

Working paper



# Guardians of accountability

A field experiment on corruption and inefficiency in local public works



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## **Guardians of Accountability: A Field Experiment on Corruption & Inefficiency in Local Public Works\***

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In the construction of public works, the lack of accountability manifests as corruption and inefficiency. Will civil society oversight that is explicitly supported by the relevant authority strengthen accountability? Or will it demoralize and frighten officials, thus causing delays? To answer these questions, the study builds on a sample of 200 urban and peri-urban district governments in Peru. Half of the districts were randomly selected to enter into a control group. The other half received letters indicating that specific public works under their charge were being monitored by a civil society organization with the support of the country's leading anti-corruption agency. The results suggest that, even as districts in the two groups completed public works at a similar rate, the intervention lowered the cost of these public works by a substantial amount. The monitoring intervention resulted in efficiency gains.

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## **Introduction:**

*Lava Jato*, Latin America's largest corruption scandal to date, began unfolding in March of 2014. The scheme involved construction companies colluding with employees of Brazil's state-owned oil company Petrobras to win public works contracts (Fuentes 2016). Petrobras employees took bribes, while politicians obtained kickbacks as personal gifts or campaign donations (Segal 2015; Smith, Valle and Schmidt 2015).

The relevant scholarship had warned that corruption could result in public works being constructed at inflated costs (e.g., Flyvbjerg and Molloy 2011). However, such warnings were ignored, and so the people involved in the Petrobras affair managed to steel billions of state dollars (Leahy 2016; Sandy 2016). Prosecutors further revealed that bribes paid by Odebrecht, the region's largest construction group, extended to eleven other countries besides Brazil (DOJ 2016). In Peru, 29 million dollars were paid to secure public works contracts worth nearly five times that amount (ibid.).

*Lava Jato* is thus as a prominent example of the corruption impacting the region. This corruption contributes to some of Latin America's other problems—from the lack of political legitimacy (Seligson 2002) to slow economic growth (Kaufmann and Wei 1999). In sector after sector, corruption generates inefficiencies (Kaufmann 1997 116). It incentivizes delays in public procedures (Mauro 1995 685), and requires that resources be spent hiding evidence of quid-pro-quo transactions (Rose-Ackerman 1978 8).

To improve on this situation, some have called for enhancing government accountability. Doing so would require strengthening both mechanisms of answerability and enforcement (O'Donnell 1994 61; Schedler 1999 14-15 & 17; Mainwaring 2003 7). On the one hand, answerability is the requirement that officeholders communicate and explain their actions (Dahl 1971 3 & 20; Day and Klein 1987 4; Dahl 2000 97; Stokes 2001 6; Rose-Ackerman 2005 5). On the other hand, enforcement is the assurance that officeholders will be held responsible for their behavior (Fox 2007 668; Mungiu-Pippidi 2015 33). Among the mechanisms that promote answerability, there are independent auditing offices (Klitgaard 1988 83; Manin, Przeworski and Stokes 1999a 24), and online platforms that track government activity (Meijer 2009 258-259). Ultimately, however, government accountability depends on more than the ability to gather information about officials' activities.

Answerability will only work if wrongdoers face the risk of punishment (Becker 1968; Becker and Stigler 1974). This is a theory that receives some attention in the empirical literature. For instance, in Buenos Aires, Di Tella and Schargrotsky (2003) find that government crackdowns on corruption reduce price padding and kickbacks in government procurement by up to 18%. Ferraz and Finan (2011) analyze local corruption data obtained from audits conducted by Brazil's federal government. They show that the threat of being removed from office significantly reduces official malfeasance. In India, Duflo and coauthors (2013) conduct a field experiment on nearly five-hundred polluting factories. They find that rigorous audits contribute to a reduction in toxic emissions, presumably because noncompliance with environmental regulations can be punished by factory closure or a fine.

These studies are part of a greater effort to understand the factors that can contribute to increasing the accountability of government officials (for additional examples see: Reinikka and Svensson 2005; Banerjee et al. 2011; Lagunes 2012). Nonetheless, studies such as these also leave some questions unanswered. For instance, a primary concern is that the people driving the anti-corruption efforts could themselves become corrupt (Olken 2007 201).<sup>1</sup> Experts provide some recommendations on how to keep these actors honest (Manion 2004 16; Ferraz and Finan 2008 708, 728 & 731). Nonetheless, even if steps are taken to limit their corruptibility, there is yet another concern: the costs associated with anti-corruption monitoring.

Oversight can be expensive (Lupia and McCubbins 1994 104). Furthermore, bureaucratic surveillance may hinder efficiency by demoralizing and distracting officials, and by fostering an ethos of excessive caution (Banfield 1975 590; Anechiarico and Jacobs 1996 176). Klitgaard and coauthors (2000 35) warn that, “We might spend so much money attacking corruption, or generate so much red tape and bureaucracy, that the costs and losses in efficiency would outweigh the benefits of lower corruption.” Thus, taken together, it may be said that anti-corruption efforts are worthwhile, but only as long as the social gains obtained from said efforts are appreciably greater than their cost (Rose-Ackerman and Palifka 2016 205-206).

The present study evaluates the costs and benefits of anti-corruption monitoring of public works with a field experiment in Peru that combines so-called *police patrol* and *fire alarm* monitoring. In the political science literature, both terms are used to describe distinct modes of oversight. On the one hand, *police-patrol* monitoring involves an active and direct approach to

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<sup>1</sup> As asked by the Roman poet Juvenal: “Sed quis custodiet ipsos custodes?” or “But who will guard the guardians?”

uncovering violations to established goals (McCubbins and Schwartz 1984 166). On the other hand, *fire-alarm* monitoring is a reactive and nonsystematic approach to uncovering the same sort of violations (ibid.). A key distinction between both forms of oversight is that the former is centralized, while the latter is often led by citizens (McCubbins, Noll and Weingast 1987 249-250). Mindful of this difference, the present research project builds on a few assumptions.

For one, as the beneficiaries of tax-funded infrastructure, citizens have a vested interest in the effective supervision of government performance. In this sense, they may be the least susceptible to corruption, which helps explain why some have championed their involvement in promoting accountability (Smulovitz and Peruzzotti 2000). However, these same citizens often lack the time and expertise required to oversee the execution of public works. They should, therefore, trust civil society organizations (CSOs) with some of the responsibility of monitoring government. CSOs are often better equipped to detect corruption than the average citizen. Moreover, their independence from government and private interests helps keep CSOs true to their mission.

Of course, anti-corruption agencies also have the expertise required to perform monitoring activities. Moreover, these agencies have the exclusive power and the official responsibility of punishing corruption, but these same agencies face a fundamental challenge: they have vast areas of responsibility and insufficient resources to monitor all areas of vulnerability. Therefore, the study's guiding hypothesis is that CSO monitoring that is supported by the relevant authorities will result in the timely and cost-effective execution of public works.

To test this hypothesis, the researcher entered into a formal collaboration with two organizations in Peru. The first is *Proética*, a reputable CSO based in Lima that enjoys extensive experience promoting ethical conduct in public administration. The second is the Comptroller General's Office (in Spanish, the *Contraloría General de la República*), which serves as the national agency responsible for auditing, evaluating, and investigating all government activities.

Jointly, the CSO and the anti-corruption agency targeted small-scale infrastructure projects being executed by 200 district governments spread across the country. Half of the districts in the sample were randomly selected to enter into a control group and, thus, did not receive the intervention. The other half received an extended audit treatment, which may be described in the following terms:

- Via a formal and personalized letter, the CSO informed each mayor that it planned to monitor one of the infrastructure projects under his charge. The specific infrastructure project in question was clearly identified in the letter.
- Soon after, the anti-corruption agency sent an official letter of its own. The letter informed each mayor that the agency was awaiting the results of the CSO's monitoring activities; thus, acknowledging a level of cooperation between both organizations.
- Months later, the CSO again contacted the same list of mayors. In this new letter, the CSO reminded each mayor that the monitoring was ongoing. The letter also highlighted irregularities detected up to that point in order to demonstrate that the CSO had the capacity to uncover problems in the execution of public works.
- The previous letter was soon followed by a final letter from the anti-corruption agency noting that its collaboration with the CSO continued.

The results show no significant difference in the rate of execution of public works between the two experimental groups. However, with regards to cost, public works in the treatment group appear to be 51.39% less expensive than their untreated counterparts. Randomization inference with control variables suggests that, on average, the intervention reduced the cost of public works by 243,000 Peruvian soles (or 75,000 USD) per public work. This result is significant at the six percent level with a one-tailed test.

Thus, anti-corruption auditing may have triggered fear among the public officials responsible for the execution of public works, but that fear did not result in the deceleration of their work. Instead, there is evidence that the collaboration between a CSO and the relevant authority reined in costs in the process of building roads, sidewalks, and other public works.

The paper proceeds as follows. Section II reviews the relevant literature, paying special attention to the literature on corruption in public infrastructure development. The section ends by highlighting the need to empower civil society in the fight against corruption. Section III provides contextual information about the setting where the field experiment was conducted. Section IV describes the field experiment in detail. Finally, sections V and VI describe the study's results and offer a conclusion.

## II. Curbing Corruption in Public Works:

There is general consensus that both corruption and inefficiency are symptoms of an unaccountable bureaucracy. They are closely related phenomena that lead to suboptimal outcomes, such as the execution of public works at inflated costs. Because corruption and inefficiency occur where information asymmetries empower officials over the members of the public, one of the strategies available for improving bureaucratic responsiveness is to reduce these asymmetries by granting citizens information about public sector performance. Another strategy is to provide organized civil society with similar information, but also with the support of the relevant authorities so that, together, they may work to curb corruption and inefficiency in government.

