

Public Procurement in Law and Practice

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Online Appendix

Appendix A: Description of Variables

The questionnaire used to collect the data 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: (1) indicate which rules regulate each stage of public procurement; (2) outline the procedures that would be followed in the award and execution of a contract for the resurfacing of a flat two-lane road; (3) indicate how long each procedure would take; and (4) answer multiple-choice questions on the frequency of certain occurrences in public procurement, such as collusion or bribery.

The prebidding stage covers the PE's administrative process to identify its procurement needs and secure the related funds. Respondents were asked to indicate how the contract value is normally estimated and whether it is published in the tender documents. We also asked whether the PE needs to obtain all necessary funds before advertising the opportunity or can do so without having secured the budget.

The bidding stage concerns how the procurement method is chosen, how the information related to the tender is made publicly available, and how bids are collected from the private sector. The bid opening, evaluation, and contract signing phases depend on the criteria used to evaluate bids and award the contract. Respondents were asked which procurement method would most commonly be used for a routine contract for road resurfacing, and whether price would be the most common criterion for the award of such a contract. They also described how the process would evolve and the most common sources of delay.

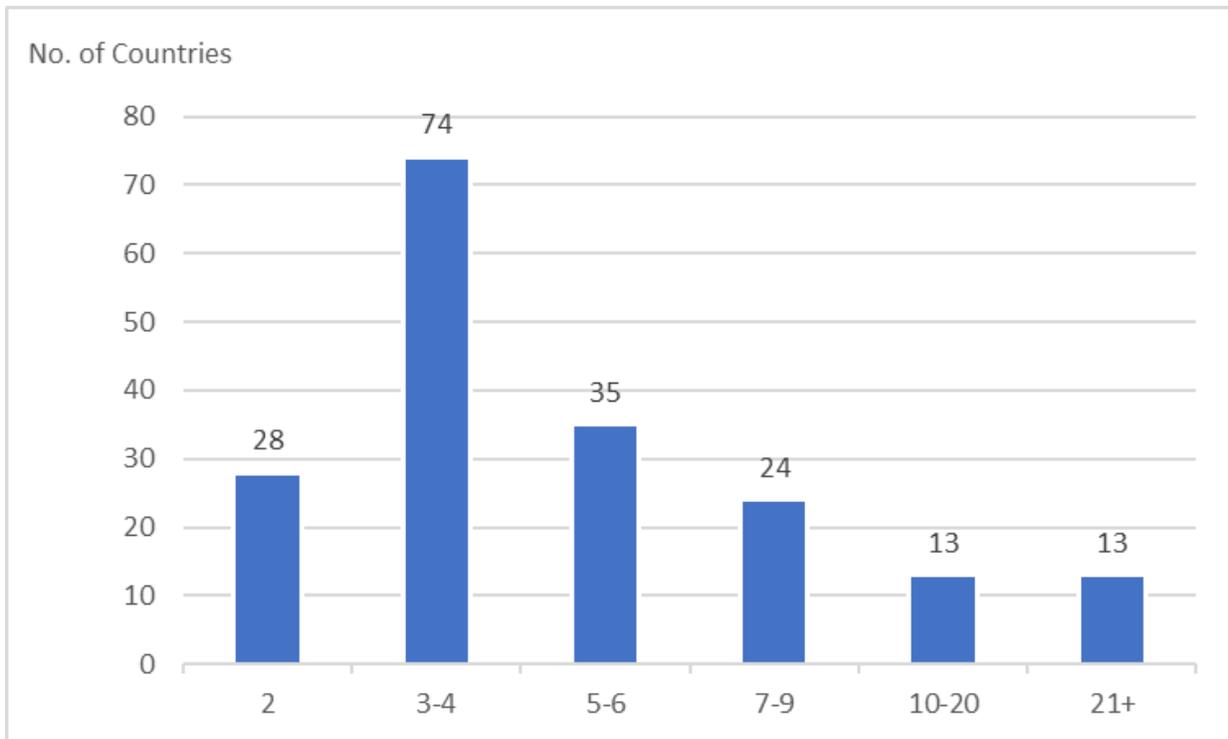
The execution stage involves the procedures from the contractor's receipt of notice to proceed until completion of the work, including requirements on contract amendments. Respondents estimated how often, and by how long, completion of the contract is delayed by changes in terms resulting from contract renegotiations or additional work requests. They also indicated the laws

that regulate subcontracting and the disclosure requirements on BidCo if it decides to subcontract part of the work.

Finally, the payment stage measures the laws and practices concerning the timeliness and frequency of payments. Respondents estimated how long it takes to collect payment from the procuring entity, as well as the frequency of inspections and how often disagreements on such inspections delay contract completion and payment.

The questionnaire was completed by lawyers with experience in administrative, procurement, and infrastructure law; construction companies specializing in the road sector; and government officials from the relevant procuring entities (for example, public works ministry, road authority, or procurement agency). Figure A1 shows the distribution of countries by the number of experts consulted by the team. An in-depth study of laws, regulations, and publicly available information on public procurement verifies this information. If answers by local experts differ, inquiries continue until the data are reconciled, including through country visits. The median is used to aggregate numeric answers.

Figure A1. Distribution of Countries by Number of Experts



Case Study

The data is collected through a case study with a series of assumptions. The contract entails the resurfacing of 20 km of a two-lane flat road and the value of the contract is \$2,500,000. Three exercises were conducted to determine the representativeness of the case study used to collect the data.

First, the team analyzed how legislators treat different size procurement projects. In particular, we examine over 1,600 pieces of legislation across 187 countries to determine whether the law stipulates particular thresholds by size for works (construction) contracts, and whether such thresholds call for different rules. This analysis suggests that the hypothetical case study facts are fully applicable for public works contracts in the range of \$250,000 to \$5,000,000, with no exceptions in the sample; and are applicable for all contract sizes in 123 sample countries. In 29 percent of the sample (54 out of 187 economies), no rules or simpler rules apply for small (below \$250,000) contracts, an unlikely value for road resurfacing work.¹ In 8.5 percent of the sample (16 out of 187 economies) some stricter rules apply in the public procurement process for larger-size (above \$5,000,000) contracts. In these 16 countries – Australia, Bulgaria, Cyprus, the Czech Republic, Finland, France, Germany, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Switzerland, the United Kingdom and the United States – the procurement process is usually more regulated for larger projects. Typical differences include timelines regulated by law (as opposed to left at the discretion of the PE in the tender documents), more stringent publication requirements and more frequent pre-qualification processes. Note that 6 countries have both higher and lower thresholds and are thus accounted for in both groups. As a robustness check, we replicated the analysis after removing these 16 countries, which all fall in the “More Educated” category. Figures A2 and A3 replicate Figures 7 and 8 in the main text. The relationship between law and outcomes remains insignificant in the smaller sample with these 16 countries excluded.

¹ The 54 countries are Algeria, Argentina, Benin, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Comoros, Congo Dem. Rep., Congo Rep., Côte d’Ivoire, Croatia, Cyprus, the Czech Republic, Djibouti, Dominica, Dominican Republic, Estonia, Fiji, Finland, Gabon, Grenada, Guatemala, Guinea, Guinea Bissau, Haiti, Hungary, Latvia, Mali, Mauritania, Mexico, Moldova, Montenegro, New Zealand, Niger, North Macedonia, Norway, Peru, Poland, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Togo, Tonga, Tunisia, Uganda, the United Kingdom, Vanuatu, and Zambia.

