

# The Role of Justice in Development: The Data Revolution

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June 2023

## **Abstract**

This paper examines the crucial role that justice institutions play in economic development, conflict, and trust in institutions. The empirical evidence shows that justice institutions have a significant impact on credit markets and firm growth, the protection of vulnerable populations, the deterrence of violence, and people's trust in formal institutions. Moreover, the paper discusses the potential of administrative data, machine learning, and randomized controlled trials to improve the efficiency, access, and quality of justice. Finally, the paper concludes by highlighting new research directions and the potential for data to improve justice systems.

# 1 Introduction

Why does justice matter for development? In his canonical work, *The Constitution of Liberty*, Friedrich Hayek (1960) advanced an ideal vision of the rule of law characterized by equality before the law, an independent judiciary, and separation of power. He believed that such rule of law protects democracy, safeguards individual freedoms and rights, and thus unleashes momenta of social progress. Lipset (1994) likewise argued that the rule of law is a prerequisite of Democratic institutions because it brings order and predictability to the economy, polity, and society. La Porta et al. (1997, 1998, 1999) showed that common-law countries, compared to French-civil-law ones, tend to have better legal protection of corporate investors, less ownership concentration and more widely held corporations, and larger debt and equity markets. The literature shed light on the link between justice institutions and socio-economic development.

In the early 2000s, the rule of law emerged as a key institution for economic growth in the discipline of economics. Acemoglu et al. (2001) exploit differences in European mortality rates to estimate the effect of institutions on economic performance. They find large effects of inclusive institutions on economic growth, as measured by income per capita. After controlling for institutions, they find that countries in Africa or closer to the equator do not have lower incomes, suggesting that substantial economic gains would come from improving institutions. In “Institutions Rule,” Rodrik (2000) argues that institutions, rather than geography or openness to trade, are the key drivers of economic development. This perspective gained traction as well in the legal field and contributed to the emergence of the Third Moment in Law and Development Theory (Trubek and Santos, 2006).<sup>1</sup> Beginning in the early 2000s, this momentum around the crucial role of institutions in development led international organizations such as The World Bank and the IMF to increasingly concentrate on governance and the rule of law as the primary means through which to promote economic prosperity around the world.

As we scrutinize in this literature review, growing scholarly efforts have provided ample empirical evidence on how justice facilitates economic development through various mechanisms. Justice institutions enforce contracts, promote incentives to invest, expand credit markets, encourage entrepreneurship. They also help resolve conflicts and violence, providing accountability for illegal actions, and avoiding tolls on economic and human development. Finally, effective justice institutions enhance citizens’ trust in public institutions and are linked to less corruption.

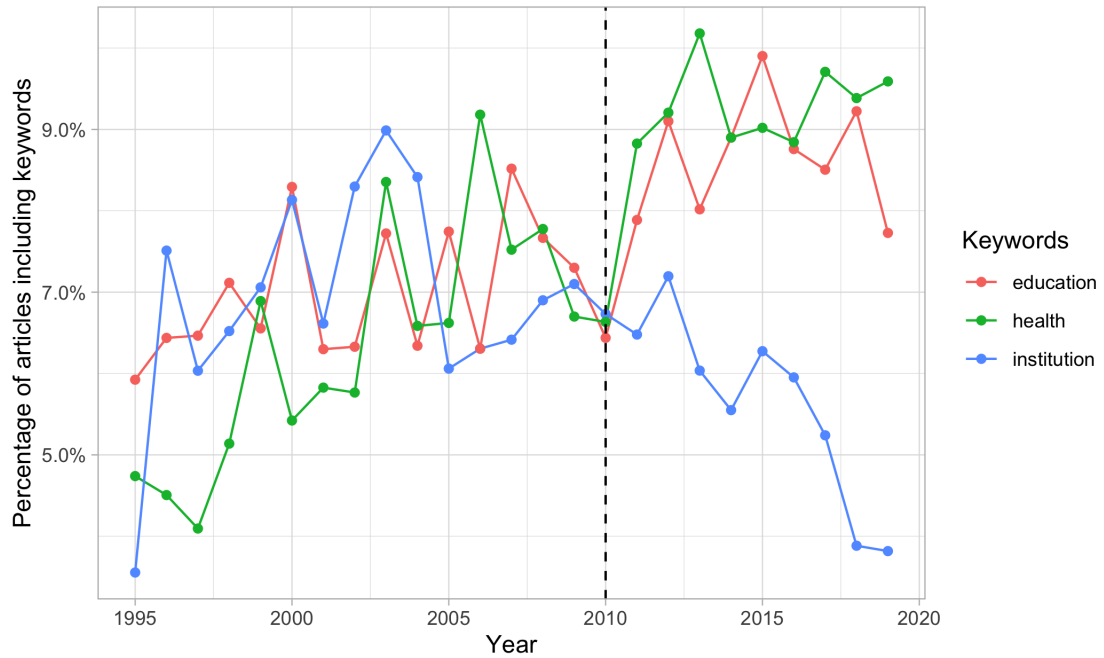
While initial papers on the role of institutions in development focused on broad theories, as the 2000s has progressed into the 2020s, studies of devel-

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<sup>1</sup>With the fall of the Iron Curtain in the 1990s, a resurgence in interest from across the academy and the legal domain has been reflected in the writings of former policymaker-scholars writing on the nexus of law and development (Carothers 2010; Dam 2007; Trubek and Santos 2006). However, the movement still has been lacking evidence for whether the law is an important factor in determining social or economic outcomes in developing societies (Davis and Trebilcock 2008).

opment have increasingly focused on more granular aspects of institutional strength (see Figure 1).

**The Presence of Keywords in Academic Articles**  
 Evolution of Institutions v. Other Topics in NBER's Abstracts



Source: data scraped by the authors from NBER's website. It contains the abstracts from all of the articles published up to November 2019

The institutionalist definition of the rule of law focuses on property rights and the efficient administration of justice. This mainly includes laws and regulations, the police, and the judiciary. Each of these institutions is under the control of different branches of government: laws are developed by the legislative branch, the police are controlled by the executive branch, and the judiciary is, in principle, independent. In this paper, we specifically focus on the judiciary. The judicial branch may include both formal and informal institutions that aim to resolve conflicts among citizens, or between citizens, corporations and/or the state.

The lack of high-frequency data is no longer an issue for many judiciaries. Recent years have seen an increase in the availability of data in judicial systems around the world. Many countries have developed electronic case management and e-filing systems. This has led to the creation of massive databases that track every characteristic of each case. In fact, this is by definition a characteristic of the fair administration of justice: everything that happens in a case needs to be tracked to prove the evidence behind fact-based decisions. Even though this data is readily available to policymakers, it has rarely been exploited to

evaluate policies or improve the functioning of the judiciary. In other words, courts have become data-rich but information-poor.

In the era of big data, the data revolution opens an immense range of opportunities. These opportunities may be used by policymakers and researchers to understand how to improve the access, quality and efficiency of justice. We examine specific ways in which data has been used, or could be used, by government officials and researchers to make more progress in responding to the “small, concrete questions” that currently dominate the field of development economics. By providing responses to these questions, we will be able to rigorously evaluate the impact of rule of law institutions on the prosperity of developing nations in future years.

In this paper, we divide our review into three parts. Part 1 studies the empirical evidence evaluating the impact of justice on development outcomes. Our review focuses on the impact on poverty reduction and firm growth, the prevention of conflict and violence, as well as on the prevalence of corruption and citizens’ trust in institutions. Part 2 discusses the importance of the data revolution in justice. We focus on the potential for judicial administrative and text data to improve the functioning of judicial institutions throughout the world, particularly in developing countries. We argue that the increase in data availability in judiciaries globally, especially since many have been compelled to transition to data-driven systems in light of the COVID-19 pandemic, has the potential to bring the rule of law back to center stage in the development agenda. Part 3 explores new avenues for future research as well as directions for policymakers to leverage the ongoing expansion of data and e-justice solutions in order to address some of today’s most pressing needs.

## **2 The Role of Justice in Development: Empirical Evidence**

In this section we review the empirical evidence that evaluates to what extent justice matters for development outcomes. Specifically, we focus on three main aspects of development: economic growth, conflict and violence, and trust in institutions.

Overall, empirical evidence shows that the judiciary matters—not only for its intrinsic value, but also for its impact on development outcomes. First, a more efficient judiciary promotes economic growth through better enforcement of contracts and more secure property rights, while also leading to healthier business environments. The judicial system can incentivize entrepreneurship, have a positive effect on firms’ outcomes and growth, and even affect the output of other industries that heavily rely on contracting. Second, a more effective judiciary may also contribute to reducing violence, by creating a deterrent effect on criminal acts and increasing citizens’ trust in the quality of institutions. Formal institutions can protect vulnerable populations in contexts where customary laws are biased against them, as well as reduce violent resolution of

disputes through alternative dispute resolution (ADR) in contexts with a weak rule of law. Demand-side interventions such as legal aid clinics can also protect vulnerable populations, reducing domestic violence and child abuse. Third, a good judiciary enhances citizens' trust in public institutions and reduces corruption, although more work is needed to better understand the mechanisms of causality. A summary of the findings is presented as a table in Appendix A.

## 2.1 How Does Justice Impact Poverty Reduction and Economic Growth?

Justice institutions have welfare implications for both aggregate and distributive outcomes. In the following subsections, we summarize empirical literature on the effects of justice institutions on entrepreneurship and firm growth, credit markets, and poverty reduction.

The empirical literature has established a causal link between contract enforcement and firm growth. Weak and inefficient enforcement hinders firm-to-firm trade, as there may be weaker incentives to cooperate in a contractual agreement if courts are slower and less reliable at enforcing contracts. This may also affect firms' incentives to invest and distort production decisions, as firms rely solely on trusted sources rather than on the most efficient sources, avoid purchasing the inputs altogether, or switch to a different production process.

In addition to the impact on the intensive margin, such as improvements in productivity and investment decisions, justice institutions can affect the extensive margin, such as entrepreneurship and firm entry. The mechanisms include a greater presence of the judiciary through specialized courts, lower uncertainty in contract enforcement, and more effective adjudication of disputes. This impact may be particularly relevant for contract-intensive industries that are more likely to rely on the legal enforcement of contracts.

Efficient and effective enforcement also has a positive impact on credit markets. By reducing moral hazard, improved justice increases willingness to lend and access to credit. Generally, contract enforcement leads to lower credit costs and improves loan recovery. Nonetheless, in settings where the supply of credit is inelastic, a reform that improves the enforcement of loans can have heterogeneous effects, sometimes hurting small borrowers in favor of the wealthy.

Finally, the judiciary can play an important role in protecting the rights of minorities and vulnerable populations. Legal aid can be an effective avenue to improve the productivity and well-being of citizens in developing as well as developed countries. By providing access to justice and incentives to invest in one's land, legal aid contributes to poverty reduction and economic growth. Thus, efforts to strengthen justice institutions and promote the rule of law can have positive effects on the lives of the poor, particularly by protecting the rights of marginalized and vulnerable populations.

Nonetheless, in many developing countries, citizens predominantly rely on customary systems to enforce their rights and resolve their disputes. This raises important questions as to the extent to which the formal justice system can

contribute to poverty reduction and economic growth in these contexts. More empirical work is needed on this crucial question.

### **2.1.1 The Impact of Effective Contract Enforcement on Firm Growth**

At the beginning of the century, the literature established a positive relationship between institutional quality and economic development (Acemoglu et al., 2001; Pande and Udry, 2005; Rodrik, 2000; Rajan and Zingales, 1996). This literature distinguished two types of institutions: property rights institutions and contracting institutions. Contracting institutions refer to the legal framework that supports private contracts and reduces transaction costs, whereas property rights institutions are those that constrain government and elite expropriation. Acemoglu and Johnson (2005) distinguish between the effects of property rights institutions and contracting institutions on growth. Relying on cross-country data, these authors argue that, while strong institutional protection of property rights has a positive effect on economic growth, the effect of contracting institutions is not robust. They suggest that contracting institutions only matter for the form of financial intermediation and not for long-term growth, for which property rights institutions matter more. The latter mitigates the risk of expropriation, and therefore is more important for long-term growth, whereas the contracting risks are better mitigated by the parties themselves (through altering or renegotiating contractual terms) in the presence of weak institutions. In contrast, Nunn (2007) establishes that contract enforcement—measured as judicial quality—is essential for investment, explaining more of the pattern of trade than physical capital and skilled labor combined.

In recent years, a nascent literature using more robust empirical methods and better data sets has found a large impact of contracting institutions on firm growth (Amirapu, 2021; Chakraborty, 2016; Ahsan, 2013; Chemin, 2012). In reviewing the literature on contract enforcement, we summarize the effects of the speed and quality of judicial institutions, which lends strength to the relevance of the enforcement of contracts on various business and market outcomes. Specifically, an environment of effective contract enforcement promotes competitive credit markets, increases firm productivity by lowering contracting costs, and supplements other market-oriented reforms (Ahsan, 2013; Sequeira, 2016).

There are four main mechanisms highlighted in the literature that show a causal impact between contracting institutions and firm outcomes. First, weak enforcement might hinder firm-to-firm trade. There might be weaker incentives to cooperate in a contractual agreement if courts are slower and less reliable at enforcing contracts (Chemin, 2012). Second, weak enforcement might affect firms' incentives to invest and distort production decisions. Crawford et al. (1978) demonstrate that slow courts will reduce investment if there is room for post-contractual opportunistic behavior by a firm's partner once investment costs are sunk. Weak enforcement might also distort the input materials used by firms, as firms rely solely on trusted sources rather than on the most efficient sources, avoid purchasing the inputs altogether, or switch to a different produc-

tion process (Chakraborty et al., 2022). Third, slow enforcement increases the opportunistic behavior of borrowers. Creditors might respond to this strategic behavior by reducing the availability of credit (Aberra and Chemin, 2021; Jappelli et al., 2005). Fourth, better judicial enforcement might increase the probability of providing a loan as well as the recovery of loans.