### *Corruption & Inefficiency in Public Works:*

Bureaucratic responsiveness is observed when unelected government officials act in the public interest.<sup>2</sup> Admittedly, defining the public interest is a complex affair (Manin, Przeworski and Stokes 1999a). Not everyone agrees on what is and is not to the benefit of the public (Schumpeter 1950 [1942] 251). But assuming that there is a latent public interest, seldom can it be measured or revealed simply by aggregating individuals' preferences.<sup>3</sup>

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<sup>2</sup> For a discussion about the definition of bureaucratic responsiveness see: Saltzstein, Grace H. "Conceptualizing Bureaucratic Responsiveness." *Administration & Society* 17.3 (1985): 283-306.

<sup>3</sup> Measuring the public interest by aggregating individuals' preferences is problematic insofar as the results risk being determined by arbitrary factors (Arrow 1963; Condorcet 2010 [1785]). Alternative approaches to realizing the public interest are not without problems of their own. For instance, emphasizing unanimity rule, in the tradition of Wicksell (2010 [1896]) and Buchanan (1967), will prove exceedingly costly. Government would stand paralyzed if every policy decision required uniform support from the citizenry.

Given the controversy surrounding the idea of a public interest, there is an advantage to recognizing that the concept of government failure is less contentious. In this sense, some have altered the conceptual focus and directed it toward bureaucratic *unresponsiveness*. Among them, Besley (2006 101) notes that there is widespread agreement that corruption and inefficiency are symptoms of an unaccountable government.<sup>4</sup> In fact, both corruption and inefficiency can be thought of as different forms of waste (Bandiera, Prat and Valletti 2009). The key distinction is that corruption—which may be understood as *active waste*—entails personal gain by a public official, while inefficiency—as a form of *passive waste*—does not (ibid.). In other words, while corruption may involve public officials embezzling the resources that would have gone toward building new roads, inefficiency occurs when resources—such as time, energy, or capital—are not expended in a manner that most directly furthers an agency’s official goals.

Given that corruption and inefficiency are related pathologies, a bureaucracy that is affected by one is likely also affected by the other. Indeed, there is empirical evidence that corruption and inefficiency are strongly correlated (Dal Bó and Rossi 2007). There is also evidence that bureaucratic delays incentivize bribery (Mauro 1995), which serves to show that corruption and inefficiency often enjoy a mutually reinforcing relationship.<sup>5</sup> It is, thus, unsurprising that anti-

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<sup>4</sup> With regards to corruption, a survey finds that a vast majority of countries’ citizens condemn the practice (Gatti, Paternostro and Jamele 2003). Similarly, according to a regional poll, there are many more Latin Americans who do not approve of corruption compared to those who do (Corporación Latinobarómetro 2002).

<sup>5</sup> In a similar vein, corruption may be assumed to breed an environment in which officials are unmotivated to work energetically to advance the government’s official goals (Chand and Moene 1999 1135).

corruption agencies, including the one featured in this study, have the dual mandate of fighting both corruption *and* inefficiency.<sup>6</sup>

One of the areas where corruption and inefficiency can have the greatest negative impact is in the construction of public infrastructure. The terms public infrastructure or public works refer to space-specific goods, such as parks, roads, and bridges, built with at least some government funding.<sup>7</sup> For centuries, public works have been known to play a fundamental role in any society (Smith 1976 [1776] IV, chap. IX). Communities lacking in public infrastructure are disconnected, finding it difficult to attract investment and promote economic development (Sachs et al. 2004). Aware of this, the United Nations (2016) included infrastructure investment among its priorities for sustainable development.

However, ensuring that communities in the developing world have universal access to basic infrastructure requires contending with the aforementioned issue of waste, especially the type of waste most directly associated with corruption. Transparency International (2008; 2011) finds that public works is one of the sectors with the highest corruption vulnerability in emerging markets. Corruption can target a public infrastructure project at any of five stages, including procurement and construction (Wells 2014 24). In the construction stage, developers can scheme to increase the contract sum in an attempt to increase profits or to recover whatever was paid in bribes during the procurement stage (*ibid.*).

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<sup>6</sup> Article 2 of the Peruvian law governing the activities of the Office of the Comptroller General dictates that the agency must promote the efficient and transparent use of state resources (Congreso de la República 2001a).

<sup>7</sup> For the technical definition of term “infrastructure” see Prud’homme (2005).

On the subject of bribes, since the Foreign Corrupt Practices Act was enacted, infrastructure has featured prominently in prosecutions (Ernst & Young 2012). The average bribe payment made in public infrastructure development is calculated between 5 and 20 percent of construction costs (Kenny 2006 4). Estimates of financial losses to corruption in the sector are estimated between 15 to 30 percent per year (Hawkins 2013 in Saint-Martin 2015). Still, it would be incorrect to assume that corruption in this area is restricted to bribery.

Funds targeting a particular project may be diverted or captured by elected and non-elected officials (TI 2005 19). Developers might rely on fewer or lower quality raw materials than what they officially report, thus reducing the intended resilience of roads, bridges, and other government-funded structures (Tanzi and Davoodi 1997; Tanzi and Davoodi 1998). Developers might also cause deliberate delays intended to create new opportunities to renegotiate the contracting price (Engel, Fischer and Galetovic 2009). Practices of this sort are common enough that, according to one study, cost overruns of fifty percent are the norm worldwide (Flyvbjerg 2005).<sup>8</sup>

In an illuminating case on the subject, Straub (2015) studies the cost overruns of two massive dams in Paraguay, which have introduced distortions in the country's energy and labor markets. Similar distortions are observed where corruption leads officials to champion developers' preferred projects while ignoring the more socially desirable ones (Mauro 1998 264; Wampler 2007 27). Such distortions help explain why corruption reduces the contribution that investment in public infrastructure has on economic growth (Del Monte and Papagni 2001).

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<sup>8</sup> For additional examples of how corruption affects the development of public infrastructure see the Global Infrastructure Anti-Corruption Centre's report (Stansbury and Stansbury 2008).

### *Reducing Information Asymmetries:*

Two salient reasons have been put forth for why infrastructure is especially prone to corruption. First, the vast amount of capital committed to infrastructure development is thought to create opportunities for rent-seeking behavior (Castalia 2004 7). Second, as Collier and Hoeffler (2005) explain, public infrastructure is especially vulnerable to corruption because the sector relies on idiosyncratic capital, meaning that it is difficult to standardize the cost of projects. This lack of standardization, in turn, allows developers and government officials to take advantage of the taxpaying public's ignorance about the cost of building infrastructure.<sup>9</sup>

Because information asymmetries lie at the center of the corruption problem, transparency plays a pivotal role in promoting general accountability (Fung, Graham and Weil 2007; Kosack and Fung 2014). Empirical studies even reveal inverse correlations between corruption and freer flows of information about bureaucracies.<sup>10</sup>

Yet there is another way that information affects the fight against corruption: having an accurate sense of the status quo is necessary to measure the gains from anti-corruption efforts (Rose-Ackerman and Palifka 2016 14). Aware of this, researchers have set out to develop new

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<sup>9</sup> In the words of a group dedicated to raising accountability in infrastructure: “No two construction projects are the same making comparisons difficult and providing opportunities to inflate costs and conceal bribes” (Matthews 2016).

<sup>10</sup> Lindstedt and Naurin (2010) conduct cross-country analysis using the World Bank's index of corruption. They find that increased transparency is associated with lower levels of perceived corruption. Another study finds that public disclosure rules for parliamentarians are also associated with lower levels of perceived corruption (Djankov et al. 2010). Similarly, Islam (2006) looks at the relationship between Freedom of Information Acts (FOIA) and several governance indicators, including, once again, the World Bank's index of corruption. The results from Islam's cross-country analysis shows a strong correlation between having FOIA and better governance.

methods for measuring corruption. Aiming to uncover corruption in the infrastructure sector, Golden and Picci (2005; 2006) innovate by indexing corruption across Italy's twenty regions as a rate of return to government spending. Essentially, they combine two datasets in order to measure infrastructure output per unit of public funding. The intuition behind this effort is summarized in the following terms: "all else equal, governments that do not get what they pay for are those whose bureaucrats and politicians are siphoning off more public monies in corrupt transactions" (Golden and Picci 2005 41). In the case of Italy, the authors find that the leakage is the work, mainly, of bureaucracies in the southern half of the country.

A different measurement strategy involves identifying inconsistencies between two sources of data, such as administrative data or primary data collected through an audit (for a review see: Sequeira 2012 153-160). As a prominent example of this approach, Olken (2007) conducted a field experiment in over 600 Indonesian villages to test the effectiveness of anti-corruption monitoring on the construction of roads. Villages were randomly assigned to one of three groups. One group served as control, while the other two received different forms of monitoring—specifically, monitoring by the central government audit agency and monitoring from villagers. Applying Political Science terminology, the central government audits were meant to activate *horizontal accountability*, while the monitoring from villagers aimed to activate *vertical accountability* (O'Donnell 1999).<sup>11</sup>

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<sup>11</sup> On the one hand, horizontal accountability describes accountability mechanisms that take place between actors of equal power. In government, horizontal accountability is when one government agency controls and sanctions another government agency. On the other hand, vertical accountability, describes accountability between unequal actors, such as between citizens and government or between civil society organizations and government. For a review of the two concepts, see: Schedler (1999).

To measure corruption, the researcher led a team of professionals in generating independent estimates of the amount that each project in the participating villages should cost. The estimates built on three sources of information: first, from engineers digging out portions of the roads to gauge the quality of the public works; second, from enumerators conducting surveys in local markets to calculate the actual price of the materials used; and third, from calculations of local labor costs. The estimates were then compared to the amount that the villages reported they spent on constructing the new roads. The gap between the two sums averaged about 24 percentage points, indicating the total amount of funds that were likely embezzled.