Figure A2. Quality of Product and Law in More Educated Countries

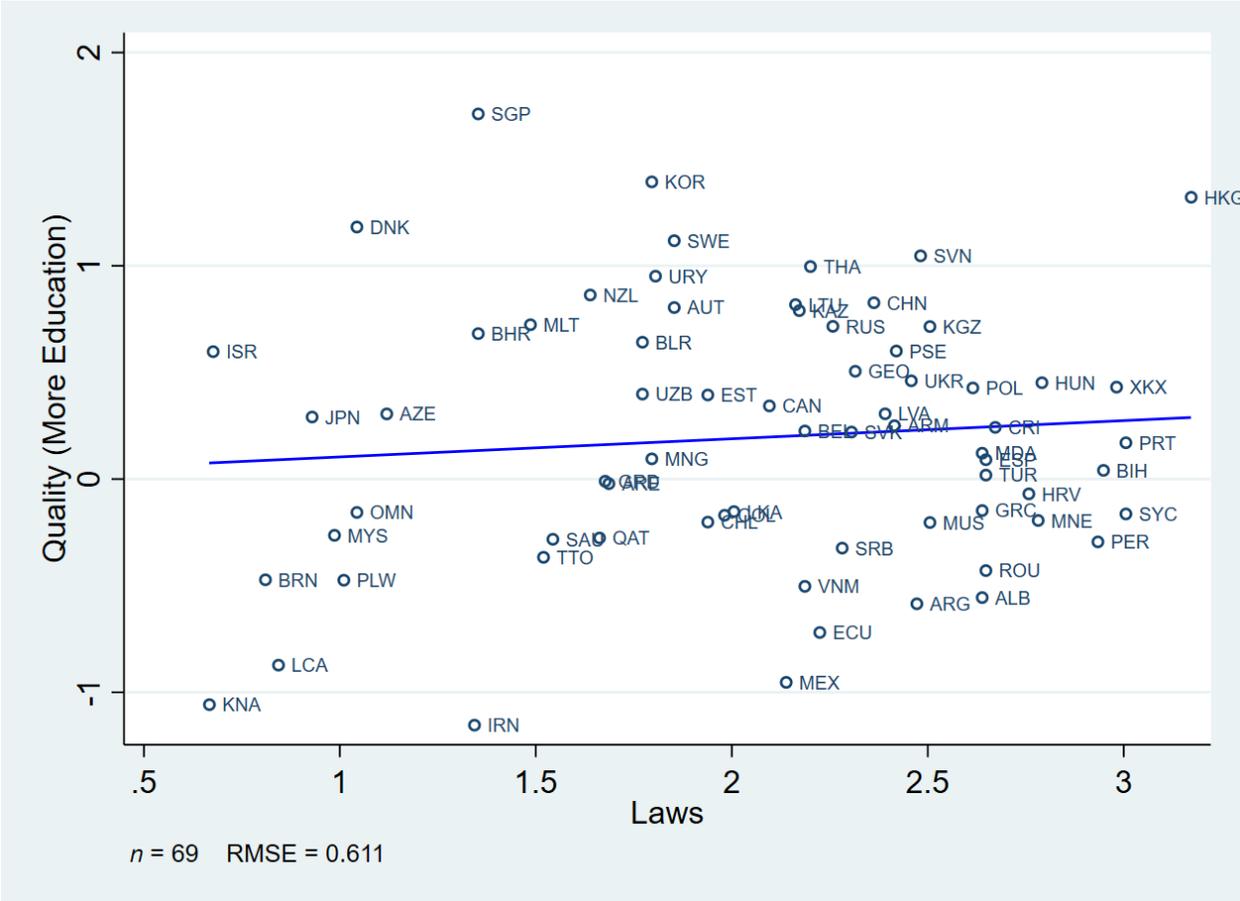
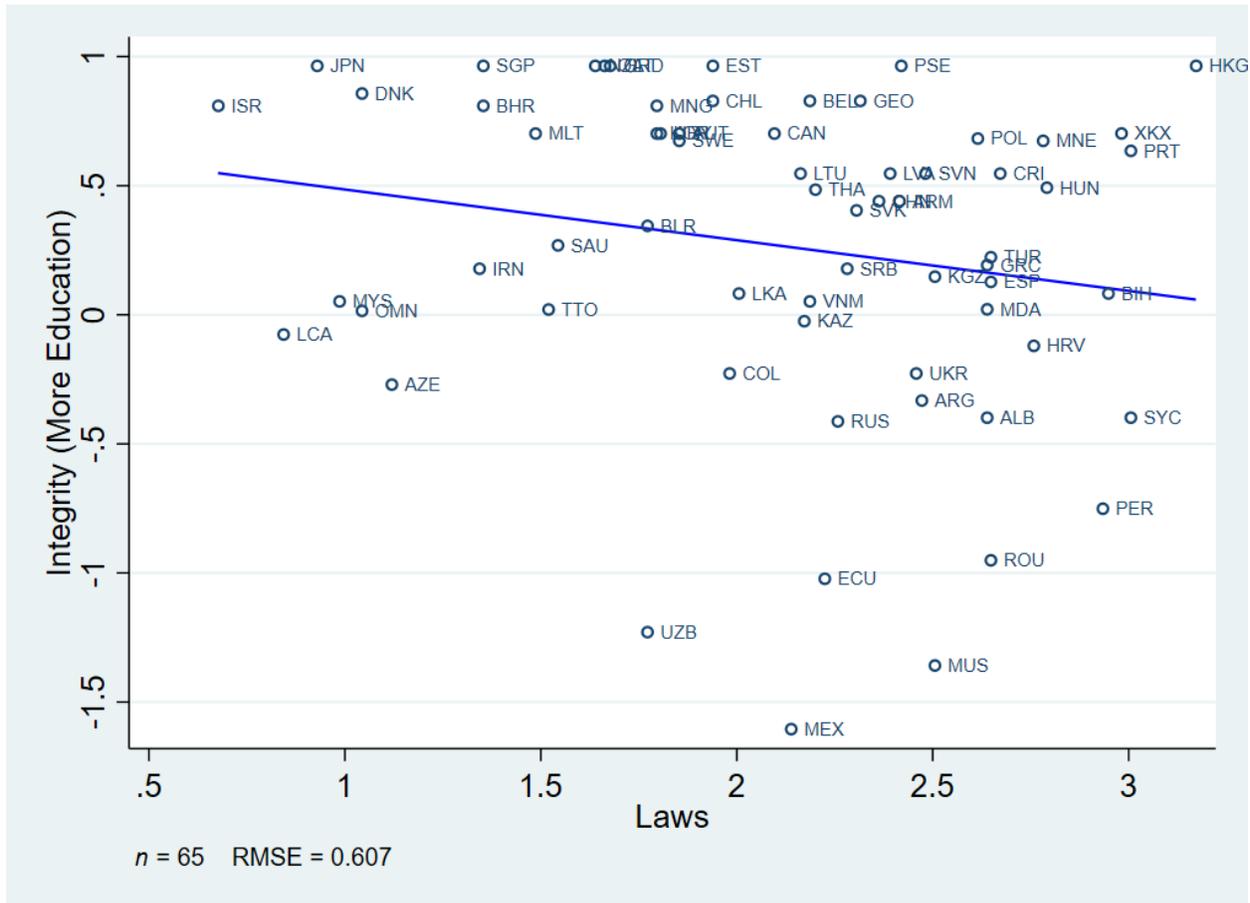


Figure A3. Integrity and Law in More Educated Countries



Second, we collect and analyze data on the actual size of procurement contracts in the latest available year with official national statistics. These statistics usually come from annual reports of the national procurement entity or the annual budget report of the Ministry of Finance. We are able to report data on 103 of 187 sample countries.² We have done extensive searches in the local languages in all other sample countries. There is information of the overall expenditure on public procurement in an additional 83 countries, but no data on the number of procured projects. The

² The 103 countries are Afghanistan, Albania, Angola, Argentina, Armenia, Australia, Austria, Bahrain, Bangladesh, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Canada, Chad, Chile, Colombia, Congo, Dem. Rep., Congo, Rep., Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, El Salvador, Estonia, Fiji, Finland, France, Georgia, Germany, Greece, Guatemala, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Kazakhstan, Kenya, Kosovo, Kyrgyz Republic, Latvia, Lebanon, Liberia, Lithuania, Luxembourg, Mali, Malta, Mexico, Moldova, Mongolia, Montenegro, Nepal, Netherlands, New Zealand, Nicaragua, Nigeria, North Macedonia, Norway, Oman, Pakistan, Panama, Philippines, Poland, Portugal, Romania, Saudi Arabia, Sierra Leone, Singapore, Slovak Republic, Slovenia, Spain, St. Vincent and the Grenadines, Sweden, Switzerland, Tanzania, Thailand, Togo, Uganda, Ukraine, the United Kingdom, the United States, Uruguay, Uzbekistan, Vietnam, Yemen, Rep., and Zambia.

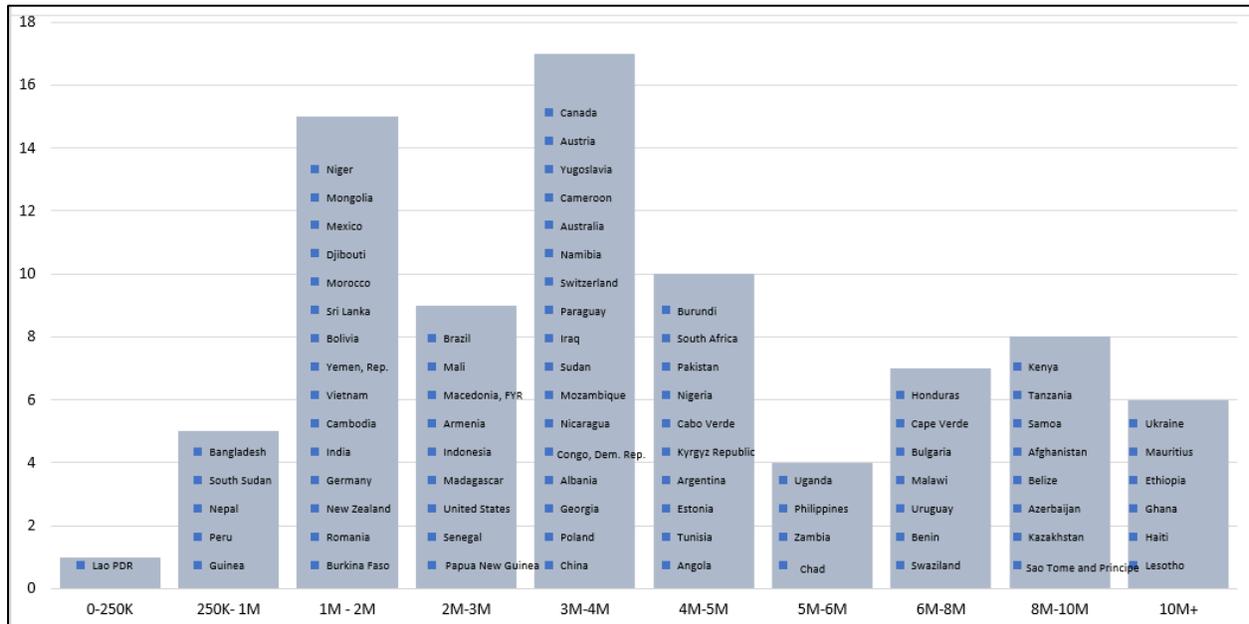
data are for all public procurement and not only construction works. Few countries report data for goods, services and public works separately, and even then, some sectors fall between these categories. The average size of public procurement projects in our sample is USD659,806, with variation across income groups (Table A1). This is a smaller number than the hypothetical case study, likely because it includes all categories of procurement (goods, services and works). The procurement of goods and services often involves repeated small-value contracts, such as to purchase pencils or obtain cleaning services.

