

Public Procurement in Law and Practice[†]

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We examine a new dataset of public procurement laws, practice, and outcomes in 187 countries. We measure regulation as restrictions on the discretion of the procuring entities. We find that laws and practice are highly correlated with each other across countries, and better practice is correlated with better outcomes, but laws themselves are not correlated with outcomes. A closer look shows that stricter laws correlate with improved outcomes, but only in countries with low public sector capacity. We present a model of procurement in which both regulatory rules and public sector capacity determine procurement outcomes. In the model, regulation is effective in countries with low public sector capacity, but not in countries with high capacity because it inhibits the socially optimal exercise of discretion to exclude low quality bidders. (JEL D73, H11, H57, K12, K42, O17)

The world spent \$11 trillion on public procurement in 2019, amounting to 12 percent of global GDP. This percentage is even higher in richer countries. Procurement is a primary channel through which public dollars pass into private hands, and as such is particularly vulnerable to misconduct. Private contractors have strong incentives to bribe public officials to increase payments, to cut out competitors, or to accept inferior quality. The challenges of renegotiation and nonverifiable quality that appear in private contracting also bedevil public procurement (Hart and Moore 1988; Hart, Shleifer, and Vishny 1997). But unlike many large private

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buyers, public agencies often lack the incentives and administrative capacity to handle these challenges.

The vulnerability of public buyers to private subversion has led every country to restrict the discretion of procuring entities in what they buy and pay. But while the regulation of the private sector empowers public officials and enables them to extract bribes in exchange for regulatory relief (Djankov et al. 2003a), the regulation of government constrains public officials. Public procurement regulations reduce the discretion of buyers, typically with the intent of reducing corruption. But what do they really accomplish?

We provide an overview of procurement laws and practice in 187 countries. Data was collected through expert surveys. Respondents in each country (typically three to six professionals ranging from public procurement lawyers to road construction companies and procuring entities) are presented with a hypothetical \$2.5 million road maintenance project and asked about the rules that would govern its procurement. Based on their answers, we construct measures of laws governing procurement, which cover transparency, competition, exclusion of bidders, and integrity of contracts. Respondents also describe whether and how procurement practice differs from the laws, so we create corresponding measures of regulatory practice. In some instances, practice does not follow the requirements of the law; in others, procurement entities go further than the requirements of the law, for instance with transparency. We also construct measures of procurement outcomes, including assessments of process Integrity (including corruption, favoritism, collusion, and absence of competition) and product Quality (including time delays, cost overruns, and low product quality). In Section I, we describe the survey and how we aggregate the answers to create indices of regulation in law and practice, and of Integrity and Quality of outcomes.

Section II presents several novel facts in these data. We find that the strictness of laws governing procurement falls with GDP per capita, but the strictness of regulatory practice increases. Nonetheless, the indices of laws and practice are highly correlated with each other. With respect to outcomes, we find, not surprisingly, that richer and higher public sector capacity countries have higher Integrity and Quality of procurement. The survey measures are also correlated with two external measures of road quality: the World Economic Forum's (WEF 2019) survey question on the quality of roads in a country, and the average night driving speeds between the north and south end of the three largest cities in each country calculated using Google Maps. These measures of road quality also rise with income.

We further document that stricter procurement practice is strongly positively correlated with both Integrity and Quality. Stricter laws, however, are not. This evidence raises a puzzle: laws predict practice; practice predicts outcomes; but laws do not predict outcomes. To shed light on this puzzle, we establish two further facts. First, we show that stricter laws are positively associated with better outcomes in poorer and lower public sector capacity (PSC) countries, but negatively associated with better outcomes in richer and higher PSC ones. Second, we show that laws tend to be stricter than practice in lower PSC countries, but less strict than practice in higher PSC ones.

Motivated by these facts, Section III proposes a model of regulation of public procurement. The model considers a simple infrastructure project in which a procuring

entity (PE) faces two bidders with different costs and quality levels. One bidder is an *insider*, who can engage in corrupt bargaining with the PE; the other is an *outsider*, who is bound by an external constraint, such as the US Foreign Corrupt Practice Act, not to bribe. We compare two institutional settings: regulation and discretion. Under regulation, the PE must run a second price auction and accept the low bid regardless of the quality level. Under discretion, the PE can exclude a bidder based on alleged lower quality. Because quality is not externally verifiable, the PE can exclude the higher-quality outsider in exchange for a bribe from the insider.

We assume that the PE maximizes a weighted average of social welfare and bribes, and that the weight the PE places on social welfare rises with PSC. We also assume that corruption is costlier in higher PSC countries. In a low PSC country, it may be easy to bribe with cash. In a higher PSC country, bribes may take the form of favors valued by the PE at less than their cost.

In this model, the advantage of discretion by law is that it enables the PE to eliminate low-quality bidders in practice. The advantage of limiting discretion by law is that doing so prevents the PE in practice from excluding a high-quality outsider in exchange for a bribe from the insider. When PSC is high, discretion dominates regulation, because the PE excludes only low-quality bidders from the auction. When PSC is low, regulation dominates discretion, because discretion in law leads to corruption in practice.

In Section IV, we summarize the predictions of the model, and connect them back to the empirical findings in Section II. We use human capital as our proxy for PSC, but our results are very similar if we use more direct measures of government effectiveness and quality. The model implies that practice is more restrictive than laws in high PSC countries, and vice versa in low PSC ones, consistent with the evidence. The model also explains the key finding that laws are positively correlated with outcomes in low PSC countries and negatively in high PSC ones. Low PSC countries lack the administrative capacity to benefit from discretion in procurement.

Section V concludes. Procuring entities are typically highly regulated, but these regulations are generally not associated with improvements in Integrity and Quality. This presents a puzzle because laws predict practice and practice predicts outcomes, but laws do not predict outcomes. The resolution of this puzzle is that the overall relationship between laws and outcomes misses a critical heterogeneity. Constraints on bureaucratic freedom improve outcomes when PSC is low, and harm outcomes when PSC is high. Contrary to a standard view that laws and PSC are complements because an effective public sector is needed to enforce laws, we show in the case of procurement that public sector capacity and the regulation of government are substitutes. The regulation of procurement helps, but only in poor countries where discretion leads to corruption.

Literature Review.—This paper contributes to several strands of a large literature on government procurement and performance. Public procurement has been found to suffer from bid rigging (Porter and Zona 1993; Conley and Decarolis 2016), cost overruns (Flyvbjerg, Skamris, and Buhl 2003), favoritism toward politically connected bidders (Burgess et al. 2015; Mironov and Zhuravskaya 2016; Baranek and Titl 2020), lack of transparency (Coviello and Gagliarducci 2014), collusion between politicians and firms (Coviello and Gagliarducci 2017), and simply bad

choices (Bandiera, Prat, and Valletti 2009). Corruption has also been found to be common in procurement (Di Tella and Schargrodsky 2003; Olken 2007; Collier and Kirchberger 2016; Colonnelli and Prem 2020; Lichand and Fernandes 2019), particularly when contracts are renegotiated (Decarolis 2014; Decarolis and Palumbo 2015; Campos et al. 2019). Our data cover the prevalence of cost overruns, favoritism, collusion, and corruption in procurement.

The trade-off between rules and discretion has been central to research on procurement. Kelman (1990) stresses the costs of rigid regulations in US government procurement and makes the case for discretion. Recently, research on the potential benefits of discretion has progressed rapidly (Spagnolo 2012; Duflo et al. 2018; Coviello, Guglielmo, and Spagnolo 2018; Rasul and Rogger 2018; Rasul, Rogger, and Williams 2019; Best et al. 2019; Baltrunaite et al. 2020; Bandiera et al. 2020; Decarolis, Spagnolo, and Pacini 2020; Decarolis et al. 2020). We follow these papers in identifying the benefits of both bureaucratic discretion and regulation. We do not have the compelling sources of exogenous variation found in other studies, but our geographic and theoretical focus is broader, as we cover 187 countries and the complete path of the procurement process.

We also follow the literature that connects public sector capacity with education across countries (Barro 1999; La Porta et al. 1999; Milligan, Moretti, and Oreopoulos 2004; Glaeser, Ponzetto, and Shleifer 2007; Pande 2011; Botero, Ponce, and Shleifer 2013; Decarolis et al. 2019). The interaction between the quality of public employees and the benefits of regulating them is a central theme of our paper.

Our paper is also linked to research on regulation around the world (Djankov et al. 2002, 2003a,b, 2008a,b; Botero et al. 2004). We show that the factors that shape the regulation of government are different from those that shape the regulation of the private sector.