Olken concludes that central government audits are more effective than grassroots monitoring in curbing corruption. However, his study also shows that villagers play a non-trivial role in promoting accountability. Considering that central government audits are especially effective where village heads plan to run for reelection, it seems that the threat of a community response is what gives this form of oversight much of its strength.<sup>12</sup> From a normative standpoint, another point to consider is that involving local communities in monitoring government is important to realizing democratic principles.<sup>13</sup>

Still, there are notable challenges associated with implementing mechanisms of vertical accountability. Citizens dedicate a majority of their time to private affairs and are often confused, if not repelled, by the complexities of public administration. The illiteracy and poverty found in

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<sup>12</sup> For a discussion regarding this issue see: Jonathan Fox's "Social Accountability: What Does the Evidence Really Say?" *World Development* 72 (2015): 346-361.

<sup>13</sup> The World Bank's flagship report called for community participation in monitoring and disciplining public officials (World Development Report 2004). The idea being that citizens should have greater control in the process of governing (Arnstein 1996; Johnston 2014).

the developing world only adds to this challenge. The promise of citizen oversight is also dampened by the fact that studies show mixed results regarding its effectiveness. On the one hand, observational studies conducted in Uganda and Brazil reveal that citizens empowered with information about the performance of government are, in fact, better able to hold officials to account (Reinikka and Svensson 2005; Ferraz and Finan 2008). On the other hand, field experiments show that offering members of the public information on performance has no effect (Humphreys and Weinstein 2012; Lieberman, Posner and Tsai 2014); an effect that is limited to where electoral pressure runs high (Grossman and Michelitch 2016); or even a negative effect on electoral turnout (de Figueiredo, Hidalgo and Kasahara 2013; Chong et al. 2015).

The present study, thus, seeks to add to this literature by exploring the effect of empowering—not citizens directly, but instead—organized civil society to monitor the performance of local government officials. This approach is guided by the notion that organized civil society can seek, in a nonpartisan fashion, to promote government accountability (Diamond 1994 6), but only if they have the ability to threaten malfeasant officials with punishment (Lagunes 2012 142-186). Therefore, in addition to empowering organized civil society with information it is also necessary to grant them the support from the relevant authorities with sanctioning capacity.

### **III. Setting & Collaborators:**

Peru stands out in the region because of the weakness of its political parties (Levitsky and Cameron 2003). However, similar to its peers in Latin America, Peru is organized into three levels

of government. At the top tier, there are twenty-six regions, which are the rough equivalent of states in other countries.<sup>14</sup> These Peruvian states are subdivided into 196 provinces, which are, in turn, subdivided into 1,646 districts (INEI 2015).

The country's district governments are primarily headed by a mayor, who also presides over the five-member legislative council. Mayors are elected for four year terms without the immediate possibility of reelection (Staff 2015a).<sup>15</sup> Notwithstanding these term limits, starting in 2002, mayors have gained considerable political and financial power through the process of decentralization (Congreso de la República 2002). One concern with this dynamic is that decentralization has had the unintended consequence of spreading corruption (Muñoz 2014 4-5 & 9).

Whether decentralization is more pernicious than beneficial is a debated question that others have examined through cross-country analyses (e.g., Fisman and Gatti 2002; Fan, Lin and Treisman 2009). In the case of Peru, data reveals that the vast majority (54.73%) of corruption claims involve district governments; however, this may have less to do with decentralization per se and more to do with the fact that the country has a greater number of municipal governments

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<sup>14</sup> Peru was previously organized into twenty-five so-called departments. However, in 2002, a constitutional reform mandated the creation of regions. Although the term “department” is obsolete according to some sources, it is still used by some as a reference to the current regions in Peru. The departments are identical to today's regions, with the exception of the new constitutional province of Callao, which is also considered a region.

<sup>15</sup> Besides term limits, there are a few additional checks on the power of mayors. For one, Peruvian law allows district residents to initiate a recall process against a mayor (Congreso de la República 2001b). Tellingly, embezzlement appears as one of the most common reasons why people seek to initiate a recall (Tuesta 2014). Peruvian law also allows residents of a district to request the removal of councilmembers for reasons relating to corruption (Congreso de la República 2003). Between the years 2003 and 2012, around 35% of requests to remove a councilmember responded to corruption concerns (Muñoz 2014 9).

than provincial or state ones (Muñoz 2014 6).<sup>16</sup> In any case, the issue to highlight is that corruption is one of Peru's most pressing problems (Panfichi and Alvarado 2011 9).<sup>17</sup>

According to Transparency International (2016), Peru ranks 101<sup>st</sup> out of 176 countries, lagging behind six of its regional neighbors.<sup>18</sup> National surveys show that between 44 and 46 per cent of Peruvians view corruption as a central concern (Proética 2013; Proética 2015). Some have even calculated that corruption adds up to 2% of the country's GDP (The Economist 2015).

At the national level, corruption scandals are chronic, starting with the one that ended Alberto Fujimori's presidency in November of 2000. The scandal began with the release of a video showing Fujimori's secret-police chief bribing an opposition congressman (McMillan and Zoido 2004). Closer in time, former presidents Alan Garcia and Alejandro Toledo were questioned on account of home purchases in two of Lima's wealthiest neighborhoods (The Economist 2013; Staff 2013a). Suspicions were again raised when members of Garcia's administration were named in the vast, regional corruption scandal originating in Brazil (Flores 2017; The Economist 2017).<sup>19</sup> This same scandal also reached the doorsteps of former presidents Alejandro Toledo and Ollanta Humala (Reuters 2017).

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<sup>16</sup> The regional governments and central government are, respectively, responsible for 7.16% and 15.45% of the corruption claims received by the Office of the Comptroller General (Muñoz 2014 6).

<sup>17</sup> Panfichi and Alvarado (2011 9) blame Peru's corruption problem on a number of factors, such as: an institutional weakness on the part of the agencies responsible for promoting accountability; scarce professionalization of the bureaucracy; a lack of government transparency; scant citizen oversight; the generalized perception that impunity rules; and the prioritization of investigative approaches over preventive approaches to fighting corruption.

<sup>18</sup> According to the World Bank, the country's regulatory quality is at the 67<sup>th</sup> percentile, governance effectiveness is at the 49<sup>th</sup> percentile, and rule of law is at the 33<sup>rd</sup> percentile (Kaufmann, Kraay and Mastruzzi 2014).

<sup>19</sup> The Peruvian press also took issue with Garcia's *narco indultos*—that is, the decision to pardon four-hundred convicted drug traffickers (Tatone 2013).

But beyond the scandals, Peru's leading anti-corruption authority identifies public infrastructure development as particularly vulnerable to corruption (CGR 2009). This is the same agency that investigates claims of corruption affecting public works. One such claim reads as follows:

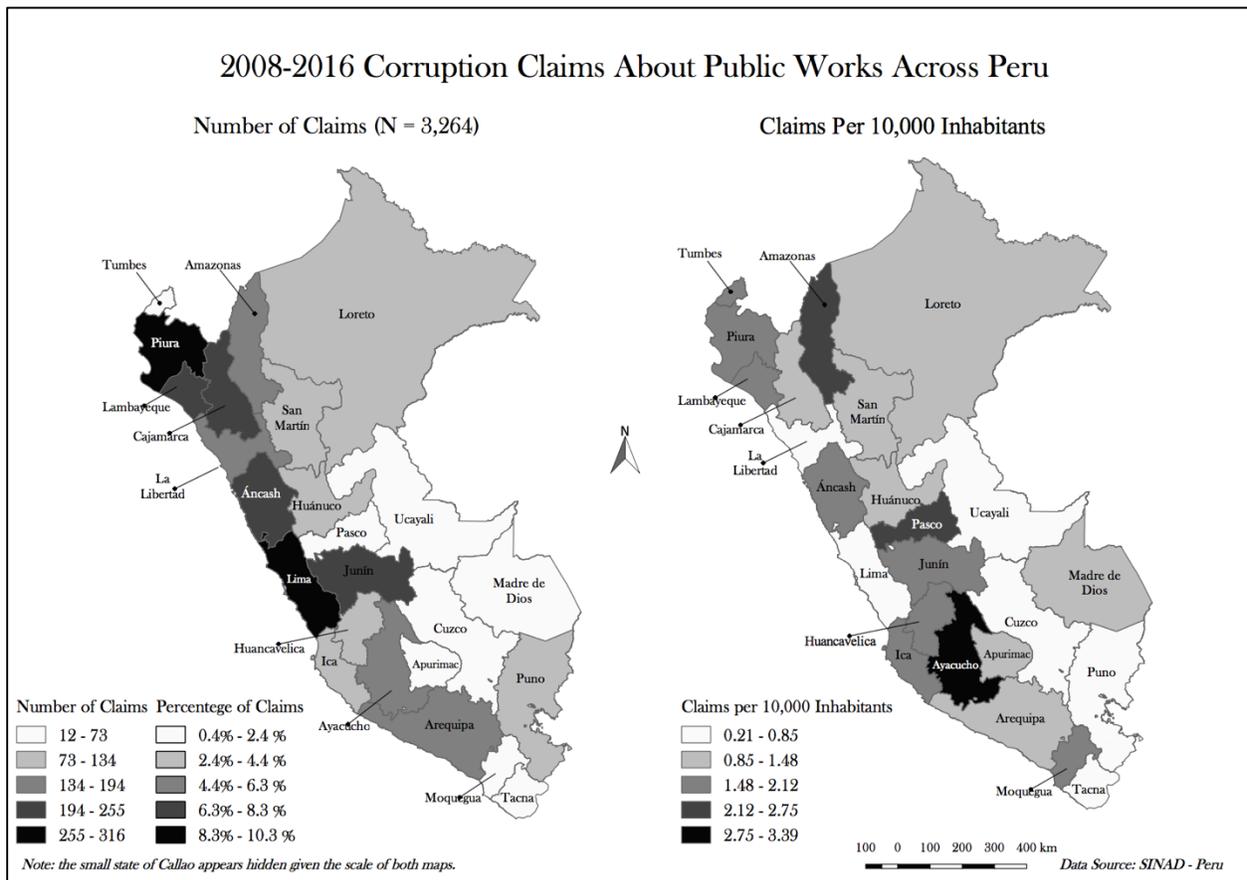
[The plaintiff] complains that the director [...] inflated the cost of public works, used false orders and receipts in the purchase of construction materials, and embezzled funds meant for maintenance (author's translation).

