, I., Regy, P., Roy, S., Sapatnekar, S., Shah, A., Singh, A. P., and Sundaresan, S. (2019). How to Modernise the Working of Courts and Tribunals in India. Technical Report id:13028, eSocialSciences.

Glaeser, E. L. and Shleifer, A. (2003). The Rise of the Regulatory State. *Journal of Economic Literature*, 41(2):401–425.

Goldberg, P. K., Khandelwal, A. K., Pavcnik, N., and Topalova, P. (2010). Imported Intermediate Inputs and Domestic Product Growth: Evidence from India. *The Quarterly Journal of Economics*, 125(4):1727–1767.

Grossman, S. and Hart, O. (1986). The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy*, 94(4):691–719.

Kondylis, F. and Stein, M. (2018). Reforming the Speed of Justice: Evidence from an Event Study in Senegal. *The World Bank Working Paper Series*, page 65.

Kornhauser, L. A. and MacLeod, W. B. (2010). Contracts between Legal Persons. Working Paper 16049, National Bureau of Economic Research.

North, D. C. (1986). The New Institutional Economics. *Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift für die gesamte Staatswissenschaft*, 142(1):230–237.

North, D. C. (1991). Institutions. *Journal of Economic Perspectives*, 5(1):97–112.

Nunn, N. (2007). Relationship-Specificity, Incomplete Contracts, and the Pattern of Trade. *The Quarterly Journal of Economics*, 122(2):569–600.

Ponticelli, J. and Alencar, L. S. (2016). Court Enforcement, Bank Loans, and Firm Investment: Evidence from a Bankruptcy Reform in Brazil. *The Quarterly Journal of Economics*, 131(3):1365–1413.

Rajan, R. G. and Zingales, L. (1998). Financial Dependence and Growth. *The American Economic Review*, 88(3):559–586.

Visaria, S. (2009). Legal reform and loan repayment: The microeconomic impact of debt recovery tribunals in India. *American Economic Journal: Applied Economics*, 1(3):59–81.

von Lilienfeld-Toal, U., Mookherjee, D., and Visaria, S. (2012). THE DISTRIBUTIVE IMPACT OF REFORMS IN CREDIT ENFORCEMENT: EVIDENCE FROM INDIAN DEBT RECOVERY TRIBUNALS. *Econometrica*, 80(2):497–558.

Williamson, O. E. (1998). Transaction Cost Economics: How It Works; Where It is Headed. *De Economist*, 146(1):23–58.

Yang, C. S. (2016). Resource Constraints and the Criminal Justice System: Evidence from Judicial Vacancies. *American Economic Journal: Economic Policy*, 8(4):289–332.