

Judicial Efficiency and Firm Productivity: Evidence from a World Database of Judicial Reforms

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I assemble and classify a database of judicial reforms funded by foreign aid agencies as either comprehensive (targeting all characteristics of quality, speed, access) or limited reform. A triple difference is used to compare firms: 1) in countries with or without judicial reforms, 2) before and after reforms, and 3) in sectors more or less reliant on contract enforcement mechanisms, due to their need for relationship-specific investments. I find that externally-financed comprehensive judicial reforms improve perceptions of judiciary efficiency (for all firms) and firm productivity (for sectors relying on relationship-specific investments) by 0.15 and 0.09 (22 percent) standard deviation, respectively.

The judiciary, by enforcing contracts and securing property rights, may foster investment and drive economic development (North, 1990; Djankov et al., 2003; Acemoglu and Robinson, 2013). As a result, judicial reforms are often seen as a core component of any development strategy. In this paper, I find that a total of \$5.4 billion USD has been spent by various foreign aid agencies on judicial reforms since 1996. Yet, there has been no rigorous impact evaluation of these costly interventions. Legal and academic scholars lament on the lack of causal evidence for judicial reforms, or for the judiciary in general (Trebilcock and Daniels, 2009 (p. 65), Aboal, Noya and Rius, 2014). Identifying the causal impact of judiciaries on economic development is extremely difficult due to endogeneity issues, such as reverse causality (rich countries can afford better judiciaries) or omitted variable bias (more fundamental unobserved factors may drive both improved judiciaries and economic development).

This is the first paper to systematically evaluate how judicial reforms, funded by foreign aid, impact firm productivity within countries. To identify the causal impact, I use a triple difference

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analysis based on the implementation of judicial reforms in some countries and not others, and based on the varying dependence of some sectors on the judiciary for technological reasons. I assemble and codify a world database of 4,568 judicial projects implemented by 500 foreign aid agencies (governments, multilateral agencies, or private sector organizations) since 1996, a project made possible by the recent release of high-quality open-data from the International Aid Transparency Initiative (IATI). This delivers a rich dataset of projects, which vary in budget size, targeted at improving the judiciary’s quality, and/or speed, and/or accessibility. For example, in Kenya, the \$120 million World Bank program called the “Judicial Performance Improvement Project” (JPIP) provided support to train court officials and streamline procedures (quality), to introduce performance management contracts designed to reduce the backlog of cases (speed) and to build courts (access). I combine this dataset of judicial reforms with the recent release of a second wave of World Bank Enterprise Surveys for 74 countries. These surveys are ideal to study the impact of judicial reforms because they contain firm-level data on perceptions of judicial efficiency and firm productivity.

Comparing the evolution of firms in countries with or without judicial reforms, in a difference-in-differences framework, may not isolate the causal impact of judicial reforms if countries enacting such reforms are on a different time path than other countries. For example, judicial reforms may be implemented by reform-minded leaders who are likely implementing other reforms positively affecting firm productivity other than through these judicial reforms. A difference-in-differences framework may be capturing a general positive trend and not the effect of judicial reforms, *per se*. To deliver causal estimates, a difference-in-differences framework must assume “common time trends”, *i.e.* treatment and control countries would have been on the same trend had there been no reform.

To address this endogeneity issue, I use a well-established insight in economics: some sectors rely more on the judiciary than others because of the need for relationship-specific investments (Klein, Crawford and Alchian, 1978; Nunn, 2007; Levchenko, 2007; Amirapu, 2015). Consider a buyer asking a seller to produce a customized good. Once this good is produced, the buyer can renegotiate prices down since there is no other buyer for this good. Anticipating this, the seller does not enter this relationship. No customized goods are produced, and the economy is trapped in the production of generic goods to avoid this issue. One solution to this dilemma is to uphold contracts, via third party enforcement. Thus, sectors that require relationship-specific investments may be particularly dependent on well-functioning judiciaries.

Based on this insight, I then implement a triple difference analysis, and compare firms: 1) in

countries with or without judicial reforms, 2) before and after the reforms, and 3) in sectors more or less affected by judiciaries. In essence, a triple difference performs two difference-in-differences: one for sectors less dependent on the judiciary, and another one for sectors more dependent on the judiciary. In this paper, I find that the first difference-in-differences is not significantly different from zero. This indicates that firms in sectors relying less on the judiciary are on a common time trend in all countries. Thus, one can reasonably assume that in the absence of judicial reforms, firms which rely more on the judiciary might also have been on a common time trend. The second difference-in-differences thus measures the effect of judicial reforms, not just a general positive trend. The remaining threats to the identification strategy are shocks happening concurrently with judicial reforms and only affecting firms involved in relationship-specific investments. To address this issue, I use the IATI dataset to develop novel indicators of all other types of foreign aid projects occurring at the same time, disaggregated by main types (education, health, transport, energy, banking, support to industry, trade, debt, tax capacity, conflict, democratic institutions), to look at whether judicial reforms still have an effect on firms involved in relationship-specific investments once all of these other potential influences are taken into account.

In this paper, I find that judicial reforms funded by foreign aid agencies improve firm perceptions of the judiciary by 0.15 standard deviation for all firms. This translates into a 0.09 standard deviation increase in firm productivity in sectors relying on relationship-specific investments, and a positive but insignificant effect on other firms. I find that these effects are driven mainly by comprehensive judicial reforms, defined as reforms which simultaneously target the three characteristics of a well-functioning judiciary, quality, speed and access, and with a project budget over 5 percent of the judiciary's annual budget, for a given country (which is the average budget of World Bank and USAID judicial reforms, the two "largest and most influential rule of law actors" according to legal scholars (Humphreys, 2010, p.20)). In contrast, I find no effect of more limited reforms, defined as reforms that address some but not all three characteristics, or with a small budget. The triple differences results remain similar when controlling for the overall business climate, the amount of foreign aid received, and other foreign aid projects implemented at the same time. The results remain similar when using various measures of relationship-specific investments used in the literature; or when using various measures of firm productivity.

These results are important because they show a role for externally funded judicial reforms. In a theoretical context where the state of a judiciary is poor, i.e., difficult to access, slow, and biased, it is unclear whether judicial reforms, regardless of breadth, would work. Limited reforms which only target one characteristic may be even less effective: a reform that would increase access

to an already slow and biased judiciary will not fundamentally alter the situation. Moreover, if the fundamental reasons for the poor state of the judiciary are extractive political institutions (Acemoglu and Robinson, 2013; Glaeser, Ponzetto and Shleifer, 2016), i.e., a small elite holds all the power and has no incentive to build an effective judiciary that would constrain their power, then there should be a low impetus for domestic judicial reforms, and increased obstacles to hinder aid agencies from implementing judicial reforms. To investigate this, I assemble a dataset of domestic judicial reforms implemented in between the two waves of World Bank Enterprise Surveys for the 74 countries in this study. In line with these predictions, I find no comprehensive domestic judicial reforms over the period of interest, and no effect of limited domestic reforms. In contrast, the main finding of this paper is that externally financed comprehensive judicial reforms have an effect, even in countries with poorly functioning judiciaries or oligarchies.

These results are important because they confirm the fundamental importance of the judiciary in the process of economic development. Doubts remain on the benefits brought by the judiciary for various reasons; since economic activity can be sustained by multilateral punishment strategies in social networks (Greif, 1993); people can always find alternative arrangements (Acemoglu and Johnson, 2005); informal institutions or social norms could equally foster cooperation and investment; the judiciary can be subverted by powerful interests (Glaeser, Ponzetto and Shleifer, 2016). In this paper, I show that the judiciary matters by using country-specific policies that implement institutional change, in line with Pande and Udry (2006). The triple difference also highlights a precise channel through which the judiciary matters: it encourages firms to undertake relationship-specific investments.

This study makes an important contribution to the empirical literature evaluating the impact of judiciaries on economic growth. Greiner and Pattanayak (2012), Aberra and Chemin (2017) and Sandefur and Siddiqi (2013) have used randomized experiments, and offered access to the judiciary to a randomized set of individuals (in the form of legal representation in Greiner and Pattanayak (2012) and Aberra and Chemin (2017), and legal aid from paralegals in Sandefur and Siddiqi (2013)). Aberra and Chemin (2017) and Sandefur and Siddiqi (2013) find significant effects on effort, investment, and welfare; while Greiner and Pattanayak (2012) find no effect on the case win rate. One issue with these interventions is that if they were scaled up, and access to the judiciary was given for free to all, court congestion could result thereby deteriorating judicial efficiency. Thus, judicial reforms targeting only access, but not speed or quality may have no effects at a global level. I directly test this by exploiting the richness and variation in the type of judicial reforms implemented: some past reforms have targeted only one of the three characteristics of

judiciaries (quality, speed, or access). I find that such reforms, which I call limited judicial reforms, have no effects on firm productivity at a national level. In contrast, I find that comprehensive judicial reforms, those which tackle quality, speed, and access at once and of significant size, drive the results of this paper.

Other attempts to measure the causal impact of the judiciary on economic activity, while taking into account general equilibrium effects, has been to use judicial reforms as natural experiments. Chemin (2009*a,b*, 2010); Kondylis and Stein (2017); Lilienfeld-Toal, Mookherjee and Visaria (2012); Lichand and Soares (2014) have used judicial reforms implemented in India, Pakistan, Senegal and Brazil respectively, in a difference-in-differences framework, and found positive effects on investment, access to credit, and growth. In this paper, I focus on a specific channel through which the judiciary matters: firms in sectors that rely more on relationship-specific investments should be more affected by contract enforcement mechanisms, and hence by judicial reforms. This insight allows me to use a triple difference analysis. The advantage of a triple difference is that it controls for the underlying trend occurring in countries with judicial reforms by looking at sectors less reliant on the judiciary, and thus relies on a weaker version of the common time effects assumption. This paper also extends on the existing literature by using a world database of judicial reforms, and utilizing the wide diversity of 4,568 judicial projects implemented since 1996. Overall, this paper confirms the findings of the previous literature: the judiciary has large effects on economic activity, especially for sectors relying on relationship-specific investments.

An identification strategy based on relationship-specific investments has been used before to infer the importance of judiciaries for international trade in Nunn (2007) and Levchenko (2007). These papers both find that the quality of contract enforcement mechanisms is an important source of comparative advantage, more so than skill or capital intensity, thereby reshaping our understanding of the determinants of international trade. These two papers were cross-country, with no variation in the quality of the judiciary over time. This paper provides an alternative interpretation: I use judicial reforms as a shock to judiciaries, which provides time variation in the quality of the judiciary. This allows for the introduction of both country and time fixed effects. Amirapu (2015) combines variation in court efficiency in India with the relationship-specific investments measure of Nunn (2007), and finds a large effect of the judiciary on firm productivity. I confirm and extend these findings by drawing from a source of variation in judicial efficiency: 4,568 judicial projects identified in the International Aid Transparency Initiative (IATI).

This paper is organized in the following way. Section I provides a conceptual framework for the role of judiciaries in the process of economic growth, and in particular for the emergence of

relationship-specific investments. This conceptual framework also clarifies the theoretical predictions for the likely effects of comprehensive, limited and domestic judicial reforms. Section II presents the empirical strategy. Section III discusses the methodology. Section IV presents the results. Section V concludes.

I. Conceptual framework

A. *The problem: Relationship-specific investments*

A buyer enters a contract with a seller to produce a customized good, which has no value outside the specific relationship. Once the customized good is produced, the buyer can renegotiate prices down since there is no other buyer for this good. Anticipating this, the seller does not invest as there are appropriable quasi rents in the relationship: the value of the customized good to the buyer exceeds the value of the good to the next best user (Klein, Crawford and Alchian, 1978). Those with the bargaining power to do so will appropriate the quasi rents and reduce the incentives for the other party to invest in the relationship. The fundamental issue is that the buyer has no credible commitment to respect the contract.

B. *A solution: The judiciary*

A solution to this problem is to uphold such relationship specific contracts, through efficient third-party enforcement facilitated by the judiciary. The seller can sue for the claim, i.e. the value of the good if the buyer breaks the contract and appropriates the good. The decision to sue depends on the three characteristics of the judiciary: the probability p to win (quality), the time T after which the judgment is given (speed), and the legal fees to pay (access), equal to a fraction l_p of the claim (index p for plaintiff). Ideally, $p = 1$, i.e., the judge rules in favor of the seller since the buyer breaks the contract (high quality of judicial decision-making), T is small (high speed), and l_p is low (the legal system is accessible). In practice, p may be less than 1 (it is possible that the courts will rule against the plaintiff if they are of low quality, for example if judges can be influenced by the defendant), and the time and costs to get a verdict may be high. With a discount factor β , the net present value recovered after a trial is a fraction $p\beta^T$ of the claim. The seller sues if the net present value recovered is greater than the costs. This defines the suing condition:

$$(1) \quad p\beta^T \geq l_p$$

If the suing condition 1 holds the seller sues, which might deter renegotiation in the first place, as a portion of the output is guaranteed to be returned to the seller. As a result, the seller exerts effort, enters more of these relationship-specific investments and increases output, as can be shown in a full-fledged model of effort provision under a judiciary in Appendix A. This notion shows that the judiciary is integral to solving the lack of credible commitment issue.

This reasoning only applies if the suing condition 1 holds i.e., the characteristics of the judiciary are such that the seller has incentives to sue. In fact, this condition does not hold in numerous countries (as shown by the map in Figure A1 in the Appendix using estimates from the Doing Business project) especially in poorer countries. There may be two explanations for this. First, it is costly to create and maintain a high quality judiciary as the costs are more binding for poor countries, so they tend to have worse judiciaries. A second explanation centers on the identity of those holding political power, in line with Acemoglu and Robinson (2013). If buyers have the bargaining power to capture quasi-rents, they may also have the bargaining power to influence policies. Consider the case where buyers are powerful, and collude with a small elite that controls a powerful government, i.e., an oligarchy. In this case, a dominant strategy for the elite is to promise a well-functioning judiciary ex-ante, and to renege on the promise once the quasi-rents are produced, so that buyers can capture them. Anticipating this, the sellers do not invest and no relationship-specific investments take place. The fundamental issue is that an oligarchy cannot credibly commit to build an effective judiciary. On the other hand, if a broad cross-section of society, which represents interests of both buyers and sellers, is in power, there will be incentives to set up a well-functioning judiciary to benefit the entire population. This reasoning would explain the existence of two groups of countries: one encompasses pluralistic governments which set up highly functioning judiciaries (high $p\beta^T - l_p$), and experience growth. In the other, oligarchic governments which set up poor judiciaries to serve the interests of the elite (low $p\beta^T - l_p$), and as a result experience poor economic development.

The deficiencies of judiciaries (low $p\beta^T - l_p$) observable in numerous countries have important implications for the likely effects of judicial reforms.

C. Implications for judicial reforms

First, consider the case of a deficient judiciary with low incentives to sue, i.e., low $p\beta^T - l_p$. In the extreme case, an oligarchy reneges on its promise of a well-functioning judiciary to capture rents and sets: $p = 0$, $T = \infty$, and l_p is high. In such a world, there are no incentives for the elite to change the situation, hence no impetus for domestic judicial reforms. In this context, there

may be a role for externally financed judicial reforms. These reforms must be comprehensive, i.e., addressing all characteristics p (quality), T (speed), and l_p (access), at the same time, to have an effect since improving only one characteristic and leaving the others unchanged does not improve the incentives to sue. For example, increasing access to an otherwise slow and biased judiciary will not fundamentally alter the situation. Thus, limited reforms, i.e., reforms tackling only one characteristic p , or T , or l_p , have no effects. Moreover, the effect of the judicial reforms on p , T , and l_p must also be large enough to reverse the inequality $p\beta^T < l_p$, otherwise they will have no effect. In the empirical section, I proxy the magnitude of a reform by its budget size. The overall prediction is that externally financed comprehensive judicial reforms, i.e., addressing all three characteristics p , T , and l_p at the same time, and of a large enough budget size, may have an effect.

Finally, in the case of a well-functioning judiciary (a rare occurrence according to Figure A1) where the suing condition 1 holds, a judicial reform which increases p , decreases T and l_p will unambiguously increase the seller's incentives to sue, further increasing effort and output (and lowering the buyer's incentives to ex-post renegotiate).¹

This reasoning only applies to firms in sectors requiring relationship-specific investments. For other firms, the good is generic, and prevents the buyer from renegotiating prices as the seller can easily turn to other potential buyers.

Overall, the predictions of the model are ambiguous and depend on the initial state of the judiciary characterized by the sign of the suing condition 1. In the empirical section, I will look at the effect of judicial reforms separately in countries with $p\beta^T < l_p$ and with $p\beta^T \geq l_p$.

Moreover, there may be strong obstacles to the proper implementation of externally financed comprehensive judicial reforms. As explained above, oligarchies have incentives to undermine judicial reforms. Local elites may have ways to undo any efforts to raise quality (higher p), speed (lower T), and access (lower l_p). For example, giving judges a long tenure to guarantee their independence (thereby increasing p) may be pointless if politicians can find other ways to influence judges (such as killing Chief Justices in the famous case of Uganda's leader Idi Amin in 1972, or packing the courts to curb its constitutional review power as Peron and Menem did in Argentina (Acemoglu and Robinson, 2013, p.371)). In the empirical section, I will look at the effect of judicial reforms in more or less oligarchic countries. Overall, the effect of judicial reforms is an empirical question.

¹To be more precise, within that second condition $p\beta^T \geq l_p$, for judicial reforms to have an effect, there must be some incentives for the buyer to ex-post renegotiate. Otherwise, judicial reforms have no effect since the judiciary is already perfect, the seller has incentives to sue, the buyer does not ex-post renegotiate, and relationship-specific investments already take place. I abstract from this particular case since Figure A2 in the Appendix makes it clear that there are incentives to ex-post renegotiate in almost all countries.

II. Empirical strategy

A. Data on firms

The World Bank Enterprise Surveys (henceforth known as the Enterprise surveys) standardized dataset contains 124,939 firm-level surveys.² To make these surveys representative of an economy’s private sector, the Enterprise surveys use a “global methodology” whereby firms are stratified by business sector, location, and firm size.

These surveys present several advantages for the analysis of judicial reforms. They include a question on the perception of the judicial quality: “Do you agree with the following statement: The court system is fair, impartial and uncorrupted?”. On a scale of 1 to 4 where 1 is strongly disagree and 4 is strongly agree, the average answer is 2.3 (SD=1) as can be seen in the descriptive statistics of Table 1.

The surveys also include measures of firm productivity. The main measure used in this paper is the value added per worker, i.e., the difference between firm revenue and cost of intermediate inputs (raw materials and intermediate goods used in production, electricity, communications services, rental of land/buildings, equipment, furniture, fuel, transport for goods, water) divided by the total number of full time employees, adjusted for temporary workers using PPP exchange rates.³ The average value added per worker is \$80,710. The Enterprise surveys also contain data on capital stock per worker, number of employees, and proportion of skilled workers.

Recently, a second wave of Enterprise surveys has been collected for most countries allowing for a before and after comparison. In total, 74 countries have a baseline and endline survey in the standardized dataset. To check for common pre-trends, I augment this dataset with earlier waves of World Bank Enterprise Surveys that are not part of the standardized dataset and which are called “Pre” in the rest of the paper.⁴ In total, 39 out of 74 countries considered in this paper have an earlier wave of data.

The next step of the analysis is to systematically document all judicial reforms implemented in between a baseline and endline survey for each of these 74 countries.

²The surveys are answered by business owners and top managers. Sometimes the survey respondent calls company accountants and human resource managers into the interview to answer questions in the sales and labor sections of the survey. Typically 1200-1800 interviews are conducted per country. The manufacturing and services sectors are the primary business sectors of interest. Formal (registered) companies with 5 or more employees are targeted for interview.

³This measure is quite noisy: the maximum value in the original dataset is 47 billion\$ per worker. I thus trim this measure at 1 percent. The maximum value with a trim at 1 percent is 3 million\$ per worker, which is high. Yet, the average value of this trimmed variable matches values in Figure B1 in the Appendix.

⁴Two issues have to be kept in mind when doing this. First, these earlier waves of data do not follow the global methodology. Hence, firms are not stratified by business sector, location, and firm size. According to the World Bank, “surveys that are Non-Global do not yield results that are representative of the firm population in a country” (p.10 of <http://www.enterprisesurveys.org/~media/GIAWB/EnterpriseSurveys/Documents/Misc/Indicator-Descriptions.pdf>). Second, the variables are not standardized and may differ across datasets.

B. Judicial reforms

To identify externally funded judicial reforms, I use data from a new open-data initiative called the International Aid Transparency Initiative (IATI) which collates all data related to projects implemented by major donors around the world in a unified and high-quality format. Since 2010, 500 organizations (donor governments, multilateral agencies, foundations, non-governmental organizations and private sector organizations) from 55 countries have agreed to publish IATI data.

In this database, I identify all projects related to the judiciary. For each project, the IATI data includes: the year and country of implementation, the implementing organization, a description and the budget. Within this dataset, I identify all reforms that started precisely in between the years of baseline and endline Enterprise surveys for each country.

Despite the available information in the IATI data, the descriptions of judicial reforms are limited to a few sentences. To get additional information on the reforms, and since legal scholars recognize the World Bank and USAID as the “largest and most influential rule of law actors” (Humphreys, 2010, p.20), I complement the IATI dataset by reviewing data on judicial reform projects directly from the World Bank and USAID databases. These two organizations publish their data in the same format as the IATI but with more detailed descriptions. I also complement these descriptions by systematically gathering official documents published by the donor describing the reforms in greater detail. The exact procedure is outlined in Appendix C. To access the data, the Online Appendix contains the full list of reforms in “List Judicial Reforms.xls”. This file contains the IATI data. For each project, the IATI data includes: the year and country of implementation, the implementing organization, a description and the budget. The coding of the quality, speed, and access nature of the reforms comes from the reading of the extra documents also provided in the Online Appendix.