Relying on papers up to 2010, Aboal et al. (2014) provide a systematic review of the causal link between contract enforcement and investment. The authors conclude that the empirical evidence establishing this link is weak, based on reviewing 19 empirical studies published between 1990 and 2010. Given the period of review, many of the studies take a broad, macro view of the relationship, rather than deep diving into the micro-foundations. Further, some of the studies reviewed conflate protection of property rights and general rule of law with contract enforcement, leading to the general conclusion of positive association between “contracting” institutions and capital accumulation. There has been an increase in empirical causal studies since 2010, which point to a more established connection between better judiciaries and better firm outcomes.

Particularly in India, three papers highlight a strong relationship between judicial efficiency and firm productivity. Ahsan (2013) studies the complementarity between the effects of trade liberalization and judicial efficiency on firm productivity (TFP). The author uses spatial variation in judicial efficiency (at lower level courts) as a key impediment or enabler to help pass-through of input tariff reduction on large firm productivity. His findings suggest that a relationship-specific (as opposed to generic) input supply chain leads to the holdup problem, where the firm under-invests in the production of such inputs lest the buyer backs out. He finds that for a 10 percentage point drop in input tariffs, firms located in the 75th percentile of judicial efficiency gain an additional 3.6 percentage points in productivity when compared to those located in median judicial efficiency areas.

Similarly, Amirapu (2021) examines the effect of slow courts on the performance of firms in India. Using variation across industries in their reliance on contracts, along with variation across Indian states in the average speed of courts, the author finds a strong positive effect of court efficiency on firm growth. Transactions involving relationship-specific investments are more exposed to post-contractual opportunism and hence have a greater need for efficient contract enforcement. The paper finds that the interaction between state-level court efficiency and industry-level relationship-specificity is highly predictive of future growth in India’s formal manufacturing sector.

Boehm and Oberfield (2020) dig into the cost of weak contract enforcement on firms’ outcomes. Using microdata on Indian manufacturing plants, the authors show that in states with weaker enforcement—as measured by judicial lags—production and sourcing decisions appear systematically distorted. Among plants in industries that tend to rely more heavily on inputs that require customization, those in states with more congested courts shift their expenditures away from intermediate inputs, whereas they find the opposite in industries that tend to rely on standardized inputs. The authors find that weak enforcement exacerbates a holdup problem that arises when using inputs that

require customization, distorting both the intensive and extensive margins of input use. Poor contract enforcement distorts production in two ways. There is a direct impact: if a producer uses a supplier for which there is severe contracting friction, the use of that input will be distorted, which will directly lower productivity. There is also an indirect impact: a severe contracting problem might lead a producer to switch to a more costly supplier or less efficient technology to avoid the friction. On average across states, the boost to productivity is roughly 5%, and the potential gains of court improvements for the states with the most congested courts are roughly 10%. The authors conclude that the economic benefits of improving courts may be large. Preliminary results suggest that, for each year reduction in the average age of pending cases, the state's aggregate productivity would increase by about 3%

### **2.1.2 Justice Effects on Entrepreneurship and Business Environments**

Empirical evidence demonstrates the impact of justice on entrepreneurship and healthier business environments. Lichand and Soares (2014) explore the creation of Special Civil Tribunals in the Brazilian state of São Paulo during the 1990s. These tribunals increased the geographic presence of the justice system, simplified judicial procedures, and increased the speed of adjudication of disputes. According to the authors, these new courts achieved considerable success and improved the business climate throughout the country. Microenterprises, creditors and the general population rushed to these new courts, leading to a greater resolution of contractual disputes, a better business environment, and greater recovery of defaulted loans by creditors. The results find that these special civil tribunals led to increased entrepreneurship among individuals with higher levels of education. The authors estimate that, as a consequence of the creation of Special Civil Tribunals, the number of people starting new businesses in Brazil increased by 10% in just 10 years.

Three papers from India, Pakistan, and Senegal record similar effects when improving the overall efficiency of the justice system. In 2002, India modernized its antiquated Code of Civil Procedure. Chemin (2012) shows that simple changes, such as limiting adjournments, imposing time limits, and encouraging out-of-court settlements, decreased the time it took to resolve cases and, in doing so, led to a number of positive changes in the economic sphere, including greater investments in firms. Commercial firms that benefited increased their investment by 7.5%. The author also finds that slower judiciaries are associated with poorer outputs in manufacturing and agricultural trade.

A different study by the same author evaluates an innovative delay reduction program implemented in Pakistan (Chemin, 2009a). In this "Access to Justice Programme," judges were trained on modern case flow management techniques, and a concerted effort was made to resolve the backlog of older cases. This improvement had a positive effect on factors related to economic development, including greater entrepreneurship in pilot districts. The author suggests that this reform, which only cost 0.1% of GDP, translated into an increase of 0.5%



of GDP.

In Senegal, Kondylis and Stein (2021) study the impact of a simple procedural reform on the efficiency and quality of adjudication. The reform gave judges the duty and powers to conclude pretrial proceedings within a four-month deadline. The length of the pretrial stage decreased by 42.9 days, the number of pretrial hearings was reduced, and there was no adverse impact on quality. The paper documents positive firm-level effects.

According to a study in Mexico, the effects of the legal system on firm size are more prominent for proprietorships—where risk is concentrated in a single owner—rather of partnerships and corporations (Laeven and Woodruff, 2007). The reason is that a judicial system of higher quality reduces the idiosyncratic risk faced by firm owners.

Overall, effects on firms mainly arise by an enabling environment to enforce contracts—with labor, with intermediate goods suppliers, with distributors, with lenders and others. The outcomes range from ease of entry, firm size, output, investment (especially efficient allocation of resources), productivity, and growth. A few papers quantify the consequences of lack of justice on firms, particularly in an environment of strife and conflict that leads firms to misallocate labor towards protection rather than towards productive tasks (Besley and Mueller, 2018). On the other hand, firms that are associated with the executive or the military (or those in power, more broadly) benefit from monopolistic distortions to the disadvantage of other firms (Guidolin and La Ferrara, 2007; Brown and Huang, 2020).

### **2.1.3 Justice Effects on Credit Markets**

There is a general consensus in the literature on the positive effects of strong justice institutions on credit markets. Both the efficiency and quality of courts have been positively associated with better credit availability and the development of credit markets. The consensus also extends to the mechanism behind this effect: prevention of moral hazard through proper enforcement of the credit contracts and increasing competition between lenders. However, caution must be exercised in examining how increasing competition among lenders ultimately affects borrowers' welfare, which would depend on the presence of well-developed insurance markets. The papers that address this issue (Horioka and Sekita, 2011; Besley et al., 2012; Lilienfeld-Toal et al., 2012) present cautionary evidence due to possible heterogeneous effects by wealth group, especially when the supply of credit is inelastic.

An initial set of papers using panel data across regions in different countries established a strong correlation between legal enforcement and credit availability (Cristini et al., 2001; Jappelli et al., 2005). In Argentina, Cristini et al. (2001) find strong results that provinces with poor legal enforcement have less credit available to borrowers and banks' non-performing loans are higher. In Italy, Jappelli et al. (2005) show that provinces with longer trial durations or larger backlogs have less developed credit markets and lower credit availability. These papers suggest that improvements in the legal system would result in a

significant increase in the availability of credit.

In more recent years, researchers have used firm-level data along with more rigorous identification strategies to establish this relationship. In Italy, Schiantarelli et al. (2016) show that firms are more likely to default against banks when legal enforcement is weak. Ponticelli and Alencar (2016) exploit the variation in the congestion of civil courts across Brazilian municipalities, along with a bankruptcy reform that improved creditors' protection, to evaluate the effect of contract enforcement on firm access to finance, investment, and size. Since congestion can be endogenous, the authors use "extra jurisdiction"—an exogenous measure that increases the congestion of existing courts—as the instrument. The authors find that municipalities that are one standard deviation below the mean with respect to potential extra jurisdiction have 28.3% less congested courts and a 5% larger increase in secured loans per firm. That is, after the reform, firms with lower potential extra jurisdiction experienced a higher increase in secured loans to manufacturing firms and a higher increase in firm investment and output. Given these results, the authors make the case that an efficient judiciary is a necessary precondition for firms to benefit from financial reforms.

In India, Chemin (2009b) examines the effects of judicial trial duration on credit markets, agricultural development, and manufacturing performance, using measures of procedural complexity of judicial institutions as instruments. The author finds that slower judiciaries reduce access to credit markets in the agriculture sector, leading to depressed agricultural outputs. In addition, contract-intensive sectors of the economy, such as registered manufacturing, are negatively affected by weak judiciaries. Thus, these papers suggest that improvements in legal enforcement of contracts would result in a significant increase in the availability of credit and, as a result, spur economic outcomes.

In addition to judicial efficiency, the quality of courts is positively associated with firms' willingness to lend. Shvets (2013) studies whether the creditor's willingness to lend to a firm is affected by the quality of courts that protect the creditor's rights. The author analyzes loans to 11,000 Russian firms between 1996 and 2002. Court quality is measured through the share of the court's decisions appealed. Using panel data regressions and matching firms and courts, the authors find that creditors make more loans when their rights are protected by courts with lower appeal rates. In the context of Native American reservations in the United States, Brown et al. (2017) evaluate the impacts of assigning state courts to adjudicate contracts instead of tribal courts. The authors find that reservations assigned to state courts, which enforce contracts more predictably, have stronger credit markets. This result is associated with significantly higher per capita income, with stronger effects in sectors that depend more on external financing.

Beyond the availability of credit, judicial performance has also been linked to a lower cost of credit. Laeven and Majnoni (2005) use cross-country data and a measure of the ex-ante cost of bank credit to investigate the effect of judicial efficiency on banks' lending spreads. The paper finds that judicial efficiency is an important determinant of interest rate spreads across countries,

suggesting that improvements in judicial efficiency are critical to lowering the cost of financial intermediation for households and firms. More recently, this relationship has been supported with analyses that combine firm-level data, within-country variations in the length of proceedings, and spatial regression discontinuity designs (Rodano, 2021).

Can judicial reforms be effective at improving the availability of credit and reducing its cost? Visaria (2009) evaluates the impact of the rollout of India’s Debt Recovery Tribunal (DRT) to evaluate this question. The DRT is an alternate contract enforcement system aimed at reducing delays in debt recovery suits and strengthen the rights of lenders to recover the assets of defaulting borrowers. Using the staggered rollout in the establishment of the DRT across India and a minimum claim amount by the lender, the paper implements a difference-in-difference design to study the effect on debt recovery, delinquency and, finally, the cost of credit for Indian firms. The author finds that the DRT increased the probability of timely payment of loan installments by 28 percentage points, and lowered the interest rates charged on loans.

Nonetheless, the credit market consequences of justice may be heterogeneous. Lilienfeld-Toal et al. (2012) find that, in contexts where the supply of credit is inelastic, the effects on small borrowers may be regressive. The authors show that India’s DRT actually increased new long-term borrowing and fixed assets for large borrowers, but decreased for small borrowers. The reason is that wealthier borrowers with more assets will be able to benefit more from the reform; if the supply is inelastic, this will hurt smaller borrowers. Similarly, Besley et al. (2012) argue that the consequences of improving property rights are likely heterogeneous by wealth group, depending as well on the competition between lenders. In Japan, Horioka and Sekita (2011) find support for the theory that improvements in judicial enforcement may reduce the bank’s incentive to adequately screen borrowers, making it harder to obtain credit for good-type borrowers, yet easier for the bad type, which may worsen credit allocation. Thus, the authors argue that better judicial enforcement facilitates the recovery of loans but may sometimes be socially harmful.

Finally, an understudied mechanism to improve credit markets is legal uncertainty (Lee et al., 2022). In the context of bankruptcy judges and corporate loans in Korea, the authors consider two types of uncertainty: idiosyncratic uncertainty, arising from the random assignment of cases to judges and then from the judge’s discretionary decision; and systematic uncertainty, arising from potential changes in regulations. They find that increased legal uncertainty reduces the size of credit markets. The loan volume at the firm-bank relationship level is higher when uncertainty is lower, there is more information about current judges, and when judge replacement occurs further in the future. More work is needed to understand better how to reduce legal uncertainty—e.g., through precedent, judge rotations, or greater transparency—and its potential effects on economic outcomes.

#### 2.1.4 Legal Aid for Vulnerable Populations

The benefits of justice can only be realized if citizens and firms have sufficient access to justice institutions. According to the World Justice Project (2019), 5.1 billion people—approximately two-thirds of the world’s population—lack meaningful access to justice. This includes 1.4 billion people who have a criminal, civil, or administrative justice problem they cannot solve, and at least 253 million people who live in extreme conditions of injustice.

Interventions that empower clients of the judicial system may yield significant benefits, especially when the clients are unaware of their legal rights. Scholarship shows most of these interventions strengthen clients’ ability to obtain a remedy for their grievances. In fact, in the parts of the world where formal legal services are out of reach for people with modest means, they hold great promise as an alternative model of providing affordable and accessible advice or representation. Legal aid may also provide valuable assistance to vulnerable populations in high-income countries. The papers in this section show that legal aid may affect a wide range of outcomes. This assistance may be valuable in addressing essential aspects of citizens’ well-being across contexts.

In rural Kenya—a setting with very low access to formal institutions but with many land disputes—Aberra and Chemin (2021) gave access to the legal system to a treatment group by offering the services of a free lawyer for 2 years. The authors find relevant impacts of access to justice on farmers’ incentives to exert efforts and invest. Those who received the free lawyer increased the number of days worked on their land by 15% in comparison to those who did not. In addition, their investment increased by 21%, access to credit increased by 56%, and agricultural production increased by 42%. This experiment, which took place in a location where most people are small-scale farmers working and investing on their plot of land, provides evidence of the potential economic impact of providing access to legal aid for citizens with limited access to justice. These results are consistent with another study in Liberia where Sandefur and Siddiqi (2013) offered paralegals to a randomly selected treatment group. The authors find that this offer led to an increase in food security and household well-being.