Corruption claims such as this one echo a core lesson from some of the previously referenced studies (e.g., Olken 2007, Golden & Picci 2005, and Flyvbjerg & Molloy 2011). Specifically, that the machinations of corrupt officials often result in the leakage of government resources.

Building on more than three-thousand claims of corruption similar to the one featured above, the following maps provide a visual representation of the risks targeting public infrastructure development across Peruvian states (see Figure 1). The main difference between the two maps is that the one on the left reflects the raw number of corruption claims per state, while the one on the right is based on a calculation of corruption complaints per 10,000 inhabitants. Thus, even if the map on the left shows Piura and Lima as concentrating the greatest number of corruption claims, the map on the right signals that the issue of corruption in public infrastructure is relatively strongest in Ayacucho, followed by Pasco and Amazonas. Curiously, neither map reflects clear trends across the coast, Andes, or jungle. However, in both maps, Ucayali, Cuzco, and Tacna appear as having the fewest corruption claims in absolute and relative terms. Finally, it

is worth noting that the small state of Callao, which appears hidden in these maps, presents the lowest rate of corruption complaints per 10,000 inhabitants.<sup>20</sup>

Figure 1



<sup>20</sup> For additional texture, news reports offer detailed examples of corruption in public works. For instance, one such report discusses the misallocation of funds earmarked for a bridge connecting the districts of Quiñota and Colquemarca in the state of Cusco (Pantoja 2013). In the northern state of Lambayeque, the municipality of Zaña purchased materials to build a sanitation plant at inflated prices (Staff 2014). Near the country’s southern pole, in the district of Chucuito, a 500,000 USD laboratory was abandoned long before its completion (Staff 2013b). Strikingly, at the start of 2015, authorities found another 339 projects in a similar state of paralysis. These stalled projects represent a potential loss of 500 million USD and a threat to key development goals, such as education, transportation, and sanitation (CGR 2015a).

The official responsibility for controlling corruption falls on a network of government actors.<sup>21</sup> Among them, the Office of the Comptroller General (or, in Spanish, *Contraloría General de la República*) stands out. The Office of the Comptroller General is an institution whose autonomy is guaranteed by the Constitution (Panfichi and Alvarado 2011 11). It leads the effort to oversee the country's public administration, mainly, by conducting audits (21). Audits that discover irregularities may be followed by a penalty, such as a formal admonishment, suspension, demotion, or dismissal (Congreso de la República 2001a). The Office of the Comptroller General can also refer cases for criminal prosecution (ibid.).

A nonprofit group that tracks global governance trends evaluated the Office of the Comptroller General. The final report recognizes the anti-corruption agency for its independence and professional staff (Global Integrity 2010). However, that same report warns that the agency would benefit from greater funding security (ibid.).

Both Freedom House (2011) and the U.S. Department of State (2015) raise a separate issue. They note that, because of deficiencies in Peru's prosecutorial system, corrupt officials are seldom punished. Once again, this is partly explained by the fact that the Office of the Comptroller General does not have sufficient resources to thoroughly investigate all the corruption complaints it receives (Remy 2005 134). However, impunity in Peru is also sustained by complications in the Judicial branch of government.

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<sup>21</sup> The institutions that most directly participate in corruption control are the Office of the Comptroller General, the Public Prosecutor's Office, the National Police, the Courts, and the Legislature (Panfichi and Alvarado 2011 19).

The Judiciary is responsible for hearing cases of corruption, but the institution is weighed down by a number of issues (Panfichi and Alvarado 2011 19).<sup>22</sup> Out of nearly seven thousand criminal charges initiated by the Office of the Comptroller General, the Courts followed up with only a few hundred cases (Montaño Pastrana 2015). A number of these cases may have contained errors that hindered prosecution (Defensoría 2014 277-278), but the general sense is that the Peruvian Judiciary could contribute more to the fight against corruption (Hunt 2006 331; Cameron 2015 2).

Despite the limits to the country's system of accountability, the relevant authorities have managed to prosecute a number of high-level corrupt officials (Staff 2015c). The public is significantly less tolerant of corruption today than during Fujimori's rule (Tanaka 2004 373). It is also noteworthy that national authorities have developed innovative approaches to controlling corruption. Case in point, in 2012, the Office of the Comptroller General enhanced its monitoring capacity by launching INFObras, an online platform that collects and publishes information about the execution of public infrastructure across the country (OECD 2014a 222; CGR & GIZ 2016). The INFObras platform publishes financial data, progress reports, pictures, and other relevant information about individual public works.<sup>23</sup> It even records citizen complaints regarding the execution of these infrastructure projects. As of this writing, there are over fifty-thousand public works registered on INFObras.

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<sup>22</sup> According to the 2016 Latinobarometro survey, 78.4 per cent of Peruvians have little or no confidence in their judiciary.

<sup>23</sup> See: <<https://apps.contraloria.gob.pe/ciudadano/>>.

The INFObras platform is an instrument that enhances government transparency. It empowers civil society by providing CSOs, reporters, neighborhood residents, and others information about how public moneys are spent by the state. Proetica is among those who use the INFObras platform. Proetica is also worth highlighting since it serves as a node in Transparency International's global advocacy network.

Founded in 2002, Proetica is a recognized sociopolitical actor in Peru. The CSO commonly conducts corruption investigations—the results of which it makes available to the relevant authorities, among them the Office of the Comptroller General. Proetica also promotes ethical conduct in public administration by developing and implementing anticorruption programs, contributing to strengthen the nation's governing institutions, and promoting democratic governance. For more than ten years, Proetica has conducted the National Survey on Corruption Perception in Peru to gauge people's perceptions about the incidence and severity of corruption in the country. Importantly, Proetica is civil society's representative in the country's High-Level Anti-Corruption Commission (in Spanish, *Comisión de Alto Nivel Anticorrupción*).

Making for a unique opportunity, both Proetica and the Office of the Comptroller General agreed to collaborate in the execution of the study.

#### **IV. Methodology:**

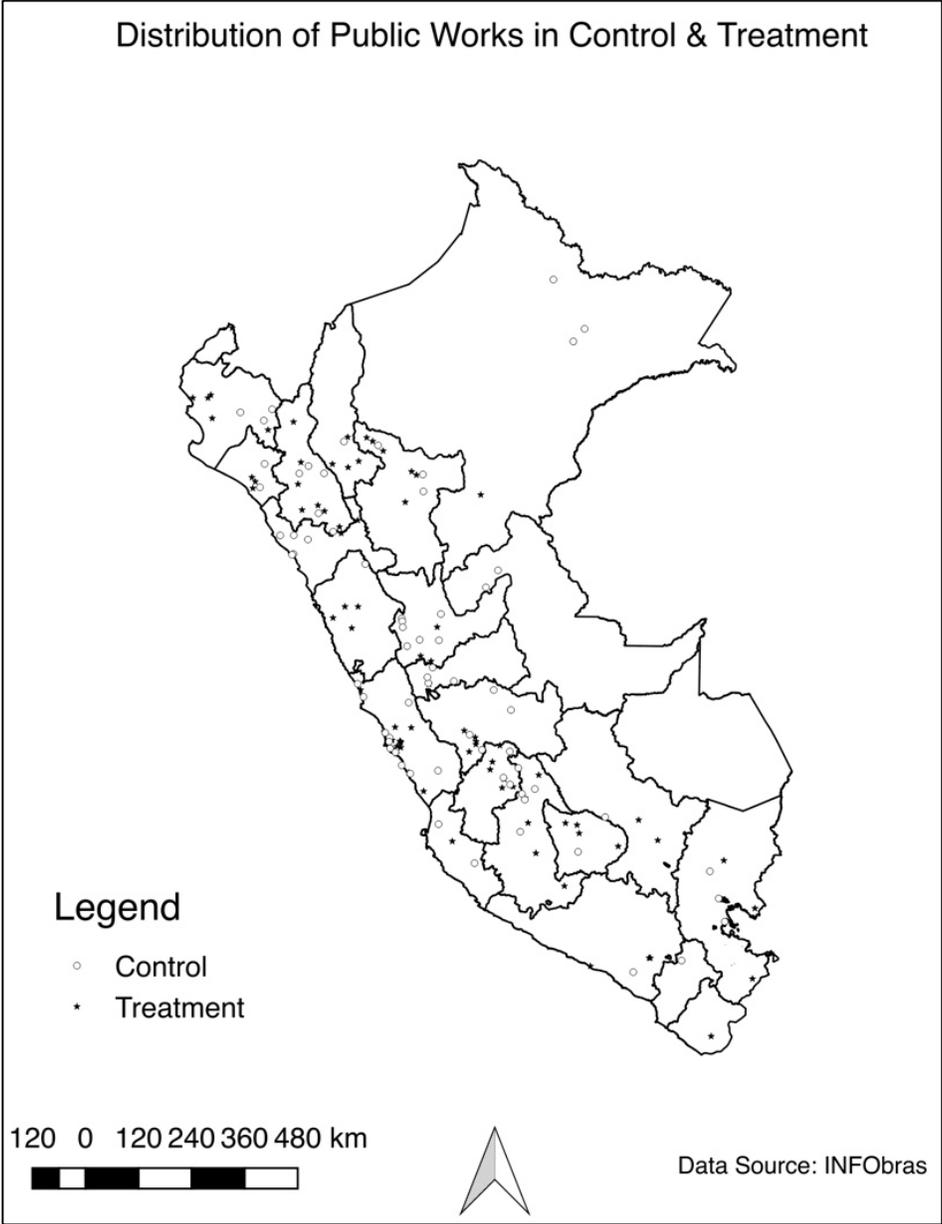
The study involved a field experiment on corruption control wherein a monitoring treatment was directed at district governments in Peru responsible for executing public works. The Central Government helped finance these public works through a program run by the Housing Ministry known as the *Programa de Mejoramiento Integral de Barrios* (PMIB).