Last, we contribute to the literature on corruption. Theoretical studies have focused on determinants of corrupt behavior (Banfield 1975; Shleifer and Vishny 1993; Banerjee 1997). Empirical studies have focused on the magnitude of corruption (Svensson 2003; Sequeira and Djankov 2014; Olken et al. 2018), political connections as channels for corruption (Fisman 2001; Faccio 2006), transparency of politicians' incomes as a barrier to corruption (Djankov et al. 2010; Banerjee, Hanna, and Mullainathan 2012), or administrative design to reduce bribes (Bertrand et al. 2007; Duflo, Hanna, and Ryan 2012). We show that corruption is reduced by regulatory constraints on the behavior of procuring entities both by law and in practice.

I. Data

Case Study.—The analysis in this paper is based on data collected through expert surveys on the regulation of public procurement in 187 countries in 2019. In this section, we describe the survey, its respondents, and the variables we construct. The survey is based on a fictitious case study of a government agency procuring bids for road resurfacing work. The type of work was determined through a World Bank study of 1,800 road-related projects in 89 countries over two decades, the Road Cost Knowledge System (ROCKS) (Bosio et al. 2018). We use the ROCKS database to describe our case facts.

The survey respondents are presented with detailed assumptions on the contract, the road, the procuring entity, the bidder, and the procurement process. The contract entails the resurfacing of 20 km of a two-lane flat road with an asphalt overlay of 40 to 59 mm (or its most common equivalent in the country). The road connects the economy's largest business city to another city in the same state, region, or province and is neither a highway nor operated under concession. The value of the contract is \$2,500,000. Online Appendix A describes how this value was calculated.

For our 187 countries, the hypothetical case we present is subject to the regulations we codify for public works contracts in the range of \$250,000 to \$5,000,000 with NO exceptions. The regulations in fact are applicable for all contract sizes in 123 sample countries. In 16 countries, (15 high income and 1 middle-income), some stricter rules apply for larger-size contracts (above \$5,000,000). In online Appendix A, we show that the relationship between laws and outcomes remains insignificant without these countries (Figures A3 and A4). In 29 percent of the sample (54 countries) no rules or simpler rules apply for small (below \$250,000) contracts.

For 82 countries in the sample, we also collected data on the actual value of road resurfacing and found that the median value of a two-lane twenty-kilometer road resurfacing project is \$4,698,659. While there is a wide distribution, road resurfacing tends to be more expensive in low-income countries. None of these 82 countries fall into the lower or upper limit of countries which by law have different rules than the ones coded in our case study. In other words, the coded law applies to all countries for our case facts. Online Appendix A further details this analysis.

The PE choosing the contractor for this project is a government agency, typically the ministry of transportation, and is the sole financier of the work. To make the case study comparable across countries, the contract is assumed to be tendered through an open, unrestricted, and competitive public call for tenders. The process ends with the contract awarded to "BidCo," whose bid satisfies all technical and administrative criteria. BidCo is a privately, domestically owned medium-sized limited liability company (or its most common legal equivalent) that operates in the economy's largest business city, is in good standing with all relevant authorities, and has all the licenses and permits required to operate.

The hypothetical contract abstracts from a number of issues important in public procurement. It focuses exclusively on procurement of works and excludes the procurement of services and goods. To exclude roads operated under concession, the road cannot be a highway. The road cannot be a street within the boundaries of a city because many cities around the world would not conduct open tendering for such a contract but rather do it in-house or through direct award. Our data underestimates the complexity of public procurement by assuming that the work is procured through an open, competitive tendering procedure in which any qualified company can submit an economic offer. All other types of procurement (e.g., direct award, framework agreements, negotiated procedures, restricted tendering) are excluded by design. BidCo has already worked with the PE and participated in similar bidding processes in the past five years. This assumption eliminates the preregistration process common in many countries.

The Questionnaire.—The data on the road resurfacing case study was collected in two rounds, in 2018 and 2019, through questionnaires disseminated by the World

Bank's team to 191 countries. Four countries (Antigua and Barbuda, Libya, the Maldives, and Syria) did not complete an open tendering procurement procedure for road work in the past five years and are excluded from the analysis. The final sample comprises three groups of 58 high-income, 53 upper-middle-income, and 76 low- and lower-middle-income countries.

The questionnaire was completed by more than 1,200 professionals involved in the procurement activity, including lawyers, construction, and engineering firms, and procuring entities. In each country, we only consulted with professionals who had been involved in procurement of works contracts with the relevant PE over the previous 12 months. Online Appendix Figure A1 shows the distribution of countries by number of experts. Whenever possible, we compared answers from people in the same country and collected all the pertinent legal documents that the respondents identified. Lawyers answered primarily questions related to the legal framework. Construction and engineering firms answered questions about practice, defined as the actual application of public procurement regulation. These experts were also essential for us to understand phases of the project in which lawyers are less involved (e.g., quality control, inspections, and payments). PEs reported on both laws and practice. The World Bank team then contacted different respondents in a country to reconcile their answers, which sometimes differed because of misunderstandings. For numeric answers, we take the median response.

The questionnaire had four parts, following the main chronological stages of the typical public procurement process: prebidding, bidding, execution, and payment. In each part, respondents were presented with four types of requests: (i) indicate which rules regulate each stage of public procurement; (ii) outline the procedures that would be followed in the award and execution of a contract for the resurfacing of a flat two-lane road; (iii) indicate how long each procedure would take; and (iv) answer multiple-choice questions on the frequency of certain occurrences in public procurement, such as collusion or bribery.

The questionnaire is organized both chronologically, to facilitate the respondents' thinking about the public procurement process, and around the following four themes (Table 1): (i) transparency: the level of public availability of key documents; (ii) competition: what rules are in place to broaden participation in the tendering process; (iii) limits to exclusion: whether there are rules in place making it more difficult for the PE to exclude bidders without justifying the exclusion or publishing the reasons; and (iv) the integrity of the contract: events that may take place during the life of the contract, such as payment, the ability to add subcontractors, renegotiation after the contract is signed, and changes in project specifications. Online Appendix A describes the construction of the variables in detail, with illustrations and examples.

We ask questions about both the laws regulating procurement and actual practice. The questions about laws elicit information about each country's rules governing the process. The answers describe the ways the regulations reduce the discretion of the PE. More specifically, "laws" refers to the body of instruments (laws, acts, regulations, etc.) that regulate the entire procurement process (from needs assessment to post-tendering). We code as "laws" all legal instruments that are procurement-specific and mandatory. Guidelines are not included if they are self-imposed by the procuring entity or are for "recommended" use. Standard bidding documents and model

TABLE 1—REGULATION OF PROCUREMENT BY LAW AND IN PRACTICE

Transparency	
Law	Practice
By law, do procurement plans need to be made publicly available by the procuring entity (PE)?	In practice, are procurement plans made publicly available by the procuring entity in more than 50% of cases?
By law, do model procurement documents and materials/standard contract conditions need to be made publicly available by the PE?	In practice, are model procurement documents and materials/standard contract conditions made publicly available by the PE in more than 50% of cases?
By law, do tender notices need to be made publicly available by the PE?	In practice, are tender notices made publicly available by the PE in more than 50% of cases?
By law, do tender documents and technical specifications need to be made publicly available by the PE?	In practice, are tender documents and technical specifications made publicly available by the PE in more than 50% of cases?
By law, do notices of award/bidding results need to be made publicly available by the PE?	In practice, are notices of award/bidding results made publicly available by the PE in more than 50% of cases?
By law, does the contract need to be made publicly available by the PE?	In practice, are contracts made publicly available by the PE in more than 50% of cases?
By law, does the legal framework regulate the need to make contract renegotiations publicly available?	In practice, are the results of contract renegotiations made publicly available in more than 50% of cases?
Competition	
Law	Practice
According to the legal framework, is open tendering the default method of procurement for a contract like the one described in our case study?	In practice, is open tendering the most common method of procurement for a contract like the one described in our case study?
According to the legal framework, after the advertisement of an open tendering procedure, can the PE require bidders to participate in a prequalification process before submitting an economic offer?	In practice, does the PE avoid requiring bidders to participate in a prequalification process?
Does the legal framework prohibit dividing contracts to circumvent thresholds for open tendering?	In practice, does the PE avoid dividing contracts to circumvent thresholds for open tendering?
According to the legal framework, is there a minimum time limit between the advertisement of the tender notice and the submission deadline for an open tendering procedure like the one described in our case study?	In practice, does the PE advertise procurement opportunities long enough to maximize competition?
Does the legal framework require the procuring entity to proceed to bid opening immediately after the deadline for bid submission has been reached?	In practice, is bid opening carried out immediately?
Is there a standstill (or pause) period between public notice of award and contract signing to allow unsuccessful bidders to challenge the award decision that suspends the procurement process?	In practice, does the filing of a complaint against the award suspend the procurement process?

(Continued)

contracts are considered as “laws” when they are for mandatory use or when a departure from them would have to be justified by the procuring entity.

