

# Whither Justice?: Judicial Capacity Constraints Worsens Trial and Litigants' Outcomes

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## Abstract

How does judge vacancy affect trial-level and litigant outcomes? Emerging economies like India suffer from state capacity constraints that affect economic outcomes. While insufficiency in the number of public teachers and health-workers in providing human capital development services has received increasing attention in economics, capacity constraints in the judiciary has rarely been discussed. In this paper, I examine the role of judge vacancy on the proceedings of ongoing trials and subsequent effects on litigant outcomes in India. The system of annual judge assignment to district courts shifts the existing high level of vacancies across courts that varies orthogonally to existing trial and litigant outcomes, enabling causal identification. First, the duration of trial increases when an ongoing trial experiences judge vacancy relative to other trials in the same court that do not. Second, this shock negatively affects wage bill and decreases the asset value of plaintiff firms whereas the effects are smaller and statistically indistinguishable from zero for defendant firms. Third, the large negative effect for plaintiff firms is likely to occur due to increase in the number of dismissals resulting from vacancy. Given that smaller firms are more likely to use the formal judicial system as a plaintiff relative to larger firms, weaker judicial capacity disproportionately affects them leading to equity concerns.

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# 1 Introduction

Disputes in economic transactions require timely resolution in which courts play a central role. Judicial capacity, measured as number of judge available in a court, has both direct effects on litigants as well as indirect effects through market-based channels. An analogy with the health-care system is apt here. The judiciary has a direct effect on litigants through the efficiency of its functioning, just like how well-equipped hospitals and health clinics are for patient outcomes. However, the judiciary also has an indirect effect on the overall economy through market-based channels similar to public health benefits of well functioning health-care institutions. Efficiency of judicial institutions and its personnel are important aspects of state capacity, which is relatively understudied compared to the functioning of bureaucrats or elected representatives. This paper draws attention to the front-line effect of judicial institutions on economic agents that actively engage the court system as litigants.

The judge to population ratio for every million in the US is 100, in Sweden it is 213, whereas in India it is 20. Each judge presides over a courtroom within a trial court where all active trials are assigned to a specific courtroom at the time of their filing. Not only is the sanctioned judge strength small, a large fraction - close to 25% of these positions are vacant. Vacancy in any given court occurs due to retirements, transfers, resignations, or death. In this paper I examine how judge vacancy in trial courts in India affects litigant outcomes. For an ongoing trial whose lifecycle lasts multiple years, I exploit plausibly random occurrence of vacancy within the lifecycle of a trial after accounting for case characteristics, time-invariant and time-varying unobservables through courtroom and court-year fixed effects, respectively. That is, the identifying variation is driven by variation between trials that experience vacancy during their life-time and those that do not within the same courtroom in the same district court.<sup>1</sup>

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<sup>1</sup>Courtroom fixed effects absorbs time invariant unobserved characteristics such as available infrastructure, location, typical complexity or characteristic of cases assigned, etc. Court-year fixed effects accounts for time-varying unobservables at the level of the district court. This includes court level infrastructure upgrades,

The problem of persisting vacancies in the Indian judiciary, coupled with the system of frequent reassignment of judges to different courts that keep their tenure short, shifts the vacancies across courts over time. Further, annual assignments are announced at the same time for all courts in a state. For example, if Judge X in Court A is transferred in April (the typical month when transfers are announced), then unless there is another judge assigned to Court A at the same time, the seat held by Judge X will remain vacant at least until the next season of transfers (i.e. next year). Since the total number of judges is less than the total sanctioned judge positions or courtrooms, the vacancies sometimes last more than a year. Therefore, cases that were filed in the courtroom before Judge X is transferred will experience a vacancy shock compared to cases that were filed in the same courtroom but whose lifecycle did not straddle a vacancy. Consistent with this argument, I find no significant pre-trends in the rate of filing and trial resolutions in the years prior to the vacancy. On the other hand, trial resolutions drop significantly in the subsequent 1-2 years, adding to growing backlog. The composition of cases do not affect these patterns either. In other words, the vacancy does not coincide with any significant pre-trends in cases pertaining to specific types of litigants and the drop in resolution subsequent to vacancy occurs consistently across litigant types.

The first set of outcomes that I examine pertain to that of the trials, including overall case duration, number of hearings, whether uncontested by defendant, and whether dismissed by the judge. While case duration and number of hearings help measure the trial process, rate of contestation and dismissals provide measures of trial outcome. These latter two variables capture the choice made by either the defendant in pursuing the case or the judge in admitting the case for full trial, respectively, therefore, providing information on trial outcomes. Vacancy increases case duration by 0.3 SD or 168 days. They are 15.3 percentage points more

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changes to court-wide administrative rules, time-varying characteristics of the court's jurisdiction including district specific population and economic growth dynamics, etc.

likely to be uncontested by defendants, and 7.4 percentage points more likely to be dismissed by the subsequent judges without completing the full trial process. On the other hand, there is no meaningful difference in the total number of hearings. Since I am interested in identifying the welfare effects of vacancy on litigants, I restrict the trial sample to the subset of trials where I matched litigants to a sample of formal sector firms. The average treatment effects are similar - the case duration increases by similar magnitude (147 days extension), likelihood that the trial is uncontested remains stable around 16 percentage points, however the probability of dismissal without full trial doubles to 15 percentage points. Statistically, the total number of hearings reduces but the effect size is less than 0.05 SD, which is very small. However, whether the litigating firm appears as a plaintiff or as a defendant matters whether the case is likely to be dismissed. Judge vacancy increases the rate of dismissals for plaintiff firms by 22.5 percentage points whereas it does not affect trials where firms appear as a defendant. The remaining trial outcomes do not differentially vary by the litigant status of the matched firms. If the nature of trials are likely to be similar whether or not firms appear as a plaintiff or as a defendant, then we shouldn't see a differential dismissal rate. Indeed, I do not see any differential effects on other case outcomes including duration even after accounting for the nature of the trial through case-type fixed effect. The differential dismissal implies that the plaintiff firm may need to re-file the suit or seek alternate means of dispute resolution. This could have particular equity concerns if plaintiff firms are more likely to be smaller and have fewer assets than defendant firms.