Table A1. Average Project Size by Region

Income Group	Obs.	Mean	Median	Std. Dev.	Min	Max
All income levels	103	659,806	203,407	1,309,126	2,202	8,626,597
High income	42	938,568	595,937	1,470,487	8,280	8,626,597
Low income	36	646,178	186,893	1,450,239	2,202	8,366,445
Middle income	25	211,113	43,421	420,210	5,005	1,914,488

Third, for a subset of 82 countries where data is available, we collect data on actual public works contracts involving road resurfacing. We show that the median value for a two-lane road resurfacing contract is USD4,698,659, with a wide distribution (Figure A4). Low-income countries typically display higher values (i.e. it is more expensive to resurface roads in poorer countries). The analysis shows that no country in this 82-country sample falls into the lower or upper limit of countries which by law have different rules than the ones coded in our cases study. In other words, the coded law applies in all cases.

Figure A4. Distribution by contract value, with country names



The value of the contract was determined as the average between the size of public procurement projects and the median value for a two-lane resurfacing contract. The analysis presented above shows that the same rules would apply to contracts between \$250,000 to \$5,000,000 in the majority of countries.

Legal Framework

For all questions discussed below, the term “legal framework” 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 “procurement 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 general contract terms are included whenever their use by the procuring entity is mandatory or when the procuring entity would have to justify a departure from their application. Customizable contract terms and non-binding instruments are not considered, as they can be modified at will by the procuring entity.

The analysis of the public procurement legal framework in 187 economies shows that 117 countries have standard documents or contract terms that are of mandatory use and were thus coded as “laws” for the purposes of our paper. Fifty-three countries have no such documents, and the

remaining 17 countries have standard documents or contract terms that are not of mandatory application. For these 17 countries, we reviewed the non-binding documents and re-coded the laws assuming that the procuring entity would apply them in their entirety. We find that non-binding documents have no impact on the coding of Afghanistan, Iceland, Lithuania and Poland; minor impact (2 points or less) on the coding of Armenia, Azerbaijan, Belarus, New Zealand, Singapore, Spain, Taiwan, and the United States; and significant impact (3+ points) on the coding of Australia. We were not able to obtain documents for Bosnia and Herzegovina, Hungary and Iran. For Bahrain, documents are only made available in Arabic.

With the updated data, we reproduced Figures 7 and 8 in the main text (Figures A5 and A6). Note that all countries with changes in laws due to applicable non-binding documents fall into the “More Education” category. The changes are minimal. The relation between law and quality of product remains statistically insignificant, and relation between law and integrity of process remains statistically significant.

Figure A5. Quality of Product and Law in More Educated Countries

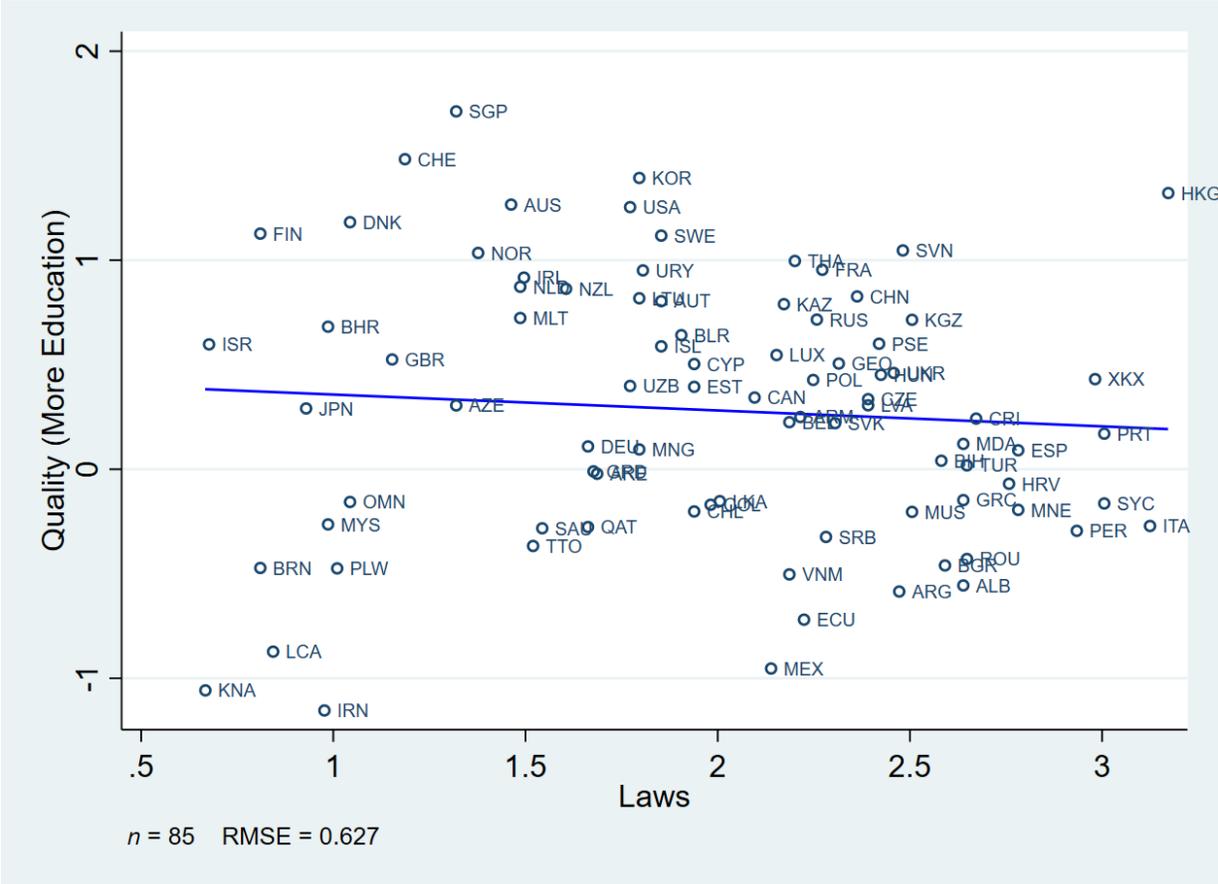
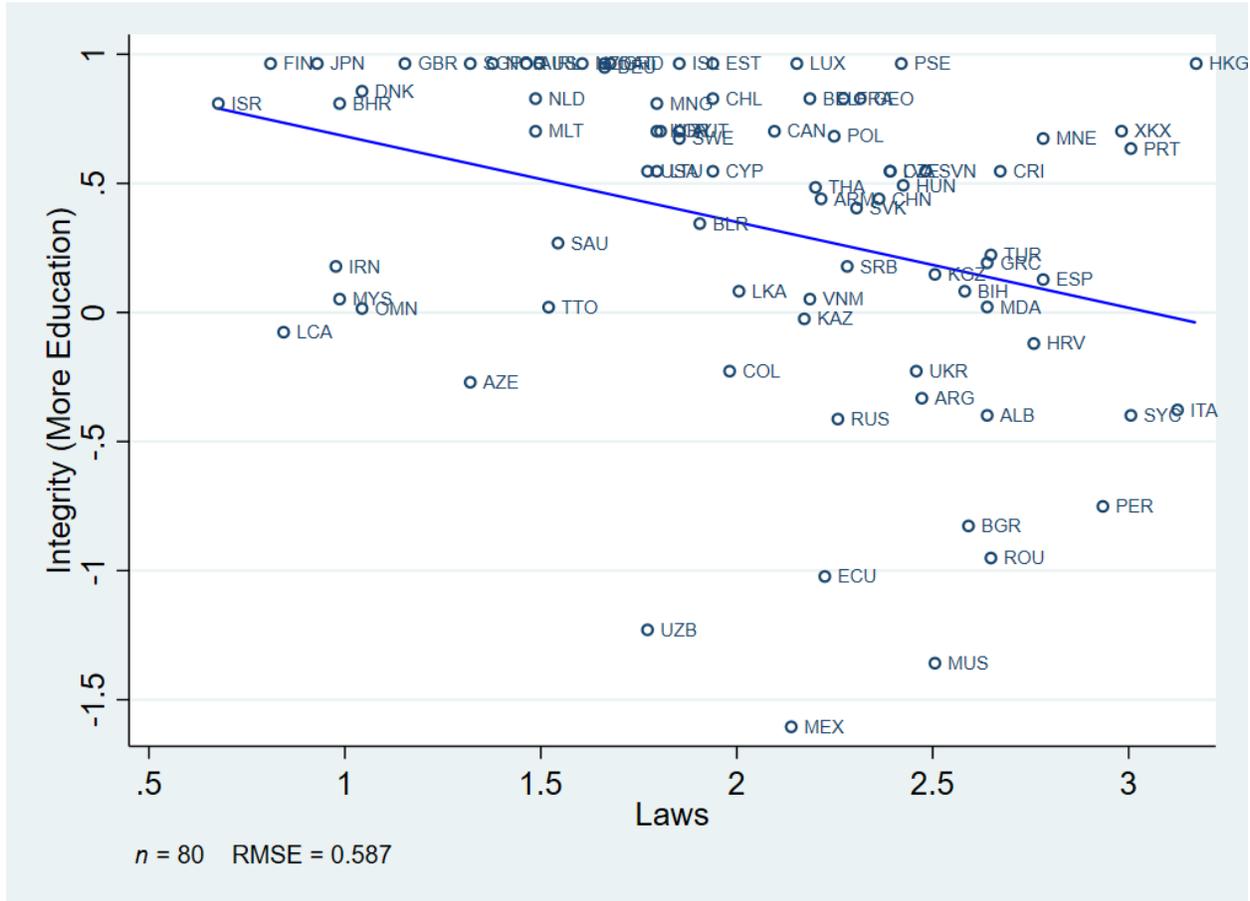


Figure A6. Integrity and Law in More Educated Countries



Laws and Practices: Variable Construction and Examples

On transparency, respondents are asked seven yes/no questions to determine whether the law requires PEs to publish the following seven documents: procurement plans, model procurement documents and standard contract conditions, tender notices, tender documents and technical specifications, notices of award and bidding results, contracts, and contract amendments. To build the transparency index, each “yes” answer is given a score of 1 and each “no” a score of 0. The transparency law index is the average of the scores for each question.