The questions about practice mirror those about laws to gauge their actual application. The coding of practice parallels that of laws: the less discretion the PE can exercise, the higher the practice score. As an example, the questionnaire asks whether, by law, the PE is required to publish tender notices and documents online. The corresponding questions about practice ask whether these notices and documents are indeed published. If such publication is meant to be online, the team checks whether this happens by visiting the relevant platforms or websites. Other

TABLE 1—REGULATION OF PROCUREMENT BY LAW AND IN PRACTICE (CONTINUED)

Limits to exclusion	
Law	Practice
Does the legal framework establish the minimum content of the tender notice and tender documents?	In practice, does the PE avoid defining technical specifications to benefit a specific bidder?
Is the PE required to make clarifications provided to bidders publicly available?	In practice, does the PE avoid informal meetings with individual bidders?
According to the legal framework, is price the award criterion to be used by the PE for a contract like the one described in our case study?	In practice, how often is the award decision based solely on price and not on best value for money?
Does the legal framework establish a criterion to identify abnormally low bids?	In practice, do bidders avoid submitting recklessly low bids to win the tender?
Does the legal framework define what constitutes a nonsubstantial error?	In practice, if a bidder submits a bid with a nonsubstantial error, is it given the opportunity to rectify such error before disqualification?
Integrity of contract	
Law	Practice
Is the procuring entity required to have already allocated budget to a specific project before tendering?	In an open tendering procedure, does the PE award a contract after having already set aside all the necessary funds?
Does the law regulate the selection, disclosure, and liability of subcontractors?	Does BidCo avoid employing subcontractors that were neither properly selected nor disclosed during the tender process?
By law, can additional work be procured through direct award?	In practice, is the use of direct awards to procure additional work avoided?
Does the law regulate the scope, limits, and disclosure of contract renegotiations?	Does BidCo avoid using the renegotiation process to increase the price or the scope of the project without another competitive process?
During the execution of the contract, does the legal framework establish a timeframe within which the PE must process payment once an invoice is received?	In practice, does BidCo receive payment within the timeframe established by the legal framework?
According to the legal framework, is the company entitled to claim interest on late payments if the PE does not pay within the legally established timeframe?	In practice, does BidCo receive interest on late payment?

practice questions measure the frequency of applying a particular provision in the law. For example, the questionnaire asks whether, by law, open tendering is the default method of procurement. The mirror practice question asks how often open tendering is used to procure road resurfacing work.

In our 187-country sample, 117 countries have standard documents or contract terms that are of mandatory use, which we code as part of the “laws.” Fifty-three countries have no such documents, and the remaining 17 countries have standard documents or contract terms that are not of mandatory application. Online Appendix A shows that if, for these 17 countries, we recode standard practice as mandatory, our results are robust.

The law and practice indices are sums of the four themes or subindices and are scored between 0 and 4, with higher values representing more regulation or less discretion. On the laws index, Rwanda scores highest (3.35 out of 4), followed by Cabo Verde (3.26) and Hong Kong (3.17). At the other end, Belize scores 0.31, followed by Barbados (0.48), and St. Vincent and the Grenadines (0.5). On the practice

TABLE 2—OUTCOME VARIABLES: QUALITY, INTEGRITY, AND ROAD QUALITY

Outcome variables		
Quality	Time	The time that it takes in calendar days from the moment the procuring entity decides to procure road works until the winning bidder can commence the works as well as the delays associated with contract management.
	Overruns	How often are the works delivered within the original budget?
	Project quality	How often do private sector companies execute the contract with less quality or with different technical specifications than were submitted during the tender process?
Integrity	Favoritism	How often do procuring entities circumvent public procurement rules by interpreting selection criteria in a way that favors a specific bidder?
	Bribes	How often do private sector companies informally pay public officials to circumvent public procurement rules?
	Collusion	How often do private sector companies collude with the Procuring Entity, to negate market entry to other competitors?
	No competition	How often do procuring entities use noncompetitive procurement methods instead of open tendering to restrict market entry?
Aspeed	Measures the nighttime (3am start) average travel speed (Aspeed) between the north and south end of the three largest cities in each country using Google Maps Distance Matrix API. The north point of the city is defined as 0.1 latitude north of the coordinates given for the city center; south as 0.1 latitude south of coordinates given for the city center. Highways are excluded where possible.	
Road Quality WEF	In your country, how is the quality (extensiveness and condition) of road infrastructure [1 = extremely poor—among the worst in the world; 7 = extremely good—among the best in the world]?	

index, Estonia scores highest with 3.38, followed by Slovenia (3.21) and Latvia (3.19). At the other end, South Sudan scores 0.68, followed by Venezuela (0.70) and Gambia (0.81).

The questionnaire also elicits expert opinions about outcomes. We convert these answers into two outcome variables (their construction is described in online Appendix A): Quality and Integrity (see Table 2). Quality reflects the time to completion, cost overruns, and the quality of the works. Integrity covers favoritism, bribes, collusion, and the absence of competition in procurement.¹ We code the inputs into the measures of outcomes literally, so higher scores indicate better outcomes (e.g., less corruption, fewer delays, smaller cost overruns).

The scoring of outcomes leads to an unsurprising list of worst and best countries. On quality, the worst are Venezuela, São Tomé and Príncipe, and Haiti; the best are Singapore, Switzerland, and the Republic of Korea. On integrity, Lao

¹In July 2021, the Global Transparency Institute in collaboration with the World Bank released and made publicly available a new Integrity measure based on a large sample of procurement contracts (Fazekas 2021). We describe this variable, which is similar to our own, in online Appendix A. The index measures favoritism and corruption in actual public procurement contracts. The index construction is based on a dataset of 1.2 million construction contracts awarded after the year 2000 in 171 countries. Only contracts worth \$100,000 or more are considered.

PDR, Myanmar, and Niger are the worst performers, while the best are Australia, Dominica, and Estonia. We next turn to analyzing these data.

II. Correlations in the Data

In this section we establish some key correlations in the data. In online Appendix B, we examine the robustness of these correlations in regressions with controls. In online Appendix C, we consider subindices of our indices of laws and practice. We begin by showing how our aggregate indices of laws and practice vary with per capita income (Figures 1 and 2). The evidence is clear: laws become less stringent as per capita income rises, but practice becomes more stringent. Poorer countries have tougher rules on the books; richer countries have more restrictive procurement practice. As we noted in Section I, this is not just a consequence of differential coding in rich and poor countries: even if we take the customary restrictions on PEs that do not appear in laws but in other documents, the relationship in Figure 1 holds.

Procurement laws and practice are also correlated with each other across countries:

$$Practice = \frac{0.27}{(0.06)} \cdot Laws + \frac{0.17}{(0.03)} \cdot \log(GDP) + \frac{0.07}{(0.30)}.$$

The R^2 for the 187 observations is 0.20. Both income and laws play a large role in explaining the variation of regulatory practice across countries.

Table 3 presents the correlations between Integrity and Quality of procurement, our measures of laws and practice, as well as log per capita GDP and the two external outcomes: the World Economic Forum (2019) survey measure of road quality and the average night night speeds between the north and south end of the three largest cities in each country calculated using Google Maps and avoiding highways whenever possible. The two outcomes from our data are highly correlated with each other across countries and are better in richer countries. The two external measures of road quality are also correlated with our survey measures and with log GDP. These outcomes are also correlated with the practice of procurement regulation. Both Integrity and Quality are robustly positively correlated with practice. In contrast, the correlations with the laws are weak: countries with more legal controls on PEs do not have better outcomes, and sometimes, as in the case of Integrity, Road Quality and Aspeed, have worse ones.

Figures 3 and 4 illustrate the relationship between procurement practice, Integrity, and Quality. The results are not surprising: both outcome variables improve with better practice of procurement. There is a clear benefit of stricter procurement practice evident in the data.

In contrast, Figures 5 and 6 show that the laws controlling government procurement are not correlated with either Integrity or Quality.

We can consider two alternative explanations of these correlations. The first is that laws do not matter at all, and what matters is PSC, which is reflected in the practice variable. According to this view, laws are passed to conform with international norms or treaty obligations but are then ignored completely in practice in low PSC countries. Laws may also not matter in high PSC countries if their practice goes far beyond the minimal standards enacted into law. This explanation does not account for the positive correlation (0.185) between laws and practice in the data.