Legal aid in housing-related interventions produced remarkable results in the United States. Seron et al. (2001) track the results of a legal assistance program for low-income tenants in New York City’s Housing Court. They find that legal counsel produces significant differences, as tenants who received aid are less likely to be evicted or denied rent abatement or repairs by landlords. These changes in outcomes are independent of the merits of the clients’ case. Greiner et al. (2013) observe a similar result when they offer limited or full legal assistance to occupants facing eviction in Boston. Approximately two-thirds of occupants in the treated group and one-third of occupants in the control group retained possession of their units at the end of litigation. Moreover, treated-group occupants received more payments or rent waivers worth a net of 7.5 months of rent per case than their control-group counterparts, on average.

In addition, predictive analytics may be relevant to understand when legal

aid may be more helpful to resolve disputes. In Mexico, the rate of settlement in specialized labor courts remains low because of overconfidence on the client-side and low-quality legal representation (Sadka et al., 2017). Many plaintiffs spent more on legal fees than what they recovered. Quality legal aid and clear predictions about the length of the trial are both effective in correcting these erroneous perceptions regarding their entitlement and the importance of particular types of evidence. As a result, more litigants chose to settle, freeing up space in court proceedings.

However, legal help may need to be dispensed with caution. Aberra and Chemin (2021) warn that offering free legal help on a large scale may flood the dockets, offsetting the positive effects of intervention. Furthermore, both the practitioner's lack of competency and the candidate's reluctance to cooperate could compromise the quality of aid. In relation to this, Chemin (2020) finds that reforms improving access to the legal system must be accompanied by simultaneous improvements in court efficiency to generate an effect on economic outcomes.

## 2.2 How Does Justice Impact Conflict and Violence?

This section presents a review of the literature on the empirical connection between justice institutions and conflict. Here, conflict is defined as civil strife and physical violence, distinct from contractual disputes addressed in the preceding section. The socio-economic repercussions of such conflicts on development are substantial, and still require a deeper understanding of the judiciary's preventive or deterrent roles.

The intertwined nature of conflict and institutions complicates the establishment of robust responses, even though there has been an uptick of this literature in recent years (Blattman and Miguel, 2010). For instance, Acemoglu et al. (2020b) find that, in scenarios where military units engage in extrajudicial killings, justice institutions play a critical role in ensuring accountability. The authors identified a rise in false positives (i.e., extrajudicial killings) in a period of high-powered incentives during Colombia's counterinsurgency strategy. They find higher false positives in settings with weak local judicial institutions, which failed to hold military units and commanders accountable. Furthermore, in municipalities with a higher share of colonels, the high-powered incentives period also coincided with a worsening of local judicial institutions, suggesting an institutional degradation under strong military pressure in already fragile environments.

The evidence demonstrates the crucial role of justice institutions in protecting vulnerable groups such as minorities, women, and children from violence, both in conflict- and non-conflict-afflicted settings. This protection can be accomplished through specific interventions or fostering an overall atmosphere of trust in state institutions, providing protection when informal institutions are biased against them. In specific, Women Justice Centers and legal aid have been shown to play an important role in reducing gender-based violence. The enforcement of property rights can also enable women to have more bargaining

power in contracting environments as well as in informal settings, which can boost their well-being and health.

In post-conflict settings, many organizations direct their resources towards molding informal practices, in light of the lengthy process of rebuilding formal mechanisms and the risks associated with declaring winners and losers in a post-conflict setting. Community-level initiatives yield mixed results. For example, Blattman et al. (2014) observed that Liberian communities that underwent mass ADR educational campaigns exhibited higher resolution of land disputes and decreased violence. However, these communities also experienced more extrajudicial punishments and heightened non-violent disagreements.

Finally, justice institutions play a pivotal role in crime deterrence and encouraging desistance from crime. Courts can play a role in blocking pathways to criminal conduct—whether by increasing the threat of punishment, offering specialized courts to deal with specific legal violations, reducing the likelihood of recidivism, or increasing trust in institutions. Most of the empirical evidence in this field comes from either the United States or European countries, although recent empirical evidence from Brazil also shows the impact of the judiciary in deterring crime in a developing country setting.

It is important to further acknowledge that conflicts can reciprocally impact judicial decisions. For example, a study by Shayo and Zussman (2011) on Israeli courts during the Second Intifada revealed a connection between in-group bias in judicial decision-making and the previous year’s violence intensity. The long-term effects of conflict were emphasized in a subsequent study, where Shayo and Zussman (2017) show a persistent positive association between past violence intensity and judicial bias, even post-conflict.

Although research elucidating the causal relationship between justice and conflict is growing, it remains limited due to data scarcity in conflict zones and potential manipulation or destruction of existing data. The reviewed papers employ various non-experimental designs to scrutinize this relationship and assess the economic cost of conflict and violence. Also, individual-level interventions like mediation and legal clinics can be analyzed using experimental methods where feasible, as highlighted in some of the following studies.

### **2.2.1 Interventions Involving Disadvantaged Groups Vulnerable to Violence**

Due to sources of oppression including socioeconomic status, gender, race, or sexual orientation, disadvantaged groups are exposed to greater risks in the wake of unrest and violence. How law and justice, the very foundation of stability and reconstruction, interact with these groups and address the challenges they face provides a useful perspective for studying the underlying causes of interpersonal and collective violence. Recognizing that individuals may hold membership within multiple social groups and their aggregate identities converge in unique experiences, this section does not limit itself to rigid characterizations. The literature shows that the rule of law protects vulnerable groups from harm and boosts their well-being.

Owen and Portillo (2003) assess the efficacy of legal aid clinics targeting economically disadvantaged women in Ecuador. They show that women who had access to these clinics were 20% more likely to receive an award in favor, 10.4% more likely to receive payments for child support, and experienced lower domestic violence than those who did not. Thus, unencumbered access to judicial institutions or mediation can protect vulnerable populations by reducing domestic violence. Sandefur et al. (2015) investigate the consequences of providing free legal aid to police detainees in Sierra Leone. The results are no less noteworthy than civil legal aid: the release of detainees without charge increased by 13% and the share of inmates held on remand reduced by 20%. Although legal aid did not visibly reduce bribes or police extortions, suggestive evidence indicates it still removed some constraints on police resources.

Besides legal clinics, as Cappelletti et al. (1982) point out, institutions such as community justice centers, arbitration, and public interest litigation are another way legal professionals can join forces to serve disadvantaged groups. As providers of police and legal services, these centers can also act as a source of employment by recruiting officers from these groups. All-Women's Justice Centers (WJCs) in Peru are an example of this. Kavanaugh et al. (2018) find the opening of a WJC in Peru increased reporting and prosecutions for gender-specific crimes by 40% and reduced gender-based violence by 10%. WJCs also impact more than one generation, demonstrated by a substantial increase in human capital investments, enrollment, attendance, and test scores among children. In Papua New Guinea, Cooper (2019) finds that the presence of community police officers, particularly female officers, increases the probability of violence against women being reported, while reducing the perceived prevalence of violence against women.

The rule of law not only protects vulnerable groups from harm, it also enhances their overall health and bargaining power. For example, in Sub-Saharan Africa, legal origins and judicial mechanisms ensuring the enforcement of property rights enable women to negotiate safe sex practices with strength and lessen their risk of contracting HIV (Anderson, 2018). Anderson reports that female HIV rates are significantly higher in common law Sub-Saharan African countries compared to civil law ones. Common law is associated with weaker female marital property laws, which leaves women lower bargaining power within the household. The author demonstrates that women are therefore less able to negotiate safe sex practices and are thus more vulnerable to HIV in common law countries, compared to their civil law counterparts. At the individual level, reducing these groups' vulnerability necessitates a holistic approach that removes the particular barriers they encounter in acquiring resources and power. At the very root is their impeded access to justice, often engendered by a lack of awareness or physical access, reinforced by a mistrust of formal institutions or a fear of backlash for seeking help. To rectify these factors, modern interventions usually involve providing immediate legal assistance for short-term relief, and education programs to improve long-term outcomes and reduce recidivism.

Legal institutions are also actively cultivating a society-wide atmosphere of trust and increasing disadvantaged groups' bargaining power. In India, lower

caste and female entrepreneurs gain more from better judicial enforcement of contract rights than their higher caste and male counterparts, possibly because informal dispute resolution mechanisms are dominated by upper-caste men (Chakraborty et al., 2022). The same phenomenon occurs in Liberia (Sanderfur and Siddiqi, 2013). Without legal aid, litigants with relatively lower social positions paid more bribes to overcome the biases they suffered at the hands of informal institutions. They are more likely to use formal forums for better protection of their rights.

In addition to protecting disadvantaged groups, these impacts are closely linked to those studied in the previous section referred to poverty reduction and economic growth. First, both contract enforcement and local-level interventions for justice or conflict resolution are predicated on the rule of law, an essential element for the functioning of any society. Even though they might seem to target distinct areas—one the macroeconomic landscape and the other community-level issues—they are part of the same ecosystem, striving for a fair, functioning society that bolsters both economic growth and social justice. Second, contract enforcement promotes economic growth by establishing a reliable environment for transactions, reducing risks, and encouraging investment. While this seems a broad and distant concept, the impacts directly trickle down to individuals in the form of job opportunities, consumer choice, and overall economic security. Third, providing legal protections to vulnerable populations is not just a moral imperative, but also an economic one. Economies thrive when everyone can contribute and participate in the economic system. Ensuring legal protection helps prevent marginalization of certain groups, fostering a more inclusive economic growth. For instance, unequal bargaining power can lead women to segregate into low-return industries and avoid entrepreneurship altogether, and improved access to adjudicating institutions can improve their overall economic activity (Ashraf et al., 2019). This inclusion brings a wider array of skills, talents, and ideas into the economy, thereby spurring innovation and growth, and benefiting the overall society. While these topics may seem far removed from one another, they are actually intricately connected, contributing to a robust, inclusive, and just economic system.

### **2.2.2 The Effect of Justice on Crime and Recidivism**

A considerable body of literature in economics and related disciplines has extensively examined crime prevention, although the majority of studies focus on the United States and other developed countries. Recent literature reviews have evaluated the empirical evidence on crime deterrence (Chalfin and McCrary, 2017; Nagin, 2013) and crime desistance (Doleac, 2021). In this section, we provide a summary of the main findings from these literature reviews and highlight the role of the judiciary in preventing crime.

Chalfin and McCrary (2017) categorize the literature on crime deterrence into three general areas. First, they investigate how crime rates respond to the likelihood of apprehension, which primarily involves the police, such as police manpower or policing intensity. Second, the authors examine the sensitivity



of crime to changes in the severity of criminal sanctions, including sentence enhancements, habitual offender laws, capital punishment regimes, and disparities in sanctions faced by different individuals. The third category explores the impact of local labor-market conditions on crime rates.

Overall, Chalfin and McCrary (2017) find consistent evidence that crime is influenced by police manpower and the presence of attractive legitimate job opportunities. The relationship between the severity of criminal sanctions, which is more directly related to the judiciary, and crime deterrence is less clear. Deterrence effects resulting from prison sentences, unlike the other two categories, are experienced in the future, which may diminish their importance for individuals who have a myopic perspective or a high discount rate. Moreover, potential offenders may be less aware of changes in prison sentences compared to changes in policing and local labor market conditions. Nevertheless, the authors find some evidence of deterrence resulting from policies targeting specific offenders with sentence enhancements (Helland and Tabarrok, 2007; Drago et al., 2009).

Apart from crime deterrence, extensive analysis has been conducted on crime desistance, which is crucial for violence prevention. As will be discussed in Section 2, the fair administration of criminal justice significantly impacts the economic outcomes of individuals and society as a whole. In the United States, two-thirds of individuals released from prison are re-arrested within three years, and half of them are re-incarcerated (Durose et al., 2014). This phenomenon is primarily driven by a group of individuals who cycle repeatedly through the criminal justice system (Rhodes et al., 2016). This raises the question of how to effectively handle individuals who have committed one or more crimes and which interventions can reduce their recidivism rates and improve social welfare. Doleac (2021) summarize the existing empirical evidence on interventions that may decrease recidivism and enhance social welfare.

According to such review, there are various ways in which the judiciary and prisons may play a significant role in crime desistance. For instance, two studies—one in the U.S. and one in Germany—find that increasing non-carceral punishments such as fines or probation (in the context of DUI and traffic offenses) has a deterrent effect on reoffending (Hansen, 2015; Gehrsitz, 2017). In addition, replacing short prison sentences or pre-trial detention with electronic monitoring has shown net benefits in reducing recidivism, possibly due to avoiding the criminogenic effects of prison, and it may improve secondary school completion for young offenders in Argentina, France, and Denmark (Di Tella and Schargrodsky, 2013; Henneguette et al., 2016; Larsen, 2017). However, the evidence on increasing prison sentences for individuals at the margin of incarceration shows mixed effects on future offending and employment outcomes.

Two studies—one conducted in Maryland, USA, and the other in France—highlight the importance of the disparity between actual time served in prison and the initially expected sentence (Bushway and Owens, 2013; Monnery, 2016). Conditional on the time served, individuals whose recommended sentences are longer tend to have a higher likelihood of recidivating after release.

Furthermore, drug courts, as an alternative to regular courts, can reduce recidivism rates (Prins et al., 2015). Courts can also enhance access to employ-

ment opportunities by providing rehabilitation certificates, shifting the risk of hiring someone from the employer to the courts (Leasure and Andersen, 2016).

In a cross-country analysis using micro-data from 25 European countries, Mocan et al. (2020) find that higher judicial quality, measured via the appointment procedures of judges and prosecutors, generates a two-fold effect: first, it diminishes individuals' criminal and dishonest behaviors; and second, it reduces tolerance for unlawful behavior and increases regard for the rule of law, impacting society as a whole.