As an example, in Argentina, PEs are not mandated by law to publish annual procurement plans (a score of 0), but all documents related to the procurement process *stricto sensu*—model documents, tender notices, tender documents, and awards—must be published (a score of 1 for

each of these four documents). Neither the contract itself nor subsequent modifications must be published by law (a score of 0 for each of these two sets of documents). Argentina scores 4 out of 7 points in the transparency law index, for an average of 0.57.

Respondents are also asked seven mirroring practice questions, again with yes/no answers, measuring whether the same documents are in fact readily available to bidders in more than 50 percent of procurement processes. For example, the mirroring practice question asks: “In practice, are tender notices made publicly available online by the procuring entity?”. Respondents are asked to supplement their answers with links to the materials (model documents, tender notices, tender documents, and awards). The team verifies such links directly before coding a “yes” answer. The transparency practice index is built by attributing a score of 1 to each “yes” answer and 0 to each “no.”

Again, in Argentina public procurement plans are not available in practice (a score of 0). Model documents and tender notices are publicly available (1 for each), but PEs do not publish tender documents and awards despite a legal obligation to do so (0 for each). Contracts and contract amendments are not published either (0 for each). Argentina thus scores 2 out of 7 points in the transparency practice, for an average of 0.29.

In more than a fourth of the sample—52 countries—the PE is not required by law to publish the award, so that the results of the auction are made available only to the winning bidder, and losing contractors are deprived of an opportunity to understand—and challenge—the reasons behind their loss. In several countries, documents are not published despite a legal obligation to do so. Argentine law mandates the publication of tender documents, but the relevant PE makes them available only upon payment of a fee. Conversely, in some countries the law does not mandate publication, but documents are nonetheless available. In the United Kingdom, for example, the law requires PEs to prepare annual procurement plans but does not mandate their publication, yet PEs choose to put them on their website.

The competition law index asks six questions related to legal provisions favoring competition throughout the procurement process (and there are six parallel practice questions). The first question asks respondents to indicate whether, according to the law, open tendering is the default method of procurement for a routine road resurfacing contract. Open tendering is defined as the

process in which any interested firm may submit a bid in response to a call for competition. A “yes” carries a score of 1 and “no” 0. The mirror question about practice asks whether the majority of road resurfacing contracts are in fact procured through open tendering. Respondents are presented with three answer options: (i) open tendering is the default by law and also the most common in practice, (ii) open tendering is not the default by law but is the most common in practice, and (iii) other methods of procurement (e.g., restricted tendering, direct award, reverse auctions, competitive dialogue) are the most common. Answer options (i) and (ii) are coded as “yes,” with a score of 1; (iii) is coded as “no,” with a score of 0.

In many European countries the law gives PEs the discretion to choose between open and restricted tendering (a score of 0 if open tendering is the default by law), but open tendering is still most frequently used (a score of 1 if it is the most common practice). In France the use of open tendering is discretionary (a score of 0), but the PE introduced a guideline—not mandatory, but strictly followed—imposing the use of open tendering for all contracts above €1,000,000 (a score of 1 for open tendering as the most common practice).

The second question asks whether, in an open tendering procedure, the PE can require bidders to participate in a prequalification process. A “yes” answer corresponds to a score of 1, “no” a score of 0. The mirroring practice question asks respondents if prequalification is used in more than 25 percent of cases. That is the case in 104 of 187 countries.

The third question asks whether the legal framework prohibits dividing contracts to circumvent thresholds for open tendering. The obligation for PEs to use open tendering is usually tied to a monetary threshold, but they may circumvent the threshold by splitting the contract and then using a non-open procedure that limits competition. A score of 1 is given if dividing contracts is forbidden by law, a score of 0 if it is not. The practice question asks how often contracts are divided to circumvent procurement rules. If this occurs in less than 25 percent of cases, the score is 1, otherwise it is 0. This phenomenon is extremely widespread—62 countries scored 0 in practice. Respondents in Mali and Sudan, for example, explained that procuring entities frequently split works into several contracts to award them to contractors of their choice with little or no publicity.

The fourth question asks whether the law mandates a minimum time limit between the advertisement of the tender notice and the submission deadline for an open tendering procedure (a

score of 1). In the absence of such a rule, a procuring entity can limit competition by setting demanding technical specifications and imposing a tight timeline. In Bulgaria, the Agency for Road Maintenance posted a €100 million procurement notice on December 29, 2016, to solicit bids for the construction of an electronic toll system; the closing date for bids was January 4, 2017. Not surprisingly, only one firm met the deadline. The practice question asks how often the PE does not advertise procurement opportunities with enough notice, thus restricting competition. If rarely or very rarely, the score is 1. If occasionally, often, or very often, the score is 0.

The fifth question in the competition law index asks whether the legal framework requires the PE to proceed to bid opening immediately after the deadline for bid submission has been reached. A score of 1 is attributed to a “yes” answer, 0 to “no.” The mirror practice question asks whether bids are immediately opened in practice; 1 if “yes,” 0 if “no.”

The sixth question asks whether there is a standstill period between public notice of an award and the contract signing, suspending the procurement process to allow unsuccessful bidders to challenge the award decision. A score of 1 is attributed to a “yes” answer, 0 to “no.” The mirroring practice question asks whether the filing of a challenge against the award does in fact suspend the process (a score of 1). In Lao PDR, for instance, open tendering is the default method of procurement (a score of 1), the PE can require bidders to participate in a prequalification process (a score of 1), the legal framework mandates a minimum time limit between the advertisement of the tender notice and the submission deadline (a score of 1), the division of contracts is forbidden (a score of 1), and a standstill is regulated by law (a score of 1). Lao PDR thus scores 5 out of 6, with an average of 0.83 on the competition law index. Practice, however, lags behind. Even though open tendering is the default by law, PEs prefer to use prequalification to prescreen candidates (a score of 1 in prequalification). In more than 90 percent of procurement processes, the PE does not advertise procurement opportunities long enough (a score of 0) and bid opening is not carried out immediately (a score of 0). The division of contracts in practice is uncommon, and challenges usually suspend the award process (a score of 1 in each). With 3 out of 6 points, Lao PDR’s score on the competition practice index is 0.5.

Questions about limits to exclusion, both by law and in practice, look at five issues. The first question asks whether the legal framework establishes the minimum content of the tender notice and tender documents, a score of 1 if “yes”, 0 if “no”.

In Bangladesh and the Russian Federation technical specifications are often drafted so narrowly that only one company satisfies them. These can include a specific type of asphalt with no obvious quality advantage that only one company in the country produces, for example, or a requirement to have performed the exact same contract for the PE in the last 7 years, creating an intrinsic and recurrent bias toward a single contractor. The practice question asks how often the PE defines technical specifications to benefit a specific bidder. If in less than 25 percent of cases, the score is 1, otherwise 0.

The second question asks whether the law requires the PE to make clarifications publicly available to everyone (including to companies that did not participate in the bidding process) to minimize one-on-one interactions with bidders. Respondents have five answer options: the PE (i) addresses all clarifications in a public meeting; (ii) must answer and communicate the answer to all other bidders; (iii) must answer, but is not always required to communicate the answer to all other bidders; (iv) answers only the relevant bidder; and (v) other. A score of 1 is given if the procuring entity must address all clarifications in a public meeting, making it more difficult to exclude bidders and minimizing one-on-one interactions; a score of 0 otherwise. The mirroring practice question asks how often the PE holds informal meetings with individual bidders. If in less than 25 percent of cases, a score of 1, otherwise 0.

The third question asks which award criterion is used for a routine road maintenance contract by law: (i) price, (ii) price and other elements (i.e., best value for money), or (iii) the choice is left to the discretion of the PE. Using price as the only award criterion makes it harder for the PE to exclude bidders, earning a score of 1; all other options make it easier, scoring 0. The mirroring practice question asks how often the award decision is based solely on price and not on best value for money. If in more than 25 percent of cases, a score of 1, otherwise 0.

The fourth question examines whether the legal framework establishes a criterion to define an abnormally low bid, making it more difficult for the PE to exclude bidders (a score of 1). The practice question asks how often private sector companies submit recklessly low bids to win the tender. A score of 1 is recorded if rarely or very rarely, and 0 in all other cases.

The fifth question asks whether the legal framework defines what constitutes a nonsubstantial error. Regulating nonsubstantial errors makes it more difficult for the PE to exclude, earning a

score of 1. The practice question asks whether the bidder would be given the opportunity to rectify such errors before disqualification. If so, it is harder for the PE to exclude (a score of 1); if not, it is easier (a score of 0).

Last, the integrity of contract indices by law and in practice look at six types of restrictions on the PE's discretion during the life of the contract. The first is whether, by law, the PE is required to have already allocated budget to a specific project before tendering. Respondents are presented with three answer options: (i) yes, there is a specific budget allocation; (ii) yes, a budget certificate is required; and (iii) no. If the law requires a specific budget allocation and/or certificate, the answer is coded "yes," a score of 1. If no such legal requirement exists, the answer is "no" and the score is 0. The practice question asks the percentage of cases in which the procuring entity awards a contract without having already set aside all the necessary funds. If this happens in less than 25 percent of cases (i.e., rarely or very rarely), a score of 1 is assigned, 0 otherwise. Data from Tunisia revealed that without a specific budget allocation or a certificate securing funds for each tendered project, procuring entities find themselves with invoices they cannot pay. In fact, it is not unusual for the PE to have to return part of its budget before the end of the fiscal year, leaving it exposed to payments it cannot make. Delays in payment create considerable slowdowns, as contractors stop working until they are paid.