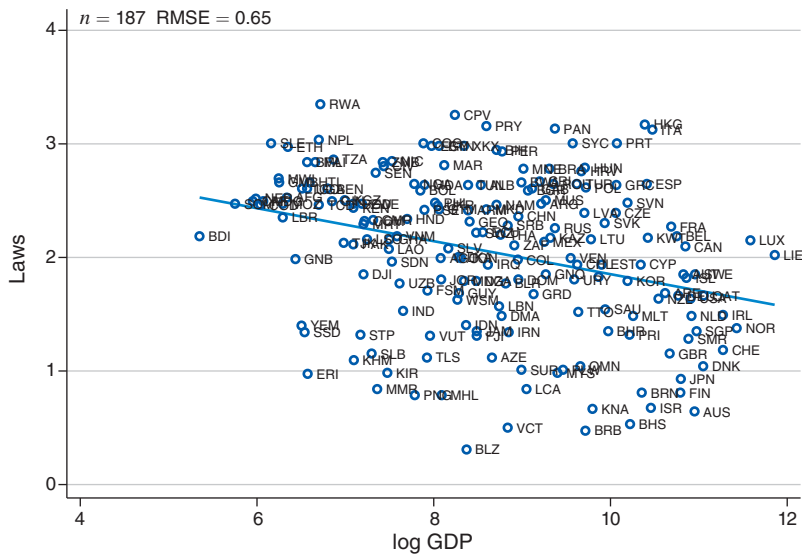


FIGURE 1. LAWS AND INCOME PER CAPITA

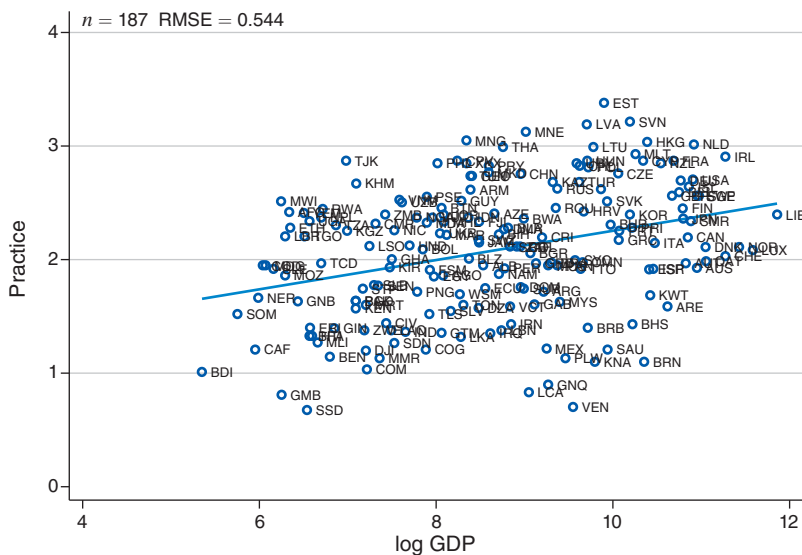


FIGURE 2. PRACTICE AND INCOME PER CAPITA

Moreover, the correlations between laws and practice are particularly strong in some subindices. For example, the correlation coefficient between transparency laws and transparency practice is 0.72, and that between competition laws and competition practice is 0.28.

The second explanation is that laws do matter, but their effect is mediated by the PSC. Public officials may use their discretion for ulterior motives in low PSC countries, but to improve outcomes in high PSC ones. Practice will then be weaker than laws in low PSC countries as bureaucrats fail to follow the laws, but stricter

TABLE 3—CORRELATIONS BETWEEN LAWS, PRACTICE, AND OUTCOMES

	Integrity	Quality	Road quality WEF	Aspeed	log GDP	Laws	Practice
Integrity	1						
Quality	0.576	1					
Road quality WEF	0.479	0.434	1				
Aspeed	0.247	0.149	0.335	1			
Log GDP	0.558	0.458	0.688	0.438	1		
Laws	−0.181	−0.068	−0.391	−0.320	−0.315	1	
Practice	0.552	0.531	0.142	0.109	0.332	0.185	1

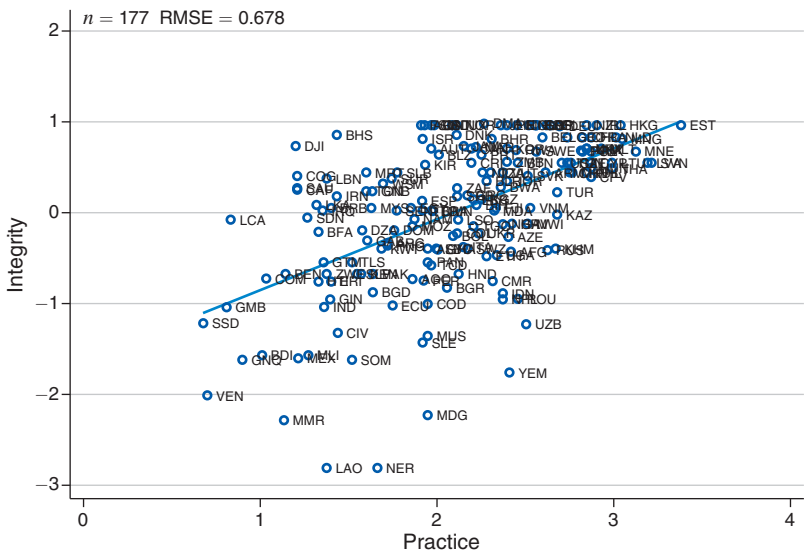


FIGURE 3. INTEGRITY AND REGULATORY PRACTICE

than laws in high PSC ones as bureaucrats exceed the minimal rules in pursuing good outcomes. This explanation is broadly consistent with earlier research on the benefits of discretion in the public sector (Rasul, Rogger, and Williams 2019; Best, Hjort, and Szakonyi 2019; Baltrunaite et al. 2020; Bandiera et al. 2020; Decarolis, Spagnolo, and Pacini 2020). It is also consistent with all the empirical findings we have reported so far. And it has two additional implications that distinguish it from the first explanation and that we can check in our data.

Figures 7 and 8 look at the critical implication that the laws that we measure display different correlations with outcomes depending on the PSC. We use education as our proxy for PSC. Education is strongly correlated with both income and other measures of PSC, and is a bit more removed from procurement than the direct measures of administrative effectiveness. Our results do not change much if we use more direct measures of PSC.

Figure 7 shows that Quality rises with stricter laws in countries with below median educational attainment, but, if anything, falls with stricter laws in countries with above median education. These findings are hard to reconcile with the hypoth-

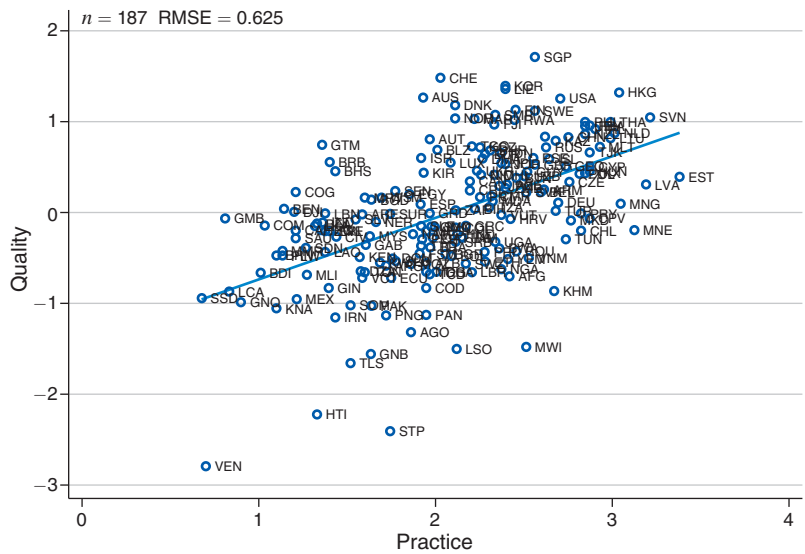


FIGURE 4. QUALITY AND REGULATORY PRACTICE

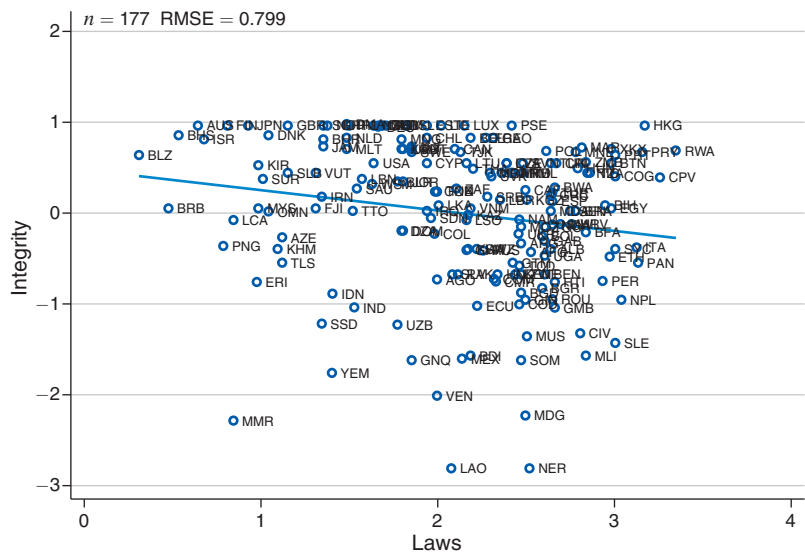


FIGURE 5. INTEGRITY AND PROCUREMENT LAWS

esis that laws just do not matter. Figure 8 shows that Integrity weakly improves with stricter laws in countries with lower educational attainment but decreases with laws in countries with higher attainment. The coefficient on laws predicting Integrity is not different between high and low human capital samples, with a *t*-statistic of -1.82 ; the coefficient on laws predicting Quality is not different between the two samples either, with a *t*-statistic of -1.44 . Online Appendix Table B1 confirms these findings in a regression format.