Empirical evidence on how courts in developing countries can reduce crime and recidivism is mostly lacking. Prior research has identified various obstacles to responding to such questions, such as the lack of data on judicial performance, the fact that crime and legal capacity have common determinants, and the fact that crime can affect judicial efficacy (Fazel and Wolf, 2015; Ferraz and Schiavon, 2022). Nonetheless, as more judicial data becomes available and accessible, more research is starting to fill in this gap. For instance, in a recent paper, Ferraz and Schiavon (2022) ask whether better judicial systems can prevent crime. The authors find that improvements in judicial capacity reduce violent crime rates and increase the number of convicted prisoners in Brazil.

Other studies have also highlighted pathways to criminal conduct in which courts can play a role. For instance, in Colombia, less crowded prison facilities with better infrastructure are associated with a 36% drop in the rate of recidivism (Tobon, 2022). In addition, reforms in court systems, such as the creation of specialized courts in both developed and developing countries, have proven effective in reducing offenses because of the specialized courts' expertise, streamlined processes, and inclusion of additional non-legal expertise and services, such as reconciliation and mental health support (Gramckow and Walsh, 2013). In Argentina, more liberal judges tend to impose electronic monitoring, rather than detention, on pretrial suspects, and assigning electronic monitoring, compared to detention, caused less recidivism (Di Tella and Schargrodsky, 2013). In Chile, pretrial detention significantly undermines first-time defendants' future labor outcomes by excluding them from the labor market and inflicting social stigma (Grau et al., 2021).

Despite the limited empirical evidence, how courts in developing countries and especially fragile and conflict-affected countries impact crime and recidivism is a key issue worth studying further. Lack of access to high-quality justice disproportionately impacts low-income countries and the poorest population. By 2030, according to the World Bank, over two-thirds of the world's six billion people living in extreme poverty will be residing in fragile and conflict-afflicted countries (Corral et al., 2020), precisely where policymakers and researchers lack data on justice systems. In Section 4 of this article, we propose investing in data infrastructure and human capital to better collect and leverage data in conducting research, making informed policies, and accomplishing downstream socio-economic development described in this section.

### 2.3 Do Better Judicial Institutions Enhance Trust and Reduce Corruption?

The fundamental basis of modern democracies is the separation of the executive, legislative and judicial branches of government. When deriving the trias politica model, Montesquieu realized that “every man invested with power is apt to abuse it, and to carry his authority as far as it will go” (Montesquieu, 1748). In order to prevent this abuse, a system was designed in which “power should be a check to power”, and the three branches would be separated, autonomous and independent from each other. In particular, the judiciary would hold accountable the other two branches and ensure fair resolution of conflicts among citizens. Even though the judiciary should hold accountable the other two branches of government, the empirical relationship between these two concepts is not so clearly defined.

Conceptually, the judiciary should play a crucial role in monitoring corruption as well as ensuring the integrity and quality of justice. A weak justice sector provides the ideal environment for corruption to expand and persist without being monitored. Moreover, when the justice sector institutions are seen as part of the corruption problem, access to a fair trial, and thus the quality of justice, are severely undermined. A corrupt judiciary opens the room for the powerful and wealthy to escape prosecution and conviction, and it may also preclude the rest of the population from their rightful access to a fair trial.

Despite being dubbed a “victimless crime,” corruption imposes hefty efficiency and equity costs on actors varying from governments to private firms to individuals (Olken and Pande, 2012). Not only does it stunt economic growth, it might also invite political turmoil and diminish the quality of life. This section reviews literature on the effects of regulatory institutions as well as overall governance structures imposing checks and balances on various components of state institutions. More empirical evidence on the impact of the judiciary on monitoring corruption would be valuable. There is substantial evidence of the pervasive effects of corruption, and it is also widely acknowledged that better courts are associated with less corruption. Yet, the precise mechanisms through which better judiciaries could reduce the incidence of corruption are yet to be documented with rigorous empirical evidence.

Furthermore, we think of corruption and integrity as tightly linked to trust in institutions. First, a fundamental aspect of a functioning legal system and societal development is the rule of law, which implies that laws are publicly promulgated, equally enforced, and independently adjudicated. If corruption exists, it undermines this concept, and trust in the legal system erodes. Second, trust in public institutions, including the legal system, is key to good governance. Corruption compromises this trust and can lead to cynicism and disengagement among citizens, which can stymie societal and economic development. Third, lower trust in institutions may also contribute to exacerbating corruption. When people do not trust their institutions or the judiciary, they might be less likely to shed light on corrupt activities and more likely to engage in corruption. Overall, trust is key for social and economic development, as it encourages cooperation

among individuals and communities. Corruption can erode this trust and can lead to social fragmentation, slowing social development. We review recent evidence showing the judiciary’s role in enhancing trust in formal institutions, and note that more empirical evidence is needed as well on this topic.

### 2.3.1 Justice and Corruption

The role of courts in curbing corruption is widely acknowledged in the literature. This link is traced back to the origins of law systems, with different motivations leading to the formation of unique structures. Glaeser and Shleifer (2002) argued that the motivation to reduce the effects of coercion and corruption in adjudication explains the crucial difference between French civil law and English common law that originated in the twelfth and thirteenth centuries. The French king selected professional, state-employed judges to counter powerful local feudal lords, whereas weaker English magnates opted for layman juries as a countermeasure to the potent English state.

In modern times, Glaeser and Goldin (2006) posits that factors such as the separation of powers, federalism, and professionalization in the judiciary have contributed to increased prosecution and conviction of corruption in the United States. Empirical evidence further supports the connection between courts and reduced corruption. Alt and Lassen (2008), using cross-sectional data from the late 1990s, find that elected U.S. state supreme court judges curbed corruption more effectively than their appointed counterparts. In Brazil, Litschig and Zamboni (2015) find that the presence of state judiciary reduced local rent extraction by 10%. However, these positive impacts could result more from *de facto* and behavioral judicial independence rather than *de jure* independence. For instance, the power of judges to draft opinions and enforce judgments could outweigh formal rules shielding them from external pressure, such as fixed tenure or an independent budget (Ríos-Figueroa and Staton, 2014).

Despite these findings, a gap remains in the empirical understanding of the precise mechanism through which courts lower corruption. On the contrary, substantial evidence from countries like India and Pakistan shows how corruption can influence judicial decision-making to favor the executive. In India, Aney et al. (2021) and Poblete-Cazenave (2021) have found that judges may rule in favor of the government in hopes of securing prestigious post-court careers, and that politicians in power tend to receive favorable treatment when facing criminal accusations, respectively.

This trend of corruption impacting judicial impartiality and independence is also common in many developing countries, leading to unjust verdicts. In such a context, the question then becomes: how can this corrupt influence be reduced?

In China, Zhang (2023) finds that an anti-corruption campaign aimed at combating political interference in courts managed to reduce the win rates of politically connected firms by 6.3%, leading to a reduction in corrupt politicians’ influence on judicial decisions and an improvement in the overall quality of decisions. Beyond judicial outcomes, the author links judicial independence and

impartiality to economic growth by investigating how regional economic performance responded to the increase in judicial independence and impartiality caused by anti-corruption campaigns. Overall, it finds that this improvement sparked increased investment, labor, output, and productivity in cities with poorly functioning judiciaries relative to those with stronger ones. A similar dynamic is studied in Pakistan. Mehmood (2021) finds that switching the judge selection process from Presidential appointment to peer-judge appointment resulted in fewer rulings in favor of the government and improved the quality of judicial decisions.

These findings indicate the potential influence of the executive on the judiciary, suggesting corruption and a compromise of judicial independence. Greater independence in judicial appointments, as well as judicial anti-corruption campaigns, can mitigate this impact and enhance economic development. This then also raises the question of whether more independent and robust judiciaries may also be able to reduce the prevalence of corruption in the public administration. Despite being theoretically established, greater empirical evidence on the source of mechanisms of this reduction would be beneficial.

### **2.3.2 Effects of Justice on Trust**

Wielding the power of judicial review, courts in modern democracies represent a key component in the system of checks and balances. The integrity of the judiciary is fundamental to the delivery of justice, citizens' well-being, and a nation's stability. Thus, enhancing citizens' trust in judicial institutions is a potential way to ensure other civil and political processes run smoothly. Empirical evidence points in fact to the role of the judiciary in enhancing trust in formal institutions, in addition to its association with lower crime and democracy promotion.

Acemoglu et al. (2020a) find that providing information on the improved efficiency of Pakistani state courts improved citizens' trust in the state. Citizens reported higher willingness to use state courts, greater trust in them, and larger allocations of funds to these courts. Choi (2010) offers suggestive evidence on courts' influence on crime reduction and democracy promotion. From 1984 to 2004, his survey of 131 countries indicates that impartial judicial systems are consistently better equipped to redress the grievances of citizens, cultivating a perception of legitimacy and lessening their tendency to turn to terrorist activities.

In a study based on judicial data from the EU Justice Scoreboard, Gutmann and Voigt (2020) found that citizens' perception of judicial independence at the national level is negatively associated with the presence of formal legislation considered conducive to judicial independence. The authors suggest that this puzzle is explained by cultural traits: countries with high levels of generalized trust (and to a lesser extent individualistic countries) show increased levels of de facto judicial independence, while also having reduced levels of de jure judicial independence.

Overall, these pointers suggest that justice plays an important role in citi-

zens' trust in institutions, yet more empirical evidence is needed. For instance, it is unclear whether it is through greater efficiency, access, quality, or independence that judiciaries may contribute to enhanced trust. Furthermore, this question may be particularly important in the context of overlapping formal and customary justice institutions, as is the case of a large number of developing countries.

## 2.4 Summary of Evidence

In our review of the literature, we find that justice institutions play a significant role in economic development, particularly through their impact on economic growth and credit markets, the protection of vulnerable populations, their capacity to deter violence and their influence over people's trust in institutions. Effective judiciaries are also perceived to reduce corruption, although more empirical evidence is needed.

First, we review the evidence on the impact of justice on economic outcomes. The evidence finds that contract enforcement reduces moral hazard, can increase the competitiveness of credit markets, and plays an important role in firms' investments and productivity. Weak enforcement affects firms' incentives to invest, thus reducing productivity, and distorts the production materials used by firms, leading them to switch to more costly suppliers or less efficient technologies.

Judicial institutions also influence entrepreneurship and the overall business environment. For example, new tribunals that increased the presence and the efficiency of the justice system in Brazil led to increased entrepreneurship and healthier business environments (Lichand and Soares, 2014). Similar effects on entrepreneurship were found in a training program for judges in Pakistan (Chemin, 2009a). Overall, an effective justice system enables firms to enforce contracts, facilitates ease of entry, influences firm size, investment, productivity, and growth, while a lack of justice can lead to misallocation of labor and distortions favoring powerful firms.

We find consensus on the positive impact of judicial institutions on credit markets, both via credit availability and the development of credit markets. Efficient and high-quality courts, along with proper enforcement of credit contracts, help prevent moral hazard and increase competition between lenders. Additionally, the quality of courts influences lenders' willingness to lend, and improvements in judicial efficiency have been associated with a lower cost of credit. However, the credit market consequences of justice may vary, with potential regressive effects on small borrowers when the supply of credit is inelastic.

Greater access to justice through legal aid can play a crucial role in the well-being of vulnerable populations, even in very different contexts. In the United States, legal aid is shown to reduce the likelihood of eviction for those at risk and increase tenants' likelihood of retaining possession of their units. In developing country contexts such as rural Kenya or Liberia, legal aid may increase farmers' investments and the productivity of their work, and even increase recipients' food security and economic well-being. Given the size of the global justice

gap, i.e. 1.5 billion citizens who lack access to justice, the capacity of justice institutions to enhance the well-being of poor citizens in developing countries may be worthy of particular attention.

Second, we review the connection between justice institutions and the presence of conflict and violence. Even though the literature in this field is scarce—mostly due to the endogeneity of conflict with institutions and the lack of granular and reliable data—in recent years a growing body of literature has focused on the ways to redress conflict.

The evidence at the macro level between institutions and conflict is still limited. There is evidence that conflict affects justice, for example, via the impact of in-group bias in judicial decision-making, as in the case of Israel (Shayo and Zussman, 2011, 2017). On the opposite direction, there is suggestive evidence that an increase in judicial quality may reduce criminal and dishonest behaviors, increase regard for the rule of law and reduce tolerance of unlawful behavior (Choi, 2010). Furthermore, greater judicial accountability may reduce extrajudicial killings in counterinsurgency strategies (Acemoglu et al., 2020b).

Different interventions at the micro level have proven to be effective at reducing violence in the resolution of disputes. An important justice-related one is alternative dispute resolution, which in post-conflict Liberia led to increased resolution of land disputes and lower violence, despite an increase in non-violent disagreements. Evidence also shows that legal aid clinics play a crucial role at protecting vulnerable populations at risk of violence. For example, legal aid clinics may reduce domestic violence and increase human capital investments. An example of this are Women Justice Centers in Peru (Kavanaugh et al., 2018). These clinics attended by women substantially reduced gender-based violence and increased children educational performance throughout the country. Beyond legal clinics and informal institutions, formal justice institutions may be particularly important at protecting vulnerable populations in contexts where customary laws are biased against them.

Third, we review the evidence linking justice, trust and corruption. Empirical evidence supports the role of effective judiciaries in enhancing citizens' trust in public institutions. However, even though the relationship between justice and corruption may sound evident, we find some, but not abundant, empirical evidence demonstrating the role of the judiciary in monitoring or deterring corruption. Specifically, there is some evidence on the causal relationship between better courts and reduced corruption. In parallel, the literature highlights the influence that the executive may have on the judiciary, which undermines judicial independence and may be indicative of corruption. Greater independence may be achieved by preventing Presidential appointment of judges, as in the case of Pakistan (Mehmood, 2021).

The evidence suggests that impartial judicial systems contribute to cultivating a perception of legitimacy and lessen people's tendencies to turn to terrorist activities (Choi, 2010). In addition, disclosure laws that require individuals or corporations to divulge information are associated with less corruption and stronger governments (Djankov et al., 2010).