To examine the effect on litigant firm outcomes, I employ the panel nature of the firms' balance sheet data. Owing to the fact that the firms can be engaged in litigation across multiple courts as well as in multiple litigations within the same court, I redefine the shock from judicial incapacity as a dummy variable that takes value 1 if any of the ongoing trials involving the firm experiences judge vacancy. Identifying the effects of judicial incapacity on litigant outcome is hard because it is hard to pin down the location of the relevant court.

I overcome this by using detailed trial data matched with firm data, which enables me to identify the set of relevant courts where the firm has an ongoing litigation and address the causal effect of judge vacancy. I find that judge vacancy decreases legal expenditure, wage bill, and asset value of plaintiff firms by 7.5, 10, and 12 percent respectively. On the other hand, the effects are substantially lower for defendant firms. The stronger negative effects experienced by plaintiff firms also coincide with the fact that such firms are more likely to have their trials dismissed. Since smaller firms are more likely to initiate litigation as a plaintiff in these trial courts, the results likely imply equity consequences of judicial incapacity. Although I cannot disentangle whether observed dismissals arise from judge incentives or litigants' incentives, not completing the full trial process is likely a negative outcome for the plaintiff. It is likely that trials get backed up when there is a vacancy and the subsequent judge has to deal with a larger docket that may alter their incentives and therefore, their decisions. For example, a larger docket of backlogged trials may motivate judges to dismiss more cases than they would have in a counterfactual scenario.

Judges are key to the functioning of the judiciary. They are public officials recruited by the state through a competitive selection process that typically requires a degree in law and minimum number of years of experience practicing law. A vast literature on the economics of crime ([Rehavi and Starr 2014](#); [Yang 2016](#); [Arnold et al. 2018](#); [Rose and Shem-Tov 2018](#); [Norris et al. 2020](#)) and bankruptcy proceedings ([Müller 2020](#)) in the context of Western democracies highlight the importance of judges' decision-making in determining the outcomes of litigants and litigant households. On the other hand, there is not much evidence on the role of judges and their effects on litigants engaged in civil disputes or in the context of developing economies where state capacity is relatively weak. [Kondylis and Stein \(2018\)](#) highlight positive response by firms to improved pre-trial process in Senegal, requiring civil judges to complete all pre-trial proceedings within a stipulated time period. However, a big challenge in any economy is whether there are enough judges to meet the demand for judicial

services. The appointments need to keep up with the demand for judiciary and ensure that periodic vacancies are addressed in a timely manner. Structural vacancies are a capacity constraint and lead to delays in the litigation process, resulting in backlogs of trials.<sup>2</sup>

This paper contributes to the literature on the organizational economics of public sector and governance institutions on the quality of “service” delivery. [Chaudhury et al. \(2006\)](#) highlight the problem of absenteeism among front-line public service providers that ranges between 19 percent among public school teachers and 35 percent among healthcare workers. [Banerjee et al. \(2004\)](#) show that high rates of absence among public healthcare workers is associated with higher expenditure incurred by local population on healthcare, including costs of multiple trips and increased visits to traditional, untrained, unregulated healers. [Finan et al. \(2015\)](#) summarize the personnel economics of public sector employees, exploring the role of selection, incentives, and monitoring behind the quality of service delivery. While a majority of the literature in this area focus on absenteeism as a measure of state capacity, this paper adds to the limited evidence on the organizational capacity of front-line judicial sector measured as judge vacancy in trial courts. Frequent vacancies in courts increase the trial duration and worsen other trial related outcomes. These have negative consequences, specifically for smaller firms that rely on courts to adjudicate transactional and contractual disputes.

A large literature on legal studies in the context of United States and other western democracies examine dispute resolution in relation to corporate finance (e.g. bankruptcy reforms). However, we do not know much about how courts function in these contexts let alone in the context of developing economies. For example, is congestion of ongoing trials in courts a big barrier in the functioning of financial markets in the United States? If so, what are

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<sup>2</sup>In the United States, appointment of judges is a highly political process. On the other hand, in India and many other former British commonwealth nations, judges are appointed by the higher judiciary, independent of the executive.

the drivers of congested courts? Müller (2020) shows that a reform to 2005 bankruptcy law in the United States substantially reduced the backlog of cases in bankruptcy courts, which subsequently improved the functioning of credit markets through increased recovery and leverage. Visaria (2009) and Ponticelli and Alencar (2016) show the effects of lowering congestion in courts through bankruptcy reforms in India and Brazil respectively and their subsequent impact on credit markets. All these papers use shocks to the filing of trials that subsequently reduce the backlog in courts or take the existing distribution of backlog as given. This paper complements this literature by emphasizing the role of organizational capacity - excessive vacancies in judge positions leading to negative consequences on the quality of judicial service. I show that this is specifically important for the growth of the corporate sector (formal sector firms) in developing economies and potentially for other types of litigants, that should be examined in future research.

The rest of the paper is structured as follows. Section 2 describes the institutional context of trial processing in trial courts in India. Section 3 describes the datasets and summarizes key variables used in the analyses. I present the empirical strategy in section 4 and present the results in section 5. Section 6 concludes.

## 2 Context

The court of interest is the District and Sessions Court, which is the principal court within the district trial court system in India. Each courtroom is headed by one judge, who is frequently rotated to a new district court at the end of their relatively short tenure. A large share - roughly 23 % - of these courtrooms are vacant. Due to frequent rotation of judges, the vacancy occurs during different years even within the same courtroom in a district court.