In May and July of 2015, the Housing Ministry revealed that, as part of the PMIB's funding cycle for that year, it would support the execution of a series of public works (El Peruano 2015a; El Peruano 2015b). The public works listed in the two announcements included roads, sidewalks, exercise courts, public markets, and other miscellaneous projects. The Housing Ministry also announced the names of the generally small urban and peri-urban districts directly responsible for the execution of these public works. A majority of the district governments (specifically, 72.5%) received funding for only one public work. Meanwhile, 18.5% received funding for two public works, and 9% received funding for three to eight public works.

To be clear, the main units of analysis in the study are the district governments that participated in the Housing Ministry's 2015 PMIB funding cycle (see Figure 2). A majority of these district governments are located in western states near the coast and central states that cross the Andes. The sample also includes twenty-six districts in states located in the country's Amazonian region toward the east. The state with the greatest number of districts benefiting from

the PMIB program is Lima. Conversely, the states benefiting the least are on the country's margins toward the north, south, and east.<sup>24</sup>

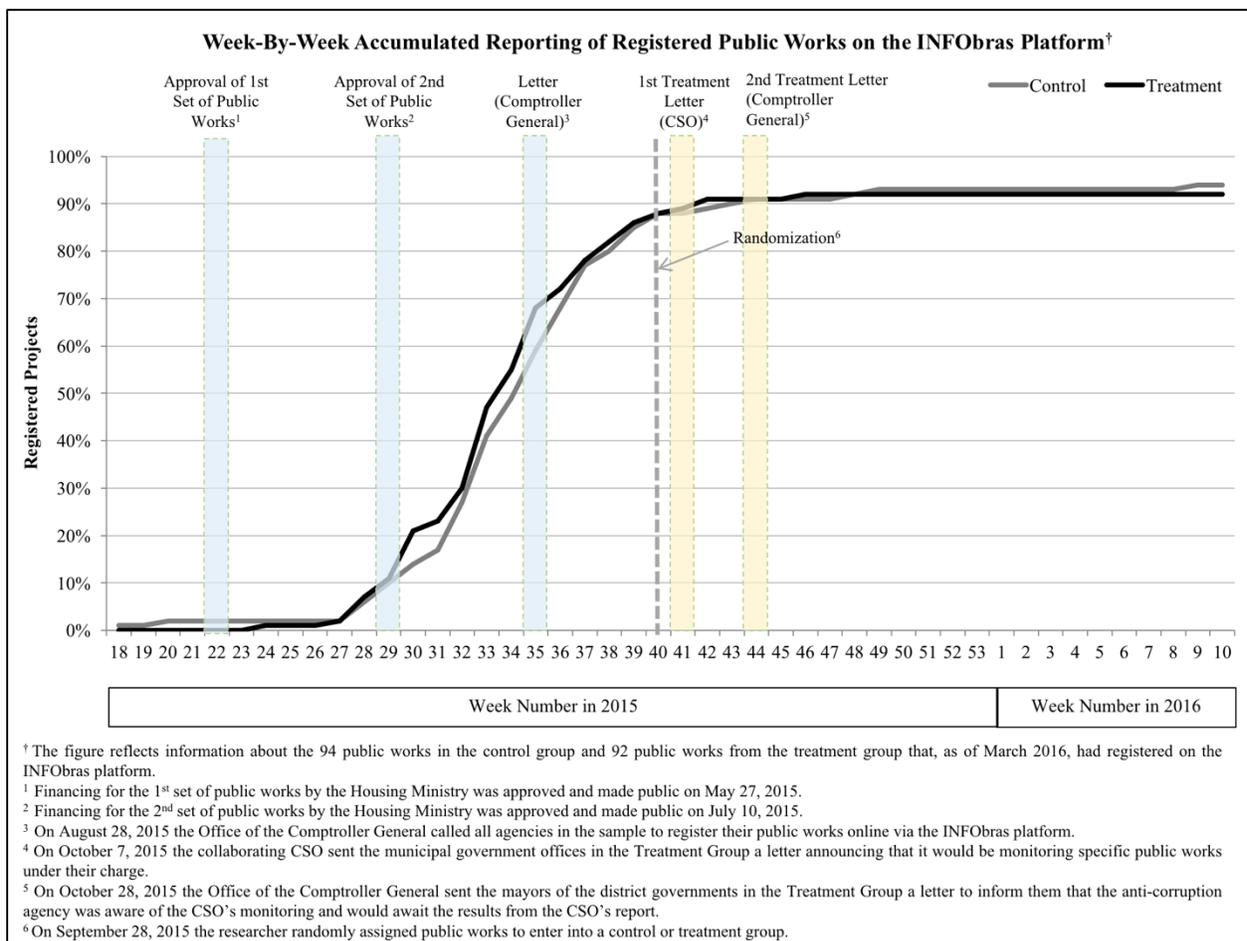
Figure 2



<sup>24</sup> Specifically, the states benefiting the least from the PMIB program are Madre de Dios, Moquegua, Tacna, and Tumbes.

Irrespective of their location, in late August, the Office of the Comptroller General sent a letter to *all* the district governments benefiting from PMIB funds in 2015. This initial letter served two purposes. First, it reminded mayors that they were required by law to publish information about public works under their charge via the INFObras platform. Without such a reminder, there was the risk that relying on INFObras for data about public works would bias the study’s results. However, as illustrated by Figure 3, the two experimental groups registered their public works at a comparable rate. In this sense, INFObras is an equally valid source of data for all projects in the sample.

Figure 3



As a next step, these 200 districts were randomly assigned to either control or treatment. Among the districts with PMIB funding for two or more public works, only one project was randomly selected to receive the monitoring treatment. The question, then, was whether randomization achieved balance between the two groups. The answer may be gleaned by studying Table 1, which shows that, out of twenty-eight variables, only three present incidental differences. These three variables are among the covariates included in the statistical analyses of the results.

Informed by census data (INEI 2007), the table also shows that the vast majority of districts in the sample are either categorized as middle- or low-income (92.5%). Additional information about the socioeconomics of these districts is reflected in the average rate of literacy of their populations (75.93%). With likely implications for grassroots accountability, only a small fraction of the people living in these districts (3.25%) benefit from a college education. Accountability goals are also constrained by the fact that only twenty-six out of two-hundred districts have an internal auditing unit.<sup>25</sup>

On a related subject, the table shows that districts in the sample are not accustomed to being audited. Over a four-year period, districts tended to be audited only twice. Importantly, there is no statistical difference in the probability of being audited for districts in control versus treatment. An imbalance in this variable, especially in the year 2016, could have skewed the study's results.

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<sup>25</sup> Audit data was provided by the Office of the Comptroller General.

Table 1

<b>Randomization Table<sup>†</sup></b>					
<b>Variables with Binary Values</b>					
Variable	N	Control (C) %	Treatment (T) %	Difference (C-T)	P-value (Two-Tailed) <sup>1</sup>
Geography: Andes	98	48.00	50.00	-2.00	0.89
Geography: Coast	76	39.00	37.00	2.00	0.88
Geography: Amazons	26	13.00	13.00	0.00	1.00
Top-Tier SEC Districts	15	6.00	9.00	-3.00	0.59
Middle-Tier SEC Districts	101	53.00	48.00	5.00	0.57
Bottom-Tier SEC Districts	84	41.00	43.00	-2.00	0.89
District has an Internal Auditing Unit	26	14.00	12.00	2.00	0.83
Project Type: Road	46	23.00	23.00	0.00	1.00
Project Type: Sidewalk	1	1.00	0.00	1.00	1.00
Project Type: Road and Sidewalk	88	52.00	36.00	16.00	0.03**
Project Type: Market	21	6.00	15.00	-9.00	0.06*
Project Type: Exercise Court	40	15.00	25.00	-10.00	0.11
Project Type: Other	4	3.00	1.00	2.00	0.62
<b>Variables with Continuous Values</b>					
Variable	Mean	Control (C) Mean	Treatment (T) Mean	Difference (C-T)	P-value (Two-Tailed) <sup>2</sup>
Provincial Land Ruggedness	656.90	657.70	656.10	1.60	0.80
District Land Ruggedness	324.80	325.10	324.50	0.60	0.98
District Population (2007)	28,390.00	25,280.00	31,470.00	-6,190.00	0.39
Percent of the Population that is Literate (2007)	75.93	76.59	75.27	1.32	0.37
Percent of the Population with a College Degree	3.25	3.32	3.17	0.14	0.39
No. of Public Works Executed by the District <sup>‡</sup>	13.07	12.56	13.58	-1.02	0.36
District Investment Efficiency (for 2014)	74.34	75.72	72.97	2.75	0.45
District Cost-Overrun Tendency	0.87	0.89	0.86	0.03	0.14
Corruption Complaints (Jan. 2009 - Apr. 2015)	9.53	10.04	9.01	1.03	0.78
Total Number of Audits (2012-2016)	2.03	1.88	2.17	-0.29	0.48
Total Number of Audits (2012-2015)	1.51	1.41	1.55	-0.14	0.18
Total Number of Audits (2016)	0.56	0.45	0.66	-0.21	0.58
No. of Sanctioned Officials (2012-2016)	13.88	14.00	13.76	0.24	0.61
PMIB Funding 2015	1,625,000.00	1,791,000.00	1,459,000.00	332,000.00	0.10
Project Verified Budget	2,777,000.00	3,119,000.00	2,438,000.00	681,000.00	0.07*

† The balance tests is based on an N of 200. Significance levels set at \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.  
‡ The number of public works executed is based on INF Obras data covering April 7, 2001 to September 7, 2015.  
<sup>1</sup> For binary values all P-values are calculated by conducting Fisher's exact test.  
<sup>2</sup> For continuous values all P-values are calculated by conducting two-tailed means comparison tests using the Wilcoxon Mann-Whitney method.