I then read and codify the description of all of these projects according to the three characteristics of efficient judiciaries highlighted in the theoretical section: quality (increase in p), speed (decrease in T), and access (decrease in L_p). To be more precise, I assign the value 1 to a variable “reform_quality” if one of the objectives of the reform is to improve the quality of the judiciary. I look for keywords such as *legal training for justice actors, legal education for judges, improvement of decision-making, capacity building, capability, accountability, integrity, independence, anti-corruption, governance, compliance with rule of law, fairness, improved service delivery, strengthening of the rule of law*. Similarly, I assign the value 1 to a variable “reform_speed” if one of the objectives of the reform is to increase the speed of courts and I look for keywords such as *effective, efficiency, fast, increase in cases disposed, reduction in pending cases, reduction in backlog*.

Finally, I assign the value 1 to a variable “reform_access” if one of the objectives of the reform is to increase access to the judiciary. In practice, I look for keywords such as *access, legal services, for the poor, justice for all, J4A, or the building of courts* (which reduces the distance to courts, thereby improving access).

As an example, I show the results for Kenya below in Table 2 (Appendix C provides an explanation for each of the 74 countries, the Online Appendix contains the full list of reforms in “List Judicial Reforms.xls” with the IATI data. The Online Appendix also includes the extra documents used to code the quality, speed, and access nature of the reforms).

Kenya had a baseline Enterprise surveys collected in 2007 and an endline 2013 (and no earlier wave of data). In 2009, Canada implemented a project whose explicit goal was to “improve access to justice”. As described above, I codify this project as intending to improve access. The budget of this reform was \$3 million⁵, 1.6 percent of Kenya’s judiciary budget.⁶ Similarly in 2010, Finland started a project to enable access to justice, which I also code as improving access.⁷

The major project of the time in Kenya was the World Bank program called the “Judicial Performance Improvement Project” (JPIP), started in 2012 for a duration of 6 years with a total budget of \$120 million.⁸ The explicit goal of the reform was to improve “*performance, accountability, access to justice and the expeditious delivery of judicial services.*” Overall, 230 activities are being implemented as part of JPIP: “*JPIP has recorded some key achievements, including on infrastructure (construction of new courts under way or completed at 17 sites); performance management (performance contracts rolled out to court stations; and a new administrative data and case management system implemented); backlog reduction (almost 50,000 very old cases resolved); skills development (3100 people have been trained); strategic and administrative reform (launches of the Judiciary Strategic Plan; High Court Registry Operations Manual; and the Human Resources and Financial Management Policies and Procedures Manual)*”. Following the procedure above, I codify this reform as intending to improve quality, speed, and access.

In later reforms in Kenya, Sweden and Germany provided support for the judicial reform called the “Judiciary Transformation Framework”.⁹ The four pillars of this reform are: “1) *people-focused*

⁵All amounts in USD

⁶There is no centralized database for the budget of judiciaries in the World. One way to estimate it is to use figures from the OECD. The median budget of the judiciary in the OECD is 0.2 percent of a country’s GDP (Palumbo et al., 2013). Kenya’s GDP was 91 Billion Dollars in 2007. According to this estimate, an upper bound for the Kenya’s judiciary budget is 182 million dollars. This is confirmed by the Kenyan official budget (available at <https://www.internationalbudget.org/open-budget-survey/>) which states that the Kenya’s judiciary budget was 13 Billion Ksh in 2016, approximately 130 Million USD.

⁷One may worry about the relevance of this project for firm productivity since the Finland project targeted “marginalized communities living in Wajir district”. I still code this reform as improving access since there may be some firms benefiting from the project within marginalized communities in Wajir district.

⁸See the full description in the Online Appendix in World Bank/Kenya JPIP description.pdf

⁹See the full description in the Online Appendix in World Bank/Kenya Judiciary Transformation Framework.pdf

*delivery of justice; 2) transformative leadership, organizational culture and professional staff; 3) adequate financial resources and physical infrastructure; 4) harnessing technology to facilitate speedier trials and enhance the efficiency and effectiveness of administrative processes.”*¹⁰ I codify this reform as intending to improve quality, speed, and access.

Overall, five projects were implemented in Kenya over the period between baseline and endline Enterprise surveys, and together addressed the three characteristics of quality, speed, and access. The total value of these reforms was \$129.7 million, or 12 percent of Kenya’s annual judiciary budget.

I repeat the exercise for all other 74 countries in between a baseline and endline Enterprise Surveys (see a short explanation for each country in Appendix C, the full list of reforms and all documents describing the reforms in the Online Appendix).

An important finding from this exercise is that the World Bank and USAID reform projects simultaneously target quality, speed, and access in all countries.¹¹ This is confirmed by World Bank and USAID documents outlining the overall objectives of their judicial reforms. In “Initiatives in Justice Reform 1992-2012” (WorldBank, 2012), the World Bank describes their reforms as targeting quality (support for modern procedures for the selection, career development, and management of justice sector personnel, support justice mechanisms to hold public institutions accountable to the public), speed (project activities focus on court management, including strategic planning, financial management, data collection, and use of data for management decisions) and access (project activities include analysis of the market for legal services, support for legal services and aid especially for the poor and vulnerable, and creation of mobile courts and services, support community-based or court-annexed alternative dispute resolution (ADR)).

Regarding USAID, the overall objectives of their judicial projects are to: “Strengthen judicial independence and impartiality” (quality), “Ensure an effective and equitable justice system...” (effective implies speed) “...by improving professional capacities and administrative and operational systems of actors and institutions; developing and implementing fair procedures; expanding access to justice (access); and ensuring adequate oversight, advocacy, and accountability.”¹² Thus, it is

¹⁰For example, “people-focused delivery of justice” means: “ensuring awareness of and understanding of the law and procedures by litigants, simplifying court documents and procedures, enhancing the easy availability of information pertinent to litigants’ cases, improving the affordability of the adjudication system; ensuring the cultural appropriateness of court procedures and processes, introducing friendly and non-intimidating courts, ensuring the timeliness in the processing of claims and enforcement of judicial decisions, increasing the number of mobile courts promoting, facilitating Alternative Dispute Resolution (ADR), and establishing a customer care desk at every court station”. These measures are designed to improve access for all individuals and firms alike.

¹¹There are two exceptions. In Nigeria, a World Bank project was solely a legal aid access intervention in one state (see World Bank/Nigeria.pdf). In El Salvador, there was a small USAID project on mediation only (see USAID/El salvador Tetra tech mediation.pdf). These two reforms are coded as limited reforms.

¹²Official document available at USAID/Department of State and USAID Strategic Plan.pdf

clear from this description that quality, speed, and access are all integral parts of a holistic approach when considering judicial reform projects.

Thus I define a variable “reform_comprehensive” as 1 if a country received a reform addressing the three characteristics: quality, speed, and access, AND with a budget above 5 percent of the national judiciary budget OR a World Bank reform OR a USAID reform (considering the magnitude and comprehensive approach taken by these two large influential actors). I use a threshold of 5 percent since it is the average budget of both World Bank and USAID’s judicial reforms. Similarly, I define a variable “reform_limited” as 1 if a country received a reform with either a small budget or not targeting all three characteristics (quality, speed, or access).

The way “reform_comprehensive” is defined leaves little room for interpretation in the coding. Although there can be some disagreement in the coding of individual judicial reforms, “reform_comprehensive” is calculated as an aggregate of all reforms at the country level. For example in the case of Kenya, there can be some disagreement on whether the 2010 Finland project should be coded as improving access because of its focus on some sections of society in one particular area of the country. Yet overall, it is quite clear that Kenya can be considered as having received a comprehensive reform considering the budget size and breadth of numerous projects. In fact, the coding was cross-validated by two independent coders, with correlations in the coding of 93 and 86 percent.¹³

Out of the 74 countries with two waves of the Enterprise surveys, 22 have experienced such comprehensive reforms, 23 with limited reforms, and 29 countries with no reforms (see the complete list in the Online Appendix in List of Judicial reforms.xls). I also repeat the exercise for the 38 countries with an earlier wave of data. None of these countries had a comprehensive reform in between a “Pre” wave and the baseline. I thus keep all these earlier waves of data to check for common pre-trends in the econometric analysis.

To identify domestic reforms, I use data from the Doing Business project which collates all the reforms implemented by countries related to the topic of enforcing contracts (the exact dispute this paper focuses on i.e., a buyer refuses to pay for a customized good).¹⁴ I read and codified the description of all these projects according to the same three characteristics (quality, speed, and access). The complete list is in Appendix C.

¹³The disagreement comes from Malawi and Rwanda. These two countries did not receive a World Bank or USAID reform; yet, as explained in greater detail in Appendix C, the two coders uncovered official documentation on other reforms showing that the reforms received were in fact comprehensive. The inclusion of Malawi and Rwanda in “reform_comprehensive”=1 does not affect the results, as shown in Table C1. Other than these two countries, the coding was exactly the same.

¹⁴<http://www.doingbusiness.org/Reforms/Overview/Topic/enforcing-contracts>

C. Endogeneity of judicial reforms

Why are judicial reforms adopted in the first place? In the extreme case of an oligarchy described in the theoretical model, the judiciary is a constraint for the elite, the elite has no incentives to build an effective judiciary, there is no impetus for domestic judicial reforms. In this world, it is hard to see why the elite would adopt externally-financed judicial reforms.

One answer is critical junctures and reform-minded leadership. Kenya provides an illustration. In the 2007 general elections, the opposition was narrowly defeated and complained of rigged elections. The opposition did not file a case in court since it did not see the judiciary as capable of delivering a fair verdict, and instead took the dispute to the streets (Gainer, 2017). The tension escalated into a grave ethnic conflict, killing more than a thousand and displacing up to 600,000. To avoid the repetition of such events, a new progressive constitution was voted in 2010, which proclaimed among other things that the judiciary shall be unbiased, fast, and accessible. The Kenyan embarked on a “Judiciary Transformation Framework”, supported financially by the World Bank with the JPIP project, as well as Sweden and Germany as visible in Table 2.

Interestingly, in the 2017 general elections, the same opposition was again defeated and complained of rigged elections. This time, they filed a case in court and won: the Supreme Court ordered a rerun of the elections, the first decision of its kind in Africa.¹⁵ The incumbent called judges “crooks”.¹⁶ In line with the theoretical argument that the executive may have incentives to undermine the judiciary, the JPIP and the judiciary are now under attack. In a recent statement,¹⁷ the Chief justice complained that the government reduced the judiciary’s budget and refused to extend the JPIP project. This illustrates that support for judicial reforms may be fleeting and dependent on the presence of reform-minded leaders. More generally than Kenya, legal scholars argue that the World Bank and USAID work with “reform-minded and active leadership” who support the reforms (p.183, Humphreys (2010)).¹⁸

The fact that aid-based judicial reforms may be responsive to reform-minded leadership poses an econometric issue: this reform-minded leadership may also be concurrently implementing other changes in the economy that may drive economic development. As such, a difference-in-differences analysis may overestimate the impact of judicial reforms. The bias could also go the other way: the World Bank and USAID may be implementing the reforms where they are needed the most, i.e.,

¹⁵The New York Times, “Kenya Supreme Court Nullifies Presidential Election”, Sept 1 2017, by Kimiko de Freytas-Tamura.

¹⁶(Associated Press, “Kenya president warns judiciary after it nullifies election”, Sep 2 2017, by Tom Odula)

¹⁷<https://www.judiciary.go.ke/download/statement-on-the-state-of-the-judiciary-in-light-of-drastic-cuts-in-budgetary-allocations/>

¹⁸Another example is Peru. In 1998, the World Bank pulled its support from a judicial project when President Fujimori reduced the independence of the judiciary, once again indicating that the placement of reforms respond to the local context (Trebilcock and Daniels, 2009).

in poor countries with declining economies. To address these potential biases, I use within-country variation in the likely effects of these reforms, described in the following section.

D. Relationship-specific investment

I use a well-established insight in economics: some sectors rely on the judiciary more than others because of the need for relationship-specific investments (Levchenko, 2007; Nunn, 2007). To measure the sectoral need for relationship-specific investments, the existing literature uses measures of input complexity, the value of inputs (since more inputs require more contracts) (Levchenko, 2007), or whether or not inputs are sold on an international organized exchange (Nunn, 2007).

Aside from replicating these measures in the Enterprise surveys, I develop a new measure from within these surveys based on the key point of the theory: the specificity of the good produced. If the good is generic, alternative buyers and sellers can easily be found for the good, and there is no possibility of ex-post renegotiation. If the good is specific, there is a possibility of ex-post renegotiation and third-party contract enforcement is needed. The empirical difficulty is to provide a quantitative measure of a sector's technological propensity for dealing in specific versus generic goods.

To determine this, I use a specific question collected in a special type of the Enterprise surveys called the "Management, Organisation and Innovation" round. I use the survey from Germany since the goal is to measure the technological propensity of a sector to deal in specific versus generic goods under a near-perfect judiciary (Germany was ranked 14th in the World in 2016 by the Doing Business project). The question is:

"If this establishment shut down its business, how long would it take your largest customers to find an alternative seller for its main product?"

The possible answers are: 1: a day or less; 2: more than a day, less than a week; 3: more than a week, less than a month; 4: a month or more; 5: never (it would be impossible to replace).

If the answer is a day or less, the good is generic. The customer can easily find an alternative seller and there is no possibility of ex-post renegotiation. The value of the good outside of a buyer-seller relationship is close to the value inside the relationship and by definition, the good is not relationship-specific (Klein, Crawford and Alchian, 1978).

In contrast, if the answer is a month or more (or even never), the good is specific. The customer would have trouble finding an alternative seller which generates a possibility for ex-post renegotiation. In this case, the seller can renegotiate prices up and the buyer agrees since he or she will have difficulty finding an alternative seller. Anticipating this, the buyer does not enter in

the relationship and the seller does not invest, unless efficient judiciaries enforce contracts. Both the buyer and the seller (despite holding the power in this particular setting) are dependent on well-functioning judiciaries.

The complete list of goods with answer 5 (never) and 1 (a day or less) is in Table D1 in Appendix D. As obvious from this list, goods from firms who answered 5 are specific (e.g., actuators for plane seats, aluminum castings, locking systems for cars), and more generic when firms answered 1 (e.g., bakery products, beer, books).

The complete distribution of answers is shown in panel (a) of Figure 1. This figure shows that firms can be split neatly into two groups of approximately equal size. One group includes firms answering 1, 2, or 3 (i.e., requiring less than a month to replace the good) and in the other group, those answering 4 or 5 (i.e., more than a month). I classify these two groups as firms dealing in generic and specific goods, respectively.

I then calculate the average answer of firms per sector, disaggregated at the 4 digit level of the ISIC rev3.1 classification (the industry code specification in the Enterprise surveys). The results are shown in panel (b) of Figure 1.

As evident from this graph, some sectors have all firms dealing in generic goods (i.e., answering 1, 2, or 3) and are thus classified as sectors dealing in generic goods. Other sectors have all firms dealing in specific goods (i.e., answering 4 or 5), and are thus classified as sectors dealing in specific goods. For the very few sectors where some firms answer 0 or 1 in the middle of the distribution, I split them according to the median of this index (median = 0.36) into either sectors dealing in generic or specific goods.

Overall, this procedure creates a dichotomous variable, called $Specific_j$, which defines two groups of sectors: those dealing in generic goods ($Specific_j = 0$) and those dealing in specific goods ($Specific_j = 1$). $Specific_j$ takes the value 1 for 40.2 percent of the sample, as shown in Table 1. Firms in sectors dealing in specific goods where the opportunity for ex-post renegotiation is greater, are more dependent on the judiciary, and should be disproportionately affected by judicial reforms.

To ensure that the results do not depend on this particular measure used, I incorporate two completely different measures of reliance on contracts that focus on intermediate inputs rather than the downstream final good. The exact procedure and results are described in greater detail below.

III. Methodology

The empirical question is: do firms become more productive after a judicial reform, especially in those sectors dealing in specific goods? To test this proposition, I estimate the following specification:

$$\begin{aligned}
 \text{Productivity}_{ijkt} = & \beta_1 \text{JudicialReform}_k \times \text{Post}_t + \beta_2 \text{Post}_t + \alpha_k \\
 & \beta_3 \text{JudicialReform}_k \times \text{Post}_t \times \text{Specific}_j + \beta_4 \text{Post}_t \times \text{Specific}_j + \alpha_k \times \text{Specific}_j \\
 & \beta_5 \text{JudicialReform}_k \times \text{Pre}_t + \beta_6 \text{Pre}_t + \\
 & \beta_7 \text{JudicialReform}_k \times \text{Pre}_t \times \text{Specific}_j + \beta_8 \text{Pre}_t \times \text{Specific}_j \\
 & + X_{kt} \gamma + X_{kt} \times \text{Specific}_j \delta + \theta_j + \varepsilon_{ijkt}
 \end{aligned} \tag{2}$$

where i is for firm i in sector j in country k at time t . $\text{Productivity}_{ijkt}$ is firm productivity, measured as value added per worker. JudicialReform_k is a dichotomous variable equal to 1 if country k experienced a comprehensive judicial reform in between base and endline Enterprise surveys, and 0 otherwise. Post_t is a dichotomous variable equal to 1 if the observation is in the endline survey, 0 otherwise. α_k are country fixed effects.

Specific_j is the specificity of the good produced by sector j . Interacting Specific_j with all variables of the model allows for a triple difference analysis. The main hypothesis tested in this paper is that β_3 is positive, i.e., judicial reforms have positive effects on firm productivity in sectors depending on the judiciary. Judicial reforms may also have a positive effect on sectors where firms deal in generic sectors. If this is the case, then β_3 would represent a lower bound on the true effects of judicial reforms since the control group is also partially affected.

To check for common pre-trends, I also look at the earlier waves of data collected before the baseline and endline surveys, called “Pre”. Pre_t is a dichotomous variable equal to 1 if the observation is in the earlier wave “Pre”, 0 otherwise. I further interact Pre_t with JudicialReform_k , $\text{JudicialReform}_k \times \text{Specific}_j$, and Specific_j to look at common pre-trends for firms in sectors dealing in specific goods in countries that later got a judicial reform. Since the omitted category is the baseline Enterprise survey, then coefficients β_5 , β_6 , β_7 , and β_8 must be interpreted as the difference between the “Pre” and baseline waves.

To address the issue of coincidental shocks that may disproportionately affect firms in sectors with relationship-specific investments, I include the following control variables in X_{kt} : the general

business climate,¹⁹ total foreign aid per capita, and sector fixed effects θ_j disaggregated to the second level of ISIC Rev3.1. In the triple difference analysis, I also interact these variables with *Specific_j*. Standard errors are robust, clustered at the level of countries.

IV. Results

A. Perception of judicial efficiency

The Enterprise surveys include a question on the perception of the judiciary’s quality. Each firm is asked on a 4-point scale whether they agree with the following statement: “The court system is fair, impartial and uncorrupted” (M=2.3, SD=1). Panel (a) of Figure 2 shows the results for sectors dealing in specific goods, i.e., more dependent on the judiciary, while panel (b) shows the results for sectors dealing in generic goods.

Clearly, one can see that perceptions of judicial efficiency improve in countries experiencing a judicial reform by almost 0.15 standard deviation, for all firms regardless of the goods they deal in. This is to be expected as judicial reforms improve the judiciary for all firms, not just some. Yet, the theory predicts larger effects on firm productivity for sectors dealing in specific over generic goods.

B. Labor productivity

Panel (c) of Figure 2 shows the evolution of labor productivity (defined as value added per worker) for sectors dealing in specific goods, i.e., more dependent on the judiciary. This figure shows a positive impact of judicial reforms: firms in countries with judicial reforms are less productive prior to reforms, but catch up to firms in countries without reforms.

C. Common time trends

To identify this effect as causal, one has to assume “common time trends”: in the absence of judicial reforms, firm productivity in treated or control countries would have evolved the same way.

There are two ways to check this. First, one can look at the evolution over the same period of other firms (less dependent on the judiciary for technological reasons). Panel (d) of Figure 2 shows the evolution of productivity for firms dealing in generic goods. The trends are rather similar. Considering the same trends in the generic sector, one can assume that the trends would have also

¹⁹Measured by Doing Business, as the distance to frontier score that measures the gap between a particular economy’s performance and the best practice of all the categories except enforcing contract, i.e., starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, resolving insolvency.

been similar in the sectors dealing in specific goods had there been no judicial reforms. Yet, panel (c) indicates a catch-up, which can be attributed to the judicial reforms.

Another approach to testing the “common time effects” assumption is to look at pre-trends. Panel (e) shows the period “pre”, one wave before the start of the judicial reforms. This graph shows that firms in countries which later got judicial reforms were on quite a similar trends than firms in other countries. If anything, the trend was slightly going in the other direction, i.e., firms in countries which later got judicial reforms were doing slightly worse. Panel (c) indicates a catch-up, which cannot be attributed to the continuation of an on-going catch-up trend.

This graphical analysis pooled all countries experiencing judicial reforms together. In regressions, one can include country fixed effects to directly control for any country-specific factors.

D. Main Regressions

Table 3 confirms the graphical results: perceptions of judicial efficiency increase by 0.15 standard deviation for all firms since the coefficient of $JudicialReform_k \times Post_t$ is 0.15 while the coefficient of $JudicialReform_k \times Post_t \times Specific_j$ is not significantly different from zero. Hence, all firms in sectors dealing in generic or specific goods have an improved perception of the judiciary.

Column (2) of Table 3 shows the results for firm productivity. The coefficient of interest, i.e., the triple difference coefficient of $JudicialReform_k \times Post_t \times Specific_j$, is 19.4 thousand dollars (or 19.4k\$ in the rest of the paper), significantly different from zero. This corresponds to an increase in 0.09 standard deviation of labor productivity (equal to 214k\$), or an increase of 22 percent (over the average firm productivity in the control group, i.e., in countries not experiencing any judicial reforms, of 86k\$).

For the earlier waves of data, the coefficient of $JudicialReform_k \times Pre_t \times Specific_j$ is not significantly different from zero, which indicates that before the judicial reforms were implemented, firms in specific sectors were on common pre-trends. The coefficient is 10.75 k\$, which can be interpreted as the difference between the “Pre” and the baseline wave. In other words, the difference between the baseline and the “Pre” wave was the opposite of this, i.e., -10.75 k\$. Thus, as visible from the graph, the situation for firms in specific sectors was slightly worsening in countries that later implemented judicial reforms. The overall finding from these earlier waves of data is that the effect of the judicial reforms is not the continuation of a positive on-going trend.