The workflow of a trial in a court is as follows. Cases are filed with the registrar by the plaintiff or their lawyer. Many courts have dedicated filing counters and the process in-

volves filling up an application with the details of the suit and paying the registration fee. Once a case is successfully registered, the court administration system assigns the case to a courtroom. The system of assignment is not randomized and depends on the discretion of the administrative judge for the court. Once it is assigned, the judge and clerks associated with the relevant courtroom set the first hearing date and the trial subsequently begins.

A trial must complete various stages before the final judgement. These begin with issuing summons to the defendant. If the defendant does not appear after the summons, the trial proceeds ex-parte, i.e. the judgement is based on the arguments and evidence provided by the plaintiff alone. If the defendant responds, then the defending party provides written statement of objections or contentions and the trial proceeds by framing of issues, examining evidence and arguments put forth by both sides before judgement is pronounced. However, the trial may be dismissed at any of these stages if the complaint is not valid as per applicable laws or if either of the parties fail on their part in providing evidence or appearing during hearings.

Within this system of trial litigation through district courts in India, there is no pre-trial hearings or intervention before a case is officially filed in a court. The judge themselves determine whether the suit warrants a full trial after issuing summons to the defendants, studying the formal written responses and framed issues. Subsequently, once the trial begins, the case may be dismissed on different accounts or can complete the full trial as per the judge's decision. A dismissal after multiple hearings is potentially a welfare loss for the litigants as they don't get full redressal in the form of a formal decree that can be executed. The loss is likely worse for the plaintiff, who may have no other means of dispute resolution. For example, small firms often do not have a separate legal team or have access to a complex system of arbitration that can be held outside the courts. Such firms may have to appeal or re-file the case after addressing the reasons for dismissal, often costing them more.



Trial courts are additionally important because they provide execution orders to promulgate decisions from any other quasi-judicial body or arbitration proceedings. So, even if trial resolution is done outside the court system, a judge is required to hear the petition for executing the orders, known as execution petition. Delays in addressing execution petition is problematic because it delays obtaining legal status to a dispute resolution order that has already been concluded. Firms are also more likely to engage in execution petitions on orders from arbitration proceedings and other quasi-judicial bodies.

The role of judicial capacity is therefore to provide both timely as well as fair judgement following due process. In this paper, I focus on the timeliness aspect whereas it is likely that the two interact. While I do not have data to be able to classify the fairness in judgements, I use outcomes of litigation such as whether they remain uncontested or dismissed without full trial as complementary measures of quality to shed light on the front-line effects of judicial capacity on litigant welfare.

## **3 Data**

In this section, I describe the datasets I use for analyses. There are two key datasets - one covering the universe of trials in a sample of district courts and another containing annual balance sheet data of a sample of formal sector firms.

### **3.1 Trial Data**

To study the effect of judicial capacity on trial and litigant outcome, I exploit the universe of ongoing trials between 2010 and 2018 across 1967 courtrooms in 195 district courts in India that I assembled from case meta data from the e-courts database. I observe ongoing trials filed before 2010, trials filed during the period, as well as trials resolved in each of

the years in the sample, which add up to 6.96 million unique trials. 5.25 million trials are filed in or after 2010 with full set of available fields. The meta data also includes the trial characteristics including dispute type and litigant identity and outcomes constructed out of time-stamps including case duration in days, total number of hearings, and case outcome. The data does not include the details of the ruling or judgement order, which is available as a text file attachment for the set of trials that undergo full trial.

## **3.2 Firms Data**

I use annual firm-level panel data comprising a sample of formal sector firms in India known as the Prowess dataset curated by Center for Monitoring Indian Economy (CMIE). The dataset contains many variables of firm performance including balance sheet information, required under public disclosure laws. In addition, the dataset contains detailed characteristics of the firm including industry, sector, and ownership details. For the purposes of analyses in this paper, I focus on five key variables from this dataset determined ex-ante. These include legal expenditure, wage bill, asset value, sales revenue, and accounting profit. The variables are transformed using inverse hyperbolic sine transformation as is standard in the literature. This also enables interpreting the effect in terms of percentage change in the outcomes of interest.

The sampling frame of firms to examine the effect of judicial capacity includes all non-banking firms with at least one ongoing case in the court sample. Whereas banks intensively use courts for debt recovery related contractual disputes that I explore in detail in an accompanying paper, this paper focuses on the effect of courts on manufacturing and service sector firms' production outcomes, including legal expenditure, wage bill, asset value, sales revenue, and accounting profit.

### 3.3 Matching Trials with Firms

The trial data provides identifying information on the litigants, which I use as a key to fuzzy-match with the firms panel data. The matching algorithm uses a combination of regular expressions allowing spelling errors, spaces and special characters, and manual verification of the resulting matches across all 5351 matched firms. 5236 of these firms are non-banking firms, which form the sample of interest.

The matched firms have an average of 91 trials and a median of 2 trials. These are filed in different courts, including those other than the location of the firms' registered office. The location of the trial is determined by the relevant jurisdiction depending on the dispute. Typically, an aggrieved firm would file a plaintiff against the defendant in the court corresponding to the defendant location or the location of the damage. As a result, a litigating firm has multiple trials across different district courts and therefore, affected by the judicial capacity of not only their home district court but also other district courts. In the sample, about 19 % of the matched non-banking firms have ongoing litigation in the same district court as their registered office location. Therefore, judge vacancies occurring in any district court with an ongoing trial concerning the firm will likely affect the firms' production outcomes.

### 3.4 Judge Shock

For the trial sample, I create judge shock as a dummy variable if an ongoing trial experiences judge vacancy during its life cycle, i.e. between the date of filing and the date of resolution. For the matched firm sample to estimate the effect on production outcomes, I define the judge shock as a dummy variable if at least one on-going trial involving the firm in any district court experiences judge vacancy in a given calendar year.