The second element relates to subcontracting. Respondents are asked to indicate which of the following three dimensions of subcontracting is regulated by law: (i) features (the administrative process to subcontract, limits of subcontracting, authorizations required, etc.), (ii) disclosure (when and how companies should inform the PE of their intent to subcontract), and (iii) liability (the responsibility of the contractor and subcontractor in case of poor performance). The answer is coded "yes" (a score of 1) only when all three aspects are regulated; all other options are coded "no" (a score of 0). The practice question asks respondents to identify whether contractors frequently employ subcontractors that were neither properly selected nor disclosed during the tendering process (a score of 0 if this happens in more than 25 percent of contracts).

The next two elements relate to contract execution. Respondents are asked to indicate how renegotiations and additional works are regulated. Renegotiations are defined as substantial changes to the original contract terms that lead to new contract clauses. Respondents are asked to indicate whether any of the following key aspects of renegotiation – process, limits, and disclosure

requirements – is regulated (a score of 1). The mirroring practice question gauges how often the renegotiation process is abused to increase the price or the scope of the project without another competitive process. If rarely or very rarely, the score is 1, otherwise 0.

Additional works are defined as all complementary works not included in the initial contract or tender documents but related to the initial work and thus awarded to the same contractor. The need for such work usually becomes apparent during the execution of the original contract and the work is awarded to the original contractor through noncompetitive methods of procurement. The law question asks whether additional work can be procured through direct award (a score of 1) or whether complete discretion is left to the PE on the process to award such works (a score of 0). The mirroring practice question tests whether additional works are in fact awarded through noncompetitive measures in more than 25 percent of cases. If rarely or very rarely, a score of 1 is assigned, otherwise 0. In many countries, renegotiations and additional work are completely unregulated.

The fifth and sixth elements relate to payment and ask whether the legal framework establishes a timeframe within which the procuring entity must process payment once an invoice is received (a score of 1 if “yes,” 0 if “no”) and whether the company is entitled to claim interest on late payments if the PE does not pay within the legally established timeframe (a score of 1 if “yes,” 0 if “no”). The practice questions ask how often payment is processed in the legally mandated timeframe and how often interest on late payments is actually paid. If payments are made on time in more than 50 percent of cases (“often” or “very often”), a score of 1 is recorded; if not, 0. The same coding applies if interest on late payments is actually paid to companies in more than half of the procurement processes.

In Singapore, the law does not require the PE to have already allocated budget before tendering (a score of 0), but the PE usually does so in practice (a score of 1). Subcontracting, renegotiations, and additional work are completely unregulated (a score of 0 on each of these three questions in the integrity of contract law index). The subcontracting and renegotiation processes in practice are not abused by the procuring entity (a score of 1 in each) and direct awards for additional work are unusual (a score of 1). The law does not specify a deadline for payment of invoices (a score of 0) but does mandate the payment of interest on late payments (a score of 1). In practice, payments are timely in more than 90 percent of cases (a score of 1), but interest is rarely paid (a score of 0).

Singapore scores 1 out of 6 on the integrity of contract law index, or 0.17. In practice, it scores 5 out of 6, or 0.83.

The law and practice indices are the sums of their four subindices. Note that this exercise differs significantly from an earlier World Bank dataset named Benchmarking Public Procurement. The latter measured central procurement by default, did not identify a specific entity, measured larger projects, and measured only supra-national rules in several country (e.g. the European Union).

Outcomes

The outcomes we measure are Quality of Product and Integrity of Process.

Construction of the quality index involves inputs on time, cost overruns and project quality. The quality index is the average of the z-scores of these three variables (time, cost overruns, project quality). High scores signify good outcomes. Questions on time benchmark the efficiency of the procurement process from the moment the procuring entity decides to advertise the procurement opportunity until the contract is successfully executed and the last payment is made. Time is measured for two phases of the procurement lifecycle: the bidding phase, which covers all interactions between the advertisement of the procurement opportunity and the commencement of the work measured in the case study, and the contract management phase, which measures all interactions with government agencies that delay the execution of the contract. The measure captures the median duration in calendar days that respondents indicate is necessary in practice to complete a procedure with minimum follow-up with government agencies and includes all typical delays that a construction company would experience when dealing with the procuring entity. Time equals $\log(\text{Number of days})$.

The bidding process can take as few as 149 days in Taiwan or as many as 801 days in Guinea-Bissau, where just obtaining permits and a notice to begin work takes 420 days. During the execution of the contract, inspections and payment are the largest sources of delay. Obtaining payment takes a year in Haiti and Iran, and in Mongolia and Mozambique companies are left waiting more than nine months for an inspection.

The question on overruns measures how often the project is delivered within the original budget. Respondents are presented with the same answer options as for other frequency questions,

with a high score if works are delivered within the original budget. In 7 countries in the sample, including Argentina, Ecuador, and Malawi, the original budget estimate is met in less than 10 percent of procurement cases. In another 37 countries, including Serbia and Tunisia, it is met in less than 25 percent of road procurement contracts. Fiji, Lichtenstein, and Singapore are three of only 5 countries in the sample where the original budget is met in more than 90 percent of contracts.

The question on the project quality asks how often the contract is executed with less quality or with different technical specifications than those submitted during the tender process. In Malawi and Pakistan, more than 90 percent of road projects are delivered with lower than expected quality, whereas in Australia, Japan, and 24 other countries this occurs in less than 10 percent of cases. The variable is scored by taking the average of the answer category; for example Malawi scores 0.95, while Australia scores 0.05.

Several questions go into the measure of integrity as well, and for each one respondents are again presented with five answer options: (i) very rarely (in less than 10 percent of cases), (ii) rarely (10–25 percent of cases), (iii) occasionally (25–50 percent of cases), (iv) often (50–90 percent of cases), or (v) very often (more than 90 percent of cases). Integrity is scored by taking the average of the answer category. Again, high scores signify good outcomes.

The favoritism variable measures how often procuring entities circumvent public procurement rules by interpreting selection criteria in a way that favors a specific bidder. In 102 countries, including Canada and Denmark, this happens in less than 25 percent of cases. In Ecuador and Mexico, favoritism characterizes more than 90 percent of procurement projects.

The question on collusion asks whether procuring entities and private sector companies prevent market entry to other competitors. Collusion is prominent in eastern Europe; in several countries—including Romania and Uzbekistan—it plagues more than 50 percent of all road procurement contracts.

The absence of competition in procurement is assessed by how often noncompetitive procurement methods are used instead of open tendering. In 27 countries in the sample, noncompetitive procurement methods instead of open tendering are used in more than 50 percent

of contracts, with peaks of more than 90 percent of contracts in Angola, Lao PDR and Niger. In Israel and New Zealand, only 10 percent of contracts use methods other than open tendering.

The question on corruption measures how often bribing happens. In Bolivia, bidders resort to bribes in 50–90 percent of road procurement cases; in Myanmar bribes are reported in more than 90 percent of such cases. The variable is scored by taking the average of the answer category, for example Bolivia scores 0.70 and Myanmar 0.95. High scores mean bad outcomes.

Integrity is the average of the z-scores of the four variables. On integrity, Lao PDR, Myanmar and Niger are the worst performers, while the best are Australia, Dominica and Estonia.

Other Outcome Variables

We use two other variables as outcomes, and describe them below. In addition, the World Bank in collaboration with the Global Transparency Institute, released in July 2021 a new measure of Integrity similar to our own, and we briefly describe it below, although we do not use it in the paper. Figures A7 and A8 display the correlation of these three outcome variables with the laws and practice indices.

The World Economic Forum’s (2019) survey asks about the quality of road infrastructure: “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]?”.

To proxy the overall quality of roads, we use average the average intracity travel speed using traffic dependent measure of duration with nighttime departure calculated through [Google Maps Distance Matrix API](#) (Application Programming Interface). To use the API, we provide an origin, destination, planned departure time, and an indicator to avoid highways. The API returns the driving distance using the shortest route between the origin and destination, the expected traffic-independent travel time³, and the expected travel time using traffic data history at the planned departure time⁴.

³ This does not depend on the planned departure time, as the departure time is used only for traffic information.

⁴ Traffic dependent travel time information is only returned if Google has adequate traffic data along the planned route. If there is insufficient traffic data, then the API only returns the traffic-independent expected travel time.

To estimate the travel speed for an entire country, we compared travel time within the three largest cities. This eliminates potential biases that may arise in travel between major cities as this may be highly dependent on how close major cities in a given country are to each other. We use a nighttime departure (i.e. the time is set to 1:00 AM local time at the origin) to avoid cases of high traffic, and we exclude highways. Since the API requires a specific date of travel, we choose this date to be June 1, 2021 as the departure time at which to estimate average travel speed. To analyze the driving speed in a city, we examine the travel time between a northern point of a city to a southern point of a city. We adopt a heuristic of estimating the travel time from 0.1 degrees north of the city center to 0.1 degrees south of the city center. The Google Maps API will generally pick the nearest accessible point to travel to for a given coordinate. This estimates north-south travel speed over approximately 14 miles (1-degree latitude is approximately 70 miles), which is typically still in the city or surrounding areas.

Data from the Global Transparency Institute's (GTI) collaboration with the World Bank are used to create an Integrity index which covers favoritism and corruption in procurement (see Fazekas 2021 for details about the GTI database). The index 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. Again, higher scores indicate better outcomes (e.g., less favoritism, less corruption).