Table 3 provides an F-test for the joint significance of all variables interacted with $Specific_j$. The null hypothesis is whether the coefficients of $JudicialReform_k \times Post_t \times Specific_j$, $Post_t \times Specific_j$, and $\alpha_k \times Specific_j$ are equal to zero. The F-statistic is 60, indicating a rejection of the

equality of the coefficients of the generic and specific sectors, and the validity of the triple difference approach.

E. Effects of comprehensive, limited and domestic judicial reforms

The wide variation in the types of judicial reforms implemented can also be used to understand which judicial reforms work best to increase firm productivity. The index $JudicialReform_k$ is defined for comprehensive judicial reforms, i.e. reforms targeting quality, speed, and access; and with a budget above 5 percent of a country’s judiciary budget. Aside from these comprehensive reforms, 23 countries have experienced more limited judicial reforms i.e. not targeting all three characteristics (quality, speed, access). I define $LimitedJudicialReform_k$ as a dichotomous variable equal to 1 if the country experienced a limited judicial reform and 0 otherwise. The results in Column (5) of Table 3 show that limited reforms have no effect on firm productivity.

This is in line with the model proposed in the previous section. Limited reforms may not be enough to reverse the inequality $p\beta^T < l_p$. In the extreme where $p = 0$, $T = \infty$, and l_p is high, addressing one constraint while leaving the others unaffected does not influence the decision for the seller to sue and the buyer to ex-post renegotiate. For example, increasing access to a slow and biased judiciary will achieve nothing. Only comprehensive reforms matter.

This framework can also be used to look at the impact of domestic judicial reforms. First, I find no comprehensive domestic-led reforms in the data, i.e., reforms targeting quality, speed and access (see Table C2). This is in line with the proposed model that predicts low impetus for domestic judicial reforms, at least in oligarchies, because of the limited commitment issue. In the data, I only find limited domestic reforms. These limited reforms have less of an effect on firm productivity than comprehensive externally financed reforms, as can be seen in Column (6) of Table 3. This does not mean that comprehensive domestic reforms would have no effect - if only they existed.

F. Robustness checks on the endogeneity of judicial reforms

Judicial reforms may be enacted by reform-minded leaders who simultaneously implement other reforms which improve the business climate. This may suggest that the effect of judicial reforms detected in this paper may be due to these other policies. To address this issue, I include a business climate index as a control variable in Column (7) of Table 3. I use the “distance to frontier” score measured by the Doing Business project. This index measures the gap between a particular economy’s performance and the best practice on the following categories: starting a business, dealing with construction permits, getting electricity, registering property, getting credit,

protecting minority investors, paying taxes, trading across borders, and resolving insolvency. From the calculation, I exclude the category “enforcing contract” since it is precisely the category studied in this paper. I call this variable $BusinessClimate_k$. Column (7) of Table 3 shows that the effect of comprehensive reforms remain very similar when controlling for the general business climate. In other words, the effect detected in this paper is net of any coincidental improvements in the process of doing business on all categories mentioned above.

Judicial projects by the World Bank or USAID may come together with additional foreign aid for other projects. In Column (8) of Table 3, I control for the amount of foreign aid per capita received in the country at a given time and find that the effect of judicial reforms remain similar. Column (9) of Table 3 also adds sector fixed effects and shows that the triple difference coefficients are unaffected.²⁰

In particular, some foreign aid projects may disproportionately affect sectors engaged in specific versus generic goods. To address this issue, I use the same IATI dataset to systematically document the effect of all other foreign aid projects on firm productivity. For example, I first select all projects related to education: basic, secondary, and post-secondary.²¹ I then match this data to the Enterprise surveys. All countries in the sample have received at least one education-related project over the period of interest. To develop a quantitative measure of the magnitude of such projects, I sum the budgets of all education-related projects in between the baseline and endline Enterprise surveys for each country in the dataset, and divide this total budget by the country’s GDP. I first determine the correlation between the index $JudicialReform_k$ calculated above (i.e., a dichotomous variable equal to 1 if country k experienced a comprehensive judicial reform and 0 otherwise) and this measure of education-related projects. As shown in Column (1) of Table F1 in Appendix F, there is a correlation between judicial reforms and education-related projects, indicating that both reforms come together. Therefore, the effect detected in this paper on firm productivity may be due to these coincidental education-related projects.

To verify that this is not the case, I add the education projects to the triple difference analysis. In Column (1) of Table 4, I add education reforms, interacted with $Post_t$, and $Post_t \times Specific_j$. Importantly, the coefficient of interest associated with judicial reforms for the specific sector is still statistically significant, indicating that the impact of judicial reforms is not merely driven by coincidental educational reforms. Education reforms have no effect per se on firm productivity, probably because reforms of basic, secondary, and post-secondary education affect firm productivity

²⁰The earlier waves of data must be dropped for this test since the variable used to create the sector fixed effects is not the same in the standardized dataset and the earlier waves of data.

²¹available at: <http://datastore.iatistandard.org/query/>; with codes 111 Education, 112 Basic education, 113 Secondary education, 114 Post-secondary education.

with a delay, not instantaneously.

Importantly, the triple difference coefficient remains significant if one controls for health sector reforms (health, basic health, population policies/ programmes and reproductive health, and water and sanitation) in Column (2), transport sector reforms (road construction, rail, water, air transport) in Column (3), energy (Oil, Gas, Coal, Nuclear, Hydro-electric power plants, Geothermal, Solar, Wind, Ocean energy) in Column (4), and banking (formal and informal, in the form of micro credit, savings and credit co-operatives), in Column (5).

In Table F2 in the Appendix, I also find that the triple difference coefficient remains significant when external factors are controlled, such as trade and debt reforms; reforms addressing the other two pillars of prosperity, tax capacity and conflict-related reforms, according to Besley and Persson (2011):²² and support to other counter-powers to the executive: the parliament, the media, independent election bodies guaranteeing free and fair elections, and anti-corruption organizations.

Overall, this table shows that the effect of comprehensive judicial reforms is not driven by coincidental foreign aid projects.

G. Robustness checks on measures of relationship-specific investment

In Table 5, I use other indices of relationship-specific investments used in the literature to check whether the results still hold. Instead of using *Specific_j* that measures the specificity of goods produced from the Germany “Innovation” round (Column (1)), I use an index of input complexity (1 minus the Herfindahl index of input use) which can be construed as a measure of the complexity of the input mix and of the reliance on contract enforcement mechanisms, according to Levchenko (2007) (see greater details in Appendix XXX for the exact calculation). I compute this indicator using the Swedish Enterprise survey (Sweden is ranked 9th in the world and there is no German World Bank Enterprise Survey in the standardized dataset). The results are similar indicating that firms requiring a more complex input mix (thereby relying more on contracts) greatly benefit from judicial reforms.

Results are also similar when using the ratio of inputs to output (firms using more inputs into their production rely more on contracts) in Column (3), or when calculating the Herfindahl index and the input/output ratio not from Sweden but from the two countries per continent with the best judiciaries as benchmarks in Column (4) and (5). The results of Column (4) and (5) are similar to previous ones. In fact, they show a larger impact of judicial reforms. The remarkable finding of Table 5 is that the results remain the same regardless of sample size (from 47,041 to 82,007),

²²The three pillars of prosperity according to Besley and Persson (2011) are tax capacity, legal capacity, an absence of internal conflict.

the sector of firms considered (manufacturing or all sectors), the benchmark country (Germany, Sweden, or the two countries with the best judiciaries within the continent), or the indicator of relationship-specific investment used (specific versus generic output, input complexity, or input to output ratio).²³

H. Other robustness checks

The empirical framework developed in this paper can be used to answer important questions about the effects of judicial reforms in different contexts. In Column (2) of Table E1, I investigate whether comprehensive judicial reforms also work in the context of poorly functioning judiciaries. The theory predicts that if the suing condition 1 does not hold, i.e., $p\beta^T < l_p$ and there are no incentives to sue, then it is unclear whether comprehensive judicial reforms have any effect. To have an effect, reforms must be large enough in terms of their effect on p , T , and l_p to reverse this inequality. One can investigate this by looking at the effects of judicial reforms in countries where $p\beta^T < l_p$. In Column (2) of Table E1, I find that comprehensive judicial reforms work even in contexts with poorly functioning judiciaries.

In Column (3), I investigate whether comprehensive externally funded judicial reforms also work in oligarchies. In terms of the model, the extreme case of an oligarchy under a limited commitment issue implies that $p = 0$, $T = \infty$, and l_p is high. Here it is unclear whether judicial reforms have any effect. Moreover, the elite might be able to undermine the effects of externally funded judicial reforms by other means. To capture the oligarchic nature of a regime, I use data from Polity IV and find that large and comprehensive externally financed judicial reforms work, even in oligarchies.

In Table H1 of the Appendix, I show that the result remain similar when including country-specific trends, when considering the sum of comprehensive and limited reforms (instead of dichotomous variables), or when the budget threshold to be considered a comprehensive judicial reform is changed to 1, 3, or 7 percent.

I also adapt the randomization inference Fisher test to this particular setting of a triple difference. Young (2017) shows that the Fisher test is both exact, i.e. with a distribution that is known no matter what the sample size or the characteristics of errors, and intrinsically resilient to outliers. In this paper, I randomly permute the comprehensive and limited reforms at the level of countries.

²³In the Appendix G, I present another robustness check using the measure developed by Nunn (2007). The issue with this measure is that it uses the Input-Output table of the United States Bureau of Economic Analysis, which uses the North American Industry Classification System (NAICS) industry classification, which is different from the International Standard Industrial Classification (ISIC), Rev 3.1 of the World Bank Enterprise Surveys. There is no exact correspondence between the two codes. In the Appendix G, I present a test using my own correspondence between the codes. The advantage of the test presented in my paper is that it only uses World Bank Enterprise Surveys that use the ISIC Rev3.1 code, with no issues of code correspondence. The matching of sectors between different dataset and different countries (i.e., Germany, Sweden, and other countries) is thus straightforward since all firms use the same code.

I then estimate the model. This generates a simulated average treatment effect, along with a simulated p-value. Doing this 1,000 times produces an empirical distribution of the p-values. The Fisher p-value is the number of times the observed p-value is lower than the simulated p-value. The Fisher p-value corresponding to the preferred specification in Column (8) of Table 3 is 0.09. This shows that the triple difference coefficient is still significant with a Fisher test.

Finally, in Table H2 of the Appendix, I use other measures of firm output and profit to show that the results are not driven by the choice of a dependent variable. I also show that the effect is not driven by the accumulation of physical or human capital, or by an increase in the number of workers. This points to the fact that the effect of institutions such as the judiciary is captured in the total factor productivity term, in line with Hall and Jones (1999).

V. Conclusion

In this paper, I use a triple difference analysis to compare firms: 1) in countries with or without judicial reforms, 2) before and after the reforms, 3) in sectors relying more or less on judiciaries due to their need for relationship-specific investments. I assemble a world database of 4,568 judicial projects, and codify each reform according to the characteristic targeted, i.e., quality, speed or access of the judiciary, and budget size. For example, the World Bank project called the “Judicial Performance Improvement Project” (JPIP) in Kenya trained court officials and streamlined procedures (quality), introduced performance management contracts designed to reduce the backlog of cases (speed) and built courts (for greater access). This greater quality, speed, and access of the courts may have increased the incentives to sue when confronted with a dispute, which could in turn have decreased the incentives to start a dispute in the first place. This may be especially important for firms engaged in relationship-specific investments which depend more on contract enforcement mechanisms.

In line with this argument, I find that judicial reforms significantly improve perceptions of judicial efficiency by 0.15 standard deviation for all firms, and firm productivity by 22 percent in sectors requiring more relationship-specific investments. The effect is positive but not significant for firms in sectors requiring less relationship-specific investments.

This paper contributes to the debate about the importance of the judiciary in the process of economic growth. On one hand, North (1990) argues that “the inability of societies to develop effective, low cost enforcement of contracts is the most important source of both historical stagnation and contemporary underdevelopment”. On the other, it is easy to think of alternative arrangements to avoid the adverse effects of weak contracting institutions (Acemoglu and Johnson, 2005; Greif,

1993).

I provide support for both views articulated around the need for relationship-specific investments. If the output is generic, with many potential buyers, then a seller can circumvent the issue of ex-post renegotiation by turning to other buyers. In this case, the judiciary may matter less. I find empirical support for this in the data: judicial reforms improve firms' perceptions of the judiciary, but have no significant effect on productivity of firms dealing in generic goods.

In contrast, if the output is specific with only one buyer, then a seller has no way to avoid the ex-post renegotiation by that one buyer. In such a case, the judiciary is more important. I find support for this in the data: judicial reforms have a large positive effect on firms dealing in specific goods. In conclusion, the judiciary may be less important for generic goods, but is crucial for the emergence of more specific and complex types of goods produced, i.e., the development of a modern economy.

Finding an effect of these judicial reforms was not a foregone conclusion. I show in this paper that in oligarchies, the elite in power have no incentives to implement domestic reforms and instead, may have incentives to undermine externally financed judicial reforms to benefit themselves or their cronies. Judicial reforms leaving politics unchanged may achieve nothing. In this paper, I show that these judicial reforms have some effects, even in oligarchies.

This paper only focused on firm productivity however, an important avenue of future research is to check whether these judicial reforms also have political effects by checking the power of the executive (La Porta et al., 2004), which could have further dramatic consequences on the economy. If the judiciary can be a check on the executive, this raises the question as to why externally-financed judicial reforms would be adopted in the first place. The JPIP may have been implemented following a critical juncture in Kenya (a new progressive constitution due to grave ethnic conflicts as explained above), yet, the judiciary is currently being undermined by the Kenyan executive. Despite the positive effects on the economy documented in this paper, there may be political obstacles to the implementation of judicial reforms.

This paper is important on both academic and policy levels. I find that \$5.4 billion has been spent on 4,568 judicial projects implemented since 1996 by 500 agencies. Up to date, there has been no rigorous impact evaluation of these costly interventions. This paper is the first to systematically collect data on these judicial reforms. A practitioner involved in judicial reforms once said: "we know how to do a lot of things, but deep down we don't really know what we are doing" (Carothers (2003), p.5). This paper is the first to find large effects of these judicial reforms on firm productivity. In particular, an important implication for practitioners is that comprehensive reforms, i.e., those

targeting all characteristics at once (quality, speed, and access) and with a budget size above 5 percent of a country's judiciary, affect firm productivity. In contrast, I find that limited reforms i.e. those which do not target all characteristics at once or with a small budget, have no effects. The intuition is that increasing access to an otherwise slow and corrupt judiciary, does not fundamentally affect outcomes. Therefore, comprehensive rather than limited judicial reforms should be favored.

REFERENCES

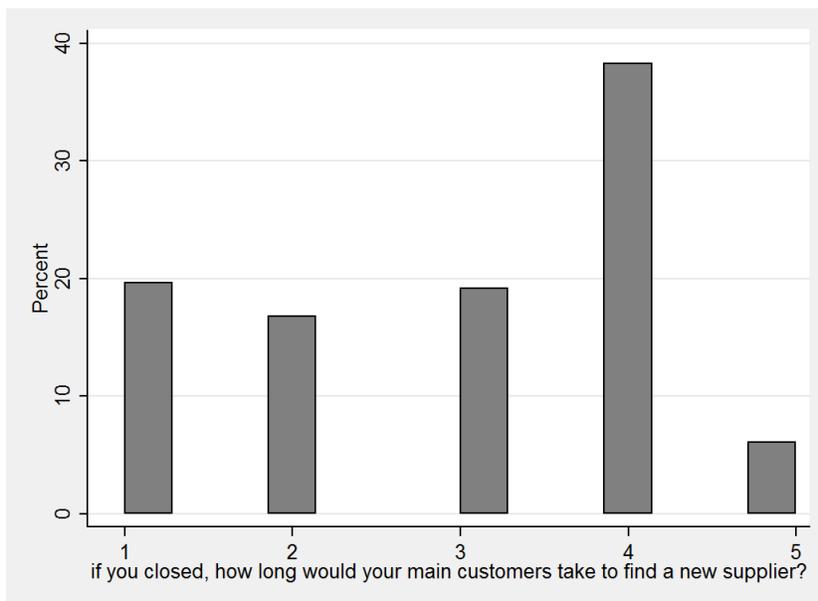
- Aberra, Adam, and Matthieu Chemin.** 2017. "The Economic Effects of Access to the Judiciary: Evidence from a Randomized Experiment."
- Aboal, Diego, Nelson Noya, and Andrés Rius.** 2014. "Contract Enforcement and Investment: A Systematic Review of the Evidence." *World Development*, 64: 322–338.
- Acemoglu, Daron, and James A Robinson.** 2013. *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. Crown Business.
- Acemoglu, Daron, and Simon Johnson.** 2005. "Unbundling Institutions." *Journal of Political Economy*, 113(5): 949–995.
- Amirapu, Amrit.** 2015. "Judicial Institutions, Relationship Specificity and Growth: Evidence from India."
- Besley, Timothy, and Torsten Persson.** 2011. *Pillars of Prosperity: The Political Economics of Development Clusters*. Princeton University Press.
- Carothers, Thomas.** 2003. "Promoting the Rule of Law Abroad: the Problem of Knowledge."
- Chemin, Matthieu.** 2009a. "Do Judiciaries Matter for Development? Evidence from India." *Journal of Comparative Economics*, 37(2): 230–250.
- Chemin, Matthieu.** 2009b. "The Impact of the Judiciary on Entrepreneurship: Evaluation of Pakistan's Access to Justice Programme." *Journal of Public Economics*, 93(1): 114–125.
- Chemin, Matthieu.** 2010. "Does Court Speed Shape Economic Activity? Evidence from a Court Reform in India." *The Journal of Law, Economics, and Organization*, 28(3): 460–485.
- Djankov, Simeon, Rafael La Porta, Florencio Lopez-de Silanes, and Andrei Shleifer.** 2003. "Courts." *The Quarterly Journal of Economics*, 118(2): 453–517.

- Gainer, Maya.** 2017. “Transforming the courts: Judicial sector reforms in Kenya, 2011–2015.” *Innovation for Successful Societies, Princeton University.*
- Glaeser, Edward L, Giacomo AM Ponzetto, and Andrei Shleifer.** 2016. “Securing Property Rights.”
- Greif, Avner.** 1993. “Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders’ Coalition.” *The American Economic Review*, 525–548.
- Greiner, D, and C Pattanayak.** 2012. “Randomized Evaluation in Legal Assistance: What Difference does Representation (Offer and Actual Use) Make?” *Yale Law Journal*, 121: 2118.
- Hall, Robert E, and Charles I Jones.** 1999. “Why do Some Countries Produce so Much More Output per Worker than Others?” *The Quarterly Journal of Economics*, 114(1): 83–116.
- Humphreys, Stephen.** 2010. *Theatre of the Rule of Law: Transnational Legal Intervention in Theory and Practice.* Vol. 73, Cambridge University Press.
- Klein, Benjamin, Robert G Crawford, and Armen A Alchian.** 1978. “Vertical Integration, Appropriable Rents, and the Competitive Contracting Process.” *The Journal of Law and Economics*, 21(2): 297–326.
- Kondylis, Florence, and Mattea Stein.** 2017. “Reforming the Speed of Justice: Evidence from an Event Study in Senegal.”
- La Porta, Rafael, Florencio Lopez-de Silanes, Cristian Pop-Eleches, and Andrei Shleifer.** 2004. “Judicial Checks and Balances.” *Journal of Political Economy*, 112(2): 445–470.
- Levchenko, Andrei A.** 2007. “Institutional Quality and International Trade.” *The Review of Economic Studies*, 74(3): 791–819.
- Lichand, Guilherme, and Rodrigo R Soares.** 2014. “Access to Justice and Entrepreneurship: Evidence from Brazil’s Special Civil Tribunals.” *The Journal of Law and Economics*, 57(2): 459–499.
- Lilienfeld-Toal, Ulf von, Dilip Mookherjee, and Sujata Visaria.** 2012. “The Distributive Impact of Reforms in Credit Enforcement: Evidence from Indian Debt Recovery Tribunals.” *Econometrica*, 80(2): 497–558.
- North, Douglass C.** 1990. *Institutions, Institutional Change and Economic Performance.* Cambridge University Press.

- Nunn, Nathan.** 2007. "Relationship-Specificity, Incomplete Contracts, and the Pattern of Trade." *The Quarterly Journal of Economics*, 122(2): 569–600.
- Palumbo, Giuliana, Giulia Giupponi, Luca Nunziata, and Juan S Mora-Sanguinetti.** 2013. "Judicial Performance and its Determinants."
- Pande, R, and C Udry.** 2006. "Institutions and Development: A View from Below." *Advances in Economics and Econometrics: Theory and Applications, Proceedings of the 9th World Congress of the Econometric Society.*
- Sandefur, Justin, and Bilal Siddiqi.** 2013. "Delivering Justice to the Poor: Theory and Experimental Evidence from Liberia." 20.
- Trebilcock, Michael J, and Ronald J Daniels.** 2009. *Rule of Law Reform and Development: Charting the Fragile Path of Progress.* Edward Elgar Publishing.
- WorldBank.** 2012. "Initiatives in Justice Reform 1992-2012."