### 3.5 Summary Statistics

[Table 1](#) and [Table 2](#) present the summary statistics of trials in the trial sample, grouped by whether or not a trial experiences a judge vacancy during its lifecycle. About 27,000 trials experience at least one vacancy during their life-time. Simple mean differences between the two groups indicate that the duration of trials experiencing judge vacancy is nearly twice as many days as trials that do not. Other trial outcomes are also poor relative to the group that don't experience any vacancy. Time to first hearing since the filing of the case is 123 days on average whereas it is only 69 days when there is no vacancy. Trials are also more likely to be uncontested and dismissed when they encounter vacancy. These are likely to have causal implications on the welfare outcomes of the litigants which I explore in the rest of the paper.

The causal effects of judge vacancy are likely to be heterogeneous depending on whether the litigant is the aggrieved (i.e. a plaintiff) or a defendant. [Figure 1](#) shows that the smaller firms, based on their asset sizes, are more likely to be plaintiff rather than a defendant. On the other hand, defendant firms are more likely to be larger firms. In the next section, I present the empirical strategy for estimating the causal effects of judge vacancy on trial outcomes and subsequently on litigant welfare.

## 4 Empirical Specification

### 4.1 Trial Outcomes

I exploit the fact that the district courts in India do not have enough number of judges to fill the available courtrooms (judge seats). Vacancy generated by this structural problem in a given court in any year is plausible random due to the fact that the existing judges get frequently relocated to a new district court at the end of their predetermined tenure. The system of judge assignment is based on specific rules and is managed by a centralized

authority, such that the timing when an ongoing trial experiences a vacancy is as good as a random shock. As a result, vacancy lasts until a new judge is appointed to the vacant seat. Given the fact that there are simply not enough judges, the vacancy lasts a long time. Therefore, the identification strategy compares the trial outcomes for cases that experience a random judge vacancy shock with cases that don't experience such a shock in the same courtroom within a district court, after flexibly accounting for the court specific time trend.

Using the universe of ongoing trial data between 2010 and 2018, I observe whether a courtroom within a district court experiences judge vacancy in any given year during this period. Since all cases filed in a district court are assigned a courtroom at the time of filing, I encode judge vacancy as a dummy variable taking on value 1 if the courtroom experiences judge vacancy in a given calendar year. Restricting the set of trials to only ongoing trials at the time of vacancy, the encoding accounts for potential endogenous response in the form of new filing. The first set of outcomes I examine pertain to the outcomes of the trial including case duration and case outcomes that indicate whether or not the case is uncontested by the defendant, and whether or not the case is dismissed by the judge. To account for unobserved factors affecting the timing of vacancy and case outcomes, I include two-way fixed effects in terms of district court-year fixed effects to account for time-varying unobservables at the level of the district court and courtroom fixed effects to control time-invariant unobservable characteristics of the courtroom. Additionally, I include case-type fixed effects to address any procedural differences in the litigation process across litigation by the type of dispute. The regression specification used is as below:

$$y_{ihcdt} = \delta_h + \delta_{dt} + \delta_c + \beta shock_{ihcdt} + \epsilon_{ihcdt} \quad (1)$$

The unit of analysis is a case or trial  $i$ , filed in courtroom  $h$  within a district court  $d$  in year  $t$  - which represents the year of filing.  $y_{ihcdt}$  is the outcome of case, which experiences a shock  $shock_{ihcdt} = 1$  if there is a judge vacancy between the year the case was filed and the year

of its resolution or the end of the study period. The specification also accounts for fixed effects as discussed above. I cluster the standard-errors by courtroom, which is the level of quasi-random variation.

Causal identification requires that the set of cases that experience the judge shock are similar in expectation to cases that do not. To demonstrate this, I present event-study results of the entire work-flow (trial filing and resolutions) of the courtroom at the time of judge vacancy. Since vacancy in a given year affects all ongoing trials within a courtroom, I test whether the timing of the shock is correlated with any past trends in the work-flow. An absence of any significant and meaningful trend suggests that the timing of the shock is as good as random.

## **4.2 Trial Outcomes for Matched Firms**

I run regression specified by equation (1) on the subset of trials involving formal sector firms in Prowess dataset. I match firms in the trial dataset with those in Prowess by their name, using a combination of regular expressions and manual verification of the match quality as discussed above. This generates the set of firms that use courts intensively and for whom, I can track their production and economic outcomes. I examine the subsequent welfare effect on these litigating firms using the empirical strategy detailed in the next subsection.

To examine any heterogeneous effects depending on whether the litigating firm appears as a plaintiff or as a defendant, I interact the judge shock with a dummy variable highlighting the litigant status of the firm. Examining this heterogeneity is important and useful to understand the equity implications of weak judicial capacity. If there is no differential effect of judge vacancy when a firm is involved as a plaintiff, we fail to reject the claim that the judicial system is equitable. Presence of a differential effect is likely indicative that judge vacancy has further negative consequences to the initiator of the trial (the plaintiff).

$$y_{ifhcdt} = \phi_h + \phi_{dt} + \phi_c + \kappa_1 shock_{ifhcdt} \times Plaintiff_{ifhcdt} + \kappa_2 shock_{ifhcdt} + \kappa_3 Plaintiff_{ifhcdt} + \xi_{ifhcdt} \quad (2)$$

$f$  represents firm  $f$  in Prowess sample matched to the trial sample. The firm can appear either as a plaintiff,  $Plaintiff_{ifhcdt} = 1$ , or as a respondent within a trial  $i$ . The remaining variables and index symbols are the same as in equation (1).