Courts also matter for people's trust in formal institutions. Improved infor-

mation on court efficiency may increase willingness to use courts, trust in them, and allocations to courts in comparison to other informal institutions.

Our summary of the evidence warrants four important caveats. First, the impact of the judiciary will depend upon the type of regime that prevails in a country. Most empirical evidence presented in this paper studies the impact on democratic regimes. However, the effect under other systems of government may be significantly different. Autocratic regimes oftentimes ensure that the judicial system is subservient and highly responsive to the government. In such contexts, it is unclear whether a more efficient or stronger judiciary will actually benefit society as a whole. Moustafa and Ginsburg (2008) question whether judicial reform may lead to political transitions, even though they realize that courts may have the potential to open a space for activists to mobilize for political change.

Second, most empirical evidence is concentrated in a limited set of regions. Despite our efforts to review the evidence in developing countries, we find that South Asia, the United States and Europe are better represented in empirical research related to the judicial system—particularly in the link between justice and firms. In contrast, Sub-Saharan Africa, East Asia, and Latin America are underrepresented in these studies. Microeconomic evidence on judicial reforms is just growing in recent years. Greater empirical evidence would be highly valuable to understand the broader impact of justice and the rule of law on development.

Third, this article focuses on the judiciary as part of the formal justice institutions and does not lend itself to adequate discussions of the informal counterparts. Even in places with strong state capacity, such as the United States, distrust of formal institutions among minorities could turn them to the informal “code of the street” (Anderson, 2000). In developing countries with weak state capacity, informal channels of justice are more prominent. A survey experiment in Mali shows that participants consider customary institutions to be quicker, fairer, and less likely to require payment for the resolution of a land dispute than the formal court system (Winters and Conroy-Krutz, 2021). Blattman et al. (2014) showed that community-level campaigns promoting ADR increased the resolution of land disputes and reduced violence. Again, it is important to recognize that informal justice institutions are not the panacea, but often complement ineffective legal systems. As discussed earlier, sometimes formal justice institutions take on the responsibility of rectifying biases, discrimination, and power imbalances embedded in social norms (Chakraborty et al., 2022; Sandefur and Siddiqi, 2013)). We welcome more scholarly efforts in understanding how formal and informal justice institutions interact with each other (Cohen, 2022; Olson and Dzur, 2004). Furthermore, legal reform advocates will need to consider preferences for customary justice institutions when considering plausible reforms (Winters and Conroy-Krutz, 2021).

Finally, we note that a meta-analysis of the cited studies would be an important contribution to the literature. The growing use of registered randomized control trials can facilitate an assessment of all interventions and mechanisms in a harmonized manner.



### 3 The Data Revolution in Justice

Recent years have witnessed an increase of data availability in judicial systems around the world. Many countries have developed electronic case management and e-filing systems. This has led to the creation of massive databases that track every characteristic of each case. In fact, this is by definition an element of the fair administration of justice: everything that happens in a case needs to be tracked to demonstrate the evidence behind facts-based decisions. However, even though this data is readily available to policymakers, it has rarely been exploited to evaluate policies or improve the functioning of the judiciary.

The underutilization of data raises many questions: What if we could harness its power to understand what sectors of the population lack access to justice? Taking it one step further, what if we could use the text of decisions to reduce judicial biases, to revamp justice systems that unfairly target gender and racial minorities? What if we could use high-frequency data to understand and address why cases get backlogged, thereby removing a main barrier to justice in the developing world? In the era of COVID-19, what if we could use high-frequency data to predict the future congestion of courts, and plan ahead to be prepared for what is yet to come? Ultimately, what if we could use data to assess the specific impact of new laws on individuals and firms, and promote best practices among different countries?

By responding to these questions, the data revolution can help the rule of law reclaim its role in development planning. More importantly, by using data more effectively, judiciaries around the world, and particularly those in developing countries, will be able to improve their performance, address deficits in the quality and accessibility of justice, and contribute to prosperity. In this section, we explore the opportunities that arise from the expanded data systems in justice. We discuss how data can help assess social prejudice and integrity in justice systems in ways that have not been possible until recently. As COVID-19 moves justice into virtual courtrooms and greater electronic processing of cases, this section assesses the opportunities that arise to evaluate and improve crucial aspects of the efficiency, quality and integrity of courts.

#### 3.1 The Expansion of Data Availability

Judiciaries across the globe generate vast amounts of data on a daily basis, traditionally collected in paper form. However, this valuable resource has remained largely underutilized, with limited quantitative analysis and insights derived from the overall patterns within the data. According to the literature, the reasons are twofold: first, judicial officers have historically not been concerned with performance indicators; and second, legal scholars have prioritized qualitative over quantitative analysis of the functioning of the judiciary (Dakolias, 1999). Nonetheless, recent developments indicate a notable shift in this trend. Judiciaries worldwide are embracing technological advancements and implementing electronic systems such as e-filing and case management platforms, electronic calendars, virtual courts, and electronic jurisprudence. These systems generate

vast amounts of data that can be harnessed to evaluate and enhance the functioning of the judiciary. Furthermore, the growing concern over case backlogs in developing countries has sparked an interest in performance metrics to improve judicial efficiency. Thus, the expanding availability of data in judiciaries worldwide presents valuable opportunities to measure overall performance, identify areas for improvement, and evaluate the impact of justice reforms.

The adoption of technological platforms that generate judicial data has happened in both developed and developing countries. The United States, Canada, European countries, and Australia are at the forefront of e-justice systems. Even so, electronic systems have also been implemented or are in the process of implementation in Latin America (Chile, Argentina, Uruguay, Peru, the República Bolivariana de Venezuela, and some Mexican states, among others), Africa (Kenya, Rwanda, Lesotho, etc.) and Asia (Malaysia, Singapore, and many others). The increased availability of judicial data can be used to improve the functioning of judiciaries, define what works in justice reforms, and produce rigorous evidence on how the judiciary may affect development outcomes. That said, this paper does not establish standard performance indicators. Indicators have already been discussed in areas such as access to justice; expedition and timelines; equality, fairness, and integrity; independence and accountability; and public trust and confidence (Reno et al., 1997). Moreover, we do not cover issues of transparency or accessibility of the data. The recommendations put forth are intended for all parties with access to judicial data. It is also recognized that not all countries may possess the institutional capacity or infrastructure to establish data ecosystems. Nonetheless, even countries without existing electronic systems can benefit from understanding the potential benefits that may arise from developing such data systems.

The extent to which each of these countries can utilize the approaches outlined in this paper will depend on the extent to which e-judiciaries are integrated, the sources of data available, as well as the quality and accuracy of this data. Concerns about representativeness and exhaustiveness may arise in contexts where not every case is included in the database, which can disproportionately impact those with limited digital access.

The main sources of data are automated registrars. Oftentimes, these cases can be merged to the judgment text. In an ideal scenario, this data will also be complemented by other sources of data to create a larger ecosystem. Case data can be linked to users or firms through tax or national IDs to evaluate the potential effect of policies or reforms on the affected parties. Case data can also be linked to other records, such as police and prison records, or to geographic areas, to better understand regional access. Finally, the data should be complemented by legal needs or court-user surveys to evaluate satisfaction with the functioning of courts. It is crucial not only to consider the perceptions of those who access courts, but also of those who have a legal need but resort to other methods to resolve it.

While creating a data ecosystem is ideal for analysis, there are at least three main limitations that may impede the utilization of this data by judiciaries and researchers. The first limitation is the difficulty in merging different databases

with varying definitions, IDs, or relationships for each case. However, even in cases where data cannot be merged, valuable insights can still be gained by comparing the results of different sources. For instance, comparing the outcomes of legal need surveys in a region to case-level data from courts can provide insights into access to justice in remote areas.

The second limitation is related to human capital. Judicial officers are rarely experts in data analysis, and engineers generally lack the domain expertise necessary to understand the functioning of the law. In courts without sufficient human capital to take advantage of available data, training bureaucrats to learn the necessary skills or hiring those with the required skills may be a valuable long-term investment for improving the functioning of courts. In the meantime, non-governmental organizations, international organizations, or private companies may contribute to filling this gap.

Finally, the increasing accessibility of public records through digital technologies raises ethical concerns related to privacy, misinterpretation, consent, and disproportionate impacts. First, the availability of these records, coupled with advanced analytical capabilities, can potentially violate individuals' privacy by revealing sensitive information—even in contexts where the data is public. The aggregation and processing of these records could lead to revealing patterns or information that an individual might not wish to be publicly known. Second, the complex nature of judicial records makes them susceptible to misinterpretation or misuse of analytics, which may lead to incorrect or harmful interpretations. Third, individuals included in these records may not have consented to their data being used in this manner. This raises ethical questions about consent requirements in research involving human subjects. Finally, the use of judicial records may disproportionately impact certain groups, exacerbating societal inequities. To address these concerns, ethical considerations should be integrated into the work of judiciaries and researchers. Mitigating strategies like anonymizing data, establishing guidelines for data interpretation and use, and implementing ethical review processes are important. Data use agreements in collaborations between researchers and judiciaries can help mitigate risks. Ultimately, ethical considerations are paramount in evaluations of the benefits of the use of data against the associated costs.

## **3.2 Measurement, Diagnostics and Experimentation**

In this section, we present an initial framework to make better use of judicial data. Justice systems should start by measuring indicators of performance, quality, integrity and accessibility of justice. These measurements can also be used to improve the deployment of resources, and therefore enhance efficiency and reduce the backlog of cases. Courts should then provide diagnostics on those areas that are most valuable to their service. For example, databases can be used to identify the main causes for adjournments, understand what the barriers to justice are, or evaluate which cases would benefit the most from mediation. Finally, researchers and policymakers should take advantage of data systems to rigorously evaluate the impact of justice reforms. The random assignment of

cases to judges behaves as an exogenous shock to evaluate the causal impact of judicial performance on the well-being of citizens and firms. By keeping track of innovations in the judiciary and experimenting with potential solutions, data systems generate the opportunity to understand the impact of reforms on people's lives and the prosperity of nations.

### 3.2.1 Measurement and Diagnostics

Despite the growing availability of case-level data, most courts around the world are underutilizing the opportunities created by these databases. Many courts are not even producing performance or management reports that summarize key indicators, such as the number of incoming cases, time to disposition, and case clearance rate. Correspondingly, most courts allocate resources without taking into account important efficiency measures that may be gleaned from stronger empirical data, for example by evaluating the backlog or productivity of specific courts. As data systems become available and more courts decide to catalog data systematically, greater opportunities to evaluate a court's efficiency will arise.

The very basic usage of case management systems consists in measuring what happens in courts. To begin with, judiciaries could create indicators that evaluate the efficiency, access, quality and integrity of each court.<sup>2</sup> Court-user surveys can complement this data by providing additional diagnostics of the quality, integrity, and public trust in the judiciary, based on the experience of the user. Databases can also be used to diagnose the main issues and problems that the judiciary faces. In many developing countries, courts are concerned about their large backlog of cases, which limits citizens' access to justice and erodes their trust in formal institutions. Databases can be used to identify the main causes of delay and adjournments in legal cases, allowing courts to take targeted action to address these issues.

Similar diagnostics can be used to evaluate an array of outcomes that are important to judiciaries, such as who uses formal institutions and how they make use of them, the level of user satisfaction, which legal needs in a region remain unfulfilled, and the main barriers to accessing justice and how to address them. Apart from diagnosing problems, data systems should also be used to coordinate and deploy resources in an efficient and effective manner. For example, the assignment of cases to judges can be automated so that they take into account the workload and backlog of cases for each judge, but also to ensure the random assignment of cases to judges. Databases can also be used to evaluate the capacity of judges and mediators. Then governments can train or incentivize those who are less capable or less willing to improve performance. Finally, databases could be used to determine which courts and cases may benefit more from ADR. Advanced systems can detect which cases are more likely to be successfully resolved through mediation and automatically redirect these cases

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<sup>2</sup>A list of indicators is available at "Court Performance Around the World: A Comparative Perspective," which includes, among others, the number of cases, the case clearance rate, the congestion rate, and the average duration of a case (Dakolias, 1999).

to mediation. By using data to identify the most appropriate cases for ADR, judiciaries can improve efficiency, reduce backlogs, and enhance access to justice.

A bureaucratic strand of literature evaluates case flow management and staffing adequacy, highlighting the importance of management practices in court performance. For courts to move through their dockets quickly, Buscaglia and Dakolias (1996) already proposed the adoption of data-driven decision-making, a method tested by Ecuador and Argentina during a period of skyrocketing pendency rates in the 1990s. Among the most constructive changes are active management of cases, clear timelines for processing, and adequate mechanisms to monitor progress. Dakolias and Said (2000) study the bottom-up approach to implementing judicial reforms. Lessons from the pilot projects on improving the judiciary in Colombia, Peru, Argentina, and Ukraine suggest that judicial reforms work best when implemented in lower courts. A change in culture and management practices and support from stakeholders from different sectors of society, including legal professionals, businesses, and NGOs, also enhance these reforms' reach.

Databases may also be used to diagnose the overall functioning of the system and the capacity of different legal actors involved. For example, Carmignani and Giacomelli (2010) argue that the number of lawyers has a large positive effect on civil litigation across Italian provinces from 2000 to 2005. This conclusion is challenged by (Yeung and Azevedo, 2011), who find that human or material resources do not fully explain the differences in efficiency across Brazilian courts. Instead, it correlated more closely with court management practices. Mitsopoulos and Pelagidis (2010) suggest that the main problems in the Greek judicial system are actually failings in the system's own design: insufficient judicial organization and accountability, excessively burdensome procedures, and lack of competition in the provision of legal services. Moreover, Coviello et al. (2015) show that judges carry out work in short, interrupted segments—what they define as task juggling. When judges juggle tasks, it lowers their productivity substantially. In particular, those judges who juggle more trials at once instead of working sequentially on a few of them over time, take longer to complete their portfolios of cases.