FIGURE 1. SPECIFIC AND GENERIC SECTORS

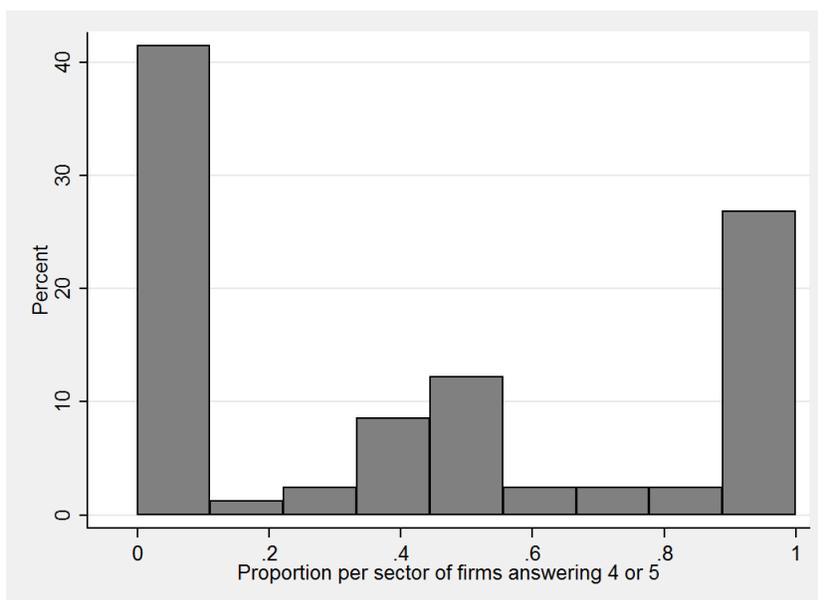
(a) If seller shut down, how long would it take to find alternative seller?



Note:

1: a day or less; 2: more than a day, less than a week; 3: more than a week, less than a month; 4: a month or more; 5: never (it would be impossible to replace)

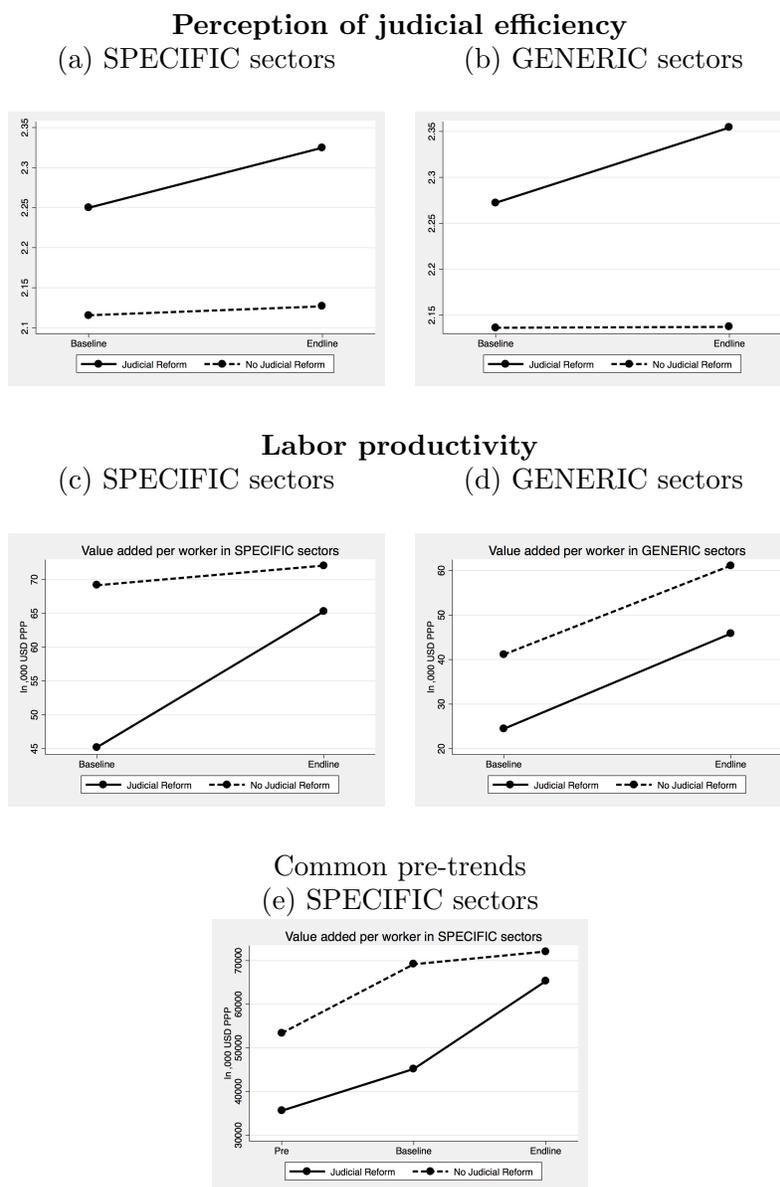
(b) Proportion per sector of firms answering 4 or 5



Note:

For each sector (disaggregated at the 4 digit level of the ISIC rev3.1 classification), I calculate the proportion of firms answering 4 or 5. This graph shows the distribution of that proportion.

FIGURE 2. EFFECT OF JUDICIAL REFORMS ON PERCEPTIONS OF JUDICIAL EFFICIENCY AND LABOR PRODUCTIVITY



Note:

Perception of judicial efficiency measured with: “The court system is fair, impartial and uncorrupted”. Answers: 1: Strongly disagree, 2: Tend to disagree, 3: Tend to agree, or 4: Strongly agree. Labor productivity is value added per worker, expressed in thousand dollars USD PPP. Judicial reform countries are countries in which at least one comprehensive judicial reform (targeting access, speed, and quality, and a budget above 5 percent of the annual judiciary’s budget) was implemented in the period between two enterprise surveys. Specific=1 is the group of sectors dealing in specific goods, Specific=0 is the group of sectors dealing in generic goods (goods are specific if it would take more than a month for the main customer to find the same good were the seller to shut down its operations).

TABLE 1—DESCRIPTIVE STATISTICS

	Mean	SD	N
Firm-level data			
Judicial efficiency	2.30	1.00	107192
Value added per worker (Thousand dollars)	80.98	212.07	99623
Capital stock per worker (Thousand dollars)	48.90	164.31	42324
Proportion of skilled workers	0.70	0.31	59168
Number employees	112.96	1125.20	117044
New firm	0.04	0.20	116063
Judicial reforms			
Comprehensive Judicial Reform	0.22	0.41	117320
Limited Judicial Reform	0.22	0.42	117320
Relationship-specific investment			
Specific	0.40	0.49	54439
Herfindhal Sweden	0.41	0.49	69429
Input/output Sweden	0.41	0.49	73743
Herfindhal Continent	0.59	0.49	105966
Input/output Continent	0.53	0.50	105962
Control variables			
Business climate	53.25	9.52	116374
Foreign aid per capita	49.72	78.55	100807

Note:

Judicial efficiency is agreement with “The court system is fair, impartial and uncorrupted” (1: Strongly disagree, 4: Strongly agree). “Comprehensive Judicial Reform” takes the value 1 when a reform addressing the three criteria of quality, speed, and access, and with a budget above 5 percent of the judiciary budget was implemented in between the two rounds of a World Bank Enterprise Surveys. Specific is a dichotomous variable equal to 1 if goods are specific, i.e., it would take more than a month for the main customer to find the same good were the seller to shut down its operations. Each variable is defined in greater detail in Appendix B.

TABLE 2—JUDICIAL REFORMS IN KENYA BETWEEN 2007 AND 2013

Year	Organization	Description	Budget	Access	Speed	Quality
2009	Canada (DFATD)	The program aims to improve access to justice, particularly for poor and marginalized people, including women.	2.98	1		
2010	Ministry of Foreign Affairs, Finland	The purpose of the project has been to enable the marginalized communities living in Wajir district to access justice, enjoy their legal rights.	0.11	1		
2012	World Bank	The objective of the Judicial Performance Improvement Project (JPIP) for Kenya is to improve the performance of the judiciary to provide its services in the project areas in a more effective and accountable manner.	120	1	1	1
2012	Sweden	Support to Judiciary Transformation Framework in partnership with GIZ (German Development Agency).	2.21	1	1	1
2012	Canada (DFATD)	The goal of this project is to improve legal services for children and youth in East Africa, so that they have access to legal protection.	4.40	1		

Budget is in Million USD.

TABLE 3—IMPACT OF JUDICIAL REFORMS ON FIRM PRODUCTIVITY

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Judicial efficiency			Firm productivity			
Judicial reform * Post	0.15** (0.07)	15.94 (11.66)	21.33 (12.92)	21.22 (13.25)	16.12 (12.97)	16.09 (12.95)	14.18 (12.02)
Judicial reform * Post * Specific	-0.03 (0.06)	19.40** (8.88)	19.92** (9.00)	19.86** (8.92)	20.33** (9.29)	20.45** (9.31)	17.94* (10.02)
Judicial reform * Pre	-0.07 (0.28)	-30.42 (33.31)	-34.64 (40.07)	-33.64 (32.59)	-36.49 (43.99)	-36.06 (43.92)	
Judicial reform * Pre * Specific	-0.15 (0.15)	10.75 (16.18)	13.72 (15.55)	13.61 (15.96)	15.83 (18.94)	15.27 (19.18)	
Limited judicial reform * Post			14.27 (10.21)	14.16 (10.19)	11.16 (9.80)	11.46 (9.82)	4.68 (7.13)
Domestic judicial reform * Post				0.88 (8.36)	4.48 (9.72)	4.90 (9.90)	-3.02 (8.21)
Business climate					-0.99 (1.00)	-0.94 (0.99)	0.26 (0.63)
Foreign aid per capita						0.08 (0.05)	0.10** (0.04)
Observations	51,190	50,493	50,493	50,493	49,373	49,373	47,041
Country fixed effects	YES	YES	YES	YES	YES	YES	YES
Sector fixed effects							YES
F-test	1100	60.14	244.9	916.4	377.9	1832	2.766e+06

Note:

OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in Column (1) is the perception of judicial efficiency, as measured on a 4 point scale as the tendency to agree with the statement: “The court system is fair, impartial and uncorrupted”. The dependent variable in columns (2) to (7) is the value added per worker, expressed in thousand dollars USD PPP.

TABLE 4—IMPACT OF JUDICIAL AND OTHER REFORMS ON FIRM PRODUCTIVITY

	(1)	(2)	(3)	(4)	(5)
Judicial reform * Post	14.29 (12.55)	12.34 (12.86)	14.69 (11.94)	13.16 (12.84)	14.14 (12.00)
Judicial reform * Post * Specific	16.81* (10.13)	18.18* (10.24)	16.54* (9.84)	18.58* (10.09)	17.23* (9.81)
Education * Post	-0.63 (5.56)				
Education * Post * Specific	4.88 (4.70)				
Health * Post		3.00 (2.84)			
Health * Post * Specific		-0.69 (1.73)			
Transport * Post			1.25 (0.94)		
Transport * Post * Specific			-1.71 (1.04)		
Energy * Post				5.40 (10.23)	
Energy * Post * Specific				-4.14 (7.43)	
Banking * Post					13.23 (29.99)
Banking * Post * Specific					20.96 (49.08)
Observations	46,990	46,990	46,990	46,990	46,990
Country fixed effects	YES	YES	YES	YES	YES
Sector fixed effects	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES

Note:

OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable is the value added per worker, expressed in thousand dollars USD PPP. Control variables are: limited judicial reform interacted with Post, domestic judicial reforms interacted with Post, business climate, foreign aid per capita, sector level fixed effects, further interacted with the Specific index. In Column (2), “Education” is the budget of education reforms over the period of interest in each country.

TABLE 5—IMPACT OF JUDICIAL REFORMS ON FIRM PRODUCTIVITY

	(1)	(2)	(3)	(4)	(5)
Judicial reform * Post	14.18 (12.02)	-0.08 (14.61)	-7.37 (14.28)	-4.90 (17.97)	-0.52 (15.32)
Judicial reform * Post * Specific	17.94* (10.02)				
Judicial reform * Post * Herfindhal Sweden		29.20* (16.46)			
Judicial reform * Post * Input/output Sweden			39.30** (15.42)		
Judicial reform * Post * Herfindhal Continent				34.64* (17.93)	
Judicial reform * Post * Input/output Continent					25.04 (17.60)
Observations	47,041	57,155	60,844	82,007	82,007
Country fixed effects	YES	YES	YES	YES	YES
Sector fixed effects	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES

Note:

OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in all columns is the value added per worker, expressed in thousand dollars USD PPP. In column (1), Specific is a dichotomous variable equal to 1 if goods are specific, i.e., it would take more than a month for the main customer to find the same good were the seller to shut down its operations. In Column (2), Herfindhal Sweden is 1 minus the Herfindahl index for input use, i.e., 1 minus the sum of shares of each of the nine inputs (labor, raw materials and intermediate inputs, electricity, communications services, fuel, transport for inputs, water, rental of land/buildings, equipment, furniture) among total input value to the squared, estimated for each sector disaggregated to the 4th digit of ISIC code in Sweden. Firms are classified in the generic or specific sectors if their Herfindahl index is above or below the median. In Column (3), “Input/output Sweden” is the ratio of the total value of inputs used divided by the value of output, disaggregated for sectors at the 4 digit level of the ISIC code in Sweden. Firms are classified in the generic or specific sectors if their Input/output ratio is above or below the median. “Herfindhal Continent” and “Input/output Continent” are defined similarly but instead of using Sweden as the benchmark country, I use data from the two countries with the best judiciaries in the same continent.

APPENDIX A: THE MODEL

A1. *The setting: relationship-specific investment*

Consider a buyer asking a seller to produce a customized good. The seller exerts effort $e \in [0, 1]$, of which he has an endowment \bar{e} . Effort e is observable, there is perfect information. This yields output A with probability \sqrt{e} , and 0 with probability $1 - \sqrt{e}$. Thus, output produced is $A\sqrt{e}$. For simplicity, the utility function u of the seller is linear in consumption c and leisure l , $u(c, l) = c + l$, such that there is no risk-aversion effects. The buyer promises in a contract to pay $A\sqrt{e}$. The seller chooses e to maximize utility:

$$\begin{aligned} \max_e \quad & A\sqrt{e} + \bar{e} - e \\ \text{s.t.} \quad & e \leq \bar{e} \end{aligned}$$

The first-order condition for an interior solution leads to equilibrium effort level $e^* = \left[\frac{A}{2}\right]^2$. Once this effort level has been sunk and output has been produced, the buyer renegotiates prices down and offers a minimal amount $\varepsilon > 0$. Since there are no other buyers for this customized good, the seller agrees. Anticipating this, the seller does not exert effort.

This outcome is inefficient, since any amount offered greater than ε would be pareto-efficient: the seller would exert more effort, and the buyer would get more of the customized good. Yet, the fundamental issue is that the buyer cannot credibly commit to respect the contract.

A2. *The solution: the judiciary*

A solution is efficient third-party contract enforcement that upholds contracts. The intuition is that, depending on the characteristics of the judiciary, the seller will sue, and this might deter buyers from deviating in the first place. The buyer can now credibly commit to an agreed-upon price, which leads to the optimal level of effort.

In quantitative terms, if the buyer renegotiates prices down and offers ε close to zero, the seller can sue for the amount of the deviation, i.e., $A\sqrt{e^*}$, also equal to $\frac{A^2}{2}$. To model the judiciary in a simple way, we assume that a judgment is made in favor of the seller with probability p , after time T . p is less than 1, since despite the clear-cut case in favor of the seller, it is possible that the courts will rule against the plaintiff if they are of low quality (e.g., judges are influenced by the defendant). p thus represents the courts' quality.

With probability p , the seller wins the case and enforces the payment of $\frac{A^2}{2}$ at time T . If the seller's discount factor is β , the net present value is $\beta^T \frac{A^2}{2}$. With probability $1 - p$, the seller loses the case, and gets nothing.

On the cost side, the seller must pay the plaintiff's legal fees (lawyer fees, court fees, enforcement costs), equal to a proportion l_p (p for plaintiff) of the value of the case $\frac{A^2}{2}$, i.e., total legal fees of $l_p \frac{A^2}{2}$. This is true in an each-party-pays system. The loser-pays-all system (in place in some countries outside of the United States) does not fundamentally alter the calculations since the plaintiff still has to put forward the initial costs $l_p \frac{A^2}{2}$ to sue. In the presence of credit constraints (the case in developing countries studied in this paper), this is the key constraint to consider when deciding to sue, no matter what future (uncertain) reimbursements might be in the loser-pays-all system. Moreover, the exact amount to be reimbursed is at the judge's discretion. In rural Kenya, the setting of a randomized experiment where Aberra and Chemin (2017) provided a lawyer to a randomized treatment group, judges awarded fees on a case by case basis, and if the defendant was too poor and/or fees incurred by winning party were not relatively large, then there was no reimbursement. In cases they won, there was no reimbursement. Thus, I focus in this paper on the system of each-party-pays. Out of completeness, I also analyze below the loser-pays-all system, which delivers very similar conclusions.

Of course, there could be other costs associated with suing (stress, time taken away from other productive activities). Aberra and Chemin (2017) find no evidence of increased stress when a randomized treatment group sues in court. They also find that people work more, not less, in the treatment group accessing courts. In the absence of convincing evidence for these other costs, we abstract from them and focus on the well documented legal fees (lawyer fees, court fees, enforcement costs).

Overall, the payoff from suing is $p\beta^T \frac{A^2}{2} - l_p \frac{A^2}{2}$. The seller sues if and only if:

$$(A1) \quad p\beta^T \geq l_p$$

This represents the basic trade-off the seller faces when deciding to sue: an uncertain benefit in a distant future must be weighed against a sure present cost.

The surplus of the seller is $(p\beta^T - l_p)A\sqrt{e} - e$. The optimal effort maximizing this is $\left(\frac{(p\beta^T - l_p)A}{2}\right)^2$, less than $\frac{A^2}{2}$. Output per worker is $\frac{(p\beta^T - l_p)A^2}{2}$. Effort and output are more than zero, as in the counterfactual with no judiciary. Recall that this is true only in sectors with relationship-specific investments. In other sectors, goods are not specific but generic, and if a buyer attempts to renegotiate prices down, there are other numerous buyers interested in the generic good.

If the suing condition (A1) holds, it is easy to see from this formula that increasing p , decreasing T and l_p increase the incentives to sue and decrease the incentives to renegotiate, which favor

relationship-specific investments.²⁴

A3. *The state of judiciaries in the world*

The “Doing Business” project (doingbusiness.org) gives an estimate for p , T , and l_p for the exact same dispute I consider in this paper, i.e., a buyer refuses to pay for a customized good.²⁵

Taking the United States as an example of a country with a high-quality judiciary, in 2016, $p = 0.76$, $T = 1.2$ years, $l_p = 0.31$. Supposing a discount rate of 5 percent, the suing condition 1 holds since the gain from suing (recovering 71 percent of the claim since $p\beta^T = 0.71$) is greater than the legal fees (31 percent of the claim). Overall, the seller recovers 40 percent of the claim after suing ($p\beta^T - l_p = 0.40$). As an example of a country with a “medium” quality judiciary, in Kenya, the judiciary is of lower quality ($p = 0.5$), slightly slower ($T = 1.3$ years), and more expensive ($l_p = 0.42$). The seller recovers a mere 5 percent of the claim when suing: there are very few incentives to sue. As an example of a poorly functioning judiciary, in Liberia, the judiciary is of such low quality ($p = 0.36$), slow ($T = 3.5$ years), and expensive ($l_p = 0.35$), that there are no incentives to sue ($p\beta^T - l_p = -0.15 < 0$).

Extending this exercise, the map in Figure A1 shows $p\beta^T - l_p$ for every country. Countries in red or orange are similar to the the case of Liberia i.e. a poorly functioning judiciary, implying no incentives to sue. According to the model, in these countries, the buyer always renegotiates resulting in no relationship-specific investments from taking place. Even in some countries in green, similar to the case of the United States with an effective judiciary, there may still be incentives for the buyer to ex-post renegotiate given the values of p , T , and l_p , which we now investigate in the section below.

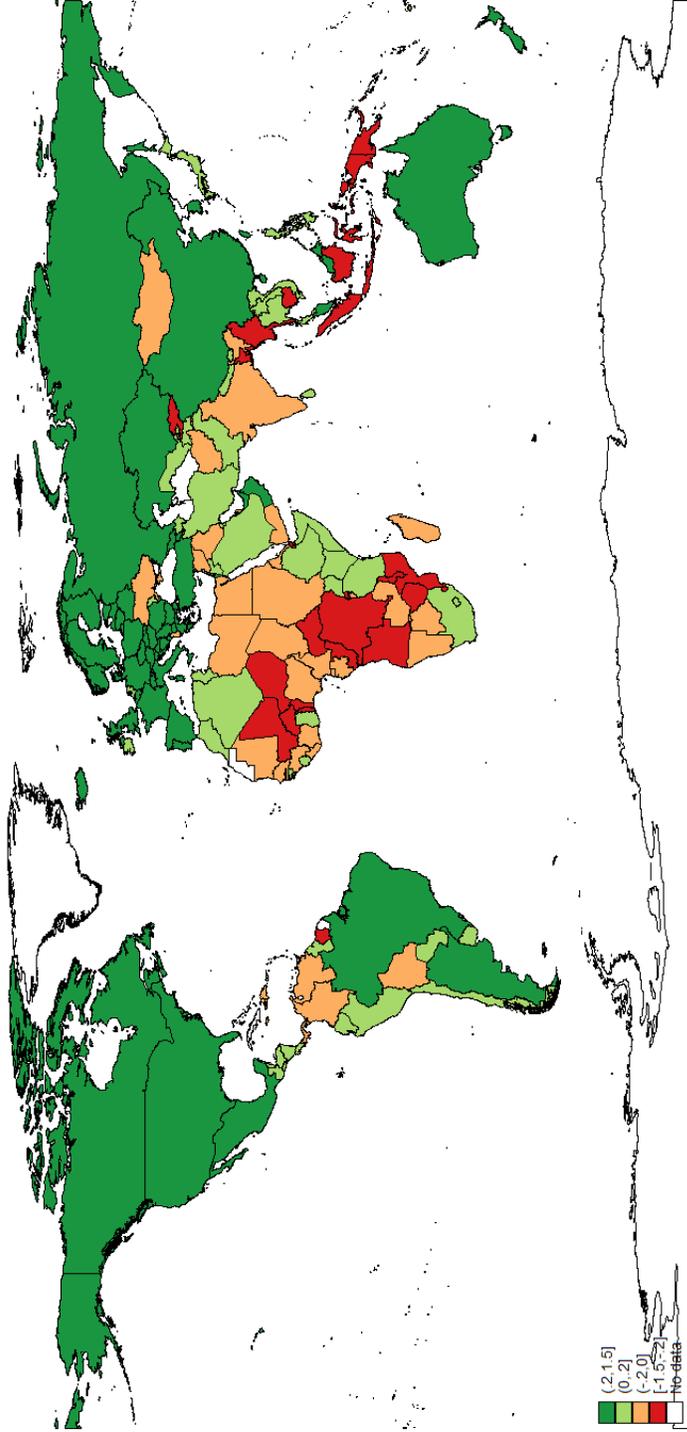
A4. *No-renegotiation condition*

If the suing condition (A1) holds, the seller sues, which affects the decision of the buyer to breach the contract. The gain from renegotiating is to capture the value of the customized good, $\frac{A^2}{2}$. In this case, the seller sues, and with probability p after time T , the buyer must repay this amount.