### 4.3 Matched Firms' Production Outcomes

To measure the effect of judicial incapacity on the outcomes of the litigants, I examine the reduced form effects of judge vacancy on the annual production outcomes of the litigant. As mentioned earlier, I restrict the set of litigants to formal sector firms in the non-banking sector. A large share of such firms are from the manufacturing sector and therefore, this analysis helps shed light on the importance of well functioning courts for economic production.<sup>3</sup>

Given that I observe the outcome at the level of a firm, which may have many ongoing trials across different courts in my sample, I define the judge shock slightly differently and use a regression specification that uses firm-level annual panel data on production outcomes. I define the judge shock treatment variable as a dummy variable if a firm encounters judge vacancy in any of the courts in the sample where it has an ongoing trial in a given year. For causal identification, I use an event-study specification where I examine the effect of judge vacancy on the current and post-period outcomes, conditional on two-way fixed effects incorporating firm and year fixed effects. The regression specification is as follows:

$$y_{ft} = \gamma_f + \gamma_t + \gamma shock_{ft} + \zeta_{ft} \quad (3)$$

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<sup>3</sup>I examine the effects on the credit market and the banking sector in a separate paper [here](#).

$y_{ft}$  is the outcome of the firm in year  $t$ , which primarily includes legal expenditure, wage bill, asset value, sales, and accounting profit.  $shock_{ft}$  is encoded as a dummy variable, taking on value 1 when a firm encounters a judge vacancy in any of the courts with their active ongoing trial(s). The above specification accounts for firm fixed effects  $\gamma_f$  and year fixed effects  $\gamma_t$  to account for all time invariant unobserved factors by firm and secular non-parametric time trend. I cluster the standard errors by firm to account for serial correlation between yearly firm outcome measures.

As in event-studies, the identifying assumption is that the trend will continue in the absence of the judge shock. Any deviation in the trend relative to the counterfactual can be attributed as the causal effect of judicial capacity. Since the counterfactual trend is fundamentally unobservable, I test for any pre-trends in the outcome variables.

## 5 Results

### 5.1 Tests for Identification

The empirical specification compares ongoing trials within the same courtroom in a district court that encounter a judge vacancy with those that don't. The identifying assumption for studying the implication of judge vacancy on trial and litigant economic outcomes requires that the characteristics and the potential outcomes of the trials experiencing the shock are similar in expectation to trials that don't. Since I condition on many of the observed trial characteristics, I rely on the absence of any significant trend in the work-flow in the prior-period of the courtroom experiencing vacancy to support the identifying assumptions. First, I show that the work-flow is not correlated with the timing of the shock by examining the flow of new trials and resolutions in a courtroom using an event-study specification. Additionally, I also examine the composition of the work-flow by the litigant type involved (i.e. set of trials involving firms or government agents).



Figure 2 shows the work-flow before and after the first judge shock in a courtroom. The y axis plots residualized number of case filing and resolutions, after conditioning for courtroom fixed effects and district court-year fixed effects. Panel A depicts number of filings and resolutions respectively across all trials filed within the courtroom. Panel B and C present the composition of the trials filed and resolved by categorizing whether the trials involved firm or government agents as either of the litigating parties, respectively.

The figures suggest that the number of filings remain relatively stable 2 years before and after the shock, which typically includes the tenure of a judge in a district court. On the other hand, the number of resolutions drop in the succeeding years suggesting that vacancy is likely sticky and adds to the backlog of cases. However, there is no evidence of a significant pre-trend that could likely affect the timing of the vacancy. This suggests that the effect of judge vacancy shock on trial and litigant outcomes can be interpreted as plausibly causal subject to the assumption that the trend would have continued had there been no shock.

## 5.2 Trial Outcomes

**All Trials** Table 3 presents the effect of judge vacancy on trial outcomes using the sample of all trials in the sample. The key outcomes examined are case duration, number of hearings, whether trial is uncontested, and whether the trial is dismissed. Experiencing judge vacancy during the life cycle of a trial increases the duration of the trial by 168 days, which represents an effect size of 0.3 SD. On the other hand, the total number of hearings remain unaltered. What this suggests is that judge vacancy leads to a postponement of hearings rather than increase or decrease the total number of hearings relative to the counterfactual. Vacancy also increases the likelihood that the trial goes uncontested by the defendant by 15.3 percentage points or by 0.36 SD as well as increases the likelihood that the trial is dismissed by the next judge by 7.4 percentage points (0.2 SD).

**Trials of Matched Firms** Restricting the trial sample to those matched with the firm data, which is roughly about 10% of the universe of trials, I find similar effects on case duration and the rate a trial goes uncontested. [Table 4](#) presents these outcomes. Case duration increases by 147 days, representing an effect size of 0.23 SD. The likelihood of being uncontested increases by 16.0 percentage points or by 0.33 SD. These are similar to the whole sample. However, the number of hearings reduces by a fraction 0.16, which while being statistically significant presents an effect size of less than 0.05 SD. Finally, the rate of dismissals increases by 15 percentage points (0.38 SD).

Examining the heterogeneous effects by whether the firm appears as a plaintiff or as a defendant, [Table 5](#) shows that judge vacancy affects the trial outcomes similarly when examining case duration, number of hearing, or the rate of uncontested trials. However, the rate of trial dismissals substantially increases on trials involving matched firms as a plaintiff. This likely implies that firms are less likely to benefit from trial resolution through the courts in the presence of judge vacancy when they initiate litigation as plaintiff. This is because dismissal implies that there is no verdict passed through the judicial proceedings and the plaint is not resolved by the court.

### 5.3 Matched Firms' Production Outcomes

To examine the subsequent effects on the production outcomes of firms engaged in litigation across courts in the trial sample, I estimate equation 3 on subsamples of trials involving the matched firms as a plaintiff and subsamples involving firms as defendant. [Table 6](#) presents the results on plaintiff firms' legal expenditure, wage bill, asset value, sales revenue, and accounting profit. Firm experiencing judge vacancy in any of the sample courts in a given calendar year when they have an ongoing trial in the courts decreases legal expenditure, wage bill, and asset value by 7.5, 10, and 12 percent respectively. Since plaintiff firms are more

likely to experience dismissal of their trial as a result of judge vacancy, they also experience a contraction in production. Sales revenue also decreases by 1.1 percent but is statistically insignificant. On the other hand, accounting profit (total income net of total expense) increases but is not significant.