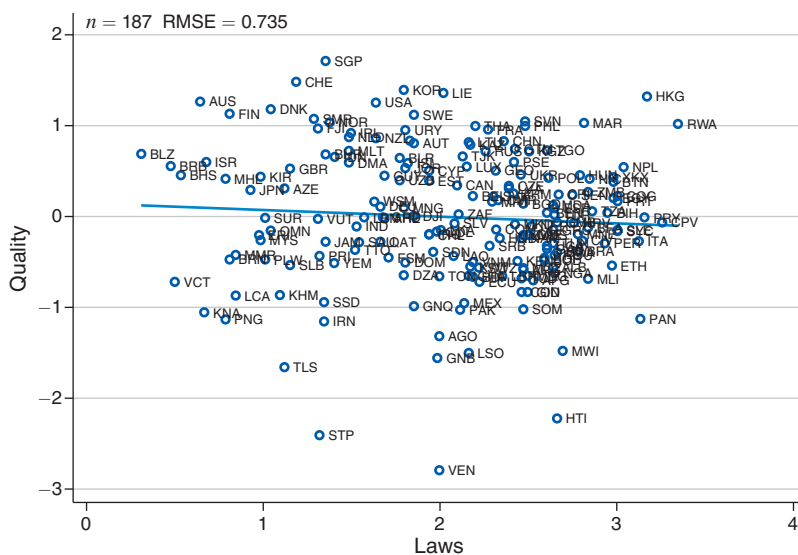


FIGURE 6. QUALITY AND PROCUREMENT LAWS

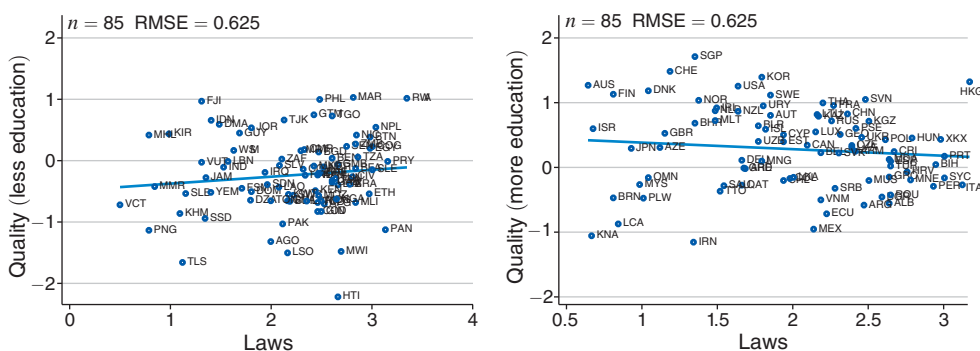


FIGURE 7. QUALITY AND LAW, BY EDUCATIONAL ATTAINMENT

A further prediction of the second explanation is that practice is weaker than laws in low PSC countries, but more restrictive in high PSC ones. The difficulty with making this comparison is that while the measures of laws and practice are not identical in the data, in most cases, the match is quite close. The law question “By law, do tender documents and technical specifications need to be made publicly available by the PE?” is matched with the practice question “In practice, are tender documents and technical specifications made publicly available by the PE?” In other cases, the match is imperfect. The question “Does the law regulate the scope, limits, and disclosure of contract renegotiations?” is paired with “Does the PE avoid using the renegotiation process to increase the price or the scope of the project without another competitive process?”

While the levels of the laws and practice variables are generally comparable, the mismatch of some variables means that our results here are only suggestive. We

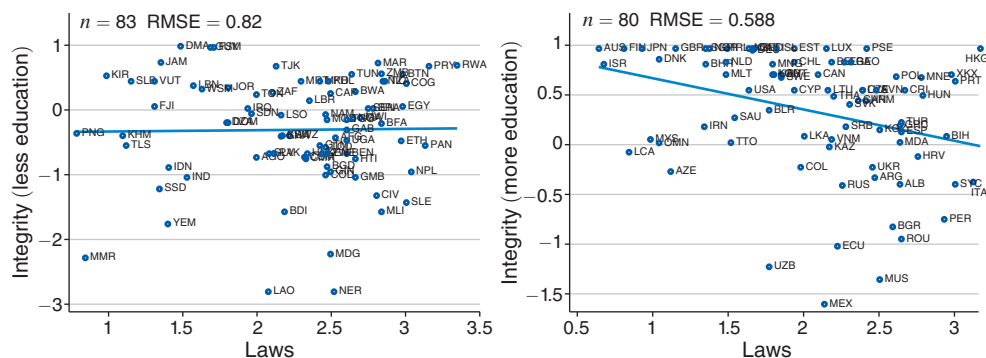


FIGURE 8. INTEGRITY AND LAW, BY EDUCATIONAL ATTAINMENT

can split the sample at the median education level and compare the mean levels of laws and practice across countries (online Appendix Table B2). The laws index in low human capital countries is 2.21 and the practice index is 1.90. The difference is highly statistically significant, with a t -statistic of 3.73. In high human capital countries, the pattern is reversed so that the mean laws index is 1.98 and the mean practice index is 2.32. Again, the difference is statistically significant, with a t -statistic of -4.42 . In our data, practice is stricter than laws in higher PSC ones, and the reverse is true in lower PSC ones.

We next turn to a model motivated by these stylized facts that tries to explain why laws predict practice and practice predict outcomes, why stricter laws do not predict better outcomes, and why the patterns look so different in high and low PSC countries.

III. A Model of Procurement

We propose a model of procurement that illustrates the impact of regulating a government procuring entity (PE) on the procurement outcomes. Like our data, the model distinguishes laws governing procurement, which we treat as restrictions on PE's discretion, from procurement practice, which need not coincide with laws.

Our model follows the structure of the scenario used in the survey. The PE must build a fixed segment of a road. There are two potential bidders, who bid in a sealed-bid second price auction. They do not collude. The road quality is initially determined solely by the identity of the winning bidder, and there is no moral hazard. We endogenize quality later.

The road can be built either by an “insider” who has cost K_I and delivers quality Q_I , or an “outsider” with cost K_O and quality Q_O . The contractor is paid by the PE and consumer surplus is defined as quality minus payment. We assume that only the insider can bribe the PE; the outsider is either bound by external rules or is not in a relationship of trust with the PE. We define the PE's objective as $\alpha(\text{quality} - \text{payment}) + \text{bribes}$ —*bribe-related penalties*. Here *bribes* are side payments made by the insider to the PE. The parameter α captures the extent to which the PE internalizes social welfare, which in turn reflects the PSC of the country.

To model *bribe-related penalties*, we assume that, with probability μ , a bribe is discovered, and then a penalty of ϑ_{PE} times the bribe is imposed on PE and a penalty of ϑ_I times the bribe is imposed on the insider. The PE's expected gain from a bribe of size X is $X(1 - \mu\vartheta_{PE})$, while the insider's cost of paying a bribe of size X is $X(1 + \mu\vartheta_I)$. We assume that $1 > \mu\vartheta_{PE}$, and use the notation $B = X(1 - \mu\vartheta_{PE})$, so that B captures the expected benefit of the bribe to the PE (which we just refer to as the bribe). We also let θ denote $(1 + \mu\vartheta_I)/(1 - \mu\vartheta_{PE})$, so that θB represents the cost of the bribe to the contractor. The value of θ rises both with the probability that bribes are detected (μ), which should be higher in higher PSC countries, and with the severity of punishment (ϑ_{PE} and ϑ_I). An alternative interpretation of θ is that for a cost of $\theta-1$ times the bribe, the bribe can be shrouded and made legally nonverifiable. The value of θ then again reflects the ability to detect and verify a bribe, which rises with PSC.

We first consider regulation of exclusion in the bidding process, a critical aspect of procurement regulation. We later examine regulation of transparency, i.e., whether the PE must inform the outsider about the auction. Transparency is different from exclusion in that in practice there can be either more or less transparency than is legally required.