²⁴A loser-pays-all system does not fundamentally alter this reasoning. In a loser-pays-all system, the plaintiff gets his legal fees reimbursed if he wins, and pays his and the defendant’s legal fees ($l_d \frac{A^2}{2}$, d for defendant) if he loses. Thus, total legal fees are $(1-p) \cdot (l_p + l_d) \frac{A^2}{2}$. The payoff from suing is $p\beta^T \frac{A^2}{2} - (1-p) \cdot (l_p + l_d) \frac{A^2}{2}$. An increase in quality (increase in p) has now two effects going in the same direction. It increases the payoff from winning, and decreases the payment of legal fees. Overall, an increase in p increases the incentives to sue. Similarly, an increase in speed (decrease in T) or access (decrease in l_p) of the judiciary would entice the seller to sue.

²⁵Local lawyers and judges are asked the cost (l_p) and time (T) it takes to solve such a case. The quality of the judiciary is proxied by an index between 0 and 1 established by lawyers and judges. This index looks at best practices in court structure, proceedings, and case managements systems. For example, one criteria is whether cases are randomly assigned to judges. Random assignment of cases guarantees that powerful parties cannot select the judge they prefer. In the model, this increases p .

FIGURE A1. INCENTIVES TO SUE IN THE WORLD (EACH-PARTY-PAYS)



Note: Data from “Doing Business” project, 2014 (doingbusiness.org). The “Doing Business” project gives an estimate for p , T , and l_p for the exact same dispute considered in this paper, i.e., a buyer refuses to pay for a customized good. These estimates are used to compute the incentives to sue, i.e., $p\beta^T - l_p$ for each country. Green and dark green indicate a positive $p\beta^T - l_p$, while red and orange indicate a negative $p\beta^T - l_p$.

The buyer must also incur the legal fees of defendants, equal to a proportion l_d (d for defendant) of the value of the case $\frac{A^2}{2}$. The total costs of being sued are: $p\beta^T \frac{A^2}{2} + l_d \frac{A^2}{2}$. Thus, the buyer does not renegotiate if the gains of deviating are smaller than the costs, i.e. $\frac{A^2}{2} \leq (p\beta^T + l_d) \frac{A^2}{2}$. This simplifies into:

$$(A2) \quad p\beta^T + l_d \geq 1$$

This represents the basic trade-off faced by the buyer: it should not ex-post renegotiate if the costs of being sued exceed the quasi-rents. Clearly, one can see that an increase in quality (increase in p) and speed (decrease in T) of the judiciary increases the cost of being sued, thereby deterring ex-post renegotiation. Similarly, an increase in legal fees l_d for the defendant deters deviation since it raises the cost of being sued.²⁶

The two conditions (suing condition (A1) and the no-renegotiation condition (A2) define three regions. First, when the suing condition does not hold (red and orange countries in Figure A1), the seller does not sue, and relationship-specific investments do not take place. Second, if the suing condition holds, but not the no-renegotiation condition, then the buyer appropriates the quasi-rents, and the seller sues. The output recovered is $(p\beta^T - l_p) \frac{A^2}{2} < \frac{A^2}{2}$, which decreases the incentives to exert effort. Finally, when both conditions hold, the buyer does not renegotiate, the seller does not need to sue, and exerts maximal effort.

Figure A2 shows the no-renegotiation condition (A2) using the Doing Business data. One issue with this data is that it does not measure the legal fees for the defendants l_d . As a first approximation, I use $l_d = l_p$. The no-renegotiation condition is only calculated for the countries in green in Figure A1 since in the countries orange and red, the seller does not sue, and therefore, the buyer renegotiates for sure. For these countries, the color is left white. In Figure A2, countries in red and orange are countries where buyers have incentives to renegotiate despite the threat of suing from sellers. Only the US, UK, Australia, Serbia, Lithuania, Malaysia, Romania, Macedonia, and Singapore have positive no-renegotiation condition, countries in which there are no incentives to ex-post renegotiate. This figure clearly shows that very few judiciaries in the World display the

²⁶The comparative statics on legal fees for the seller and the buyer are of opposite signs. To limit ex-post renegotiation, legal fees should be decreased for the seller, and increased for the buyer. This is exactly the intuition of a loser-pays-all system. In that system, the loser must pay the court fees of the winner to encourage access, and deter offense in the first place. To be more precise, in a loser-pays-all system, the buyer pays his own legal fees l_d and the plaintiff legal fees l_p with probability p , and 0 with probability $1 - p$, since in this case, the plaintiff pays the legal fees. Thus, the buyer does not renegotiate if $p\beta^T \frac{A^2}{2} + p(l_p + l_d) \frac{A^2}{2} \geq \frac{A^2}{2}$. The comparative statics are exactly the same in the loser-pays-all system. An increase in quality (increase in p) has now two effects going in the same direction. It increases the amount to repay and increases the payment of legal fees, thereby decreasing the incentives to renegotiate. Similarly, an increase in speed (decrease in T), access for the seller (decrease in l_p), and costs for the buyer (increase in l_d) decreases the incentive to renegotiate.

characteristics conducive to relationship-specific investments.

APPENDIX B: DATA ON FIRMS

The graph below shows the correlation between a Rule of Law index and firm productivity (GDP per worker) from World Development Indicators.

The next section explains in greater detail the variables used in Table 1.

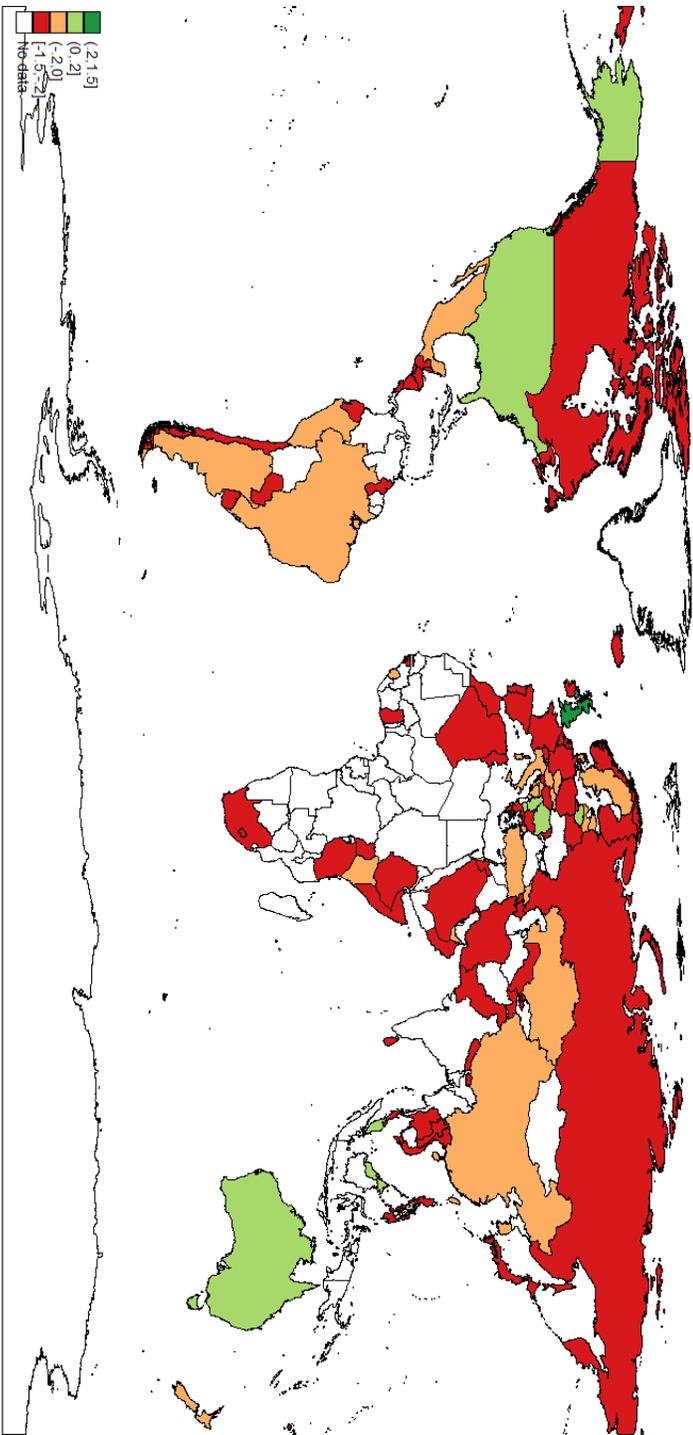
Firm-level data from standardized dataset of World Bank Enterprise Surveys. Judicial efficiency is the answer to the question “Do you agree with the following statement: “The court system is fair, impartial and uncorrupted”?”, on a scale of 1 to 4, 1: Strongly disagree, 4: Strongly agree. Value added per worker is firm revenue minus cost of intermediate inputs (raw materials and intermediate goods used in production, electricity, communications services, rental of land/buildings, equipment, furniture, fuel, transport for goods, water), divided by the number of workers, using PPP exchange rates, trimmed at 1 percent. Capital stock per worker is only available for the manufacturing sector. It is estimated from the question: “If this establishment had to hypothetically purchase the land and buildings, and machinery and equipment in use now, as they are in their current condition, how much would it cost to purchase each of the following?”. Proportion of skilled workers is only available for the manufacturing sector. It is the number of skilled production workers divided by the number of total production workers. The dichotomous variable “New firm” takes the value 1 if the firm was created after the baseline, 0 otherwise.

Judicial reforms: “Comprehensive Judicial Reform” takes the value 1 when a reform addressing the three criteria of quality, speed, and access, and with a budget above 5 percent of the judiciary budget was implemented in between the two rounds of a World Bank Enterprise Surveys. “Limited Judicial Reforms” takes the value 1 when a reform addressing some, but not all, of the four criteria (quality, speed, access, budget), was implemented.

Relationship-specific investment: Specific is a dichotomous variable equal to 1 if goods are specific, i.e., it would take more than a month for the main customer to find the same good were the seller to shut down its operations. Herfindhal Sweden is the Herfindahl index for input use, i.e., 1 minus the sum of shares of each of the nine inputs (labor, raw materials and intermediate inputs, electricity, communications services, fuel, transport for inputs, water, rental of land/buildings, equipment, furniture) among total input value to the squared, estimated for each sector disaggregated to the 4th digit of ISIC code in Sweden. “Input/output Sweden” is the ratio of the total value of inputs used divided by the value of output, aggregated for sectors at the 4 digit level of the ISIC code in Sweden. “Herfindhal Continent” and “Input/output Continent” are defined similarly but instead of using Sweden as the benchmark country, I use data from the two countries with the best judiciaries in the same continent.

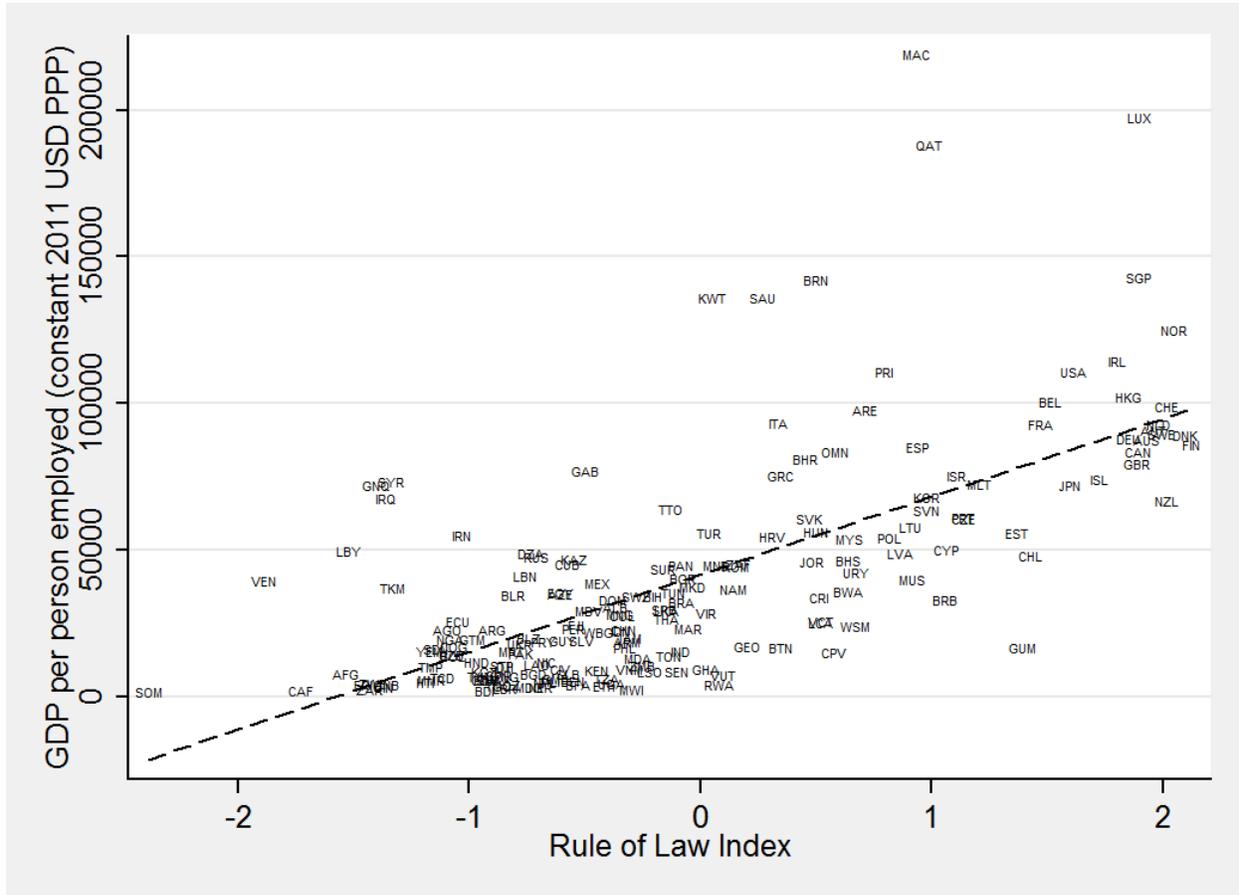
Control variables: Business climate is the distance to frontier score that measures the gap be-

FIGURE A2. NO-RENEGOTIATION CONDITION IN THE WORLD (EACH-PARTY-PAYS)



Note: Data from “Doing Business” project, 2014 (doingbusiness.org). The “Doing Business” project gives an estimate for p , T , and l_p for the exact same dispute considered in this paper, i.e., a buyer refuses to pay for a customized good. These estimates are used to compute the ex-post no-renegotiation condition, i.e., $p\beta^T + l_p - 1$ for each country. Green indicates a positive $p\beta^T + l_p - 1$, while red and orange indicate a negative $p\beta^T + l_p - 1$.

FIGURE B1. RULE OF LAW AND GDP



Note: Correlation = 0.64, $R^2=0.41$. World Bank data. Rule of Law index from the Worldwide Governance Indicators, and firm productivity (GDP per worker) from World Development Indicators, for the year 2014

tween a particular economy’s performance and the best practice of all the categories except enforcing contract, i.e., starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, resolving insolvency. Foreign aid per capita is the net Official Development Assistance (ODA) received by countries per capita in current USD.

APPENDIX C: DATA ON JUDICIAL REFORMS

To access the data, the Online Appendix contains the full list of reforms in “List Judicial Reforms.xls”. This file contains the IATI data. For each project, the IATI data includes: the year

and country of implementation, the implementing organization, a description and the budget. The coding of the quality, speed, and access nature of the reforms comes from the reading of the extra documents also provided in the Online Appendix.

The section below describes in greater detail the data.

C1. Source of data

Data on judicial reforms comes from three sources: the International Aid Transparency Initiative (IATI), the World Bank, and the United States Agency for International Development (USAID).

First, I use data from the International Aid Transparency Initiative (IATI). Since 2010, data following the IATI format has been published by the major donors: the World Bank, the US Agency for International Development (USAID), the UK's Department for International Development (DFID), the United Nations, the European Commission, Germany - Federal Ministry for Economic Cooperation and Development (BMZ), The Bill & Melinda Gates Foundation, the William and Flora Hewlett Foundation, Canada - Department of Foreign Affairs, Trade and Development, African Development Bank (AfDB), Ireland - Irish Aid, Netherlands - Ministry of Foreign Affairs - Development Cooperation, Denmark - Ministry of Foreign Affairs, Finland - Ministry for Foreign Affairs, Australia - Department of Foreign Affairs and Trade, Inter-American Development Bank (IDB), Belgium - Belgian Development Agency (BTC), The Global Fund to Fight AIDS, Tuberculosis and Malaria (see IATI, Annual report 2016).

The full database is available online at: <http://datastore.iatistandard.org/query/>. I select all projects related to sector 15130: Legal and Judicial Development. This delivers 4,568 projects, between 1996 and 2016, for a total value of \$3.2 Billion; average: 5.5 million dollars; max 701 million dollars.

For all World Bank projects, I collect additional information in the World Bank database of projects, available online at: <http://data.worldbank.org/data-catalog/projects-portfolio>. In this database, I select all projects whose main sector is "Law and Justice". This returns 51 projects implemented between 2006 and 2015, for a total value of \$1.5 Billion. The average budget is 30 million dollars, the maximum budget is 300 million dollars.

For USAID projects, I use ForeignAssistance.gov. I select all projects related to the sector "Rule of Law and Human Rights", available at:

<http://beta.foreignassistance.gov/assets/Sector/Rule%20of%20Law%20and%20Human%20Rights.csv>
(or accessible by searching "rule of law", and then downloading "all rule of law and human rights" data). The data is in IATI format. USAID implements rule of law projects through mainly five

implementing organizations: the American Bar Association (http://www.americanbar.org/advocacy/rule_of_law.html), Tetra Tech (<http://www.tetrattechdpk.com/en/countries.html>), Chemonics (<http://www.chemonics.com/> our practices: democracy and governance), East-West Management Institute (<http://ewmi.org/PromotingJustice>), and Checchi Consulting (<http://www.checchiconsulting.com/>). Additional information on the projects was gathered from these websites. I read the description of all these reforms, and followed the same coding (speed, quality, access). This delivers 57 judicial reforms implemented between 2008 and 2016, for a total value of \$676 million. The average budget is 14 million dollars, the maximum budget is 66 million dollars.

Figures on the judiciary's budget are not available in a unified downloadable format. To get an estimate for the judiciary's budget, I use the approximation of 0.2 percent of a country's GDP, based on the median budget of the judiciary in the OECD is 0.2 percent of a country's GDP (Palumbo et al., 2013). For the 8 countries where the reform budget as a proportion of the judiciary's budget is a critical determinant of whether the country is codified as receiving a comprehensive reform or not (i.e., a reform was implemented that target all three characteristics (access, speed, quality), but not implemented by the World Bank or USAID, i.e., Malawi, Nigeria, Pakistan, Rwanda, Tanzania, Uganda, Vietnam, Zambia), I searched <https://www.internationalbudget.org/open-budget-survey/> to get official budget documents on the judiciary's budget.

The full list of judicial reforms can be seen in List judicial reforms.xls in the Online Appendix.

C2. Definition of variables

Here is the definition of variables:

- year_baseline: year of the baseline Enterprise Survey
- year_endline: year of the endline Enterprise Survey. Only reforms with a start date in between these two years (including the baseline year, excluding the endline year) are considered.
- year_reform: year of start of reform from the IATI dataset
- iatiidentifier: identifier of reform in IATI dataset
- reportingorg: name of donor organization
- description: description from IATI dataset
- reform_access: dichotomous variable equal to 1 if one of the objectives of the reform is to increase access for all or a certain section of society (keywords: access, legal services, for the poor, for vulnerable [...], justice for all, building of courts).

- `reform_speed`: dichotomous variable equal to 1 if one of the objectives of the reform is to increase the speed of courts (keywords: effective, efficiency, fast).
- `reform_quality`: dichotomous variable equal to 1 if one of the objectives of the reform is to improve the quality of the judiciary (keywords: legal training for justice actors, legal education for judges, improvement of decision-making, capacity building, capability, accountability, integrity, independence, anti-corruption, governance, compliance with rule of law, fairness, improved service delivery, strengthen the rule of law).
- `total_budget`: budget of the reform
- `reform_comprehensive`: dichotomous variable equal to 1 if the country received a comprehensive reform in between `year_baseline` and `year_endline`, i.e., [all criteria (access, speed, quality) addressed AND budget reform > 5% budget judiciary) OR World Bank reform OR USAID reform]
- `reform_limited`: dichotomous variable equal to 1 if the country received a limited reform in between `year_baseline` and `year_endline`, i.e., [A reform AND (small budget OR one criteria missing) AND (not WB, not USAID)]
- `reform_budget_jud`: sum of budgets of all reforms (excluding World Bank and USAID reforms) divided by budget judiciary

C3. Explanation of coding

The description of judicial reforms in IATI is limited. I thus complement these descriptions by searching for official documents published by the donor describing in greater details the reform to search for the keywords of access, speed, quality (available in the Online Appendix). I did not use these extra documents to code other variables, e.g. the year of the reform, which is given by the IATI dataset. I only used these extra documents to code for the access, speed, quality nature of the reforms.

Here is a brief explanation for every country in the database:

- Afghanistan (Enterprise Surveys in 2008 and 2014): In between those dates, there were two World Bank projects and one USAID project. World Bank documents describes the major objectives of the “Justice Service Delivery Project” to be: improving the capacity of Justice Institution’s, greater skills for judges (quality), and increased access to legal services (access) (see World Bank/Afghanistan.pdf). The USAID reform aims to increase public confidence

in the rule of law system and support the improved performance (speed) and accountability (quality) of the judiciary (see USAID/Afghanistan.pdf). This is codified as a comprehensive reform.