These diagnostics may be an essential tool to understand the main areas for improvement in the justice system. The establishment of comprehensive databases and performance indicators is the first step towards understanding what works, or what needs to be improved, in a country's justice system. Policy-making can then benefit from targeted goals and recommendations that are based on solid measurements.

### **3.2.2 Experimentation**

Apart from measurement and diagnostics, data systems provide the ideal opportunity to experiment with policy options in order to rigorously evaluate the impact of justice reforms. Innovative policies can be implemented in a staggered fashion to provide the opportunity to rigorously evaluate them. Alternatively, performance incentives and other cost-effective measures can be tested via ran-

domized controlled trials (RCTs). For policies that can have a relevant long-term impact, iteratively testing and evaluating their impact through RCTs can lead to a better understanding of the benefits and trade-offs of such policies.

Legal scholars and judges have long made arguments about laws and regulations and justified their arguments with theories about the effects of these legal rules. A particularly challenging dimension of studying the effects of legal rules is that many other aspects of society are correlated with the presence of legal rules, so it is difficult to determine cause or effect. Much like medicine a century ago, prior to clinical trials, theories most often lacked rigorous causal evidence.

Randomizing judicial decisions, however, violates our notion of justice and equal treatment before the law. On the other hand, randomizing case assignment to judges generates a retrospective “clinical trial”, the first example of which was only published as recently as 2006 (Kling, 2006), where the policy question was whether longer sentence lengths affected subsequent labor outcomes and earnings. Randomizing sentences is unethical, but randomizing cases to judges who are systematically harsher or more lenient than others generated the inference on the long-run impacts of sentence lengths. Thus, in countries where cases are randomly assigned, the random assignment itself can be used as an exogenous source of variation to evaluate the impact of judicial decisions. This method has become widely used since the credibility revolution.

For instance, Dobbie and Song (2015) investigate the causal effect of consumer bankruptcy—one of the largest social insurance programs in the United States—on debtors by exploiting the random assignment of bankruptcy filings to judges. The authors find that debt relief increases individuals’ earnings and employment and decreases mortality and foreclosure rates. In Norway, Dahl et al. (2014) evaluate the existence and importance of family welfare cultures, where the receipt of a welfare program by one generation causes increased participation in the next generation. The authors exploit the random assignment of judges to applicants for disability insurance whose cases are initially denied, by comparing the implications of being assigned an appeal judge who is systematically more lenient than a harsher one. They find strong evidence for a causal link across generations, where the adult child’s participation increases if the parent also participated in the insurance program.

Another policy question that has been answered by leveraging the random assignment of cases to judges is the impact of pretrial detention on defendants. Arnold et al. (2018) use the detention tendencies of quasi-randomly assigned bail judges to evaluate the impact of pretrial detention on subsequent defendant outcomes. They find that pretrial detention—due to comparably harsher judges—decreases formal sector employment and the receipt of government benefits.

This “judge-lenientcy” design may be applied to other characteristics of judicial decisions. For example, what is the impact of the speed of justice? These kinds of questions can be studied in administrative data where random case assignments exist. Judges predicted to be fast also tend to be fast in other cases. The causal effect of faster case resolution can be studied by linking it to

long-term outcomes where the data infrastructure permits.

Overall, experimentation brings the opportunity to implement rigorous causal evidence to the legal realm. Whether it is via RCTs or leveraging the random assignment of cases to judges, “clinical trials” can bring important lessons on why the rule of law matters for development outcomes, and perhaps more importantly, on what is the impact of specific policies and reforms on the litigants’ well-being.

As a final note, while researchers obtain rigorous empirical evidence from incremental experimentation, carrying out effective justice reforms may require efforts on a much broader level. Literature has shown that only comprehensive judicial reforms that seek to improve quality, speed, and access all at once, but not limited reforms, increase firm productivity and economic growth on a national level with lasting effect (Chemin, 2020).

### **3.3 Machine Learning Applications**

In this section, we discuss avenues to leverage machine learning to improve judicial decision-making and increase the effectiveness of justice. Moreover, we propose a multi-step approach to leverage administrative data to analyze disparities in judicial decisions. We also explore the potential of machine learning and natural language processing (NLP) techniques to process large quantities of text to improve the knowledge and efficiency of justice systems. These techniques currently allow researchers and policymakers to analyze texts to an extent that was not humanly possible before. Such opportunity has arisen not only due to the increase in the large volumes of available data, but also thanks to the recent development of computational tools that make it possible to process and analyze such large and complex data.

#### **3.3.1 Applications of Administrative Data**

Even though the adoption of machine learning tools in the justice system is in its early stages, the preliminary results showcase the potential of these methods while also highlighting the risks that their inappropriate use may present. Recent research examines the potential of machine learning techniques to “improve human decision”, in specific by evaluating the potential of machine learning to decide whether defendants should await trial at home or in jail in different US urban cities (Kleinberg et al., 2018). The authors focus on bail decisions, in which judges have to assess whether the defendant will flee or commit a new crime if released, and trade off these risks against the cost of incarceration. In brief, the judges have to decide, based on their prediction, what a defendant would do if released. This specific prediction task makes an algorithm particularly promising for this job.

The authors use a large data set of cases heard in New York City from 2008 to 2013 to build an algorithm that assesses the risk of fleeing or recidivism. The algorithm then makes a prediction based only on data available to the judges at the time of the bail hearing. After comparing results, the authors find that

the algorithm improves judicial decisions, and has the potential to reduce crime by as much as 25% without changing the number of people waiting in jail. By evaluating the results, they realize that judges release many defendants the algorithm ex-ante identifies as very high risk, and that stricter judges do not jail the riskiest defendants first. These results are not restricted to New York City, as the authors report similar findings in a national data set as well. Moreover, the authors show the potential of machine learning tools to diagnose why judges mispredict.

The results from the aforementioned study suggest a promising avenue for future research on the application of machine learning to predict the risk of recidivism and improve the precision of judicial decisions. According to the United Nations (2018), the proportion of prisoners held in detention without being sentenced for a crime has remained almost constant between 2003-2005 and 2014-2016, and still affects almost one-third of all prisoners. Thus, the importance of potential developments in this field may be particularly relevant all over the world to better identify those who should stay in prison—or at home—while expecting a trial.

In addition, clear predictions about the length of a trial or expected gains from it may be helpful to improve litigants’ decisions on their cases. In Mexico, the rate of settlement in mediation in specialized labor courts remains low because of overconfidence on the client-side and low-quality legal representation (Sadka et al., 2017). Many plaintiffs spend more on legal fees than what they recover in court. Quality of legal aid and predictions about the case are both effective in correcting these erroneous perceptions regarding their entitlement and the importance of particular types of evidence. Sadka et al. (2017) find that providing information to litigants on their predicted outcomes in courts reduces the level of overconfidence of litigants, and nearly doubles the overall settlement rate. Nonetheless, the increase in settlement rates only occurs for the subset of cases for which the plaintiff is present to receive the information, as the information provided to lawyers does not have an effect. Thus, administrative data may also be able to improve litigants’ expectations of a case, identify the optimal path to resolve a specific case and—as in the case of Mexican labor courts—lead more litigants to settle, freeing up space in court proceedings.

Nonetheless, the implementation of machine learning tools in the judicial sector entails relevant risks that may not be overlooked. Inappropriate application of these tools can lead to decisions that may violate due process or that may discriminate based on race, gender or other characteristics. This may be of particularly high risk when the tools represent a black box with no clear explanation of how it works (Rudin and Ustun, 2018). Without appropriate safeguards, letting machines make judicial decisions could amplify existing biases and discrimination.

### **3.3.2 Analyzing Disparities in Justice Systems**

Equal treatment before the law is an essential feature of democratic societies. According to the Universal Declaration of Human Rights, “All are equal before



the law and are entitled without any discrimination to equal protection of the law.” As a consequence, everyone must be treated equally under the law regardless of race, gender, color, ethnicity, religion, disability, or other characteristics, without privilege, discrimination or bias. Judges are responsible for following and interpreting the law. Thus, they play a crucial role in ensuring de facto equality of treatment under the law. De jure equality—that is, equality in laws and regulations—will not lead to de facto equality under the law if those responsible for applying the law are still affected by biases along gender, race, or other dimensions of discrimination. On a global scale, despite equal laws, social discrimination, stereotypes, biases, and even ignorance and reluctance continue to undermine the implementation of equal justice (Hyland et al., 2020).

Thus, it is crucial for the formal legal system to enforce equal rights, turning the law into real outcomes. For example, in India, improvement in women’s legal rights to land and enforcement by courts increased women’s chances to inherit land and leave a violent spouse (Agarwal, 2003; Deininger et al., 2013). In Rwanda, likewise, reforms to the Successions Law increased women’s ability to resist polygamy while keeping permanent rights to land (Daley et al., 2010).

Despite this principle, there is ample social scientific evidence documenting arbitrariness, unfairness, and discrimination in judicial decision-making. Judges become more politicized before elections and more unified during war (Chen, 2016; Berdejó and Chen, 2017). Politics and race also appear to influence judicial outcomes (Schanzenbach, 2005; Mustard, 2001; Steffensmeier and Demuth, 2000; Albonetti, 1997; Zingraff and Thomson, 1984; Abrams et al., 2012; Boyd et al., 2010), as does masculinity (Chen et al., 2017), defendant birthdays (Chen and Philippe, 2020), football game outcomes (Eren and Mocan, 2018; Chen, 2017), time of day (Chen and Egel, 2017), name (Chen et al., 2016), and shared biographies (Chen, 2016) or dialects (Chen et al., 2015). These biases affect the quality of decisions and may undermine citizens’ confidence in the judiciary.

The overwhelming majority of existing literature on judicial in-group biases concerns the United States (Ash et al., 2021a), but the literature is now extending to other countries, including the Global South. Analyzing the decision of Israeli Arab and Jewish judges during and in the aftermath of the Second Intifada, Shayo and Zussman (2017) found that ethnic biases in local small claims court decisions are positively associated with the intensity of conflict across different localities, and the adverse effects persisted despite the decline of violence. Gazal-Ayal and Sulitzeanu-Kenan (2010) found similar ethnic biases in detention decisions in first bail hearings in Israel. In Kenya, judges hearing criminal appeals are 3–5 percentage points more likely to grant appeals to defendants of the same ethnicity than to other defendants (Choi et al., 2022). In contrast, in India where women, Muslims, and lower castes are underrepresented in the judiciary, Ash et al. (2021a) found no judicial biases in decisions along any one of the three demographic factors.

There are also various papers showing clear judicial biases in laboratory environments. Judges, as humans, are also affected by behavioral biases such as anchoring, framing, hindsight bias, representative heuristics, egocentric bias,

snap judgments, and inattention (Guthrie et al., 2001; Rachlinski et al., 2009, 2015). Thus, the primary question is not whether these problematic features of the legal system exist. Rather, the dilemma facing policy-makers is what, if anything, can be done.

Predictive judicial analytics holds the promise of increasing the fairness of the judiciary. Much empirical work observes inconsistencies in judicial behavior. By predicting judicial decisions—with more or less accuracy depending on judicial attributes or case characteristics—statistical analysis and machine learning offer opportunities to detect when judges are most likely to allow extralegal biases to influence their decision-making. Thus, data may be used to understand, and address, judicial biases in decision-making.

As one of the key institutions that enforces social contracts and resolves conflicts, the judicial system plays a vital role in addressing disparities. Based on previous literature, we propose the following framework to measure and analyze disparities in a systematic manner:

1. **Gathering Relevant Data:** Begin by collecting comprehensive data from multiple sources related to the justice system. Divide the data into three categories: pre-decision data, decision data, and post-decision data. Each category will inform different steps in the framework. To the extent possible, collect data on external factors that may influence judicial decisions, implicit biases of judges and court actors, and the economic and social outcomes of litigants after their judicial case.
2. **Examining Pre-Decision Data and Initial Interactions:** Examine pre-decision data, focusing on the initial encounters with law enforcement. Analyze whether adding control variables, such as race or ethnicity, influences the disparity in these interactions. This analysis identifies potential biases at the earliest stages of the criminal justice process. *Example:* Fryer (2019) assesses whether racial differences in police use of force arise from omitted variables associated with race in the US, showing that Blacks and Hispanics are more likely to experience non-lethal use of force by the police compared to whites, even after taking into account the context and civilian characteristics
3. **Step 3: Identifying and Analyzing Bias in Decision-Makers:**
  - (a) **Identifying Biased Decision-Makers:** Analyze past behavior of decision-makers to understand if bias is concentrated among specific individuals or widespread. The goal is to identify the aggregate disparity driven by which and how many of the decision-makers. *Example:* Goncalves and Mello (2021) identified racial bias at the police officer-level and found that the entire discrepancy within a unit could be explained by the behavior of just 40% of the force. In contrast, in Kenya, Chen et al. (2022) find that gender and ethnic in-group biases are mild and widespread across the entire body of judges.