While the PE must use a second price auction, we consider two alternative institutional arrangements for exclusion: regulation and discretion. We define regulation to mean that the PE is not allowed to exclude buyers from the auction. The PE is then unable to either exclude a low price bidder she knows to be low quality, or to make a side deal with the insider to exclude the outsider. With discretion, the PE may exclude either bidder because of allegedly low quality. Quality levels are known to both bidders and the PE, but are not legally verifiable. Consequently, discretion to exclude cannot be made contingent on bidder quality; nor can payment to the bidder be contingent on quality ex post.

The upside of discretion is that the PE may exclude a lower-quality bidder who would otherwise win the auction by bidding less. The downside is that the PE may choose to exclude an outsider and make a corrupt deal with the insider. We analyze the relationship between regulations and PSC, which is captured by α .

Regulation in this model is meant to capture the legal rules described in Section I, particularly the ease of exclusion. We assume that this rule binds, so the model cannot explain why in some countries exclusion is restricted by law but common in practice. The absence of regulation, or PE discretion, can lead to a divergence between rules and practice. Without regulation, the PE has the power to exclude low-quality bidders but can also use that power to exclude outsiders. When the PE chooses to exclude a higher-quality bidder, we can point to a divergence between rules and practice.

The model delivers a version of both Integrity and Quality. Corruption, which results from the PE making deals with the insider, is one component of the Integrity index. If the PE unduly favors the insider by excluding the outsider, then there is favoritism and absence of competition, which are the other two elements of Integrity. Integrity may be low even if the excluded outsider offers lower quality, because the benefits from including him may exceed the higher prices in a one-bidder auction. Quality is captured by final product quality and price, which in the data are measured as low quality and cost overruns. Low Quality manifests itself if the PE

selects the insider with poor quality. Quality is equivalent to consumer welfare in the model, defined as quality minus price. All proofs appear in online Appendix D.

We assume that there is a maximum possible payment for service C_{max} , and that $\min[Q_I, Q_O] > C_{max} > \max[K_I, K_O]$, so that it is always optimal to build and that both builders are willing to build for a fee of C_{max} . Higher PSC could also lead to a lower value of C_{max} , since more effective government bureaucrats should be able to more accurately determine a reasonable upper bound for these private costs. All parameters are common knowledge.

In a regulated second price auction with no exclusion, both bidders accurately report their costs and neither has a reason to bribe the PE. They do not benefit from knowing the bid of the other firm, and the PE cannot exclude either bidder. Since rules are obeyed, this model automatically delivers the result that regulation reduces corruption. The regulated second price auction does not, however, maximize consumer surplus, both because it ignores quality and because the winning bidder usually earns profits.

When the PE has discretion, the insider can bribe the PE either to keep him in the auction even though he delivers low quality, or to exclude the outsider. In negotiations over bribes, we assume that the PE has bargaining power β , so the Nash bargain maximizes: $(U_{BARGAIN} - U_{NO})^\beta (I_{BARGAIN} - I_{NO})^{1-\beta}$, where $U_{BARGAIN}$ and $I_{BARGAIN}$ are the PE's welfare and the insider's profits in a bargain, and U_{NO} and I_{NO} are the PE's welfare and the insider's profits if no bargain is reached. The bargain may involve a bribe from the insider to the PE, but not from the PE to the insider. Recall that we have assumed that a bribe of B costs the insider θB , with $\theta > 1$. The parameter θ captures the waste involved in noncash bribes, such as quasi-legal gifts, campaign contributions, or favors. Higher PSC entails a higher value of both θ and α . Empirically, we identify higher values of national human capital with higher values of α and θ .

At the negotiation stage, the PE can commit to exclude the outsider or include the insider in exchange for a bribe, but cannot threaten to take any action that is not in her ex post interest. If the bargaining fails, the PE optimizes her own welfare, which, with no bribe, coincides with social welfare, defined as consumer surplus. The quality gap between outsiders and insiders is denoted, $\Delta = QO - QI$. We then have the following proposition:

PROPOSITION 1: *If $K_0 < K_I$, then discretion (i) raises welfare by excluding the low-quality outsider if $\Delta < -(C_{max} - K_I)$; (ii) reduces welfare by excluding the outsider if $-(C_{max} - K_I) < \Delta < \left(\frac{1}{\alpha\theta} - 1\right)(C_{max} - K_I)$; and (iii) has no impact on welfare if $\Delta > \left(\frac{1}{\alpha\theta} - 1\right)(C_{max} - K_I)$.*

If $K_0 > K_I$, then discretion (i) raises welfare by excluding the low-quality insider if $\Delta > \text{Max}\left[C_{max} - K_O + \frac{K_O - K_I}{\alpha\theta}, \frac{C_{max} - K_I}{\alpha\theta}\right]$; (ii) reduces welfare by excluding the outsider if $\alpha\theta < 1$ and $\Delta < \frac{C_{max} - K_I}{\alpha\theta}$; and (iii) has no impact on welfare if $\alpha\theta > 1$ and $\Delta < C_{max} - K_O + \frac{K_O - K_I}{\alpha\theta}$.

Figures 9 and 10 illustrate the different cases in Proposition 1. Figure 9 shows the case in which the outsider has lower costs and would win the auction if not

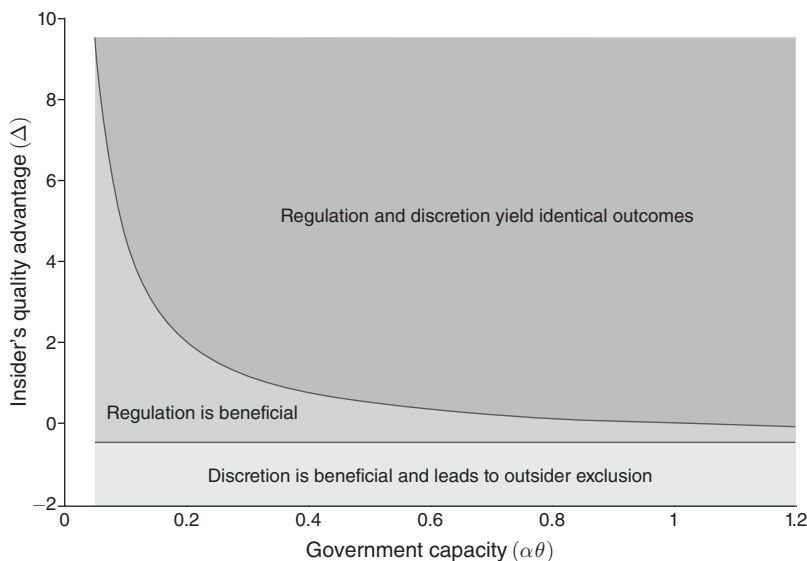


FIGURE 9. OUTSIDER IS THE LOWER-COST BIDDER

excluded. The horizontal axis, $\alpha\theta$, reflects PSC. The vertical axis plots Δ , the quality advantage of the outsider.

In the top region, where the quality advantage of the outsider is high, discretion delivers the same welfare as regulation. In this region, the PE always includes a high-quality outsider in the auction, even though the insider offers bribes to exclude him. The region becomes smaller when $\alpha\theta$ is low, and it disappears entirely when $\alpha\theta$ equals zero.

In the middle region, discretion leads the PE to exclude the outsider, which is a bad outcome. The price always rises. Quality also declines if $\Delta > 0$. In this region, if $\alpha\theta < 1$ and $\Delta > 0$, discretion creates a divergence between law and practice; the PE is meant to exclude low-quality bidders, but in practice excludes the higher-quality outsider in exchange for a bribe. If $\alpha\theta > 1$, then the PE excludes only the outsider with lower quality than the insider, so law and practice are aligned. Yet that exclusion may still be socially suboptimal if $\Delta > -(C_{max} - K_I)$, because the gain in quality does not offset the higher price that must be paid in a less competitive auction.

In the bottom region, where $\Delta < -(C_{max} - K_I)$, discretion also leads the PE to exclude the outsider, but the outsider's quality is so low that this outcome is socially optimal. Practice aligns with laws. Moreover, there are no bribes because the PE cannot commit to allow the outsider to remain in the auction, and therefore cannot extract any rents. If we had a distribution of values of Δ , then at low levels of $\alpha\theta$ efficient exclusion would be rare, relative to the inefficient exclusion of higher-quality outsiders. For higher levels of $\alpha\theta$, efficient exclusion becomes the norm so that practice and laws are more aligned.

Figure 10 shows the case where the insider is the lower-cost bidder ($K_I < K_O$).