- Albania (2007-2013): A USAID reform improving the efficiency, transparency, and accountability, as well as civic monitoring and engagement (see USAID/Albania.pdf). This is codified as a comprehensive reform.
- Angola: no reform starting in between year_baseline and year_endline
- Argentina: no reform starting in between year_baseline and year_endline
- Armenia: USAID reform (no documents found), and a EU reform (24 Million Euros, see EU/Armenia.pdf) mentioning: improved access to justice, efficiency in resource allocation, capacity building assistance, and increased independence of the judiciary leading to improved public trust in court proceedings. This is codified as a comprehensive reform.
- Azerbaijan: A World Bank project mentions building courts, effectiveness, legal aid, capacity building (see World Bank/Azerbaijan.pdf). This is codified as a comprehensive reform.
- Bangladesh: Both a World Bank and USAID reform (mentioning delivery of legal aid, strengthening the capacity of the judiciary, court excellence in justice delivery). Additionally, a EU project “activating village courts” has the explicit objective to “empower and enable the poor, women and vulnerable groups to access a fair and effective justice system at the local level by so that disputes may be resolved in an expeditious manner” (see EU/Bangladesh.pdf). This is codified as a comprehensive reform.
- Belarus: no reform starting in between year_baseline and year_endline
- Bhutan: A UN reform mentions “access to justice”, and has a low budget. This is a codified as a limited reform.
- Bolivia: A Denmark project mentions “access to justice”. This is a codified as a limited reform.
- Bosnia and Herzegovina: a USAID reform mentions effectiveness, accountability, legal aid and access to justice (see USAID/Bosnia.pdf). This is a codified as a comprehensive reform.
- Botswana: no reform starting in between year_baseline and year_endline
- Bulgaria: no reform starting in between year_baseline and year_endline

- Burundi: Four reforms from Great Britain and Belgium mention access, efficiency, and accountability; yet the total budget falls short of the 6% threshold. This is a codified as a limited reform.
- Cambodia: A EU project's objective is to enhance delivery of justice and rule of law. This is a codified as a reform targeting quality with no mention of access and speed, hence a limited reform.
- Chile: no reform starting in between year_baseline and year_endline
- Colombia: no reform starting in between year_baseline and year_endline
- Congo, Dem. Rep.: USAID reform mentions access, effectiveness, transparency, management, reducing case processing times (see USAID/Congo DRC.pdf). Additionally, there are other EU projects (see EU/Congo DRC.pdf). This is a codified as a comprehensive reform.
- Croatia: A World Bank project mentions access, efficiency, and strengthening of court-based processes (see World Bank/Croatia.pdf). This is a codified as a comprehensive reform.
- Czech Republic: no reform starting in between year_baseline and year_endline
- Ecuador: no reform starting in between year_baseline and year_endline
- El Salvador: A Canadian project mentions improving criminal justice systems, and has a low budget. There was also a small USAID project on mediation (see USAID/El salvador Tetra tech mediation.pdf). This is coded as a limited reform.
- Estonia: no reform starting in between year_baseline and year_endline
- Ethiopia: a EU project mentions supporting the Federal Justice Organs Professionals Training Centre (JOPTC). This is coded as targeting quality, hence a limited reform.
- Georgia: A USAID reform mentions judicial independence (quality), legal empowerment (access), and performance evaluation tools for guiding advancement and disciplinary decisions (speed). This is a codified as a comprehensive reform.
- Ghana: no reform starting in between year_baseline and year_endline
- Guatemala: no reform starting in between year_baseline and year_endline
- Honduras: A World Bank reform mentions efficiency, judicial accountability and transparency, and access (see World Bank/Honduras.pdf). This is a codified as a comprehensive reform.

- Hungary: no reform starting in between year_baseline and year_endline
- Indonesia: A USAID reform mentions enhanced management, transparency, and accountability, improved capacity (quality), effective adjudication of cases (speed), and improved court and public interaction (access) (see USAID/Indonesia.pdf). This is a codified as a comprehensive reform.
- Kazakhstan: no reform starting in between year_baseline and year_endline
- Kenya: A World Bank reform mentions reduction in time (speed), judiciary training (quality), building courts (access) (see World Bank/Kenya JPIP description.pdf). This is a codified as a comprehensive reform.
- Kosovo: A USAID reform mentions training judges, independent and effective operation of the courts, public understanding of justice system (see USAID/Kosovo Checchi Consulting.pdf). This is a codified as a comprehensive reform.
- Kyrgyz Republic: no reform starting in between year_baseline and year_endline
- Lao PDR: A EU project (with limited budget) mentions improving the legal system (quality) (see EU/Lao PDR.pdf). This is a codified as a limited reform.
- Latvia: no reform starting in between year_baseline and year_endline
- Lithuania: no reform starting in between year_baseline and year_endline
- Macedonia, FYR: A USAID reform mentions efficiency, fairness, and citizen participation (see USAID/Macedonia.pdf). This is a codified as a comprehensive reform.
- Madagascar: A EU project mentions the opening of three legal clinics (access). This is coded as a limited reform.
- Malawi: A EU project (with a large budget) mentions access, accountability, and 26,000 cases resolved through a Village mediation programme (speed) (see EU/Malawi.pdf). Additionally, a DFID project entitled “The Justice for Vulnerable Groups Programme” mentions quality and availability of justice services to Malawi’s vulnerable groups; capacity building for judicial officers; effective proceedings and prioritizing cases (speed). This is a codified as a comprehensive reform.
- Mali: The Good Governance programme mentions strengthening the judiciary system as one of its objectives (with technical assistance, see EU/Mali.pdf). This is coded as a limited reform.

- Mauritania: A EU project (with limited budget) mentions the strengthening of the judiciary. This is coded as a limited reform.
- Mexico: A project mentions judiciary training on the Indigenous people’s culture (with limited budget). (Note: there are several USAID projects, but not in the time interval between two enterprise surveys for Mexico, i.e. 2006-2010). This is coded as a limited reform.
- Moldova: A USAID project mentions strengthen the institutional capacity, transparency and accountability of key justice sector institutions in order to enhance the independence and effectiveness of the judiciary, and the involvement of civil society organizations (see USAID/Moldova.pdf). This is a codified as a comprehensive reform.
- Mongolia: Two reforms from Great Britain mention training of prosecutors and materials for mediation system. This is coded as a limited reform.
- Montenegro: A USAID reform mentions improving judicial administration and transparency, improve public perception and trust of the judicial system, develop and implement enforcement of time and performance standards (see USAID/Montenegro.pdf). This is a codified as a comprehensive reform.
- Namibia: A reform mentions legal services for the poorest and marginalized of the society. This is coded as a limited reform.
- Nepal: A EU reform mentions effectiveness, inclusivity and accountability; yet has no information on budget, and EU/Nepal.pdf indicates a project in only 6 districts of Nepal’s more than 70 districts. This is coded as a limited reform.
- Nicaragua: no reform starting in between year_baseline and year_endline
- Nigeria: A World Bank project is solely a legal aid access intervention in one state (see World Bank/Nigeria.pdf). A EU reform mentions effectiveness, accessibility and fairness, and a DFID reform mentions reducing delays, quality of service delivery, and equitable access (see EU/Nigeria.pdf), both with large budgets. This is a codified as a comprehensive reform.
- Pakistan: A EU project (with limited budget) mentions increasing access to justice for the poor and vulnerable in Punjab province. This is coded as a limited reform.
- Panama: no reform starting in between year_baseline and year_endline
- Paraguay: no reform starting in between year_baseline and year_endline

- Peru: no reform starting in between year_baseline and year_endline
- Philippines: A EU reform (with limited budget) mentions promoting an equitable access to justice. This is coded as a limited reform.
- Poland: no reform starting in between year_baseline and year_endline
- Romania: no reform starting in between year_baseline and year_endline
- Russian Federation: no reform starting in between year_baseline and year_endline
- Rwanda: A large EU project's objective is aligned with the JRLO (Justice, Reconciliation, Law and Order) strategy which itself mentions: universal access to quality justice, and increased numbers of cases processed (see EU/Rwanda.pdf). This is a codified as a comprehensive reform.
- Senegal: A World Bank project mentions improving court performance and user-friendliness (access), efficient dispute resolution (speed), and predictable enforcement of legally binding rules (quality) (see World Bank/Senegal.pdf). This is a codified as a comprehensive reform.
- Serbia: two Great Britain reforms mention greater efficiency and consistency of four new Serbian Appellate Courts; and strengthening a training programme. This is coded as a limited reform.
- Slovak Republic: no reform starting in between year_baseline and year_endline
- Slovenia: no reform starting in between year_baseline and year_endline
- Tajikistan: A Swiss project mentions improving access to justice for vulnerable people. This is coded as a limited reform.
- Tanzania: Two Canadian projects mention equal and timely access to justice for all by: reducing case backlog (speed); building the capacities of judges and lawyers (quality); providing legal aid to poor and marginalized people (access). A Denmark project mentions enhancing the rule of law and justice, percentage of court cases outstanding for 2 years (speed), and legal aid providers in order to expand the geographical coverage and quality of legal aid (see EU/Tanzania.pdf). This is a codified as a comprehensive reform.
- Timor-Leste: A Swiss project (with limited budget) mentions the development of a strong formal justice system. This is coded as a limited reform.

- Turkey: no reform starting in between year_baseline and year_endline
- Uganda: several projects support the JLOS (Justice Law and Order Sector) which includes access to justice, speedy justice, and independence (see EU/Uganda JLOS.pdf and EU / Uganda JLOS 2.pdf). This is coded as a comprehensive reform.
- Ukraine: several projects (with low budget) mention independence. This is coded as a limited reform.
- Uruguay: no reform starting in between year_baseline and year_endline
- Uzbekistan: a Great Britain project’s objective is to strengthen the capacity of judges. This is coded as a limited reform.
- Vietnam: One EU project (with limited budget) aims at strengthening the rule of law in some selected provinces, another aims at increasing legal aid. This is coded as a limited reform.
- Yemen: no reform starting in between year_baseline and year_endline
- Zambia: An EU project (with limited budget) aims to increase the efficiency of the five institutions involved in justice service delivery in Zambia by enhancing systems, strengthening infrastructure and improving coordination creating better access to justice for all in Zambia. This is coded as a limited reform (due to the limited budget).

C4. Coding of World Bank and USAID reforms

The explanations above make it clear that the World Bank and USAID target access, speed, and quality in all cases. There are two exceptions. In Nigeria, a World Bank project is solely a legal aid access intervention in one state (see World Bank/Nigeria.pdf). In El Salvador, there was a small USAID project on mediation only (see USAID/El salvador Tetra tech mediation.pdf). These two reforms are coded as limited reforms.²⁷

In all other cases, it is clear that all criteria are addressed. This is confirmed by World Bank and USAID documents outlining the overall objectives of judicial reforms. In “Initiatives in Justice Reform 1992-2012” WorldBank (2012) for example, the World Bank describes their reforms as targeting speed (project activities focus on court management, including strategic planning, financial management, data collection, and use of data for management decisions), quality (support for

²⁷In the case of Nigeria, two other reforms implemented by the EU and DFID targeted all three characteristics and had significant budgets. Thus, Nigeria is coded as receiving a comprehensive reform.

modern procedures for the selection, career development, and management of justice sector personnel, support justice mechanisms to hold public institutions accountable to the public), access (project activities include analysis of the market for legal services, support for legal services and legal aid for especially the poor and vulnerable, and creation of mobile courts and services, support community-based or court-annexed alternative dispute resolution (ADR)).

Concerning USAID, in USAID/Department of State and USAID Strategic Plan.pdf, the overall objectives are: “Strengthen judicial independence and impartiality” (quality), “Ensure an effective and equitable justice system” (effective = speed) “by improving professional capacities and administrative and operational systems of actors and institutions; developing and implementing fair procedures; expanding access to justice; and ensuring adequate oversight, advocacy, and accountability.” Thus, it is clear from this description that access, speed, and quality are considered as part of a holistic approach.

C5. Cross-validation

Two undergraduate Economics McGill students coded the judicial reforms according to the three criteria. The two students were given List judicial reform.xls. The variables reform_access, reform_speed, and reform_quality were left blank. They were also given the definition of the variables, and the documents in the Online Appendix.

The correlation in the coding of reform_comprehensive between Student 1 and mine was 93%, Student 2 and mine was 86%. This very high correlation is due to the fact that although there can be some disagreement in the coding of individual judicial reforms,²⁸ reform_comprehensive is calculated as an aggregation of all reforms at the country level, and leaves little room for interpretation. For example, in the case of the first country in the list (Afghanistan), there was some disagreement in the coding of the 13 judicial reforms received by the country; yet, it is clear that the country received a comprehensive reform overall (two World Bank reforms, one USAID reform, one EU reform, with an overall massive budget). What matters for the regressions is reform_comprehensive (and reform_limited) only, not the coding of individual justice reforms.

The disagreement in the coding of reform_comprehensive between the students and me comes from two countries: Malawi and Rwanda. Malawi has received neither a World Bank, nor a USAID reform; yet, Malawi received a massive EU reform. I had based my coding on the short description in the IATI data: “Promotion of Access to Justice and Democratic Accountability”, thus my coding was access=1 (for the word access) and quality=1 (for the word accountability). One of

²⁸The correlation in the coding of the individual indicators (reform_access, reform_speed, and reform_quality) is: 73% between Student 1 and mine, and 66% between Student 2 and mine.

the students actually found EU/Malawi.pdf with a more detailed description of the project. This document mentions access, accountability, and 26,000 cases resolved through a Village mediation programme (speed). Moreover, the student found EU/Malawi DFID.doc which describes “The Justice for Vulnerable Groups Programme”, with mentions of quality and availability of justice services to Malawi’s vulnerable groups; capacity building for judicial officers; effective proceedings and prioritizing cases (speed). Considering these documents and the size of the budget, Malawi is codified as receiving a comprehensive reform.

Rwanda has received neither a World Bank, nor a USAID reform; yet, Rwanda received a massive EU reform. I had based my coding on the short description in the IATI data: “The objectives of this programme is aligned with the JRLO Strategy. Its overall objective is to strengthen the rule of law to promote good governance and a culture of peace.” Thus, my coding was quality=1 (for the words “strengthen the rule of law”). One of the students actually found EU/Rwanda.pdf that describes the JRLO (Justice, Reconciliation, Law and Order) strategy in greater detail. This strategy mention universal access to quality justice, and increased numbers of cases processed (speed). Considering these documents and the size of the budget, Rwanda is codified as receiving a comprehensive reform.

In all other cases, our codification of reform_comprehensive was the same. Table C1 shows the results with Malawi and Rwanda as reform_comprehensive=1 in Column (1) and as reform_comprehensive = 0 in column (2). The coefficient is very similar, and slightly higher in Column (1), which goes in line with the theory since it is clear from the discussion above that Malawi and Rwanda should be classified as having received a comprehensive reform.

C6. List of comprehensive and domestic judicial reforms

TABLE C1—ROBUSTNESS CHECKS WITH CODING

	(1)	(2)
		Without Malawi Rwanda
Judicial reform * Post	14.18 (12.02)	13.92 (12.09)
Judicial reform * Post * Specific	17.94* (10.02)	17.08* (10.16)
Observations	47,041	47,041
Country fixed effects	YES	YES
Sector fixed effects	YES	YES
Controls	YES	YES
Mean control group	86.31	86.31
(SD)	214.78	214.78

Note: OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in all columns is the value added per worker, expressed in thousand dollars USD PPP. Column (1) shows the preferred specification. Column (2) shows the regression codifying Malawi and Rwanda as not receiving a comprehensive reform, only a limited reform. The following controls are included in all columns: limited judicial reform countries, domestic judicial reform countries, business climate, Foreign aid per capita, sector level fixed effects.

C7. Map of judicial reforms

The following map shows countries that received a comprehensive judicial reform (in dark grey), a limited judicial reform (in grey), and no reforms (in light grey). Countries in white do not have two waves of World Bank Enterprise Surveys in the standardized dataset.

TABLE C2—LIST OF JUDICIAL REFORMS

Country	Year baseline	Year endline	externally funded		Domestic	
			Comprehensive reform	Limited reform	Comprehensive reform	Limited reform
Afghanistan	2008	2014	1	0	0	0
Albania	2007	2013	1	0	0	0
Angola	2006	2010	0	0	0	0
Argentina	2006	2010	0	0	0	0
Armenia	2009	2013	1	0	0	1
Azerbaijan	2009	2013	1	0	0	1
Bangladesh	2007	2013	1	0	0	0
Belarus	2008	2013	0	0	0	0
Bhutan	2009	2015	0	1	0	1
Bolivia	2006	2010	0	1	0	0
Bosnia and Herzegovina	2009	2013	1	0	0	0
Botswana	2006	2010	0	0	0	0
Bulgaria	2007	2013	0	0	0	1
Burundi	2006	2014	0	1	0	0
Cambodia	2013	2016	0	1	0	0
Chile	2006	2010	0	0	0	0
Colombia	2006	2010	0	1	0	0
Congo, Dem. Rep.	2006	2013	1	0	0	1
Croatia	2007	2013	1	0	0	0
Czech Republic	2009	2013	0	0	0	0
Ecuador	2006	2010	0	0	0	0
El Salvador	2006	2010	0	1	0	0
Estonia	2009	2013	0	0	0	0
Ethiopia	2011	2015	0	1	0	0
Georgia	2008	2013	1	0	0	1
Ghana	2007	2013	0	0	0	1
Guatemala	2006	2010	0	0	0	1
Honduras	2006	2010	1	0	0	0
Hungary	2009	2013	0	0	0	0
Indonesia	2009	2015	1	0	0	0
Kazakhstan	2009	2013	0	0	0	0
Kenya	2007	2013	1	0	0	0
Kosovo	2009	2013	1	0	0	0
Kyrgyz Republic	2009	2013	0	0	0	0
Lao PDR	2009	2016	0	1	0	0
Latvia	2009	2013	0	0	0	0
Lithuania	2009	2013	0	0	0	0
Macedonia, FYR	2009	2013	1	0	0	1

TABLE C3—LIST OF JUDICIAL REFORMS - CONTINUED

Country	Year baseline	Year endline	externally funded		Domestic	
			Comprehensive reform	Limited reform	Comprehensive reform	Limited reform
Madagascar	2009	2013	0	1	0	0
Malawi	2009	2014	1	0	0	1
Mali	2007	2010	0	1	0	0
Mauritania	2006	2014	0	1	0	1
Mexico	2006	2010	0	1	0	0
Moldova	2009	2013	1	0	0	1
Mongolia	2009	2013	0	1	0	0
Montenegro	2009	2013	1	0	0	0
Namibia	2006	2014	0	1	0	0
Nepal	2009	2013	0	1	0	1
Nicaragua	2006	2010	0	0	0	0
Nigeria	2007	2014	1	0	0	0
Pakistan	2007	2013	0	1	0	0
Panama	2006	2010	0	0	0	0
Paraguay	2006	2010	0	0	0	0
Peru	2006	2010	0	0	0	0
Philippines	2009	2015	0	1	0	0
Poland	2009	2013	0	0	0	0
Romania	2009	2013	0	0	0	1
Russian Federation	2009	2012	0	0	0	0
Rwanda	2006	2011	1	0	0	1
Senegal	2007	2014	1	0	0	1
Serbia	2009	2013	0	1	0	0
Slovak Republic	2009	2013	0	0	0	0
Slovenia	2009	2013	0	0	0	0
Tajikistan	2008	2013	0	1	0	0
Tanzania	2006	2013	1	0	0	0
Timor-Leste	2009	2015	0	1	0	1
Turkey	2008	2013	0	0	0	0
Uganda	2006	2013	1	0	0	1
Ukraine	2008	2013	0	1	0	1
Uruguay	2006	2010	0	0	0	0
Uzbekistan	2008	2013	0	1	0	0
Vietnam	2009	2015	0	1	0	0
Yemen	2010	2013	0	0	0	0
Zambia	2007	2013	0	1	0	1

FIGURE C1. MAP OF JUDICIAL REFORMS



APPENDIX D: CONTRACT-INTENSIVE SECTORS

TABLE D1—SPECIFIC AND GENERIC GOODS

Answer = 5 (never): Specific	
Establishment's main product	Sector
actuators for plane seats	Manufacture of electric motors, generators and transformers
aluminum castings	Casting of non-ferrous metals
construction devices (for construction vehicles)	Manufacture of machinery for mining, quarrying and construction
injection pumps	Manufacture of pumps, compressors, taps and valves
locking systems for cars	Manufacture of cutlery, hand tools and general hardware
machines for production of envelopes	Manufacture of other special-purpose machinery
manufacture of light metal cast parts	Casting of non-ferrous metals
newspaper	Publishing of newspapers, journals and periodicals
newspaper print	Printing
packing machines	Manufacture of machinery for food, beverage and tobacco processing
porcelain	Manufacture of non-structural non-refractory ceramic ware
tobacco products	Manufacture of tobacco products
Answer = 1 (a day or less): Generic	
Establishment's main product	Sector
bakery products	Manufacture of bakery products
beer	Manufacture of malt liquors and malt
ben-u-ron (medical pills)	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
black forest ham	Production, processing and preserving of meat and meat products
books	Publishing of books, brochures and other publications
caustic soda	Manufacture of basic chemicals, except fertilizers and nitrogen compounds
cloth for shirts and blouses	Preparation and spinning of textile fibers; weaving of textiles
coagulant, steam turbine, ventilator	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
colouring and enamelling	Manufacture of paints, varnishes and similar coatings, printing ink and mastics

Note: Complete list of main products sold by firms answering 5 (never) or 1 (a day or less) to the question: "If this establishment shut down its business, how long would it take your largest customers to find an alternative seller for its main product?"