A few additional variables are worth highlighting from the table. For instance, *land ruggedness* represents the standard deviation for elevation data.<sup>26</sup> Thus, a smooth area in Peru

<sup>26</sup> Land ruggedness data was obtained from the Food and Agriculture Organization of the United Nations (Fischer et al. 2008).

might have a *land ruggedness score* of 36, while a highly-rugged area might have a *land ruggedness score* of 1,741. At the district-level, the variable captures some of the factors obstructing infrastructure development—after all, it is more challenging to build on uneven terrain. At the provincial level, the variable reflects the extent to which a district is accessible from the outside, for it is more difficult to reach a district surrounded by sloping hills. Using this information to interpret the ruggedness data in the table, one can see that, on average, the districts in the sample are not ideal for building and are only somewhat accessible.

Next, for a sense of how the district governments are managed, the Ministry of the Economy publishes data on the rate of public investment execution (MEF 2017).<sup>27</sup> The INFObras dataset is also useful for calculating the number of public works executed by the districts over a given time period, and for gauging the districts' tendency to overspend on public works. According to the table, on average, officials in the studied districts tend to complete fewer than one public work a year and generally fail to spend what was budgeted. At the same time, officials in these districts usually draw 9.53 corruption complaints a year.<sup>28</sup> In sum, the studied districts tend to be poorly administered.

Having confirmed the balance between the two study groups and having described the districts in the sample with some level of detail, the next step is to describe the intervention itself. Following the random assignment, districts in the control group were left untouched by the study's

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<sup>27</sup> This data is a relatively common measure of overall government performance (Loayza, Rigolini and Calvo-González 2014; Vasquez 2015; Pique 2017).

<sup>28</sup> Corruption complaints data was provided by the Office of the Comptroller General.

intervention.<sup>29</sup> As to the districts in the treatment group, these received a total of four letters over the course of fourteen months.

In early October, Proetica sent the first batch of letters warning that, as a civil society organization dedicated to the fight against corruption, it would be using INFObras to monitor the execution of local public works. A key paragraph in the letter read as follows:

In accordance with our mission, we have initiated rigorous and independent monitoring of a limited sample of public works implemented by the municipalities in Peru. For such monitoring we will be using, among other tools, the web system INFObras, which is administered by the Office of the Comptroller General. The law requires that governments register their public works on the platform.

Each letter in the batch was customized for the particular district government to which it was addressed: the salutation mentioned the mayor by name and the body of the text singled out the public work that would be monitored. Importantly, the letters also made note of the fact that Proetica would eventually share the results of its monitoring efforts with the Office of the Comptroller General and the general public.

Soon after receiving a copy of the CSO's first batch of letters, the Office of the Comptroller General mailed letters of its own. These letters were designed to let the mayors know that the anti-corruption agency was actively coordinating with Proetica on the monitoring of public works. The opening paragraph highlighted the agency's responsibility to ensure the proper use of public

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<sup>29</sup> It is, however, worth noting that, given the Office of the Comptroller General's powers and responsibilities, its agents were free to engage in monitoring of properties in either the control or treatment group. Similarly, neither the agency nor the CSO would limit their regular activities for the sake of the study.

resources. The letter's core paragraph stated that, for the purpose of supervising the execution of public works, the Office of the Comptroller General was relying on INFObras and Proetica. In general, the letter avoided giving the impression that the Office of the Comptroller was abdicating its responsibilities by leaving it up to civil society to monitor public works.

The second wave of the experimental intervention was launched a year later, once Proetica had been monitoring the public works for an extended period of time. In October of 2016, the CSO sent a new batch of letters to remind the mayors of the ongoing monitoring. Where applicable, Proetica highlighted specific irregularities that had been detected for a public work and even featured a color printout of a recent satellite image of the public work being monitored. The action of highlighting irregularities aimed to demonstrate CSO's ability to conduct effective audits with the available data. As to the satellite images, these were meant to highlight one of the tools the CSO had available to monitor physical progress in the execution of a public work.

Two months later, in December, the Office of the Comptroller General drew the intervention to a close with a final letter. This last letter noted that the agency continued to coordinate with the CSO on the monitoring of public works.

Together, the four treatment letters were expected to have a disciplinary effect on the behavior of local government officials. As compared with public works in the control group, the intervention was, mainly, hypothesized to improve the efficiency with which public works in the treatment group were executed. The treatment's impact was, thus, measured looking at the total

amount of funds required to complete the public works as communicated on the INFObras platform.

Notably, the study's design builds on the researcher's previous field experiment on corruption control in urban development, which was executed in collaboration with the City of Queretaro in central Mexico (Lagunes 2012). In that other study, building permit applications were randomly assigned to enter into a treatment group. Officials were made aware that, as an independent auditor, the researcher was carefully reviewing all the physical documentation for applications within this group. The same officials did not realize that another set of randomly selected permit applications were part of a comparison group and, thus, also subject to external monitoring. The results reveal that monitoring can spur greater diligence and stringency among officials, but only when there is the risk that they could be punished by their superiors for not enforcing the law.

The new field experiment tests whether the findings from the Mexico study apply in a different national context and in a different area of government, where the fruits of corruption control would be revealed as savings to the public treasury. While the previous study unfolded in a single government agency, the new field experiment treats distinct and geographically dispersed district governments. Finally, in this new study, the CSO took the place of the researcher as the external monitor, and the risk of a sanction was activated by the Office of the Comptroller General.

## **V. Results:**

Before inspecting the study's results, there is an issue with missing information that merits discussion. There are three public works in the control group and one in the treatment group with missing information on INFObras. These public works are excluded from the main analysis, thus reducing the sample size to 196 units. The balance table in the appendix demonstrates that the general comparability between the two experimental groups is unaffected by the removal of these public works. However, as is discussed later in this section, the issue of missing variables is also addressed with a robustness test using alternate data. The alternate data is made available by Peru's Ministry of the Economy, and is free of the missing values issue. A limitation, though, is that the alternate data is not updated as frequently and is not as fine grained as the INFObras data. For these reasons, the INFObras data is used for the main analysis, and the alternate data is used for robustness tests.

Besides missing four values, another issue worth highlighting about the INFObras data is that it is produced by an official recorder in each of the district governments being studied. In other words, INFObras relies on self-reported information. But there are three reasons one may trust that the data is useful for the study's purposes. First, official Peruvian auditors—that is, auditors who do not depend on the district governments, but are responsible for overseeing their work—are explicitly required to validate the information published on INFObras (CGR 2015c). Second, the researcher and the collaborating CSO validated the data published on INFObras by personally conducting field inspections of twenty-one public works in different areas of the country. All except for one of the public works were in the treatment group, since the priority was testing

whether what appeared to be a treatment effect could be trusted as such. Third, the researcher also examined satellite imagery to verify that public works that were reported as finalized were, in fact, completed (see Figure 4).

Figure 4



Images obtained via Google Earth (<https://www.google.com/earth/>)

Regarding the single district in the control group that received a visit, it was selected because of its proximity to a district in the treatment group. The two districts are separated by 16.6 kilometers or a mere seventeen-minute drive. The purpose of visiting the district in the control

group was, mainly, to test for the possibility of a spillover effect. Notably, not one of the officials in the district had any knowledge of the treatment letters or of the CSO's monitoring activity.<sup>30</sup>

An additional test of potential spillover effects was conducted by looking at the number of firms that were, at once, constructing public works in both control and treatment districts. If developers tended to have a hand in building public works across the two experimental groups, then the probability of a spillover effect was greater. However, out of two-hundred public works in the study, there was only one case of a firm building a pair of projects split between control and treatment.<sup>31</sup> Therefore, the probability that the study suffers from spillover effects appears limited. But assuming there are spillovers, it is important to consider that they would likely cause districts in the control group to act more like districts in the treatment group, thus biasing the results *against* a finding.

Turning to the study's results, nearly two years since the first treatment letter was issued, 87.23% of public works in the control group and 85.41% of them in the treatment group have reached completion. During the seven months that preceded the last round of data collection, the average rate of completion for all public works has remained relatively stable (see Figure 5).