The effects of judicial incapacity has a similar but muted effects when firms appear as defendant (Table 7). The point estimates have the same sign but the magnitude is half the point estimates when the firm appears as a plaintiff. Additionally, none of the coefficients are statistically significant.

## 5.4 Discussion

I show that judge vacancy occurring as good as randomly increases the trial duration of an ongoing case. This does not have an effect on the total number of hearings between trials experiencing vacancy relative to those that don't. However, such trials are more likely to go uncontested by the defendants and more likely to be dismissed by the subsequent judge. These patterns hold for the subset of cases involving formal sector firms matched with a firm-level panel data.

**Distributional Consequences** The differential effects of judicial capacity on whether the litigant firm is one among the plaintiff or the defendant points towards equity consequences of poor judicial capacity. Plaintiff firm experiences an increase in costs not only from longer case duration that similarly affects the defendant firms, but additionally experiences a higher likelihood of their trial being dismissed. This negatively affects their production outcomes, lowering wage bill and asset value. On the other hand, they spend less on legal expenditure category, plausibly because payments to lawyers are tied to number of hearings attended rather than case duration. Longer trial duration likely stretches legal expenditure such that average annual expenditure is lower than the counterfactual situation. However, increase in

trial duration and increased likelihood of dismissal of their claim may cause firms to contract production by reducing wage bill and assets losing their value. This leads to concerns on equity since smaller firms are also more likely to use the courts system to initiate litigation to resolve transactional or other types of disputes.

## 6 Conclusion

To conclude, this paper demonstrates that judicial capacity constraints measured in terms of judge vacancy negatively affects trial outcomes and leads to welfare loss for litigants. By exploiting plausibly random occurrence of vacancy within the lifetime of an ongoing trial, I show that trials encountering vacancy face delays in trial conclusion. This increases the backlog of trials on the docket of the incoming judge who later fills the vacant position. Subsequent outcomes of the trials, including the rate at which the trial is uncontested and the rate of dismissal increase whereas the total number of hearings is not affected by the vacancy. The trial outcomes are similar for the subset of trials with matched firms as litigants. Further, litigating firms appearing as plaintiff in trials facing vacancy experience lowering of their legal expenditure, wage bill, and asset values, indicating a potential welfare consequence of judicial incapacity.

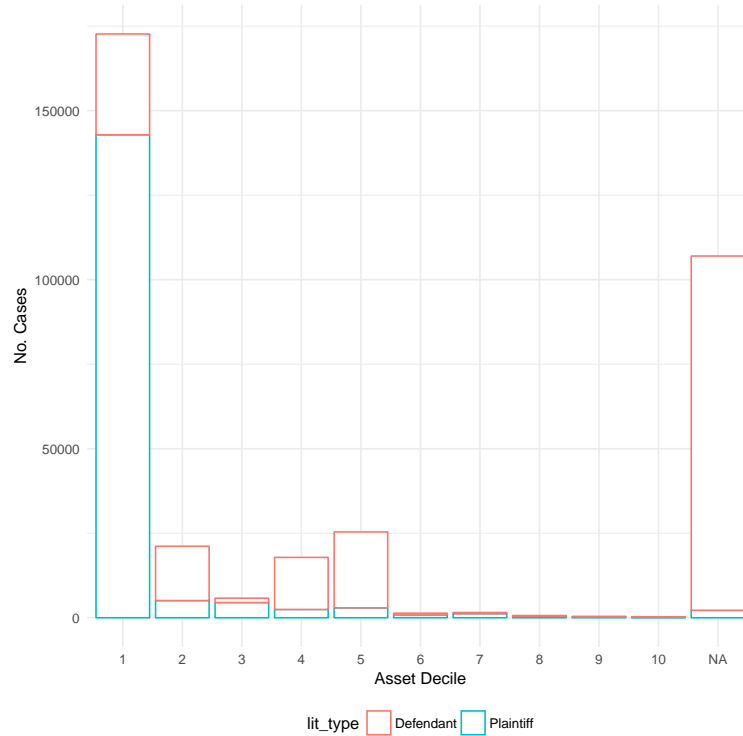
What remains to be addressed is how the capacity issue affects the performance incentives of existing judges that inherit backlog of trials due to preceding vacancy. Further, disentangling trial outcomes resulting from judge behavior from that of litigant behavior is important to design the appropriate policy response.

The role of judiciary in building state capacity and promoting economic development is relatively understudied but nonetheless important. More research is needed to fully understand how these institutions function and how they interact with other government and market

institutions in the economy. As detailed administrative data and experimental evidence addressing these open questions become more common, we will be able to shed light on appropriate policy action and design of institutions.