Eight questions, divided into two subindices – Favoritism and Bribes – go into the measure of Integrity GTI. Again, high scores signify good outcomes. Integrity GTI is the z-score of the two subindices. The favoritism subindex measures how often procuring entities circumvent public procurement rules by interpreting selection criteria in a way that favors a specific bidder. Favoritism GTI is based on four questions – is the call for tender unpublished, is the length of advertisement period too short, is the length of decision period too short, and is the supplier's share in annual public procurement significant. The Bribes GTI subindex measures how often bribing happens. High scores mean good outcomes. The subindex is based on four questions – is non-open procedure the prevalent method of procurement, is there a single bidder, is there evidence of price manipulation, and is the supplier registered in a tax haven.

Control Variables

Two control variables feature in the analysis. The World Bank's human capital index measures the amount of human capital that a child born today can expect to attain by age 18, given the risks of poor health and poor education that prevail in the country where she lives (Angrist et al. 2021). Government effectiveness, from the World Bank (2020) World Development Indicators, is based on unobserved components model using 33 data sources that are rescaled and combined to create an aggregate indicator. The measure captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Figure A7. Road Quality, Average Speed, Integrity GTI, and Practice

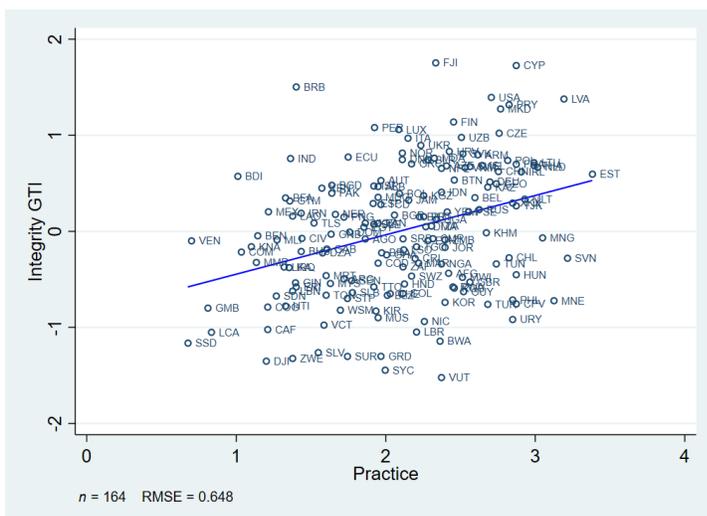
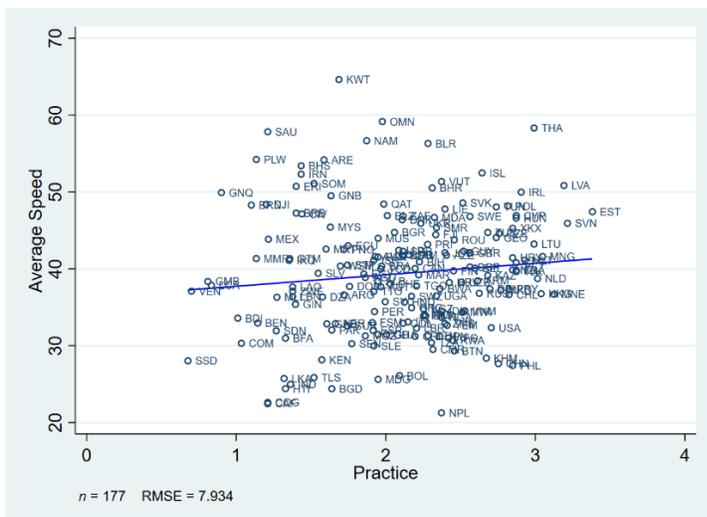
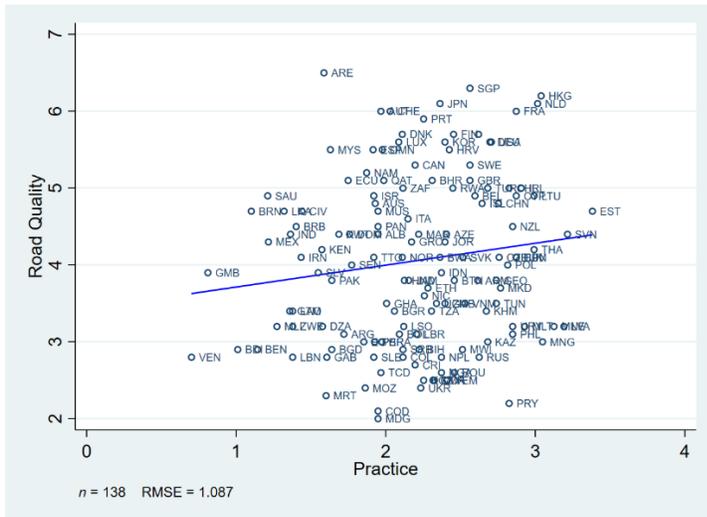
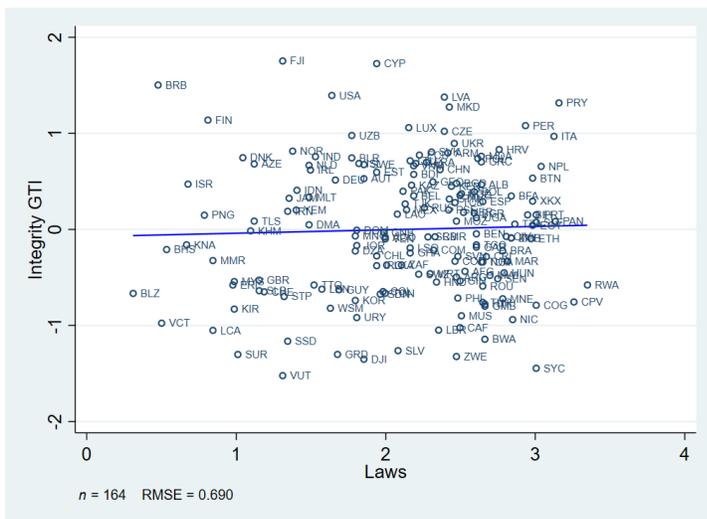
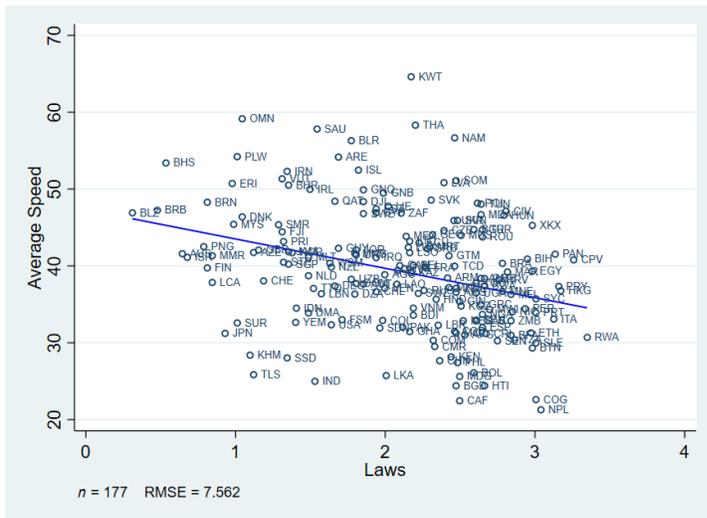
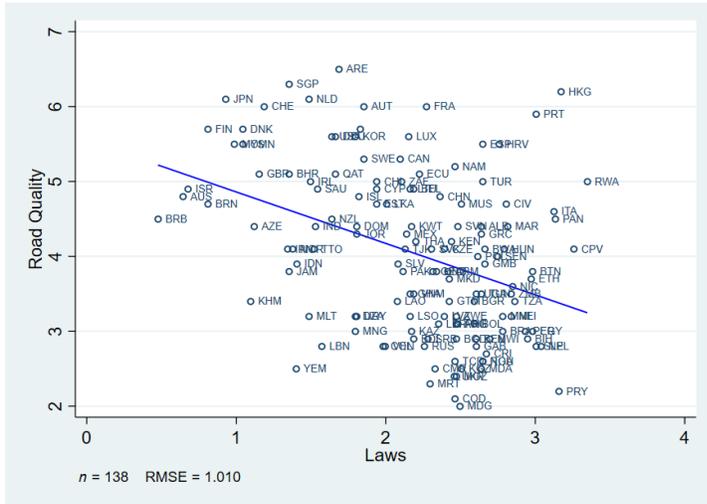


Figure A8. Road Quality, Average Speed, Integrity GTI, and Laws



Appendix B: Robustness of Correlations Shown in Figures in Regressions with Controls

Figure 8 shows that Integrity and Quality weakly improve with stricter laws in countries with lower educational attainment, but decrease with stricter laws in countries with higher educational attainment and human capital as measured by HCI. Table B1 confirms these findings controlling for human capital.

Table B1: Laws and Outcomes controlling for Education

	Less Educated		More Educated	
	Integrity	Quality	Integrity	Quality
Laws	0.144 (0.146)	0.196* (0.104)	-0.209** (0.095)	-0.012 (0.084)
HCI	4.408*** (1.231)	3.003*** (0.946)	3.695*** (0.747)	4.850*** (0.693)
N	83	85	80	85
R ²	0.138	0.121	0.319	0.381

(standard errors in parentheses)

We next split the sample at the median education level and compare the mean levels of laws and practice across countries (Table B2). In our data, practice is stricter than laws in higher PSC countries, and the reverse is true in lower PSC ones.