A common trait among the lagging districts is that they are socioeconomically disadvantaged. Even if some of these poorer districts are able to accelerate the work, the observed trend in the execution rate is unlikely to change. Thus, based on these results, the first conclusion

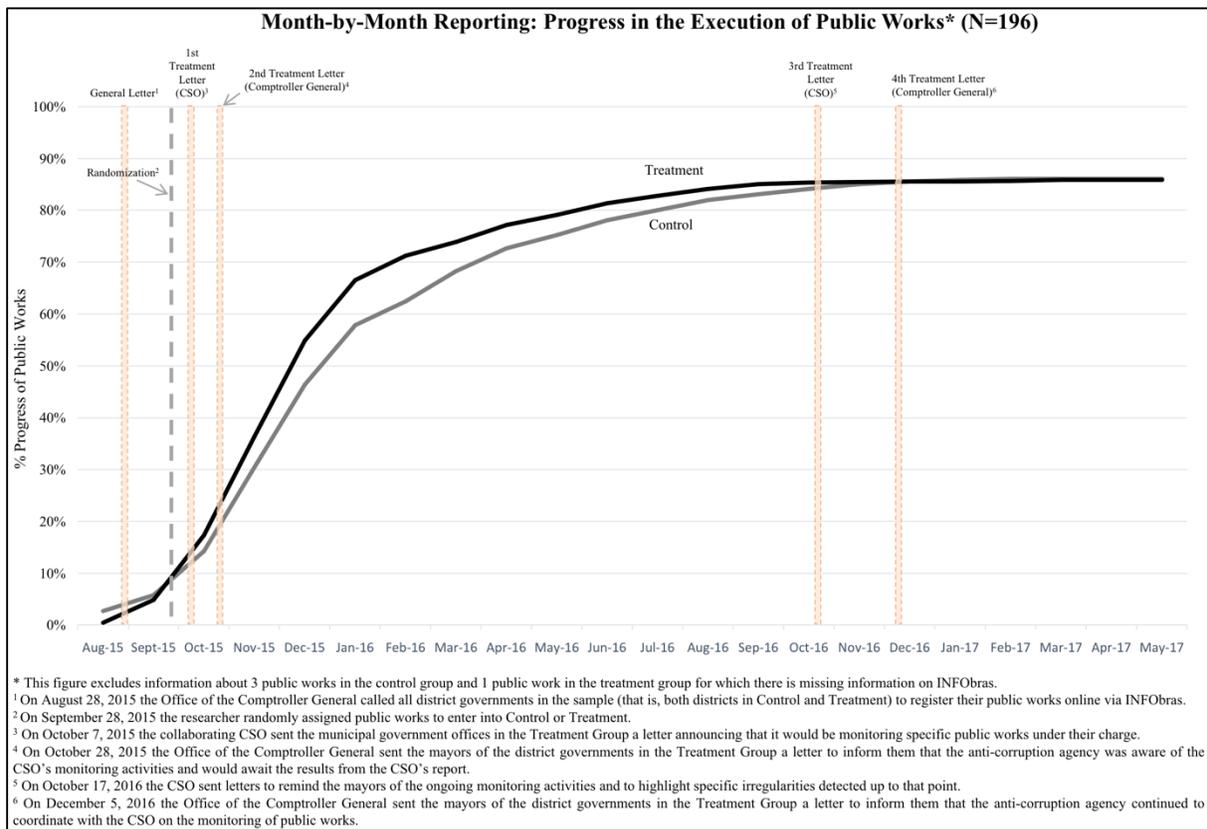
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<sup>30</sup> The test was limited to visiting one district in the control group since the visits themselves could have made officials in the non-experimental group sense that they were being monitored.

<sup>31</sup> More than one-thousand kilometers (or more than six-hundred miles) separated these two projects.

that can be drawn is that, ultimately, there is no meaningful difference between control and treatment with regards to the rate of execution. Furthermore, even if the temporary gap showing between the two experimental groups around January 2016 is taken into account, one can still say with confidence that there is no evidence that the anti-corruption intervention decelerated the construction of public works.

Figure 5



Turning to the financial data, based on the median total cost of the public works in the sample, the results show that treated units as a group were 51.39% less expensive than their untreated counterparts. Randomization inference without controls shows that, on average, the treatment reduced the cost of public works by 455,370 Peruvian soles (or 140,309.45 USD). With

controls, the average treatment effect equals 243,000 soles (75,000 USD). These results are statistically significant at the five-percent and ten-percent levels, respectively (see Table 2). Moreover, these results are somewhat robust when excluding an especially expensive public work in the control group; when imputing values to replace the missing value; and when estimating the treatment effect with cost data provided by the country’s Ministry of the Economy (see Table 3).

Table 2

Treatment Effect on the Accumulated Cost of Public Works <sup>†</sup>								
	April 2016 (i.e., six months after completing the first wave of the treatment)		September 2016 (i.e., eleven months after completing the first wave of the treatment and shortly before initiating the second wave of the treatment)		January 2017 (i.e., shortly after completing the second wave of the treatment)		May 2017 (i.e., over four months after completing the second wave of the treatment)	
Source of Cost Data	INFObras		INFObras		INFObras		INFObras	
N	196	196	196	196	196	196	196	196
Analysis Includes Control Variables	No	Yes	No	Yes	No	Yes	No	Yes
Analysis Includes the Outlier in the Control Group <sup>‡</sup>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Average Treatment Effect	-388,783*	-307,100**	-423,464*	-215,400*	-449,910**	-239,700*	-455,370**	-243,000*
S.E.	246,899.30	179,885.20	271,223.30	151,000.90	276,480.20	153,482.60	277,280.30	154,239.20
P-Value (One-Tailed)	0.06	0.04	0.06	0.08	0.05	0.06	0.05	0.06

<sup>†</sup> Randomization inference was run on the sample encompassing 196 public works spread across Peru, which excludes 4 projects missing on INFObras. Significance levels for the results are set at \* p≤0.1, \*\* p≤0.05.

<sup>‡</sup> All covariates build on pre-treatment data. The specific covariates added in the regressions are: (1) district socioeconomic level; (2) project type; (3) distance to Lima; (4) provincial land ruggedness; (5) district land ruggedness; (6) percent of the population that is literate; (7) percent of the population with a college degree; (8) number of public works executed by the district; (9) district investment efficiency; (10) PMIB funding allocation for the year 2015; and (11) project verified budget.

Table 3

Robustness Tests: Treatment Effect on the Accumulated Cost of Public Works <sup>†</sup>						
Source of Cost Data <sup>◊</sup>	May 2017				July 2017	
	INFObras				Ministry of the Economy	
Statistical Method	RI	RI	RI	OLS	RI	RI
N	195	195	200	200	200	200
Analysis Includes Control Variables <sup>‡</sup>	No	Yes	Yes	Yes	No	Yes
Analysis Includes Imputed Values	No	No	Yes	Yes	No	No
Analysis Includes the Outlier in the Control Group	No	No	Yes	Yes	Yes	Yes
Average Treatment Effect	-288,952*	-94,820.00	-242,700*	-242,700*	-540,740**	-200,900
S.E.	223,285.90	125,041.20	153,364.70	154,600.00	334,616.60	165,617.90
P-Value	0.1	0.23	0.056	0.059	0.05	0.12

<sup>†</sup> The p-values reported here are for a one-tailed test. Significance levels for the results are set at \*  $p \leq 0.1$ , \*\*  $p \leq 0.05$ .

<sup>◊</sup> Peru provides two online sources with cost data for public works: INFObras and SOSEM. INFObras is managed by the National Anti-Corruption Agency (i.e., the *Contraloría General de la República*). SOSEM, on the other hand, is managed by the Ministry of the Economy (i.e., the *Ministerio de Economía y Finanzas*). The data from both sources is strongly correlated. That said, each data source has its strengths and weaknesses. Data on INFObras is presented in a more disaggregated manner and is updated more frequently; however, INFObras is missing information about 3 public works in the control group and 1 public work in the treatment group.

<sup>‡</sup> All covariates build on pre-treatment data. The specific covariates added in the regressions are: (1) district socioeconomic level; (2) project type; (3) distance to Lima; (4) provincial land ruggedness; (5) district land ruggedness; (6) percent of the population that is literate; (7) percent of the population with a college degree; (8) number of public works executed by the district; (9) district investment efficiency; (10) PMIB funding allocation for the year 2015; and (11) project verified budget.

The study's results may also be analysed by examining Figure 5. Again, the data producing this figure excludes four public works for which information is unavailable; moreover, it controls for an outlier in the control group by reporting the median accumulated cost of the infrastructure projects. Notably, the line representing the treatment group curves in the expected direction around the date when the district governments would have received the second treatment letter. Figure 6

provides confidence intervals to complement the results shown in Figure 5. Finally, figures included in the appendix, reveal that the difference between treatment and control is, mainly, driven by public works that, according to their pre-treatment budgets, were of an average cost.