## 7 Figures

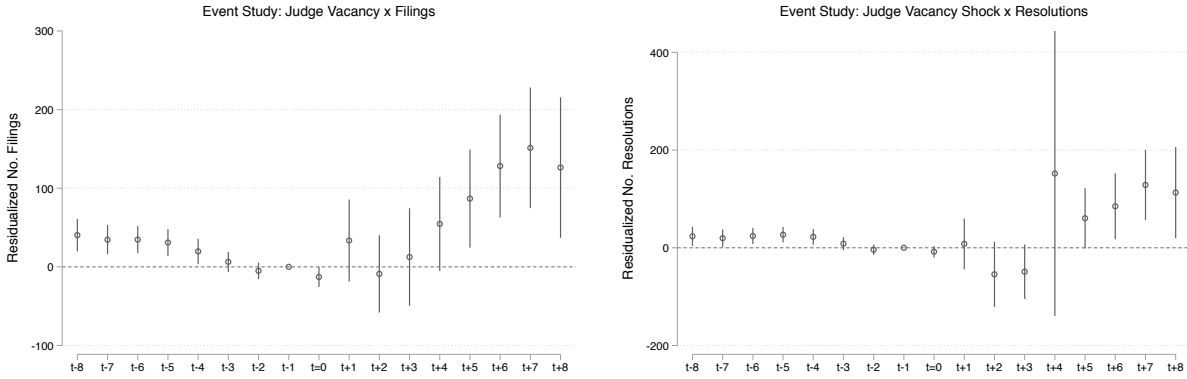
Figure 1: Number of Cases by Litigant Firm: Plaintiff vs. Defendant



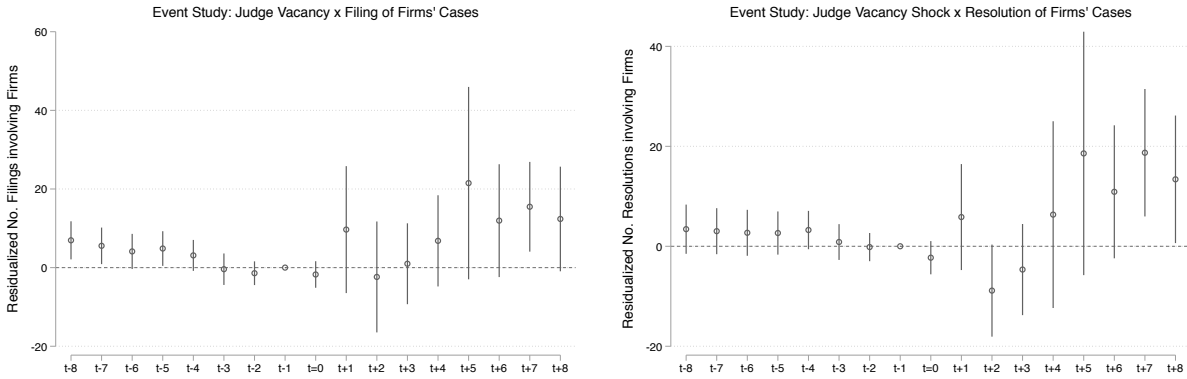
Notes: Above figure presents number of trials with matched firms grouped by whether the firm appears as a plaintiff or defendant across asset deciles.

Figure 2: Judge Vacancy: Event-Study on Courtroom Work-Flow

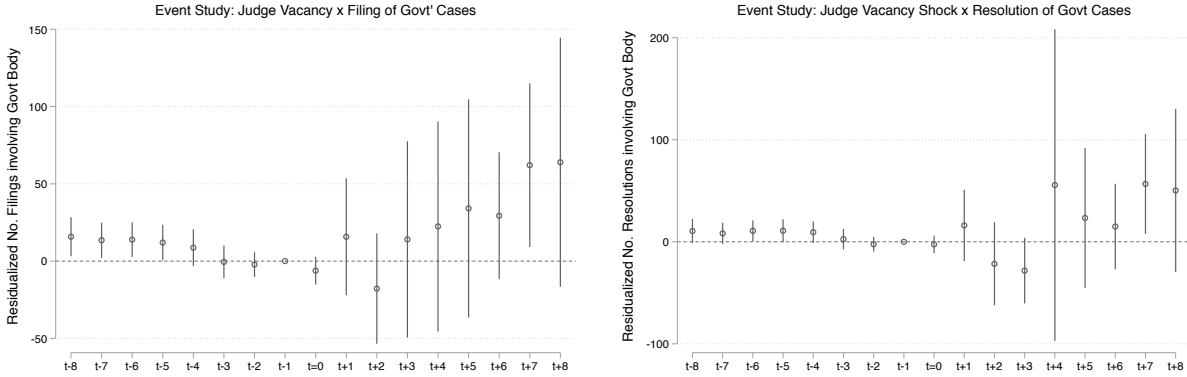
Panel A: All Trials Assigned to a courtroom



Panel B: Firm-Specific Trials Resolved in a courtroom



Panel C: Govt Trials Resolved in a courtroom



Notes: Figures present event study results of first judge vacancy shock on filings and resolutions overall (Panel A) and by whether either of the litigants involve a firm (Panel B) or a government entity (Panel C). The dependent variables - incoming cases and resolutions - are residualized of courtroom and district court-year fixed effects.

## 8 Tables

Table 1: Summary Statistics - Trials without Vacancy

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Case Duration (days)	5,042,069	428.023	576.898	0.000	16.000	625.000	4,022.000
Time to first hearing (days)	4,943,111	69.482	208.241	0.000	1.000	42.000	3,740.000
Number Hearings	4,520,278	2.760	6.137	1.000	1.000	3.000	788.000
Fraction Uncontested	5,099,871	0.227	0.419	0	0	0	1
Fraction Dismissed	5,099,871	0.162	0.368	0	0	0	1

Notes: Above table presents the summary of trial outcomes for cases that do not experience a judge vacancy over their lifetime.

Table 2: Summary Statistics - Trails with Vacancy

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Case Duration (days)	27,048	868.029	648.445	3.000	352.000	1,213.000	3,206.000
Time to first hearing (days)	25,941	122.623	267.338	0.000	1.000	92.000	2,857.000
Number Hearings	23,841	2.510	4.151	1.000	1.000	3.000	62.000
Fraction Uncontested	27,051	0.429	0.495	0	0	1	1
Fraction Dismissed	27,051	0.223	0.416	0	0	0	1

Notes: Above table presents the summary of trial outcomes for cases that experience a judge vacancy over their lifetime.