TABLE D2—SPECIFIC AND GENERIC GOODS - CONTINUED

Answer = 1 (continued)	
Establishment's main product	Sector
concrete slatted floor	Manufacture of articles of concrete, cement and plaster
cooling devices	Manufacture of other special-purpose machinery
dura-clip	Manufacture of plastics products
enameling line	Manufacture of other special-purpose machinery
filter units	Manufacture of other general-purpose machinery
gas meters	Manufacture of instruments for measuring, checking, testing, navigating
hot glue fusing machines	Manufacture of other general-purpose machinery
leather	Tanning and dressing of leather
lebkuchen (gingerbread)	Manufacture of bakery products
lime stone	Cutting, shaping and finishing of stone
machines for environmental industry	Manufacture of other special-purpose machinery
newspaper	Publishing of newspapers, journals and periodicals
newspaper printing machines	Manufacture of other special-purpose machinery
outerwear for women	Manufacture of wearing apparel, except fur apparel
pantyhoses and socks	Manufacture of knitted and crocheted fabrics and articles
paper	Manufacture of pulp, paper and paperboard
plastic foil	Manufacture of plastics products
presentation systems for retail	Manufacture of furniture
printed products	Publishing of newspapers, journals and periodicals
production of bakery products	Manufacture of bakery products
rail grinder	Manufacture of machinery for mining, quarrying and construction
ropes	Manufacture of cordage, rope, twine and netting
scale colors	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
soda	Manufacture of soft drinks; production of mineral waters
spanner	Manufacture of cutlery, hand tools and general hardware
spinnery machines	Manufacture of machinery for textile, apparel and leather production
stamps, signing systems	Manufacture of other fabricated metal products n.e.c.
steel and apparatus construction	Manufacture of structural metal products
welding capacity of tracks	Manufacture of other fabricated metal products n.e.c.
wheels	Production, processing and preserving of meat and meat products
wood processing	Manufacture of builders' carpentry and joinery
woven carpets	Manufacture of carpets and rugs

Note: Complete list of main products sold by firms answering 5 (never) or 1 (a day or less) to the question: "If this establishment shut down its business, how long would it take your largest customers to find an alternative seller for its main product?"

Table D3 below shows the average characteristics of firms in specific and generic sectors. Firms dealing in specific goods have higher productivity, and use more capital per worker. They do not employ more workers, or use a higher proportion of skilled workers. They are not more likely to be newer firms.

TABLE D3—FIRMS IN SPECIFIC AND GENERIC SECTORS

	(1)	(2)	(3)
	Specific	Generic	Specific-Generic/t-stat
Judicial efficiency	2.36	2.29	0.06*** (6.90)
Value added per worker (Thousand dollars)	65.77	48.03	17.74*** (11.74)
Capital stock per worker (Thousand dollars)	55.39	43.64	11.75*** (6.63)
Proportion of skilled workers	0.68	0.70	-0.02*** (-6.91)
Number employees	136.59	132.73	3.86 (0.38)
New firm	0.03	0.04	-0.01*** (-6.95)

Note: Column (1) shows the average of the variable for firms in dealing in specific goods. Column (2) shows the average of the variable for firms in dealing in generic goods. Column (3) shows the difference (and in brackets the t-statistics of a t-test for the equality of the difference to zero. Judicial efficiency is the answer to the question “Do you agree with the following statement: “The court system is fair, impartial and uncorrupted”?”, on a scale of 1 to 4, 1: Strongly disagree, 4: Strongly agree. Value added per worker is firm revenue minus cost of intermediate inputs (raw materials and intermediate goods used in production, electricity, communications services, rental of land/buildings, equipment, furniture, fuel, transport for goods, water), divided by the number of workers, using PPP exchange rates, trimmed at 1 percent. Capital stock per worker is only available for the manufacturing sector. It is estimated from the question: “If this establishment had to hypothetically purchase the land and buildings, and machinery and equipment in use now, as they are in their current condition, how much would it cost to purchase each of the following?”. Proportion of skilled workers is only available for the manufacturing sector. It is the number of skilled production workers divided by the number of total production workers. The dichotomous variable “New firm” takes the value 1 if the firm was created after the baseline, 0 otherwise.

The empirical framework developed in this paper can be used to answer important questions about the effects of judicial reforms in different contexts. In Column (2) of Table E1, I investigate whether comprehensive judicial reforms also work in the context of poorly functioning judiciaries. The theory predicts that if the suing condition 1 does not hold, i.e., $p\beta^T < l_p$ and there are no incentives to sue, then it is unclear whether comprehensive judicial reforms have any effect. To have an effect, reforms must be large enough in terms of their effect on p , T , and l_p to reverse this inequality.

One can investigate this by looking at the effects of judicial reforms in countries where $p\beta^T < l_p$. I define “Suing_condition_positive”, a dichotomous variable equal to 1 if $p\beta^T \geq l_p$, and 0 otherwise. I interact this with all other variables of the model, in a “quadruple difference” analysis. Column (2) of Table 3 shows that the triple difference coefficient of $JudicialReform_k \times Post_t \times Specific_j$ is 20k\$, while the quadruple difference coefficient $JudicialReform_k \times Post_t \times Specific_j \times SuingConditionPositive_k$ is not significantly different from zero. Thus, judicial reforms work in all countries, even in countries where the suing condition 1 does not hold, i.e., $p\beta^T < l_p$. This result is important for policy implications, showing that comprehensive judicial reforms are substantial enough to work in contexts even with poorly functioning judiciaries.

In Column (3), I investigate whether comprehensive externally funded judicial reforms also work in oligarchies. In terms of the model, the extreme case of an oligarchy under a limited commitment issue implies that $p = 0$, $T = \infty$, and l_p is high. Here it is unclear whether judicial reforms have any effect. Moreover, the elite might be able to undermine the effects of externally funded judicial reforms by other means.

To capture the oligarchic nature of a regime, I use data from Polity IV.²⁹ For each country, a score is determined which ranges from -10 (autocracy) to +10 (democracy). I interact $JudicialReform_k \times Post_t$ and $JudicialReform_k \times Post_t \times Specific_j$ with this Polity IV score, to form $JudicialReform_k \times Post_t \times PolityIV_k$ and $JudicialReform_k \times Post_t \times Specific_j \times PolityIV_k$. Column (3) shows the results: the triple difference coefficient $JudicialReform_k \times Post_t \times Specific_j$ is 21k\$. This coefficient must be interpreted at a Polity IV score of zero, i.e., an anocracy. The quadruple coefficient $JudicialReform_k \times Post_t \times Specific_j \times PolityIV_k$ is not significantly different from zero. This means that comprehensive judicial reforms work in all countries, even in oligarchies.

These results are important for policy implications. I find that large and comprehensive exter-

²⁹<http://www.systemicpeace.org/polity/polity4.htm>

nally financed judicial reforms work, even in countries with poorly functioning judiciaries and in oligarchies.

TABLE E1—HETEROGENEOUS EFFECTS OF JUDICIAL REFORMS

	(1)	(2)	(3)
	Firm productivity		
Judicial reform * Post	15.94 (11.66)	17.28 (15.11)	-3.45 (10.44)
Judicial reform * Post * Specific	19.40** (8.88)	22.74** (9.62)	24.19*** (8.56)
Judicial reform * Pre	-30.42 (33.31)	-31.07 (33.42)	-27.61 (33.51)
Judicial reform * Pre * Specific	10.75 (16.18)	10.11 (16.76)	12.91 (17.69)
Judicial reform * Post * Suing condition positive		-3.97 (19.17)	
Judicial reform * Post * Specific * Suing condition positive		-6.95 (14.36)	
Judicial reform * Post * Polity IV			3.83* (2.24)
Judicial reform * Post * Specific * Polity IV			-0.80 (1.52)
Observations	50,493	50,493	49,300
Country fixed effects	YES	YES	YES
Sector fixed effects			
F-test	60.14	93.99	1.67e+20

Note: OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in columns (1) to (3) is the value added per worker, expressed in thousand dollars USD PPP. Judicial reform countries are countries in which at least one comprehensive judicial reform (targeting access, speed, and quality, and a budget above 5 percent of the annual judiciary’s budget) was implemented in the period between two enterprise surveys. “Post” is a dichotomous variable equal to 1 in the endline survey, while “Pre” is a dichotomous variable equal to 1 in the “Pre” wave, the omitted category is the baseline survey. Specific is a dichotomous variable equal to 1 if the sector is dealing in specific goods (goods are specific if it would take more than a month for the main customer to find the same good were the seller to shut down its operations), 0 otherwise. “Judicial reform * Post * Specific” is the triple difference coefficient of interest. In Column (2), “Suing_condition_positive” is a dichotomous variable equal to 1 for countries in which $p\beta^T \geq l_p$, and 0 otherwise. This variable is interacted with “Judicial Reform * Post” and “Judicial Reform * Post * Specific” (the level term is absorbed by the country fixed effects since *SuingConditionPositive_k* is defined at the country level, constant over time). In Column (3), Polity IV is the score which ranges from -10 to +10, where -10 corresponds to autocracies and 10 to democracies. The table provides an F-test for the joint significance of all the variables interacted with *Specific_j*.

These findings are also visible on a graph. Figure E1 below replicates the main Figure 2 of the paper, with the sample split by the suing condition $p\beta^T < l_p$, and $p\beta^T \geq l_p$. Panels (a) and (b) focus on countries with a negative suing condition, i.e., $p\beta^T < l_p$. For these countries, the double difference for specific sectors is positive, while the double difference for the generic sectors is very small, in other words, there is a positive triple difference. For panels (c) and (d) focusing on countries with a positive suing condition, i.e., $p\beta^T \geq l_p$, the double difference in specific sectors

is more than the double difference in generic sectors, hence a positive triple difference. Overall, judicial reforms have an effect in all countries, including those with a negative suing condition.

Figure E2 below replicates the main Figure 2 of the paper, with the sample split by the median of the Polity IV score. The median in the sample is 7. I thus define a dichotomous variable “Above Median Polity IV” equal to 1 if the country has a score above 8 (i.e., more political rights, less oligarchic), and 0 if the country has a score below 7.

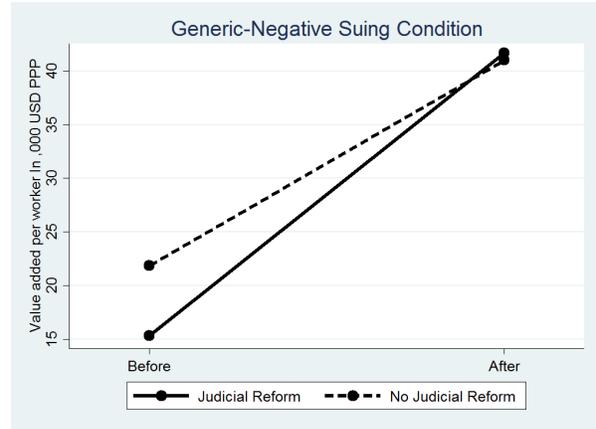
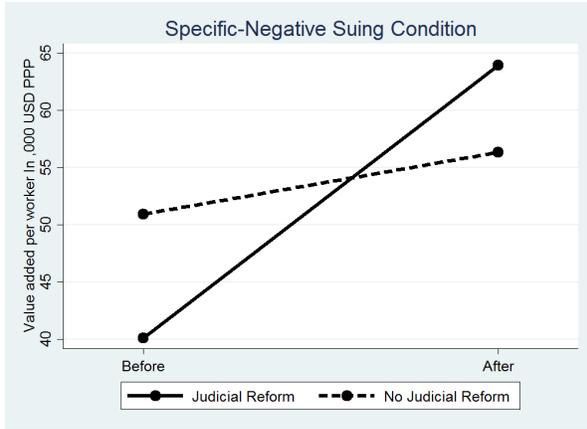
Panels (a) and (b) focus on countries scoring below the median Polity IV score. For these countries, the double difference for specific sectors is positive, while the double difference for the generic sectors is slightly negative, in other words, there is a positive triple difference. For panels (c) and (d) focusing on countries scoring above the median Polity IV score, the double difference in specific sectors is more than the double difference in generic sectors, hence a positive triple difference. Overall, judicial reforms have an effect in all countries, including oligarchic ones.

FIGURE E1. HETEROGENEOUS EFFECTS

Negative Suing Condition

(a) SPECIFIC sectors

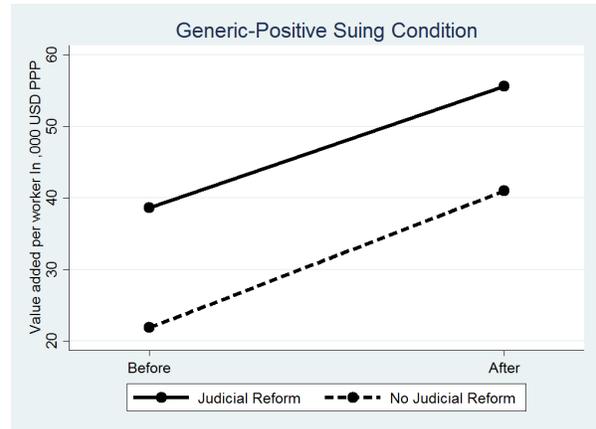
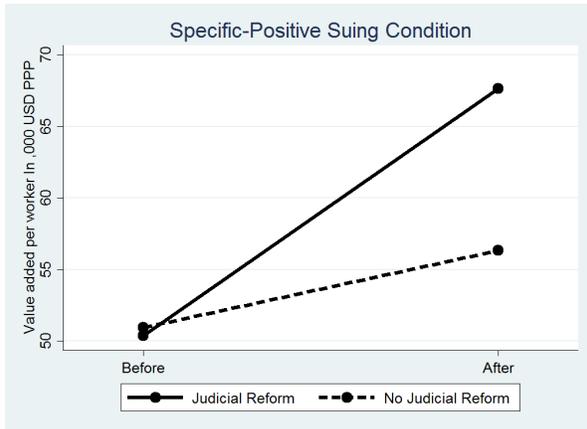
(b) GENERIC sectors



Positive Suing Condition

(c) SPECIFIC sectors

(d) GENERIC sectors



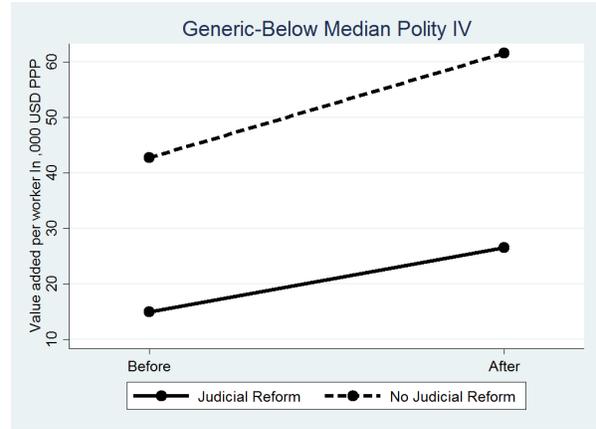
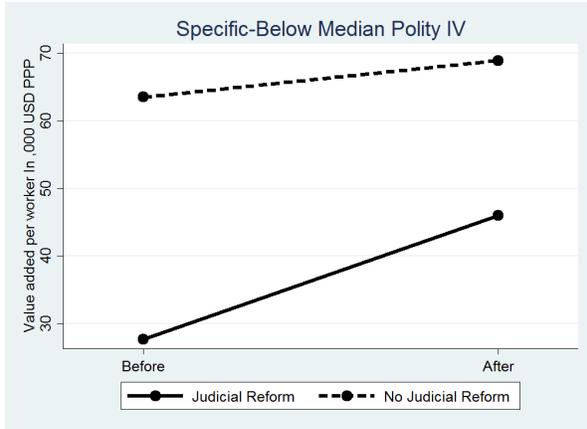
Note: Negative suing condition designates countries where $p\beta^T < l_p$. Positive suing condition designates countries where $p\beta^T \geq l_p$. Labor productivity is value added per worker, expressed in thousand dollars USD PPP. Judicial reform countries are countries in which at least one comprehensive judicial reform (targeting access, speed, and quality, and a budget above 5 percent of the annual judiciary's budget) was implemented in the period between two enterprise surveys. Specific=1 is the group of sectors dealing in specific goods, Specific=0 is the group of sectors dealing in generic goods (goods are specific if it would take more than a month for the main customer to find the same good were the seller to shut down its operations).

FIGURE E2. HETEROGENEOUS EFFECTS

Below median Polity IV

(a) SPECIFIC sectors

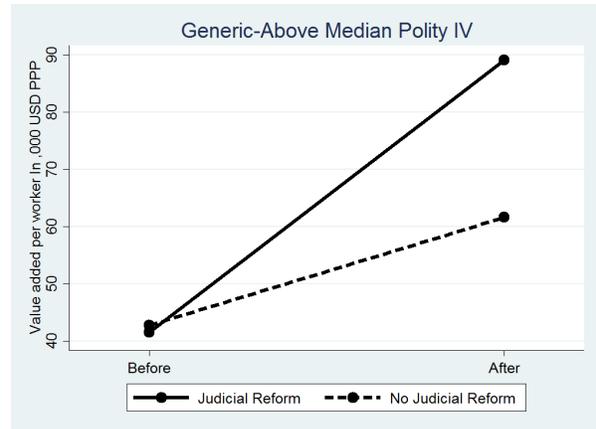
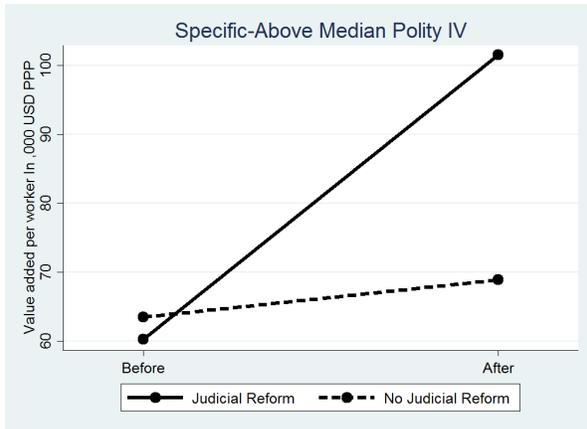
(b) GENERIC sectors



Above median Polity IV

(c) SPECIFIC sectors

(d) GENERIC sectors



Note: Political data from Polity IV. For each country, a score is determined which ranges from -10 to +10, with -10 to -6 corresponding to autocracies, -5 to 5 corresponding to anocracies, and 6 to 10 to democracies. The median in the sample is 7. “Below Median Polity IV” are countries with a score below 7. “Above Median Polity IV” are countries with a score above 8. Labor productivity is value added per worker, expressed in thousand dollars USD PPP. Judicial reform countries are countries in which at least one comprehensive judicial reform (targeting access, speed, and quality, and a budget above 5 percent of the annual judiciary’s budget) was implemented in the period between two enterprise surveys. Specific=1 is the group of sectors dealing in specific goods, Specific=0 is the group of sectors dealing in generic goods (goods are specific if it would take more than a month for the main customer to find the same good were the seller to shut down its operations).

APPENDIX F: ROBUSTNESS CHECKS WITH OTHER REFORMS

Table F1 shows the correlation between the index JudicialReform_k (i.e., a dichotomous variable equal to 1 if country k experienced a comprehensive judicial reform, and 0 otherwise) and the budgets of all other foreign aid projects in between a baseline and endline enterprise surveys for each country in the dataset.

In Table F2, Column (1) includes all foreign aid projects supporting specific industries (code 32) or business (codes 25010 and 25020). Importantly, the coefficient of interest associated with judicial reforms for the specific sector is still statistically significant, indicating that the impact of judicial reforms is not driven by coincidental projects supporting industry and business.

This empirical framework can be used to assess the relative importance of judicial reforms with respect to other types of foreign aid programs. Judicial reforms seem to matter more than support for international trade (trade facilitation, regional trade agreements, multilateral trade negotiations) in Column (2), or debt reforms (debt forgiveness, rescheduling and refinancing, debt for development swap) in Column (3).

Columns (4) and (5) look at the three pillars of prosperity described in Besley and Persson (2011): tax capacity, legal capacity, and the absence of internal conflict (related to Adam Smith listing “peace, easy taxes, and a tolerable administration of justice” as sufficient conditions for prosperity). In Column (4), I include tax reforms (domestic revenue mobilization, tax collection, other non-tax revenue mobilization). In Column (5), I add conflict-related reforms (civilian peace-building, conflict prevention and resolution, reintegration and small arms and light weapons, child soldiers (prevention and demobilization)). These two columns show that judicial reforms matter for firm productivity even when these factors are controlled for.