In this case, there are also three regions. When Δ is above the downward sloping curve, discretion leads to better outcomes because the low-quality insider is

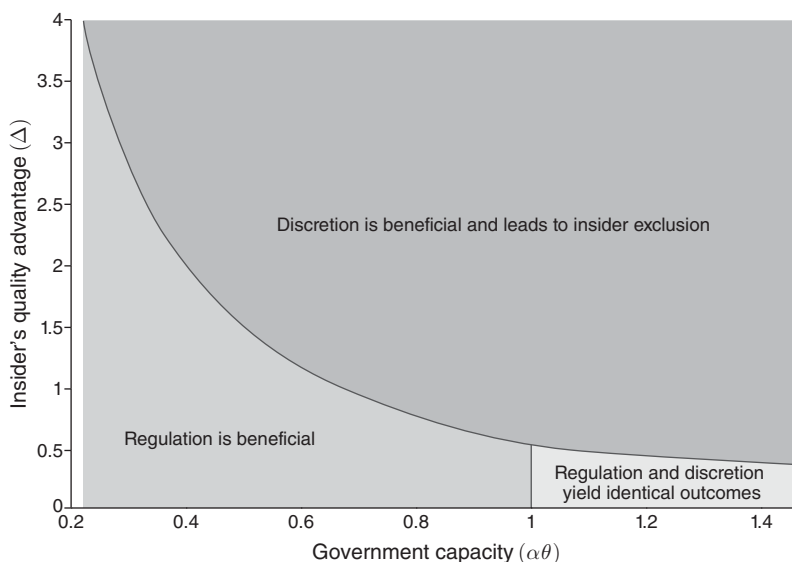


FIGURE 10. INSIDER IS THE LOWER-COST BIDDER

excluded from the auction. In this region, there are no bribes and laws and practice are aligned. Once again, as $\alpha\theta$ falls, this region becomes smaller and as $\alpha\theta$ goes to zero, it disappears.

When $\alpha\theta < 1$ and Δ is below the downward sloping curve, discretion leads to bad outcomes because the outsider is excluded. This region features the mismatch between laws and practice that the model predicts would appear in low PSC regimes. The PE is supposed to exclude low-quality bidders, but instead excludes high-quality outsiders in exchange for bribes. In this region, bribes do not change the identity of the winner relative to the regulated second price auction—the insider wins in either case—but they raise the price. The PE uses discretion to favor the insider and creates a noncompetitive auction, which we measure as inferior process. Quality and consumer welfare also decline because discretion raises the price for the same road.

When $\alpha\theta > 1$ and Δ is below the downward sloping curve, discretion is irrelevant. An accountable PE does not exclude the outsider when his quality advantage is modest, and so the regulated second price auction is replicated even with discretion.² With high enough PSC, practice and laws are aligned, since discretion is used only to exclude the low-quality insider, not the outsider in order to increase insider profits and reduce PE costs. If higher PSC also means a lower value of C_{max} , discretion is also more attractive.³

²Discretion produces the same consumer welfare in this region, but for a small parameter range, it transfers wealth from the insider to the PE. The insider bribes the PE to keep him in the auction, despite low quality. In this case, laws and practice diverge slightly, but quality is not worse relative to the regulated outcome.

³Another possibility is that at higher levels of PSC the PE has better information about the quality of the bidders. Since the upside of discretion is the ability to exclude low quality bidders, this information also favors discretion.

Regulation with Endogenous Quality.—The case for discretion, as opposed to regulation, becomes stronger when firms know the rules and can respond by changing quality or cost or both. Discretion enables PEs to guard against opportunism because regulation makes them a fixed target for optimizing bidders.⁴ We endogenize quality by assuming that the insider, but not the outsider, can take an action that reduces both costs and quality (e.g., by using inferior materials), as in Hart, Shleifer, and Vishny (1997). This action is taken before any bidding or negotiation and requires an effort of ε , which is arbitrarily small. This effort cost is used in the model only to break ties, and is subsequently treated as a minute fixed cost. We assume that the outsider is a large global firm, that cannot easily change its production methods for this particular setting. The insider is a smaller, nimbler local firm.

The outsider's quality and costs remain at Q_O and K_O . If the insider does not invest ε , we assume his quality is also Q_O and his costs are $K_O + A$. If the insider invests ε , his quality falls to $Q_O - \Delta$ and costs fall to $K_O - A$. We assume that $\Delta > C_{\max} - K_O + A$, so it is optimal to exclude the insider who has cut costs and quality from the auction. In a second price auction, quality choice generates a race to the bottom, since the insider cuts costs to win the auction. Consumer welfare then equals $Q_O - \Delta - K_O$. Proposition 2 details outcomes when the PE has discretion and can reject a bidder with low quality.

PROPOSITION 2: *If the PE has discretion, then (i) if $\alpha\theta > 1$, the insider does not cut quality, loses the auction, and consumer welfare is $Q_O - K_O - A$; (ii) if $1 > \alpha\theta > \frac{C_{\max} - K_O + A}{\Delta}$, the insider does not cut quality, the outsider is excluded, the insider wins the auction, and consumer welfare is $Q_O - C_{\max}$; and (iii) if $\alpha\theta < \frac{C_{\max} - K_O + A}{\Delta}$, the insider cuts quality, the outsider is excluded, the insider wins the auction, and consumer welfare is $Q_O - \Delta - C_{\max}$.*

The gains from discretion are highest when $\alpha\theta > 1$ because, in that case, the threat of exclusion stops the insider from cutting quality. The auction remains competitive and delivers a high-quality product. When $1 > \alpha\theta > \frac{C_{\max} - K_O + A}{\Delta}$, the insider still does not cut quality, but the outsider is excluded from the auction. Discretion leads to higher quality but also higher prices. Because $\Delta > C_{\max} - K_O + A$, the gain in quality is higher than the loss in price. In this region, the PE cares enough about social welfare that bargaining induces the insider to internalize the social welfare losses that come from cutting quality.

If $\alpha\theta < \frac{C_{\max} - K_O + A}{\Delta}$, discretion leads to a corrupt bargain between the insider and the PE. The PE cares too little about social welfare to forgo bribes to get higher quality, so the insider cuts quality. The quality delivered is the same as in the regulated second price auction, but discretion enables the PE to cut the outsider from the bidding and push the price up. Discretion raises consumer welfare when PSC is high, but reduces it when PSC is low.

⁴This is very closely related to the idea of judicial discretion and common law, where judges are often allowed to use broad principles such as fiduciary duty to adjudicate disputes. In civil law judges rely on more precise legal rules, which opens opportunities for manipulation.

Laws, Practice, and Transparency.—In the preceding model, divergence between laws and practice occurred when the PE was allowed to exclude a bidder, allegedly for low quality, but instead excluded high-quality bidders in exchange for bribes. When the law prevents any exclusion, the PE is bound to follow that law. The PE could then have worse but not better practice than regulated by the law. In a different area of regulation, such as transparency, practice can easily exceed legal mandates. The law may not require transparency, but the PE may still choose it. In our data, many countries, such as Egypt and Benin, have transparency practice weaker than laws. Other countries, such as the Netherlands, Lithuania, and the Czech Republic, have transparency practice stronger than what laws require. By allowing the PE to make a transparency choice, we allow both positive and negative divergence between law and practice.

We now assume that $Q_O = Q_I$, so there is no legitimate case for exclusion, and that $K_O < K_I$, so the insider loses the auction if the outsider bids. Moreover, we assume that the outsider cannot be excluded, but cannot bid when he does not know about the auction. We consider two institutional regimes: Transparency regulation means that the procuring entity is required to notify both bidders about the auction. Transparency discretion means that the PE can choose whether to notify the outsider.

We formalize transparency as the probability, denoted by π , that the outsider learns of the auction. The value of π is set by the PE and can be either $\pi_L < 1$ or 1. Absent a transparency law, the PE can set π to either π_L (which can be zero) or 1 at no cost. If transparency is regulated, the PE can either set $\pi = 1$ or pay a cost $\alpha z > 1$ to set $\pi = \pi_L$. The cost αz captures the hassle of deviating from legal norms and the risk of detection and penalty. This cost scales up with α so that cheating is costlier under more accountable governments. The PE negotiates with the insider before choosing π , and the two actors simultaneously agree on a bribe level (b) and a level of transparency (π). The PE can make a binding commitment to a level of transparency, or, more accurately, nontransparency. Both the insider and the PE are risk neutral. Proposition 3 describes the interplay between transparency laws and practice.