Table B2 Practice and Laws in Less and More Educated Countries

Laws	Less Educated		More Educated			Probability (Practice - Laws) is Higher in High H.C. Countries
	Practice	Prob. Laws = Practice (t-score)	Laws	Practice	Prob. Laws = Practice (t-score)	
2.209 (0.069)	1.897 (0.055)	0.000 (3.726)	1.984 (0.071)	2.318 (0.059)	0.000 (-4.415)	1.000 (5.723)

Table B3 shows that human capital and government effectiveness are strongly correlated with the Integrity and Quality, holding procurement laws constant.

Table B3: Human capital and Government Effectiveness correlated with Integrity and Quality

	Integrity			Quality		
Laws	-0.053 (0.087)	-0.067 (0.077)	-0.030 (0.085)	0.083 (0.068)	0.075 (0.065)	0.102 (0.067)
Human Capital	3.062*** (0.384)		0.915 (0.725)	2.792*** (0.321)		1.272** (0.611)
Gov. Efficiency		0.493*** (0.052)	0.374*** (0.108)		0.454*** (0.046)	0.260*** (0.090)
N	163	177	163	170	186	170
R ²	0.308	0.364	0.356	0.314	0.353	0.347

Table B4 shows that the interactions between the law index and education are negative and statistically significant with either Integrity or Quality as dependent variables.

Table B4. Interactions of Laws and Education

	Integrity			Quality		
Laws	-0.034 (0.087)	0.005 (0.085)	0.008 (0.086)	0.101 (0.066)	0.083 (0.067)	0.081 (0.069)
Human Capital	3.157*** (0.384)	0.422 (0.856)	0.217 (0.825)	2.883*** (0.312)	2.434*** (0.710)	2.061*** (0.695)
Human Capital* Laws	-1.164* (0.592)	-0.687 (0.620)		-1.649*** (0.475)	-1.167** (0.514)	
Gov. Eff		0.214 (0.131)	0.241* (0.124)		0.261** (0.108)	0.330*** (0.104)
Gov. Eff.*Laws			-0.097 (0.085)			-0.073 (0.069)
Log GDP		0.166** (0.082)	0.162** (0.082)		-0.124* (0.069)	-0.140** (0.069)
N	163	163	163	170	170	170
R ²	0.325	0.375	0.376	0.360	0.384	0.369

Appendix C: The Components of Laws and Practice

Table C1 presents the correlations between the four measures of the laws index, the laws index itself, and the log of per capita income. Across countries, different aspects of the regulation of procurement are strongly positively correlated with each other. But we also get the first surprising result: regulation is generally less restrictive in richer countries: the correlation coefficient with per capita income is -0.315, so richer countries give their PE's more discretion. They are particularly prone to have fewer laws regulating competition and integrity of contract.

Table C1: Correlations between components of the laws index

	Transparency	Competition	Integrity of contract	Limits to exclusion	Log GDP	Laws
Transparency	1					
Competition	0.330***	1				
Integrity of contract	0.426***	0.465***	1			
Limits to exclusion	0.459***	0.315***	0.343***	1		
Log GDP	-0.080	-0.442***	-0.264***	-0.124*	1	
Laws	0.743***	0.718***	0.795***	0.684***	-0.315***	1

Table C2 shows that practices across multiple dimensions of procurement regulation are highly positively correlated with each other. We also find that practices are less discretionary in richer countries, with correlation coefficient of 0.332 – the opposite of the finding for laws.

Table C2: Correlations between components of the practice index

	Transparency	Competition	Integrity of contract	Limits to exclusion	Log GDP	Practice
Transparency	1					
Competition	0.290***	1				
Integrity of contract	0.067	0.158**	1			
Limits to exclusion	-0.082	0.226***	0.445***	1		
Log GDP	0.071	0.070	0.360***	0.303***	1	
Practice	0.557***	0.603***	0.670***	0.648***	0.332***	1

Are these outcomes correlated with the laws and practice of procurement regulation? Table C3 shows the correlations between corruption, Quality, and Integrity for both laws (odd columns) and practice (even columns). Corruption is negatively correlated with laws and positively correlated with practice, and the correlation with practices is stronger. Both Quality and Integrity are robustly positively correlated with all the practice variables, except for the transparency indicator and

Integrity. In contrast, the correlations with the laws variable are weak, and often negative: countries with more legal controls of PE's have no better and perhaps worse outcomes.

Table C3: Correlations between Law and Practice and Outcome Variables

	Corruption and Laws	Corruption and Practice	Integrity of Process and Laws	Integrity of Process and Practice	Quality of Process and Laws	Quality of Process and Practice
Overall Index	-0.157**	0.564***	-0.181**	0.552***	-0.069	0.531***
Transparency	0.034	0.120	-0.049	0.017	0.058	0.179**
Competition	-0.228***	0.275***	-0.162**	0.244***	-0.118	0.129*
Limits to Exclusion	-0.057	0.453***	-0.094	0.540***	0.023	0.333***
Integrity of Contract	-0.173**	0.579***	-0.194***	0.592***	-0.137*	0.656***

Table C4 exhibits the results for laws and practice in countries with different levels of human capital for the four distinct elements of laws and practice. In low capacity countries, laws are stricter than practice for transparency, competition, and integrity of contract (though not for limits of exclusion). In better educated countries, laws are less binding than practice for transparency and exclusion, though not for competition and the integrity of contract. But in our ultimate test of laws vs practice in educated vs uneducated countries, we find the same result for every sub-index as we do for the overall index of laws.

Table C4: Laws and practice in countries with different levels of education

	Less Educated			More Educated			Probability (Practice - Laws) is Higher in High H.C. Countries
	Laws	Practice	Prob. Laws = Practice (t-score)	Laws	Practice	Prob. Laws = Practice (t-score)	
Transparency	0.477 (0.021)	0.418 (0.028)	0.013 2.547	0.492 (0.026)	0.513 (0.029)	0.237 -1.191	0.997 2.758
Competition	0.718 (0.023)	0.588 (0.020)	0.000 4.722	0.582 (0.022)	0.621 (0.017)	0.080 -1.773	1.000 4.805
Limits to Exclusion	0.369 (0.023)	0.543 (0.028)	0.000 -4.779	0.362 (0.020)	0.670 (0.027)	0.000 -8.972	0.996 2.689
Integrity of contract	0.645 (0.030)	0.348 (0.021)	0.000 8.095	0.547 (0.028)	0.514 (0.024)	0.382 0.879	1.000 5.038

N = 85 for each H.C. group.

Table C5 examines the impact of these interaction terms on the seven components of Quality and Integrity (recall that the variables here are coded so that higher values mean better outcomes). All interaction coefficients, except for corruption, are negative. Four of the regressions show

interactions that are statistically significant and economically meaningful. The interaction is not significant for the project quality, no competition and corruption outcomes.

Table C5. Regressions with Interactions

	Time	Overrun	Project Quality	No Competition	Favoritism	Collusion	Corruption
Laws	65.48*** (24.72)	0.018 (0.025)	-0.016 (0.027)	-0.002 (0.028)	-0.033 (0.029)	0.003 (0.024)	0.013 (0.030)
Human Capital	930.3*** (116.5)	0.449*** (0.117)	0.658*** (0.117)	0.811*** (0.122)	0.530*** (0.129)	0.483*** (0.103)	1.410*** (0.132)
Human Capital*Laws	-324.8* (177.3)	-0.547*** (0.180)	-0.233 (0.182)	-0.268 (0.187)	-0.397** (0.199)	-0.441*** (0.160)	0.0367 (0.203)
N	170	168	163	161	161	160	160
R ²	0.283	0.117	0.194	0.237	0.139	0.156	0.445

Appendix D: Proofs of Propositions

Proof of Proposition 1: In a simple second price auction with known costs and no exclusion, both bidders bid their costs. If $K_0 < K_I$ then the outsider also receives the contract under the second price auction. In that case, consumer surplus is $Q_0 - K_I$ and the PE's welfare is $\alpha(Q_0 - K_I)$ as there is no scope for bribes. If $K_0 > K_I$, then the insider wins the auction, consumer surplus is $Q_I - K_0$, and the PE's welfare is $\alpha(Q_I - K_0)$.

In the excludable auction case, we begin with the default action of the PE if no bribe is paid.

If $K_0 < K_I$, then the exclusion of the outsider is the default if and only if $Q_I - Q_0 > C_{max} - K_I$.

If $K_0 < K_I$, and $\Delta < -(C_{max} - K_I)$, then the insider pays no bribes because he knows that the outsider will be excluded if a bargain is not reached. Exclusion is socially optimal and occurs without any bribes.

If $K_0 < K_I$ and $-\Delta < C_{max} - K_I$, then a corrupt bargain to exclude the outsider selects the bribe to maximize $(\alpha(Q_I - C_{max}) + B - \alpha(Q_0 - K_I))^\beta (C_{max} - \theta B - K_I)^{1-\beta}$, subject to the constraint that $\frac{C_{max}-K_I}{\theta} \geq B \geq \alpha(C_{max} - K_I + Q_0 - Q_I)$, which requires that $(\frac{1}{\alpha\theta} - 1)(C_{max} - K_I) > \Delta$. In that case, the bribe is $(\frac{\beta}{\theta} + (1 - \beta)\alpha)(C_{max} - K_I) + (1 - \beta)\alpha\Delta$ and consumer surplus is $Q_I - C_{max} < Q_0 - K_I$. If $(\frac{1}{\alpha\theta} - 1)(C_{max} - K_I) < \Delta$, then both entities remain in the auction and consumer surplus is unchanged with discretion.

If $K_0 > K_I$, then the procuring entity will exclude the insider if and only if $\Delta > C_{max} - K_0$.

If $K_0 > K_I$, then there are two corrupt possibilities: (1) the insider and outsider both remain in the auction even though the socially optimal outcome is to exclude the insider, and (2) the insider remains and the outsider is excluded.