- (b) **Understanding Internal Drivers of Biases:** Acknowledge and analyze the susceptibility of decision-makers to subconscious stereotypes. Employ Implicit Association Tests (IATs), if available, or Natural Language Processing (NLP) techniques to understand these biases in the written decisions of court actors. Given the textual nature of the law, and the importance of argumentation and reasoning to legal decision-making, there is a substantial amount of textual data that can be used to examine how legally relevant and legally irrelevant factors affect legal outcomes. Recordings of online hearings represent another method to evaluate and understand biases in judicial decisions by, for example, using court recordings and 3D Virtual Reality technology to alter the defendants' race to simulate alternative environments. *Examples:* Ash and Chen (2018) uses judges' writings to predict the average harshness and racial and sex disparities in sentencing decisions. That work finds that the information contained in written opinions can improve significantly on naive prediction of punitiveness and disparity. Bielen et al. (2021) conducted a study to understand courtroom biases in virtual reality courtrooms. They find that, while evaluators are harsher towards defendants of their own race during the guilt-innocence decision, in the sentencing phase they tend to be more lenient towards defendants of their own race. This pattern leads to significant bias against minorities at all stages.
- (c) **Evaluating the Impact of External Stressors on Decisions:** Examine how unrelated environmental stressors affect judgment. Understand whether certain groups bear a disproportionate impact of these stressors, which could introduce another layer of bias into the decisions. These environmental factors range from weather and time of day to outcomes of football games. The question then is not whether such factors affect judgment, but whether certain groups bear a disproportionate brunt of judges' inattention or their psychological stressors. For example, if disgruntled or tired judges are more likely to punish blacks more harshly than whites because they are more likely to rely on heuristics, it inadvertently adds another layer of bias.
4. **Sequential Analysis of Disparities:** Conduct an in-depth sequential analysis of sentencing decisions, taking into account the defendant's criminal history and other legally permissible characteristics. Aim to pinpoint sources of discrimination that may be embedded in overlooked legal aspects of the case. *Example:* Using linked data across stages on federal cases, Rehavi and Starr (2014) show that blacks receive sentences that are 10% longer than those of whites with similar history and charged with similar crimes. The primary source of this disparity is the prosecutor's initial decision to file charges carrying mandatory minimum sentences. Blacks are charged with such offenses more often than whites.

5. **Evaluating Post-Decision Data:** Observe the post-judgment behavior of defendants using post-decision data. Focus on outcomes like bail decisions, recidivism rates, and employment status post-incarceration to illuminate bias and its potential sources. *Example:* If the bail decisions are not biased, we should expect to see more or less similar levels of pre-trial misconduct among different racial groups. Arnold et al. (2018) shows that this is not the case. Blacks are systematically perceived to be higher risk and are less likely to be granted bail. However, estimates suggest that marginally released white defendants are about 22 percentage points more likely to be re-arrested prior to disposition than comparable black defendants.
6. **Assessing Long-Term Consequences of Disparities:** Just as important as ensuring that the justice system works efficiently and without bias is understanding how it impacts the lives of those that pass through it. It is possible that the long-term consequences of being in prison, for example, are different for different racial groups, even if they were convicted of the same crime. Linking judicial data to administrative data such as social security information, employment status, health information and so on, can provide an informative picture of the impact both of bias within the judicial system and the independent differential impact of court decisions on defendants of different races.
7. **Comparing Human and Machine Learning Decisions:** Deploy machine learning algorithms to study disparities and biases. Compare human decisions with algorithmic predictions to quantify the extent of human bias without necessarily replacing human judges with algorithms. *Example:* An algorithm, when built with rich data for clearly defined objectives, can be less biased than the human judge. As shown by Kleinberg et al. (2018), the algorithm can achieve the same crime rate as that achieved by human judges but by jailing 38.8% fewer blacks and 44.6% fewer Hispanics, suggesting that machine learning can also be used to identify biases and understand how to improve human decisions.
8. **Implementing and Evaluating Interventions:** Based on the analysis, implement appropriate interventions to reduce the biases identified. Include mechanisms to evaluate the effectiveness of these interventions and adapt as needed. This step would ensure continuous improvement and real-world effectiveness of the strategies implemented.

Overall, the results from this analysis could be used to aid decision-makers in ways that reduce bias in the system. For example, training programs could be targeted toward biased judges, either with the goal of debiasing or to help them learn how to use the hearing process to better advantage. Simply alerting judges to the fact that their behavior is highly predictable in ways that may indicate unfairness may also be sufficient to change their behavior. Informing judges

about the predictions made by a model decision-maker could help reduce judge-level variation and arbitrariness. Potential biases that have been identified in prior decisions or writing could be brought to a judge’s attention, where they could be subjected to higher-order cognitive scrutiny.

Thus, data not only makes it possible to measure and understand judicial bias, but also provides different avenues to address these biases and reduce existing discrimination. Leveraging such opportunities may be essential to ensure that not only *de jure* equality exists, but also that there is *de facto* equality in the interpretation and application of the law.

### 3.3.3 Applications of Text as Data

Recent innovations have generated new opportunities for empirical research on the delivery of justice. Court proceedings and rulings are now increasingly digitized, allowing the construction of large-scale data sets. The increase in text availability is particularly promising in the legal field, where legal documents are meticulously documented and play an essential role in judicial decisions. Additionally, computer scientists have developed a slate of machine learning tools that can produce interpretable data from unstructured text—including written judicial opinions—making it possible to analyze a quantity of text that would be far too large for humans to read.

The question of how to analyze texts has gained importance in social science research in recent years (Gentzkow et al., 2019). In the past, the most common approach was qualitative, with either a deep reading of the text or a subjective coding of important themes (see Glaser et al. (2017) for an example of the latter approach). However, these approaches lack a rigorous method of replication (Ricoeur, 1981; DiMaggio, 1997) and more formal methods to analyze texts have been developed (Andrade, 1995; Mohr, 1998). Topic modeling discovers underlying topics and themes through an inductive method (Blei et al., 2003; Blei, 2012; Mohr and Bogdanov, 2013). Another family of models learns the features of text that are predictive of some outcome, such as political ideology (Gentzkow et al., 2019; Jelveh et al., 2018; Ash, 2015; Ash et al., 2017; Osnabrügge et al., 2020).

Recent approaches have gone beyond the traditional network or topic methods by mapping word relations into a high-dimensional vector space (Mikolov et al., 2013; Pennington et al., 2014). This approach positions connected words close to each other in the space and can be used to recover relevant dimensions in language. A rich literature in computational social science has begun to apply these methods in many contexts (Rodriguez and Spirling, 2022).

More specifically, an active literature has begun to apply Natural Language Processing methods to legal documents (Carlson et al., 2016; Leibon et al., 2018). Ganglmair and Wardlaw (2017) apply a topic model to debt contracts; Ash et al. (2019) implement a syntactic parser to extract legal commitments and entitlements from union contracts. Ash and Chen (2019) construct document embeddings for federal courts and show they recover differences between courts, over time, and across topics.

As online collections of court decisions grow, many options become available to use text for legal research. For instance, legal scholars may be able to trace evolving interpretations of legal concepts such as fault, causation, or damages, or to examine patterns in how courts handle specific types of cases or parties (Liebman et al., 2020). Given that word embeddings measure correlations between words, they can be used to detect biases in language. Ash et al. (2021b) analyze gender bias in the language of US Circuit Court judges, finding that slanted judges vote more conservatively in gender-related cases.

Even further, NLP may be used not only to identify and understand human biases, but also to mitigate them. For instance, a possibility may be to prevent prosecutors from seeing irrelevant information about a case (such as race or ethnicity) when making an initial decision on whether to charge someone. The San Francisco District Attorney’s Office has begun to use an algorithm that automatically redacts race-related information from free-text case narratives (Chohlas-Wood et al., 2021). This approach has been described as “blind charging”, and may enable prosecutors’ offices to reduce the potential racial bias in prosecutors’ initial decisions on whether to charge someone.

The promise of NLP may also be of particular relevance to support legal actors’ knowledge of jurisprudence. Legal search engines already compile jurisprudence and identify decisions that are similar to the one at hand; decisions that apply similar laws and regulations; or decisions with similar case patterns, among other characteristics. Thus, these tools bring opportunities to improve the quality and consistency of legal arguments and judicial decisions, as well as to improve the training of lawyers, judges and prosecutors. Summarization tools may also be able to extract patterns of interest, reducing the amount of work spent on inputting case information into case management systems. Even further, NLP may be able to automatize basic judicial decisions, such as those that only require human revision of documents. For instance, according to a report submitted to the Administrative Conference of the United States, NLP is already being used to improve the accuracy and efficiency of formal adjudication in the United States (Engstrom et al., 2020). A tool called Insight is used to parse text in draft decisions to flag potential errors. The tool identifies weaknesses in draft opinions that are suggestive of policy noncompliance or internal inconsistencies in the decision. Thus, it aims to ensure that adjudicators properly go through the analysis required by regulations.

## 4 Future Directions

In this paper, we discuss how the data revolution in justice systems may bring ample opportunities for policymakers and researchers alike to improve the justice sector and identify the mechanisms through which justice contributes to development outcomes.

The following section proposes a way forward for researchers and policymakers to 1) expand the empirical evidence regarding the role of justice in development and 2) leverage data for better judiciaries.

## 4.1 New Avenues for Research

Better empirical evidence should fill in the gap in academic literature regarding both how to improve judiciaries as well as the mechanisms through which better judiciaries may influence development outcomes.

Most research is concentrated on the efficiency of and access to the judiciary, rather than on its quality or integrity. Reducing legal uncertainty may be an additional mechanism through which justice could contribute to development outcomes, even though this has been understudied (Lee et al., 2022). A better understanding of the relative impact of each of these indicators would be beneficial to identify the main barriers and opportunities to improve justice. Despite numerous academic discussions on the topic, it is unclear whether trade-offs exist between greater efficiency, quality, and access to justice. For instance, it remains an open question whether the speedier resolution of cases comes at the expense of procedural defects, or whether wider access might increase case filings and lead to a slower resolution of cases. In addition, the relative importance of each metric for different legal actors may vary widely, as judges, lawyers, and litigants might have different interests and incentives. Thus, the evaluation of judicial reforms should take into consideration how key justice metrics interact and the relative importance of each of these metrics for citizens and policymakers in distinct contexts.

The closing of courtrooms during the COVID-19 pandemic has highlighted the importance of understanding how to leverage technology well. Technological applications should be subject to rigorous testing and evaluation to understand how they affect key justice metrics. Researchers should leverage NLP methods to assess the impact of automatizing the revision of judicial decisions, improve legal training, and address judicial biases. In addition, given the extent of the global justice gap, the capacity of these innovations to bring the judiciary closer to citizens is worthy of future research and evaluation.

The impact of the rule of law on conflict and violence deserves particular attention in future research, a subject which is at once complex and essential to addressing instability in fragile, conflict-prone and violent (FCV) settings. Given the rise in violent conflict since 2010 and the expectation for FCV countries to host up to two-thirds of the world's extreme poor by 2030 (World Bank, 2022), further empirical evidence evaluating the role of the rule of law and the judiciary in these settings becomes of paramount importance to build safer and more prosperous societies. Furthermore, more empirical evidence is also needed to better understand the political economy of justice reform, both in fragile and stable settings. Implementing judicial reforms often requires navigating complex political and economic factors, where there are vested interests in the judiciary. For instance, the judiciary may be subject to political interference, which can undermine the effectiveness of reform efforts. Identifying the conditions under which judicial reforms succeed in practice, or under which governments weaken the judiciary, would also be valuable in developing effective strategies for promoting the rule of law and building more stable and prosperous societies.

Future research should evaluate the relationship between formal and informal

dispute resolution mechanisms and their comparative advantages in providing effective resolutions that contribute to stability and long-term peace. The role that unresolved grievances and inaccessible justice systems may play in future conflict also deserves further attention. In contexts with a weak rule of law or a large presence of organized crime, the effect of strengthening the judiciary and its impact on peace, economic outcomes or corruption still needs to be empirically studied. Moreover, further research is needed to better understand how judiciaries affect the relationships between ethnicities. Ethnic nationalism being “the leading source of group cohesion and intergroup civil conflict” (Blattman and Miguel, 2010), a better judicial system could theoretically prove very relevant in reducing ethnic tensions and deterring conflict, yet there is insufficient evidence on the subject.

A new avenue of research should evaluate the potential of a stronger judiciary to reduce corruption. To what extent can a stronger judiciary hold accountable corrupt politicians and government officials? What interventions could achieve greater judicial independence—and would they lower corruption in society? What is the specific impact of a corrupt judiciary on development outcomes such as poverty, violence and overall corruption? These questions mostly remain unanswered. Big data may offer new ways to evaluate the independence or quality of the judiciary, for example, by identifying outlier decisions in comparison to similar decisions based on fact patterns and legal precedent. Empirical research on these topics may become promising in the fight against corruption.

For empirical evidence to truly contribute to development, greater diversity in the countries and contexts of study is essential. Our review shows that few countries—mostly in South Asia, Europe, and North America—concentrate most research on justice. There is less research on the role of justice in Sub-Saharan and North Africa, Latin America, the Middle East, and East and Southeast Asia. Extending the geographical presence of research is important for a variety of reasons. On the research side, it provides greater external validity to ongoing research and brings new perspectives, contexts and challenges into consideration. On the policy side, these regions tend to concentrate a significant number of the poor as well as the conflict-afflicted areas.

Challenges related to the unreliability and unavailability of data pose a conundrum: countries that stand to gain the most from data-driven technologies lack the resources and data infrastructure to take advantage of them. However, with sufficient training, support, and testing of new innovations to collect and analyze data there is the capacity to overcome such challenges. Addressing these will be essential to ensuring that the promise of technological innovations and data-driven decision-making reach those who need it the most.

## 4.2 Data for Better Judiciaries

To exploit the potential of the data revolution, countries should start by creating a data ecosystem that relates different sources of data to each other, thereby improving the universe of analyses that becomes possible. This requires planning



ahead and making an up-front investment in data infrastructure whose benefits may not be realized until the long term. Realizing the promise of data requires another essential asset: human capital. In the legal field, engineers generally lack domain knowledge whereas lawyers tend to lack the technical skills to wrangle and analyze data. Thus, staff training and hiring may be essential to ensuring that data is used responsibly to develop effective innovations. It is through investment in human capital that countries may leverage the promise of data in justice systems for the greater good.

Once the appropriate data ecosystem and the human capital are established, we propose the following paths for the use of data, each of which is explored in greater detail below: 1) access to e-justice for citizens; 2) data for better court performance; and 3) data for better knowledge.