The theoretical model in this paper states that the judiciary is important because it constrains powerful individuals who may be connected to the executive. The judiciary is a counter-power to the executive, and introduces some pluralism in a society. Other organizations constitute a counter-power to the executive: the parliament, the media, independent election bodies guaranteeing free and fair elections, and anti-corruption organizations. Columns (6) to (9) add measures of foreign aid support to these counter-powers. Column (6) refers to Parliament (15140 Government administration Systems of government including parliament, local government, decentralization; civil service and civil service reform, 15152 Legislatures and political parties Assistance to strengthen key functions of legislatures/ parliaments including subnational assemblies and councils (representation; oversight; legislation), such as improving the capacity of legislative bodies, improving legislatures’ committees and administrative procedures). Column (7) refers to Elections (15151 Elections Elec-

TABLE F1—CORRELATION BETWEEN JUDICIAL REFORMS AND OTHER REFORMS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Education	0.10*													
	(0.06)													
Health		0.02												
		(0.03)												
Transport			-0.01											
			(0.01)											
Energy				0.07										
				(0.07)										
Bank					-0.00									
					(0.33)									
Support						0.04								
Industry						(0.23)								
Trade							1.16							
							(1.08)							
Debt								12.32						
								(7.46)						
Tax									-0.13					
									(0.86)					
Conflict										1.64				
										(2.29)				
Parliament											0.70			
											(27.10)			
Elections												0.47		
												(0.75)		
Media													2.41	
													(3.91)	
Corruption														-1.18
														(4.31)
Obs.	73	73	73	73	73	73	73	73	73	73	73	73	73	73
Mean X	0.41	0.86	1.66	0.29	0.09	0.13	0.03	0.00	0.01	0.01	0.00	0.02	0.01	0.00
(SD)	0.86	1.70	6.37	0.72	0.16	0.23	0.05	0.01	0.06	0.02	0.00	0.07	0.01	0.01

Note: OLS regressions. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in all columns is a dichotomous variable equal to 1 if the country experienced at least one comprehensive judicial reform (targeting access, speed, and quality, and a budget above 5 percent of the annual judiciary's budget) in the period between two enterprise surveys. In Column (1), "Education" refers to the total budget on education reforms (codes 111 Education, 112 Basic education, 113 Secondary education, 114 Post-secondary education) for every country in the period between two enterprise surveys. Column (2) refers to Health: (codes 121 Health, general, 122 Basic health, 130 Population policies/ programmes and reproductive health, 140 Water and sanitation). Column (3) refers to Transport (code 21: road construction, road maintenance, Rail transport, Water transport, Air transport). Column (4) refers to Energy (code 23: Oil, Gas, Coal, Nuclear, Hydro-electric power plants, Geothermal, Solar, Wind, Ocean energy). Column (5) refers to Banking (code 24: formal and informal (Micro credit, savings and credit co-operatives) institutions). Column (6) refers to support to specific industries (code 32) or to business (codes 25010 and 25020). Column (7) refers to trade (code 33: Trade facilitation, Regional trade agreements, Multilateral trade negotiations). Column (8) refers to Debt (code 60: Debt forgiveness, Rescheduling and refinancing, Debt for development swap). Column (9) refers to Tax (code 1514: Domestic Revenue Mobilization, 15116 Tax collection Operation of the inland revenue authority, 15155 Tax policy and administration support, 15156 Other non-tax revenue mobilization). Column (10) refers to Conflict (code 15220 Civilian peace-building, conflict prevention and resolution, 15240 Reintegration and SALW control, 15261 Child soldiers (Prevention and demobilisation)). Columns (11) to (15) refer to checks on executive power. Column (11) refers to Parliament (15140 Government administration Systems of government including parliament, local government, decentralisation; civil service and civil service reform, 15152 Legislatures and political parties Assistance to strengthen key functions of legislatures/ parliaments including subnational assemblies and councils (representation; oversight; legislation), such as improving the capacity of legislative bodies, improving legislatures' committees and administrative procedures). Column (12) refers to Elections (15151 Elections Electoral management bodies and processes, election observation, voters' education, 15161 Elections Electoral assistance and monitoring). Column (13) refers to Media (15153 and 15163 Media and free flow of information, skills and integrity of the print and broadcast media). Column (14) refers to Anti-corruption (code 15113 Anti-corruption organisations and institutions, 15120 Strengthening financial and managerial accountability; measures against waste, fraud and corruption).

toral management bodies and processes, election observation, voters' education, 15161 Elections Electoral assistance and monitoring). Column (8) refers to Media (15153 and 15163 Media and free flow of information, skills and integrity of the print and broadcast media). Column (9) refers to Anti-corruption (code 15113 Anti-corruption organizations and institutions, 15120 Strengthening financial and managerial accountability; measures against waste, fraud and corruption).

Interestingly, judicial reforms still have a statistically significant effect over and above support to these other counter-powers. This highlights the predominant role of the judiciary in the process of economic development.

TABLE F2—IMPACT OF JUDICIAL AND OTHER REFORMS ON FIRM PRODUCTIVITY

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Judicial reform * Post	13.44 (12.34)	14.05 (12.39)	12.99 (12.15)	14.16 (12.03)	12.32 (12.31)	12.56 (12.40)	13.94 (12.24)	14.10 (12.04)	13.82 (12.39)
Judicial reform * Post * Specific	17.43*	17.72*	18.33*	17.94*	16.75*	16.45*	16.89*	17.99*	18.18*
Support Industry * Post	15.36 (25.98)		(10.17)	(10.02)	(9.60)	(9.86)	(9.55)	(10.00)	(10.03)
Support Industry * Post * Specific	3.80 (31.02)								
Trade * Post		-8.92 (134.36)							
Trade * Post * Specific		57.46 (104.46)							
Debt * Post			702.46*** (148.82)						
Debt * Post * Specific			112.66 (577.60)						
Tax * Post				24.43 (33.90)					
Tax * Post * Specific				-63.22** (28.49)					
Conflict * Post					419.53** (168.65)				
Conflict * Post * Specific					305.19 (238.51)				
Parliament * Post						3,618.24** (1,452.65)			
Parliament * Post * Specific						2,470.18 (1,916.30)			
Media * Post						114.16 (273.50)			
Media * Post * Specific						779.50 (583.82)			
Elections * Post							34.03 (51.27)		
Elections * Post * Specific							-27.16 (49.58)		
Corruption * Post								170.31 (390.12)	
Corruption * Post * Specific								-122.96 (349.15)	
Observations	46,990	46,990	46,990	46,990	46,990	46,990	46,990	46,990	46,990
Country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in all columns is the value added per worker, expressed in thousand dollars USD PPP. Other reforms are: support to specific industries (code 32) or to business (codes 25010 and 25020) in Column (1); international trade (trade facilitation, regional trade agreements, multilateral trade negotiations) in Column (2); debt reforms (debt forgiveness, rescheduling and refinancing, debt for development swap) in Column (3); tax reforms (domestic revenue mobilization, tax collection, other non-tax revenue mobilization) in Column (4); conflict-related reforms (civilian peace-building, conflict prevention and resolution, reintegration and small arms and light weapons, child soldiers (prevention and demobilisation)) in Column (5); Parliament (15140 Government administration Systems of government including parliament, local government, decentralisation; civil service and civil service reform, 15152 Legislatures and political parties Assistance to strengthen key functions of legislatures/ parliaments including subnational assemblies and councils (representation; oversight; legislation), such as improving the capacity of legislative bodies, improving legislatures' committees and administrative procedures) in Column (6); Elections (15151 Electoral management bodies and processes, election observation, voters' education, 15161 Elections Electoral assistance and monitoring) in Column (7); Media (15153 and 15163 Media and free flow of information, skills and integrity of the print and broadcast media) in Column (8); Anti-corruption (code 15113 Anti-corruption organisations and institutions, 15120 Strengthening financial and managerial accountability; measures against waste, fraud and corruption) in Column (9).

In this section, I define in greater details the measures used in Table 5. The measure *Specific_j* focuses on the specificity of the output. A completely different measure would focus on inputs, and the possibility of hold-up that also applies to their procurement.

First, I use an index of input complexity similar in spirit to Levchenko (2007). The intuition is that a more complex input mix will increase the dependence on contract enforcement mechanisms since firms rely on contracts for their inputs. To measure complexity, rather than simply using the number of input suppliers, Levchenko (2007) uses 1 minus the Herfindahl index for input use. The downside of using the number of suppliers is that it may give excessive weight to insignificant input suppliers. The importance of expropriation by suppliers of minor inputs is probably much smaller than by important suppliers. Thus, this simple measure may overestimate the effective reliance on institutions. Instead, 1 minus the Herfindahl index uses the actual share of each input used and is a more accurate measure of the complexity of the input mix and of the reliance on contract enforcement mechanisms, according to Levchenko (2007). To calculate the Herfindahl index, I disaggregate inputs into nine categories in the Enterprise surveys (labor, raw materials and intermediate inputs, electricity, communications services, fuel, transport for inputs, water, rental of land/buildings, equipment, furniture). I compute this indicator using the Swedish Enterprise survey since the goal is to measure the technological reliance of sectors on a complex input mix under a near-perfect judiciary (Sweden is the best ranked country (9th) according to the Doing Business project and with an Enterprise Survey).³⁰

Results are shown in Table 5. Column (1) replicates the triple difference result of Column (8) of Table 3, while Column (2) shows the result using the Swedish Herfindahl index. The results

³⁰ I could not use Germany, the benchmark country chosen for the primary measure of relationship-specific investment, as the benchmark country for this new measure since there is no German World Bank Enterprise Survey in the standardized dataset. There is an earlier wave from 2005, however this dataset does not follow the global methodology, is not stratified by sector, and thus cannot be used for the analysis. For the primary measure, I used the special type of the Enterprise surveys called the “Management, Organisation and Innovation” round. This special dataset can be used for my primary measure of specificity, but cannot be used for the Herfindahl-index based measure since there is no measure of value added, sales and inputs in that dataset.

are similar indicating that firms requiring a more complex input mix (thereby relying more on contracts) greatly benefit from judicial reforms.

Second, rather than the concentration of input use, it may be the total value of inputs with respect to output that makes firms dependent on the judiciary. In other words, firms using more inputs into their production rely more on contracts. Thus, I use the total input to output value ratio as an alternative measure. If the index is zero, the firm is not using any inputs and is not relying on any contracts with suppliers. As the index increases, the firm relies more on contracts and on contract enforcement mechanisms. Once again, I calculate this index at the 4 digit level of the ISIC code in Sweden. Column (3) of Table 5 shows that firms in sectors with a higher total input to output ratio benefit more from judicial reforms.

One advantage of these two measures (the Herfindhal index of input and total input to output ratio) is that they can be calculated for all firms, not just those in the manufacturing sector as in the main measure *Specific_j* used above. Therefore, the sample size is larger in Columns (2) and (3) and the main result of this paper is robust to using a different measure of relationship-specific investment, and using Sweden instead of Germany as the benchmark country. Still, the sample size does not include the full dataset (a total of 124,939 observations) since there are few Swedish firms and not all sectors are represented in Sweden. Swedish firms may also differ greatly from those in developing countries, even in the same sector.

To increase the sample size and use more comparable countries as benchmarks, I use data from the two countries per continent with the best judiciaries in the as benchmarks in Columns (4) and (5).³¹ The intuition is that the nature of firms is more similar within continents than when compared with Sweden alone. The sample size in Columns (4) and (5) is much larger and includes all firms. It does not reach the maximum size of 124,939 observations, since the two benchmark countries per continent are excluded from the analysis.

The results of Column (4) and (5) are similar to previous ones. In fact, they show a larger impact of judicial reforms. The remarkable finding of Table 5 is that the results remain the same regardless

³¹ The two countries with a World Bank Enterprise Survey and with the best judiciaries in each continent according to the Doing Business project are (first number is rank in world, second number is rank in continent): Europe: Sweden (9, 7), Estonia (12, 9); Asia: Malaysia (23, 4), Thailand (46, 5); Middle east: Morocco (68, 4), Tunisia (77, 5); Latin America: Mexico (47,1), Peru (54,2); Africa: Mauritius (49, 1), Rwanda (56, 2).

of sample size (from 47,041 to 82,007), the sector of firms considered (manufacturing or all sectors), the benchmark country (Germany, Sweden, or the two countries with the best judiciaries within the continent), or the indicator of relationship-specific investment used (specific versus generic output, input complexity, or input to output ratio).

In Table G1, I present other robustness checks based on other measures of relationship-specific investments. One measure suggested by Nunn (2007) is to use the proportion of inputs sold on internationally organized exchanges. The intuition is that inputs sold on internationally organized exchanges are generic, while inputs not sold on internationally organized exchanges are specific, and thereby necessitates relationship-specific investments. Nunn (2007) uses the input-output table from the US Bureau of Economic Analysis (using North American Industry Classification System (NAICS) industry classification) to estimate the input need per sector. He then matches this with data on goods sold on on internationally organized exchanges (using Standard International Trade Classification (SITC) codes). The issue with the World Bank Enterprise Surveys is that they use the International Standard Industrial Classification (ISIC), Rev 3.1. There is no existing correspondence between the two codes (see <https://unstats.un.org/unsd/cr/registry/regot.asp?Lg=1>). I thus established a correspondence between the Nunn (2007) and the ISIC Rev3.1 (available in the Online Appendix). The match is not perfect since the codes do not exactly correspond.³²

Nonetheless, I use this correspondence to estimate an index of contract intensiveness similar to Nunn (2007) for each sector. The results are shown in Column (1) of Table G1. Despite the ambiguity in the correspondence of the codes, the results are similar, in the sense that comprehensive judicial reforms increase the firm productivity of firms in contract-intensive sectors, albeit not significant. The advantage of the test presented in my paper is that it only uses World Bank Enterprise Surveys that use the ISIC Rev3.1 code, with no issues of code correspondence. The matching of sectors between different dataset and different countries (i.e., Germany, Sweden, and other countries) is thus straightforward since all firms use the same code.

In Columns (2) to (6), I use the continuous measure of the specificity indices rather than a binary coding of the specific versus generic sectors. Overall, the coefficients are still positive, although

³²There are many ambiguities in the correspondence. For example, consider code 1531 in ISIC Rev3.1 “Manufacture of grain mill products”. I matched it in NAICS with: 311210 “Flour milling and malt manufacturing”, and 311221 “Wet corn milling” by calculating an average of Nunn’s measure between the two sectors. First, it is unclear whether taking the average of two sectors is the right weighting scheme. Second, the correspondence is unclear since grain mill products in ISIC Rev3.1 is a more general category than just flour and wet corn milling in NAICS. Another issue with this correspondence is that malt manufacturing is included in the NAICS code, but is not in the ISIC Rev3.1. Other examples show the many-to-one correspondence. For example, consider the following codes in ISIC Rev3.1 2692 Manufacture of refractory ceramic products and 2693 Manufacture of structural non-refractory clay and ceramic products. NAICS just has: 327100 Clay product and refractory manufacturing. In this case, I matched 2692 and 2693 with NAICS 327100; yet NAICS 327100 includes more than the ISIC Rev3.1 codes. Other examples were one-to-many correspondence. For example, ISIC Rev3.1 has 2694 Manufacture of cement, lime and plaster. NAICS has: 327310 Cement manufacturing 327400 Lime and gypsum product manufacturing. In that case, I averaged the complexity measures of the two NAICS industries. Overall, the correspondence is ambiguous since very few codes match exactly.

some lose significance.

TABLE G1—IMPACT OF JUDICIAL REFORMS ON FIRM PRODUCTIVITY

	(1)	(2)	(3)	(4)	(5)	(6)
Judicial reform * Post	5.01 (15.73)	18.84 (14.34)	-6.17 (19.02)	-11.30 (14.38)	-12.38 (26.95)	7.68 (10.61)
Judicial reform * Post * Contract Intensive	40.68 (34.28)					
Judicial reform * Post * Specific (continuous)		4.53 (19.49)				
Judicial reform * Post * Herfindhal Sweden (cont.)			78.88 (51.67)			
Judicial reform * Post * Input/output Sweden (cont.)				85.23** (33.23)		
Judicial reform * Post * Herfindhal Continent (cont.)					96.13 (61.63)	
Judicial reform * Post * Input/output Continent (cont.)						16.76* (8.79)
Observations	53,748	47,041	57,155	60,844	88,926	88,926
Country fixed effects	YES	YES	YES	YES	YES	YES
Sector fixed effects	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES

Note: OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in all columns is the value added per worker, expressed in thousand dollars USD PPP. In Column (1), “Contract Intensive” is the proportion of inputs not sold on internationally organized exchanges, following Nunn (2007). In column (2), Specific is a the proportion of firms in a given sector, disaggregated at the 4 digit level of the ISIC rev3.1 classification, which indicate that it would take more than a month for the main customer to find the same good were the seller to shut down its operations, in the 2009 German “Management, Organisation and Innovation” round of the World Bank Enterprise Survey. In Column (3), Herfindhal Sweden is 1 minus the Herfindahl index for input use, i.e., 1 minus the sum of shares of each of the nine inputs (labor, raw materials and intermediate inputs, electricity, communications services, fuel, transport for inputs, rental of land/buildings, equipment, furniture) among total input value to the squared, estimated for each sector disaggregated to the 4th digit of ISIC code in Sweden. In Column (4), “Input/output Sweden” is the ratio of the total value of inputs used divided by the value of output, disaggregated for sectors at the 4 digit level of the ISIC code in Sweden. “Herfindhal Continent” and “Input/output Continent” are defined similarly but instead of using Sweden as the benchmark country, I use data from the two countries with the best judiciaries in the same continent.

APPENDIX H: EFFECTS OF JUDICIAL REFORMS ON OTHER FIRM-LEVEL OUTCOMES

In Table H1, I implement further robustness checks. Column (1) replicates the preferred specification of Column (8) of Table 3. In Column (2), I include country-specific trends, i.e. $\alpha_k \times Post_t$.³³

In Column (3), I define “Sum Comprehensive Reforms” as the sum of comprehensive reforms implemented in the country over the period of interest. Similarly, “Sum Limited Reforms” is the sum of limited reforms implemented in the country over the period of interest. Results are similar, and show that the accumulation of limited reforms does not have an effect on firm productivity.

In Column (4), the threshold of the budget to be considered a comprehensive judicial reform is 3 percent, i.e. comprehensive reforms are defined as reforms targeting access, speed, and quality, and a budget above 3 percent of the annual judiciary’s budget. In Column (5) and (6), the threshold budget is 7 and 1%. The triple difference coefficients remain similar, indicating that the results are not sensitive to the particular choice of 5% as a threshold to be considered a comprehensive reform.

In Table H2, I use other measures of firm output to show that the results are not driven by the choice of a dependent variable. Column (1) replicate the main triple difference result of the paper. Columns (2) and (3) show that the results also hold true when considering the firm’s value added or profit as outcomes. The effect is not driven by the accumulation of physical capital (Column (4)), or human capital (Column (5)), or growth in the number of workers (Column (6)). This points to the fact that the effect of institutions such as the judiciary is captured in the total factor productivity term, in line with Hall and Jones (1999).

In Column (7), I construct a dichotomous variable “New firm”, that takes the value 1 if the firm was created after the baseline, 0 otherwise.³⁴ The triple coefficient is not significant. One caveat is that the proportion of new firms in the sample is very small (4 percent); statistical power may be too low to detect any meaningful effects of judicial reforms on the creation of firms. Overall, judicial reforms do not seem to be associated with the creation of new firms.³⁵

³³Judicial reform * Post is a perfect linear combination of $\alpha_k \times Post_t$, and thus cannot be included in the regression. Similarly, other controls interacted with Post (such as limited reforms, domestic reforms, doing business indicators, and foreign aid per capita) cannot be included.

³⁴I use the question: “In what year was this establishment formally registered?”. If the year of establishment fell in between the two waves of the Enterprise surveys, I deduced the firm “new”, and the dichotomous variable “New Firm” than takes the value of 1.

³⁵One cannot exclude that the results are driven by the exiting of low-productivity firms since one cannot identify in the data the exiting firms.

TABLE H1—IMPACT OF JUDICIAL REFORMS ON OTHER OUTCOMES

	(1)	(2)	(3)	(4)	(5)	(6)
	Country trends			Budget: 3%	7%	1%
Judicial reform * Post	14.18 (12.02)			14.18 (12.02)	14.18 (12.02)	13.14 (11.71)
Judicial reform * Post * Specific	17.94* (10.02)	17.55*** (6.39)		17.94* (10.02)	17.94* (10.02)	16.46* (9.92)
Sum Comprehensive Reforms * Post			5.14 (5.77)			
Sum Comprehensive Reforms * Post * Specific			9.38** (4.40)			
Sum Limited Reforms * Post			5.87 (9.24)			
Observations	47,041	47,363	47,041	47,041	47,041	47,041
Country fixed effects	YES		YES	YES	YES	YES
Country-specific trends		YES				
Controls	YES		YES	YES	YES	YES

Note: OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in Column (1) is the value added per worker, expressed in thousand dollars USD PPP. The coefficient of interest is the triple difference coefficient of “Judicial reform * Post * Specific”. In Column (2), country-specific trends are included, i.e. $\alpha_k \times Post_t$. In Column (3), Sum Comprehensive Reforms is the sum of comprehensive reforms implemented in the country over the period of interest. Similarly, Sum Limited Reforms is the sum of limited reforms implemented in the country over the period of interest. In Column (4), the threshold of the budget to be considered a comprehensive judicial reform is 3 percent, i.e. comprehensive reforms are defined as reforms targeting access, speed, and quality, and a budget above 3 percent of the annual judiciary’s budget. In Column (5) and (6), the threshold budget is 7 and 1%.

TABLE H2—IMPACT OF JUDICIAL REFORMS ON OTHER OUTCOMES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Value added per worker	Value Added	Profit	Capital stock per worker	Proportion of skilled workers	Number employees	New firm
Judicial reform * Post	11.42 (12.73)	4.84e+10 (8.50e+10)	4.70e+10 (8.34e+10)	2,153.02 (6,124.41)	0.08** (0.04)	-14.48 (20.15)	0.02 (0.03)
Judicial reform * Post * * Specific	19.40* (10.28)	2.51e+11* (1.32e+11)	2.54e+11* (1.34e+11)	9,850.92 (8,940.15)	0.01 (0.04)	24.89 (22.06)	-0.02 (0.02)
Observations	46,818	47,451	47,451	34,522	47,676	52,782	52,322
Country fixed effects	YES	YES	YES	YES	YES	YES	YES
Sector fixed effects	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES
Mean control group	84.60	4.65e+10	4.60e+10	52223.52	0.69	117.69	0.04
(SD)	211.95	9.50e+12	9.50e+12	173671.40	0.31	1231.84	0.19

Note: OLS regressions. Robust standard errors in parentheses, clustered at the country level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. The dependent variable in Column (1) is the value added per worker, expressed in thousand dollars USD PPP. The coefficient of interest is the triple difference coefficient of “Judicial reform * Post * Specific?”. In Column (2), the dependent variable is the value added, i.e., firm revenue minus cost of intermediate inputs (raw materials and intermediate goods used in production, electricity, communications services, rental of land/buildings, equipment, furniture, fuel, transport for goods, water). In Column (3), the dependent variable is firm profit, i.e., firm revenue minus cost of labor (including wages, salaries, bonuses, social payments) minus cost of intermediate inputs (same as above). In Column (4), the dependent variable is capital stock per worker, only defined for the manufacturing sector. The value of capital stock is estimated from the question: “If this establishment had to hypothetically purchase the land and buildings, and machinery and equipment in use now, as they are in their current condition, how much would it cost to purchase each of the following?”. In Column (5), the dependent variable is the proportion of skilled workers in the firm (defined just for the manufacturing sector as the number skilled production workers divided by the number of total production workers). In Column (6), the dependent variable is the number of workers within the firm. In Column (7), the dichotomous variable “New firm” takes the value 1 if the firm was created after the baseline, 0 otherwise. “Mean control group” shows the mean of the dependent variable for firms in countries not receiving a comprehensive reform.