PROPOSITION 3: *If transparency is not regulated, the PE sets $\pi = 1$ if $\alpha\theta > 1$ and sets $\pi = \pi_L$ in exchange for a bribe if $\alpha\theta < 1$. If transparency is regulated, the PE sets $\pi = 1$ if $\alpha\theta > \frac{C_{max} - K_I}{C_{max} - K_I + \frac{z}{1 - \pi_L}}$ and $\pi = \pi_L$ in exchange for a bribe if $\alpha\theta < \frac{C_{max} - K_I}{C_{max} - K_I + \frac{z}{1 - \pi_L}}$.*

Proposition 3 predicts that practice will be good even without laws when PSC is high. If $\alpha\theta > 1$, the PE ensures full transparency even without a transparency regulation. If PSC is low enough that $\theta < \frac{C_{max} - K_I}{C_{max} - K_I + \frac{z}{1 - \pi_L}}$, then transparency is low even with transparency regulation, as is the Integrity of process, with or without laws. If $1 > \alpha\theta > \frac{C_{max} - K_I}{C_{max} - K_I + \frac{z}{1 - \pi_L}}$, then laws bind, and the procurement process will have Integrity with a law, but not without one. In our model, transparency rules never do any harm, but in the world, there are many countries that have extensive regulation but impose few transparency requirements. If there is a cost of imposing

these requirements, either on PE or the legislature, then the model predicts that they should not be adopted in high PSC countries. The proposition implies that practice is stricter than the law stipulates in high PSC countries, weaker than legal mandates in low PSC ones.

To the extent that there are pressures in an economy toward efficient institutions, our model implies that well-governed countries should give their bureaucrats more discretion. Low PSC countries should regulate procurement more heavily. Yet, as Figure 1 illustrates, there is a great deal of variation in laws, holding per capita income constant. There are well-governed countries, such as Canada, with high levels of procurement regulation, and countries with limited state capacity, like Eritrea, where procurement is lightly regulated. This mismatch between real-world institutions and the normative implications of our model might in some cases reflect poor measurement, but it seems at least as likely to reflect three factors missing from our model.

First, self-interested bureaucrats in low PSC countries may block reforms limiting their discretion. Second, the costs of adopting or changing legislation can mean that poor countries never adopt laws that would reduce corruption, and the richer countries never eliminate the rules that were optimal in earlier years when their PSC was lower. Third, in many cases, these rules are mandated by global treaties. Well-governed European countries must abide by the European Union's rules on procurement, even when discretion would be beneficial. Rules that are optimal for the treaty members collectively need not be optimal for every single country.

IV. Empirical Predictions of the Model

The model makes several empirical predictions of the model for the relationships between laws, practice, Integrity, and Quality, which we compare to the cross-sectional evidence in Section II.

Prediction 1: Practice is stricter than laws in high PSC countries and weaker than laws in low PSC countries.

The model predicts that when exclusion is not regulated, its practice is weaker than the laws in low PSC settings. When PSC ($\alpha\theta$) is sufficiently low, discretion to exclude bidders results in the exclusion of high-quality bidders, since the low-quality bidder pays a bribe. When exclusion is regulated, practice cannot be worse than laws because the laws are followed (by assumption). If we allowed the PE to pay a cost and avoid the regulation, as we do with transparency, we would also find that practice is weaker than laws when exclusion is regulated.

For regulation of transparency, high PSC leads to high transparency even without mandates. A high $\alpha\theta$ encourages the PE to notify the outsider even without the rules, because competition serves the PE's objectives of lower cost and higher quality. Breaking the transparency rule by the PE is more common when PSC is low. The model thus predicts that practice is stricter than laws when bureaucratic incentives are aligned with public welfare, but weaker than laws when these incentives are not aligned. With previously noted limitations of our data, this is what we have documented in Section III.

Prediction 2: Higher PSC improves both Quality and Integrity, regardless of laws.

In the model, higher α and θ lead to better Integrity and Quality whenever the PE had any room to act. When the PE cannot exclude, these variables are irrelevant, since outcomes are everywhere the same. When the PE has discretionary power to exclude, good outcomes, such as the exclusion of low quality bidders, obtain when α and θ are high. Bad outcomes, such as the arbitrary exclusion of outsiders, obtain when α and θ are low.

In the model of transparency, because the law can be avoided at a cost, the role of PSC is particularly clear. When the PE has control over transparency, high levels of α and θ lead to competitive auctions and lower prices, with or without a law. When α and θ are low, transparency is low, even with the law, so competition is lower, and prices are higher.

In the data, human capital (and other measures of PSC) is strongly correlated with the Integrity and Quality, holding procurement laws constant (online Appendix Table B3). Controlling for the laws makes little difference, because as we have already seen in Figure 4, panels A and B, laws are essentially uncorrelated with outcomes. PSC is consistently significant, with explanatory power of 30–40 percent. These results are of course compatible with many other models as well.

Prediction 3: Procurement Laws deter corruption, especially in low PSC countries.

The model of regulation of exclusion predicts higher Integrity when exclusion is regulated (forbidden), because the PE has no discretion to exclude in exchange for a bribe. When the PE does have discretion, the insider can bribe her to exclude the outsider, reducing Integrity. The model thus predicts that control of exclusion deters corruption and improves Integrity. In contrast, the regulation of transparency does not guarantee a process with integrity. Since we allow the PE to flout the law at a cost, bribery still occurs in low PSC countries. In settings with modest PSC ($1 > \alpha\theta > \frac{C_{max} - K_I}{C_{max} - K_I + z}$), regulation eliminates bribes and improves Integrity.

With both forms of regulation, Integrity is higher when PSC ($\alpha\theta$) is sufficiently high. If corruption is costly, or if the PE is public-spirited enough, she does not take bribes even if she has full discretion. The model then predicts that regulation should have a stronger positive impact on the Integrity of the procurement process at low levels of PSC. Regulation of the public sector does not, however, increase corruption or reduce Integrity at any level of PSC, unlike in the case of regulation of the private sector.

The regulation of business can cause corruption, either because businesses pay bribes to capture their regulators (Stigler 1971) or because government officials introduce regulations to extract bribes (Djankov et al. 2003a). Regulating public officials can reduce bribes, by constraining their discretion. Regulation of private activity typically increases the discretion of public officials because they can choose whether or not to enforce the regulation.

In the data, when we control for a country's education, laws have a significant negative effect on corruption (online Appendix Table C5), but we cannot address the endogeneity of these laws. This measured effect is stronger in less educated

countries, consistent with the model. Laws are more strongly associated with less corruption in countries with lower levels of human capital and PSC.

Prediction 4: Laws improve Quality and Integrity in low PSC countries and adversely affect them in those with high PSC.

In Section III, we showed that stricter laws correlate with better practice, better practice correlates with higher Integrity and Quality, but laws do not correlate positively with better outcomes. In the exclusion model, regulation is beneficial when α and θ are low because discretion leads to corruption. Regulation is harmful when α and θ are high because discretion enables the elimination of low-quality bidders. We see this prediction as the most important result of the model, and one documented in Figures 7 and 8.

Online Appendix Table B4 shows that the interactions between the law index and education are negative and statistically significant with either Integrity or Quality as the dependent variables. In online Appendix Table C5, we show similar results with interactions between country-level education and the laws index, with sub-components of Integrity and Quality. The interaction between law and education is significant for five out of the seven subcomponents of Integrity and Quality (collusion, favoritism, time to build, cost overruns and product quality). The interaction is insignificant with the absence of competition and bribes as dependent variable.

V. Conclusion

Most countries regulate their bureaucracies in addition to regulating their private sectors. We investigate such regulation in the case of public procurement using the hypothetical study of a road resurfacing contract in 187 countries. We distinguish between regulatory rules and regulatory practice, and measure them in terms of how much discretion they allow procuring entities in selecting and managing contractors. We then evaluate the relationship between the two as well as their effect on procurement outcomes, namely the Integrity of the procurement process, and the Quality of the procurement product.

A look at the evidence shows tremendous dispersion on how heavily countries regulate the procurement process in law, with poorer countries generally having more extensive regulation. We find that procurement laws are highly, though not perfectly, correlated with procurement practice. However, we also find some puzzling evidence. Although better procurement practice is highly correlated with procurement outcomes, stricter procurement laws generally do not predict better outcomes. A closer look shows that heavier regulation of procurement is associated with better outcomes in countries with lower-quality public sectors, and with worse outcomes in countries with higher-quality ones. The evidence supports recent findings from better-identified but more specific settings that point to the benefits of bureaucratic discretion (Coviello, Guglielmo, and Spagnolo 2018; Bandiera et al. 2020).

We present a new theoretical framework to explain this finding. The theory describes a procurement auction in which the organizers may take bribes in exchange for favoring connected bidders. The model allows us to discuss a variety of regulations of the procurement process, but also delivers a basic prediction: Procurement

regulation is more socially valuable when bureaucrats (e.g., procuring entities) are less motivated by social welfare. Properly motivated bureaucrats require fewer rules.

There is a broader point as well. In many settings, economists and legal scholars see laws and their enforcement as complements—laws are more effective in countries with better judiciaries, bureaucracies, and the like. Here we find the opposite: laws and enforcement capabilities are substitutes. As argued by Best, Hjort, and Szakonyi (2019), policy change can act as an effective substitute for low bureaucratic capacity. Countries with weak bureaucracies need strict laws to regulate them; countries with strong bureaucracies can lay off a little. This message has application to the design of institutions, particularly the regulation of government.

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