If $K_0 > K_I$ and $\Delta < C_{max} - K_0$, then the insider wins the auction with or without bribery. Consequently, a corrupt bargain to exclude the outsider selects the bribe that maximizes $(\alpha(Q_I - C_{max}) + B - \alpha(Q_I - K_0))^\beta (C_{max} - \theta B - K_0)^{1-\beta}$, subject to the constraints that $\frac{C_{max}-K_0}{\theta} \geq B \geq \alpha(C_{max} - K_0)$, or $1 \geq \theta\alpha$. In this case, the bribe equals $(\frac{\beta}{\theta} + (1 - \beta)\alpha)(C_{max} - K_I) = B$.

If $K_0 > K_I$ and $\Delta > C_{max} - K_0$, then the insider is excluded from the auction if there are no bribes. Bribery can either leave both bidders in the auction or exclude the outsider.

If the outsider is excluded, then the bargain maximizes $(\alpha(Q_I - C_{max}) + B - \alpha(Q_0 - C_{max}))^\beta (C_{max} - \theta B - K_I)^{1-\beta}$, subject to the constraint that $\frac{C_{max}-K_I}{\theta} \geq B \geq \alpha\Delta$. The bribe level satisfies $B = (1 - \beta)\alpha(Q_0 - Q_I) + \frac{\beta}{\theta}(C_{max} - K_I)$, so that joint welfare is $\beta^\beta(1 - \beta)^{1-\beta} \left(\alpha(Q_I - Q_0) + \frac{1}{\theta}(C_{max} - K_I) \right)$.

If the outsider is included then the bargain maximizes $(\alpha(Q_I - K_O) + B - \alpha(Q_O - C_{max}))^\beta (K_O - \theta B - K_I)^{1-\beta}$, subject to the constraint that $\frac{K_O - K_I}{\theta} \geq B \geq \alpha(Q_O - Q_I + K_O - C_{max})$, which requires $\frac{K_O - K_I}{\alpha\theta} + C_{max} - K_O \geq Q_O - Q_I$. The bribe satisfies $B = (1 - \beta)\alpha(Q_O - Q_I + K_O - C_{max}) + \frac{\beta}{\theta}(K_O - K_I)$, so that joint welfare is $\beta^\beta(1 - \beta)^{1-\beta} \left(\alpha(Q_I - Q_O + C_{max} - K_O) + \frac{1}{\theta}(K_O - K_I) \right)$. Joint welfare is higher in the corrupt bargain if the outsider is excluded if and only if $1 > \alpha\theta$.

Putting these conditions together, if $1 > \alpha\theta$, then a corrupt bargain to exclude the outsider and keep the insider occurs if and only if $\frac{C_{max} - K_I}{\alpha\theta} \geq \Delta$. In that case, social losses relative to the simple second price auction equal $C_{max} - K_O$. If $\frac{C_{max} - K_I}{\alpha\theta} < \Delta$, then the outsider is kept, the insider is excluded, and there are social gains from discretion.

If $1 < \alpha\theta$, then a corrupt bargain to keep the insider occurs if and only if $C_{max} - K_O + \frac{K_O - K_I}{\alpha\theta} \geq \Delta$, but in this case the bargain just replicates the simple second price auction, so there are no social welfare losses. If $1 < \alpha\theta$ and $C_{max} - K_O + \frac{K_O - K_I}{\alpha\theta} < \Delta$, the insider is excluded and there are social gains of $Q_O - Q_I + K_O - C_{max}$ relative to the simple second price auction. If $1 < \alpha\theta$ then $C_{max} - K_O + \frac{K_O - K_I}{\alpha\theta} > \frac{C_{max} - K_I}{\alpha\theta}$ and if $1 > \alpha\theta$ then $C_{max} - K_O + \frac{K_O - K_I}{\alpha\theta} < \frac{C_{max} - K_I}{\alpha\theta}$, so discretion is beneficial if and only if $\Delta > \text{Max} \left[C_{max} - K_O + \frac{K_O - K_I}{\alpha\theta}, \frac{C_{max} - K_I}{\alpha\theta} \right]$. If $1 > \alpha\theta$ and $\frac{C_{max} - K_I}{\alpha\theta} \geq \Delta$, then discretion reduces consumer welfare. If $1 < \alpha\theta$ and $C_{max} - K_O + \frac{K_O - K_I}{\alpha\theta} \geq \Delta$, then discretion does not impact consumer welfare.

Proof of Proposition 2: If the insider has made a cost-cutting investment, he is a low-cost/low-quality provider: In a regulated second price auction without exclusion, the insider always reduces quality to win the bid. Consumer welfare is equal to $Q_O - \Delta - K_O$.

As $K_O > K_I$ and $\Delta > C_{max} - K_O$, then the insider is excluded from the auction if there are no bribes. Again, bribes can either leave both bidders in the auction or exclude the outsider.

Following the logic of the proof of proposition 1, if $1 > \alpha\theta$, then a corrupt bargain to exclude the outsider occurs if and only if $\frac{C_{max} - K_I}{\alpha\theta} \geq \Delta$. If $1 < \alpha\theta$ and $C_{max} - K_O + \frac{A}{\alpha\theta} > \Delta$, then there is a corrupt bargain with the insider, but as we assume that $\Delta > C_{max} - K_O + A$, there is never a corrupt bargain when $1 < \alpha\theta$ and so the insider earns zero profits if he has cut quality.

If $\frac{C_{max} - K_O + A}{\Delta} < \alpha\theta < 1$, then the insider is included and so earns zero profits. If $\frac{C_{max} - K_O + A}{\Delta} > \alpha\theta$, then the outsider is excluded, the insider wins the auction, pays a bribe of $(1 - \beta)\alpha\Delta + \frac{\beta}{\theta}(C_{max} - K_O + A)$, and so earns total profits of $(1 - \beta)(C_{max} - K_O + A - \alpha\theta\Delta)$.

If the insider does not cut costs, his quality is the same as the outsider's and $K_0 < K_I$, so the default is not to exclude anyone and for the insider to earn zero profits. If $\alpha\theta > 1$, the outsider is not excluded and the insider loses the auction. If $\alpha\theta < 1$, the outsider is excluded and the insider wins and earns profits after bribes of $(1 - \beta)(1 - \alpha\theta)(C_{max} - K_0 - A)$.

If $\alpha\theta > 1$, the insider earns zero profits whether or not he cuts costs. By assumption he does not make the investment and so is not excluded from the auction. The auction therefore yields consumer welfare of $Q_0 - K_0 - A > Q_0 - \Delta - K_0$.

If $\frac{C_{max} - K_0 + A}{\Delta} < \alpha\theta < 1$, the insider earns zero profits if he cuts costs, but positive profits if he does not. In this range, he does not invest and consumer welfare is $Q_0 - C_{max} > Q_0 - \Delta - K_0$.

If $\frac{C_{max} - K_0 + A}{\Delta} < \alpha\theta$, he earns profits after bribes of $(1 - \beta)[(C_{max} - K_0 - a) - (C_{max} - K_0 - a)\alpha\theta]$ if he does not cut costs, and $(1 - \beta)[(C_{max} - K_0 + A) - \Delta\alpha\theta]$ if he does.

Discretion then leads to quality cuts if and only if $\alpha\theta < \frac{a+A}{\Delta - C_{max} + K_0 + a} < \frac{C_{max} - K_0 + A}{\Delta} < 0$. In that case, consumer welfare is $Q_0 - \Delta - C_{max}$, which offers the worst case scenario of maximum price and minimum quality.

Proof of Proposition 3: A corrupt bargain can occur which will decide both on a bribe level and the level of transparency. The corrupt bargain if it occurs will maximize the joint surplus of both the PE and the contracting insider. If there is no bribe, the PE sets $\pi = 1$, since added competition reduces costs and raises social welfare. In that case, the insider receives zero profits. The insider's profits equal $C_{max} - K_I$.

If there is no law, a corrupt bargain to reduce transparency selects the bribe to maximize $(\alpha(1 - \pi_L)(K_I - C_{max}) + B)^\beta ((1 - \pi_L)(C_{max} - K_I) - \theta B)^{1-\beta}$, subject to the constraint that $\frac{(1-\pi)(C_{max}-K_I)}{\theta} \geq B \geq \alpha(1 - \pi_L)(C_{max} - K_I)$, or $(C_{max} - K_I) \left(\frac{1}{\alpha\theta} - 1\right) \geq 0$. Hence if $\alpha\theta > 1$, the PE sets $\pi = 1$. If $\alpha\theta < 1$, the PE sets $\pi = \pi_L$, and the bribe is $B = \left(\frac{\beta}{\theta} + (1 - \beta)\alpha\right) (1 - \pi_L)(C_{max} - K_I)$.

If there is a law, a corrupt bargain to reduce transparency selects the bribe to maximize $(\alpha(1 - \pi_L)(K_I - C_{max}) + B - \alpha z)^\beta ((1 - \pi_L)(C_{max} - K_I) - \theta B)^{1-\beta}$, subject to the constraint that $\frac{(1-\pi)(C_{max}-K_I)}{\theta} \geq B \geq \alpha(1 - \pi_L)(C_{max} - K_I) + \alpha z$, or $(C_{max} - K_I) \left(\frac{1}{\alpha\theta} - 1\right) \geq z$. Hence if $\alpha\theta > \frac{C_{max} - K_I}{C_{max} - K_I + z}$, the PE sets $\pi = 1$. If $\alpha\theta < \frac{C_{max} - K_I}{C_{max} - K_I + z}$, then the PE sets $\pi = \pi_L$, and the bribe is $B = \left(\frac{\beta}{\theta} + (1 - \beta)\alpha\right) (1 - \pi_L)(C_{max} - K_I) + (1 - \beta)\alpha z$.