First, the data revolution can bring better access to e-justice for citizens and companies. One of the most salient problems facing legal systems around the world is the lack of access to formal justice mechanisms. Thus, identifying ways to make justice more accessible for vulnerable populations is on top of the policy agenda (Steven et al., 2020). Data may be used to identify gaps in access to justice, for example, by comparing legal need surveys to the actual disputes that are brought to courts. This may help policymakers better understand if there are specific disputes that elude the justice system, where better access to legal means of resolving disputes might be the main gap. For instance, if surveys indicate that a district is deeply affected by domestic violence, but few cases of domestic violence are resolved in courts, this will provide evidence of a gap in domestic violence cases being brought to courts. Data systems may also be used to inform citizens of their prospective outcomes in mediation as compared to courts, allowing them to decide the most appropriate mechanism to resolve their dispute (Sadka et al., 2017). Furthermore, data and technology may create new avenues to access justice. For instance, in response to the COVID-19 pandemic, the Chilean judiciary developed a digital platform, Conecta, which allows citizens to access courts' services through a video call, chat, or WhatsApp. By bringing different data sources together in one platform, Conecta allows courts to effectively respond to citizens' queries, share updates on their cases, and provide a more efficient service to litigants. Going further, a comprehensive data infrastructure may introduce the ability to build chatbots that improve institutional capacity to respond to citizens' queries and demands.

In addition to this example, other tools such as e-arbitration or electronic hearings may represent important ways in which data and technology can bring justice closer to citizens and improve the effectiveness of the legal system while enhancing people's trust in institutions. For instance, various countries have introduced virtual courts to resolve fast or urgent matters. First, Canada introduced the Civil Resolution Tribunal (CRT)—an online tribunal that allows online dispute resolution, mostly related to small claims, property disputes, and traffic accidents. Other countries such as India, Pakistan, and South Africa rapidly introduced virtual courts to resolve urgent matters as a result of the COVID-19 pandemic. These technologies filled in a crucial gap in access to justice as courts closed, yet they may also bring risks to effective dispute res-

olution going forward. For example, a study in the United States finds that the switch to video in bail hearings in Cook County led to an average increase of 51% in overall bail amounts (Diamond et al., 2010). A rigorous evaluation of the trade-offs between faster and—potentially—more accessible justice, on the one hand, and the risks associated with online communication, cyber-security, and disparities in access, on the other, should be undertaken before adopting these technologies going forward.

Second, the data revolution may improve court performance. Data has the promise of improving the efficiency, fairness, and effectiveness of justice systems. It may be used to identify the main bottlenecks of courts, i.e., the reasons why cases get backlogged or why adjournments take place (Chemin et al., 2022). Data systems have the potential to facilitate a better deployment of resources by diagnosing and forecasting future needs in courts and litigants’ needs. In addition to providing diagnoses, there are data-driven solutions that may improve court performance. An example is dashboard management tools and nudges to court actors. These apps allow for a wide range of options: from providing personalized feedback on best and worst-performing metrics, to motivating better performance via behavioral nudges (Cooke et al., 2018). These applications can be enhanced by bringing AI to act as a support tool for court actors. AI can help predict future congestion in courts, of particular importance due to the pandemic’s effect on adjournments; detect early and prioritize cases at high risk of gender-based violence; or potentially help predict recidivism (Kleinberg et al., 2018). These innovations may come with risks and trade-offs that need to be evaluated and calibrated, yet the promise of the applications makes them worthy of a proper assessment. Finally, data may also be used to identify and address judicial biases and inconsistencies, including gender and racial discrimination or snap judgments, among others. We have presented in this paper an 8-step approach by which data integration may help identify such biases.

Third, the data revolution may be used to create better knowledge within and across justice systems. Data has the promise to improve the quality and accessibility of judicial decisions and promote best practices among legal actors. As a diagnostic tool, data may help evaluate the text of judicial decisions, identify inconsistencies in writings, and create tools for better training of judges. Specific innovations may include, for example, legal search engines that allow judges and court actors to find cases with similar fact patterns or legal citations, thus speeding up the process—and ideally the quality—of legal decisions. This data may also be used to train judges based on the history of their past decisions in comparison to their peers. In addition, data may not only help legal actors develop a knowledge base for their own decisions, but may also help to create and share knowledge with peers. For example, the sharing of advice in a systematic manner across mediators or judges may create a set of best practices that others in the profession can use to improve the quality and efficiency of their services. This knowledge can scale up beyond cases in a country and actually refer to laws across countries. The data revolution may bring the possibility to identify best legal practices or “missing laws” in any specific country by developing an empirically-based method to analyze and compare existing regulations to

enhance a country's legal system.

Overall, by collecting data, measuring indicators, evaluating performance and testing innovations, judiciaries around the world can improve the efficiency, access to and quality of justice. Data systems and technological innovations bring the opportunity to improve the functioning of justice systems while also evaluating the impact of justice reforms. Such opportunities should not be overlooked, particularly in developing countries, given the crucial role that justice and legal institutions play in people's lives and the prosperity of nations.

# Appendices

## A Summary of the Literature Review

The following table summarizes the findings from the literature review. The review has focused on empirical papers that aim to demonstrate a causal relation between the justice system and development outcomes. The review primarily includes experimental or quasi-experimental studies that connect the judiciary with key development outcomes such as economic growth, peace and stability, and integrity and trust in institutions. The specific methods used in each paper are summarized in the following table. This summary shows that most papers rely on quasi-experimental methods, while RCTs are more commonly used for legal aid interventions. Non-causal work is only included when necessary to provide context on potential mechanisms that have not been sufficiently studied. Additionally, a brief revision of the macro literature is included to better understand the evolution of the field over the past decades. The review primarily focuses on developing countries, but also includes literature on developed countries to complement the lessons learnt on economic development more broadly.

*Notes:* In the following table, FE refers to “fixed effects”, IV refers to “instrumental variables”, DiD refers to “differences-in-differences”, RD refers to “regression discontinuity”, Review refers to a literature review, and RCT refers to “randomized controlled trial”.

Development Goals	Impact Areas	Source (Judicial Improvements)	Specific Results (Evidence on Outcomes and Benefits)	Countries	Authors (Year of Pub), Methods
<i>Economic Growth</i>	Investment and firm growth	Improved contract enforcement through: <ul style="list-style-type: none"> <li>- Faster adjudication and backlog reduction</li> <li>- Simplified judicial procedures</li> <li>- Increased out-of-court settlements</li> <li>- Improved enforcement of regulation</li> <li>- Specialized tribunals expanding the presence of the justice system</li> </ul>	<ul style="list-style-type: none"> <li>- Boost firm-to-firm trade</li> <li>- Align production and investment incentives</li> <li>- Prevents switching to more costly suppliers or less efficient technology to avoid contracting frictions</li> <li>- Enhance firm-level outputs</li> <li>- Encourage entrepreneurship</li> <li>- Reduce labor misallocation (from protection against predation to production)</li> </ul>	India Brazil Pakistan Mexico Senegal	Ahsan (2013), FE+IV+Matching Amirapu (2021), Panel+FE Boehm and Oberfield (2020), FE+IV Lichand and Soares (2014), IV Chemin (2009, 2012), DiD Laeven and Woodruff (2007), IV Kondylis and Stein (2021), DiD
	Credit markets	Improvements in: <ul style="list-style-type: none"> <li>- Enforcing credit and loan recovery</li> <li>- Speedy adjudication and backlog reduction</li> <li>- Quality of court decisions (resulting in lower appeal rates)</li> <li>- Adjudication by state courts instead of tribal courts</li> <li>- Reducing legal uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>- Prevention of moral hazard through enforcement of credit contracts</li> <li>- Increased access to credit markets</li> <li>- Better loan recovery, as it reduces buyers' incentives to default on their contractual obligations</li> <li>- Greater lending and competition among lenders</li> <li>- Potential heterogeneous effects across lenders by wealth group, especially if the supply of credit is inelastic</li> <li>- Decreased idiosyncratic risk for firm owners</li> <li>- Maximized benefits from financial reforms for firms</li> </ul>	Argentina Italy Brazil India Russia South Korea Japan	Cristini et al. (2001), Panel+FE Jappelli et al. (2005), Panel+FE Schiantarelli et al. (2016), Panel+FE+IV Ponticelli and Alencar (2016), IV Chemin (2009), DiD Brown et.al (2017), Panel+FE Laeven and Majnoni (2005), Panel+FE Shvets (2013), Panel+FE Visaria (2009), DiD, Lilienfeld-Toal et.al (2012), Panel+DiD Lee et.al (2022), Panel+FE Horioka and Sekita (2011), Panel+FE
	Property rights and protection for vulnerable populations	<ul style="list-style-type: none"> <li>- Protection for minorities facing bias in customary systems</li> <li>- Legal aid to protect land rights for farmers and for those facing eviction</li> <li>- Access to adjudicating institutions for women in small commercial disputes</li> <li>- Authority to state courts rather than tribal courts, reducing</li> </ul>	<ul style="list-style-type: none"> <li>- Enhance food security and protection</li> <li>- Strengthen property rights and incentivize investment</li> <li>- Defend housing rights against eviction</li> <li>- Boost women's economic activity and bargaining power</li> <li>- Reduces uncertainty over legal enforcement, which boosts long-run economic growth</li> </ul>	Kenya Liberia United States Mexico Zambia	Aberra and Chemin (2021), RCT Sandefur and Siddiqi (2013), RCT Seron et al. (2001), RCT Greiner et al. (2013), RCT Sadka et al. (2017), RCT Brown et.al (2017), Panel Ashraf et al. (2022), RCT

Development Goals	Impact Areas	Source (Judicial Improvements)	Specific Results (Evidence on Outcomes and Benefits)	Countries	Authors (Year of Pub), Methods
<i>Violence and Conflict Deterrence</i>	Conflict and post-conflict disputes	<ul style="list-style-type: none"> <li>- ADR (Alternative Dispute Resolution) awareness campaigns</li> <li>- Efficient, less corrupt judicial institutions capable of investigating killings</li> </ul>	<ul style="list-style-type: none"> <li>- Better resolution of land disputes</li> <li>- Reduced violence in dispute resolution</li> <li>- Accountability for the military and other non-state actors</li> </ul>	Liberia Colombia	Blattman et al. (2014), RCT Acemoglu et al. (2022), Panel+FE
	Rights of minorities and women	<ul style="list-style-type: none"> <li>- Mediation, legal aid clinics for disadvantaged women, and Women Justice Centers</li> <li>- Free legal aid for detainees, community police officers (including female officers)</li> <li>- Enforcement of rights, protection against retaliation, and strengthened female property laws</li> <li>- Trust-building in formal institutions and access to justice</li> </ul>	<ul style="list-style-type: none"> <li>- Increased reporting and reduction in domestic violence</li> <li>- Protection of economically disadvantaged women, leading to improved health and other outcomes</li> <li>- Better child support and educational outcomes for children</li> <li>- Increased trust in state institutions despite biased informal ones</li> </ul>	Ecuador Liberia Peru Papua New Guinea India	Owen and Portillo (2003) Cooper (2019), RCT Sandefur et al. (2015), RCT Kavanaugh et al. (2018), DiD Chakraborty et al. (2022), Panel+FE Sandefur et al. (2013), RCT

Development Goals	Impact Areas	Source (Judicial Improvements)	Specific Results (Evidence on Outcomes and Benefits)	Countries	Authors (Year of Pub), Methods
<i>Violence and Conflict Deterrence</i>	Lower crime and recidivism	Judicial decisions and improvements in quality such as: - Increasing non-carceral punishments - Replacing short prison/pre-trial detention with electronic monitoring - Drug and specialized courts with streamlined processes and inclusion of non-legal expertise (e. g., reconciliation and mental health support) - Providing rehabilitation certificates - Judicial capacity (experience and productivity of judges)	- Crime deterrence (mixed evidence) - Crime desistance - Fewer violent crimes due to higher arrests with warrant - Improved educational outcomes and labor opportunities for offenders - Reduced individuals' criminal and dishonest behavior; increase regard for rule of law	United States Germany Argentina France Denmark Brazil	Chalfin and McCrary (2017), Review Nagin (2013), Review Doleac and Hansen (2021), Review Helland and Tabarrok (2007), ~IV Drago et al. (2009), ~IV Hansen (2015), RD Gehrsitz (2017), RD Di Tella and Schargrodsky (2013), IV Henneguelle et al. (2016), IV Larsen (2017), RD Bushway and Owens (2013), DiD Monnery (2016), IV Prins et al. (2015), RCT Leasure and Andersen (2016), RCT Mocan et al. (2020), IV cross-country Fazel and Wolf (2015), Review Ferraz and Schiavon (2022), RD
<i>Integrity and Trust in Institutions</i>	Trust in the state	- Information on the improved efficiency of courts - Impartial justice systems & de facto judicial independence - A robust system of checks and balances - Effective and impartial judicial systems and citizens' recognition of the law as legitimate	- Higher citizen trust in the state - Greater willingness to use state courts - Reliance on formal instead of informal institutions - Reduction in terrorist activities	Pakistan EU	Acemoglu et al. (2020), RCT Choi (2010) Gutmann and Voigt (2020)

Development Goals	Impact Areas	Source (Judicial Improvements)	Specific Results (Evidence on Outcomes and Benefits)	Countries	Authors (Year of Pub), Methods
<i>Integrity and Trust in Institutions</i>	Less corruption	<ul style="list-style-type: none"> <li>- Independence and professionalism in the judiciary</li> <li>- Judge selection procedure (by peer judges instead of Presidential; elected instead of appointed)</li> <li>- Greater state presence of the judiciary</li> <li>- De facto judicial independence (not only de jure)</li> <li>- Anti-corruption campaign for the judiciary</li> </ul>	<ul style="list-style-type: none"> <li>- Higher prosecution and conviction of corruption</li> <li>- Lower rent extraction</li> <li>- Higher quality of judicial decisions and rulings in favor of the government</li> <li>- Higher investment, labor, and productivity</li> </ul>	United States Brazil China	Glaeser and Goldin (2006) Alt and Lassen (2008), OLS +IV/FE Litschig and Zamboni (2015), IV Ferraz and Finan (2011), RD Zhang (2022), DiD



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