Table 3: Effect of Judge Vacancy on Trials

	<i>Dependent variable:</i>			
	Case Duration (days)	No. Hearings	If uncontested	If dismissed
	(1)	(2)	(3)	(4)
Judge Vacancy	168.408*** (42.371)	-0.085 (0.295)	0.153*** (0.020)	0.074*** (0.017)
Control Mean	428.02	2.76	0.23	0.16
Control SD	576.9	6.14	0.42	0.37
Court-Hall FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Court-Year FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Case-type FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	5,069,117	4,544,119	5,126,922	5,126,922
Adjusted R <sup>2</sup>	0.516	0.448	0.250	0.208

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Notes: Above table presents the reduced form effects of judge vacancy on trial outcomes.

Standard errors are clustered by courtroom that experiences vacancy over time.

Table 4: Effect of Judge Vacancy on Firms' Trial Outcomes

	<i>Dependent variable:</i>			
	Case Duration (days)	No. Hearings	If uncontested	If dismissed
	(1)	(2)	(3)	(4)
Judge Vacancy	146.867*** (40.280)	-0.164*** (0.044)	0.160*** (0.034)	0.151*** (0.034)
Control Mean	559.23	2.18	0.38	0.2
Control SD	647.24	3.4	0.49	0.4
Court-Hall FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Court-Year FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Case-type FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	558,300	448,494	570,661	570,661
Adjusted R <sup>2</sup>	0.479	0.743	0.374	0.391

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Notes: Above table presents the reduced form effects of judge vacancy on trial outcomes for the subset of trials involving firms matched with Prowess. Standard errors are clustered by courtroom that experiences vacancy over time.

Table 5: Effect of Judge Vacancy by Firm's Litigant Status

	<i>Dependent variable:</i>			
	Case Duration (days)	No. Hearings	If uncontested	If dismissed
	(1)	(2)	(3)	(4)
Judge Vacancy x Plaintiff	13.448 (79.816)	0.005 (0.073)	0.036 (0.063)	0.225*** (0.056)
Judge Vacancy	139.214* (80.099)	-0.167*** (0.058)	0.139*** (0.042)	0.021 (0.024)
Plaintiff	24.782 (18.124)	-0.048 (0.031)	0.001 (0.011)	0.001 (0.013)
Control Mean	559.23	2.18	0.38	0.2
Control SD	647.24	3.4	0.49	0.4
Court-Hall FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Court-Year FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Case-type FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	558,300	448,494	570,661	570,661
Adjusted R <sup>2</sup>	0.479	0.743	0.374	0.392

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

Notes: Above table presents the heterogeneous effects of judge vacancy by litigant status on trial outcomes for the subset of trials involving firms matched with Prowess. Standard errors are clustered by courtroom that experiences vacancy over time.

Table 6: Effect of Judge Vacancy on Plaintiffs' Outcomes

	<i>Dependent variable:</i>				
	Asinh Legal Exp (1)	Asinh Wage Bill (2)	Asinh Assets (3)	Asinh Sales Rev (4)	Asinh Profit (5)
Judge Vacancy	-0.075* (0.044)	-0.100*** (0.031)	-0.120*** (0.032)	-0.011 (0.038)	0.150 (0.225)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	8,866	12,549	13,348	11,238	13,029
Adjusted R <sup>2</sup>	0.903	0.950	0.953	0.945	0.476

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Notes: Above table presents the reduced form effects of judge vacancy on plaintiff firm outcomes for litigating firms matched with Prowess. Standard errors are clustered by the litigating firm that experiences vacancy over time.

Table 7: Effect of Judge Vacancy on Defendants' Outcomes

	<i>Dependent variable:</i>				
	Asinh Legal Exp (1)	Asinh Wage Bill (2)	Asinh Assets (3)	Asinh Sales Rev (4)	Asinh Profit (5)
Judge Vacancy	-0.047 (0.036)	-0.033 (0.030)	-0.052 (0.033)	-0.003 (0.043)	0.107 (0.227)
Firm FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Year FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	10,352	14,593	15,670	13,512	15,255
Adjusted R <sup>2</sup>	0.899	0.944	0.945	0.934	0.480

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Notes: Above table presents the reduced form effects of judge vacancy on defendant firm outcomes for litigating firms matched with Prowess. Standard errors are clustered by the litigating firm that experiences vacancy over time.

Table 8: Robustness of Plaintiffs' Outcomes: Without Frequent Litigators

	<i>Dependent variable:</i>				
	Asinh Legal Exp (1)	Asinh Wage Bill (2)	Asinh Assets (3)	Asinh Sales Rev (4)	Asinh Profit (5)
Judge Vacancy	-0.067 (0.047)	-0.088*** (0.033)	-0.097*** (0.034)	-0.014 (0.041)	0.230 (0.233)
Firm FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Year FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	8,341	11,740	12,517	10,629	12,201
Adjusted R <sup>2</sup>	0.899	0.947	0.953	0.939	0.470

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Notes: The table presents robustness of judge vacancy effect on plaintiff firms when removing highly litigating firms - over 99 percentile of number trials - from the sample. Standard errors are clustered by the litigating firm that experiences vacancy over time.

Table 9: Robustness of Defendants' Outcomes: Without Frequent Litigators

	<i>Dependent variable:</i>				
	Asinh Legal Exp (1)	Asinh Wage Bill (2)	Asinh Assets (3)	Asinh Sales Rev (4)	Asinh Profit (5)
Judge Vacancy	-0.035 (0.039)	-0.027 (0.033)	-0.040 (0.036)	0.008 (0.047)	0.073 (0.233)
Firm FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Year FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	9,731	13,735	14,788	12,777	14,377
Adjusted R <sup>2</sup>	0.895	0.940	0.942	0.929	0.477

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Notes: The table presents robustness of judge vacancy effect on defendant firms when removing highly litigating firms - over 99 percentile of number trials - from the sample. Standard errors are clustered by the litigating firm that experiences vacancy over time.

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