Figure 5

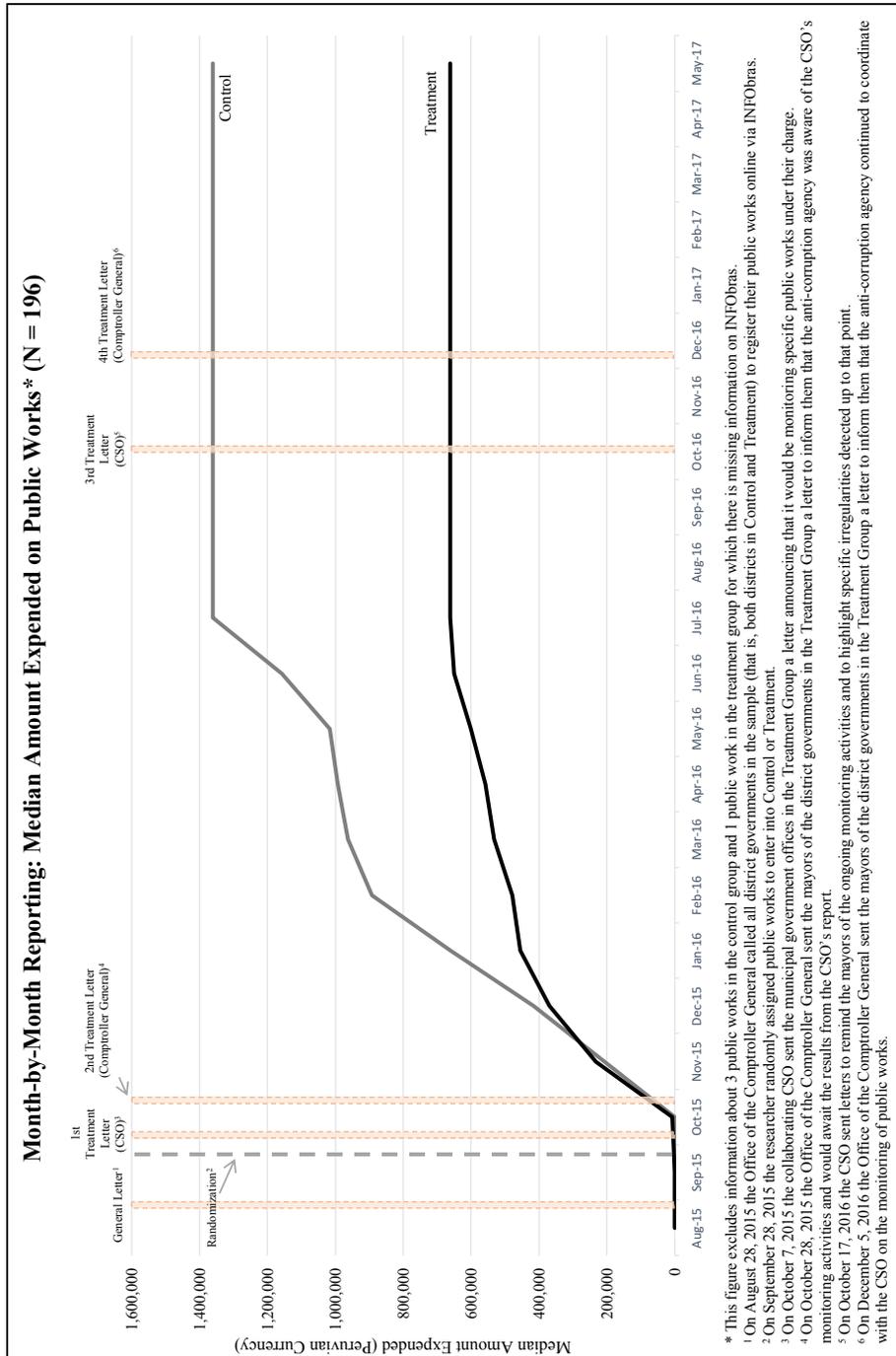
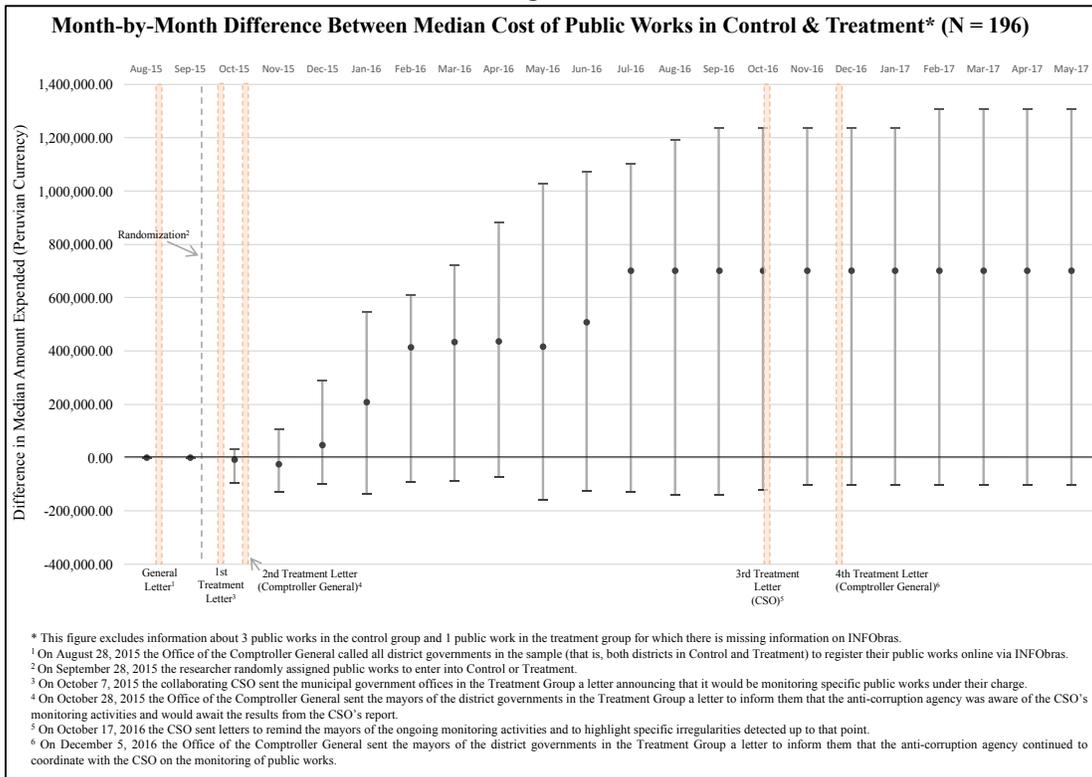


Figure 6



## VI. Conclusion:

Corruption is a major burden on Latin American countries. Fortunately, the literature provides some suggestions on how to solve the problem. For instance, on occasion, deregulation may eliminate opportunities for corrupt officials to extract illegal rents (de Soto 1989). Similarly, outsourcing some services to private firms and revising employment mechanisms are two additional anti-corruption tactics (Rose-Ackerman 1999 71 & 84-87).

Regarding merit recruitment, experts argue that improving the selection process of bureaucrats by emphasizing incorruptibility and technical competence can reduce the risk that

officials will misbehave (Calvert, McCubbins and Weingast 1989 599, 604 & 605).<sup>32</sup> In a similar vein, it is often claimed that ensuring officials receive competitive wages and bonuses has an inverse effect on the utility gained from corruption (Becker and Stigler 1974; Goel and Rich 1989; Chand and Moene 1999 1137; Van Rijckeghem and Weder 2000; Jain 2001 80; Di Tella and Schargrodsky 2003; Duflo, Hanna and Ryan 2010).<sup>33</sup>

Governments might also limit the probability that an agency's staff will engage in corruption by altering the organization's work climate. One way to achieve this is through education programs that highlight corruption's harmful effects. Another involves encouraging whistleblowing by granting protection and incentives to insiders that report wrongdoing (Rose-Ackerman 1999 53 & 58).

Yet another anti-corruption strategy is said to involve the judicious administration of officials' duties. Reducing the number of agents in sensitive positions is a means of concentrating responsibility and facilitating supervision (Gardiner and Lyman 1978 187). Sometimes, however, it may be best to take the opposite approach by dissipating responsibility and generating intra-agency competition. The likelihood of corruption should be reduced when officials lose monopoly power over the provision of certain goods, such as government permits (Rose-Ackerman 1978 137-138).

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<sup>32</sup> Civil service reform also involves setting up mechanisms to avoid conflicts of interest and to require that officials disclose their assets in a routine manner (Rose-Ackerman 1999 74-76).

<sup>33</sup> Note, however, that there are some good reasons to question the impact that wages can have on corruption. For instance, as Svensson (2005) reminds us, "if the official and bribe-giver bargain over the bribe, a higher wage strengthens the official's bargaining power as it raises the expected cost of being corrupt and thus leads to higher bribes."

Finally, oversight mechanisms and a credible system of punishment are nontrivial tools at reformers' disposal (Klitgaard 1988: 82). However, some warn that monitoring in the form of audits involve costs. Indeed, it is said that audits and similar mechanisms of oversight are often expensive to conduct and may even paralyze the work of a bureaucracy. In response to this concern, the present study examines the impact of a one-two punch approach to anti-corruption whereby a CSO and the relevant authority coordinated in monitoring the execution of public works in Peru.

On the one hand, CSOs often have the expertise and the motivation to fight corruption, but they lack the authority to impose administrative and criminal sanctions on wrongdoers. On the other hand, anti-corruption agencies wield the power to punish malfeasant government officials, but they are incapable to monitor all corners of a public administration. Thus, to the extent that these agencies are sincere in their desire to control corruption, they should proactively collaborate with CSOs. This argument finds support in the study's results.

The field experiment shows that districts that received the intervention completed public works at a similar rate as those that did not. At the same time, however, the districts that received the monitoring treatment spent less in building these public works. Thus, considering the costs of conducting the study as compared with the apparent savings from the experimental intervention, it appears as though the monitoring scheme was worthwhile.

## Appendix:

<b>Randomization Table<sup>†</sup></b>					
<b>Variables with Binary Values</b>					
Variable	N	Control (C) %	Treatment (T) %	Difference (C-T)	P-value (Two-Tailed) <sup>1</sup>
Geography: Andes	94	46.39	49.49	-3.10	0.67
Geography: Coast	76	40.21	37.37	2.83	0.77
Geography: Amazons	26	13.40	13.13	0.27	1.00
Top-Tier SEC Districts	15	6.19	9.09	-2.91	0.59
Middle-Tier SEC Districts	101	54.64	48.48	6.15	0.40
Bottom-Tier SEC Districts	80	39.18	42.42	-3.25	0.67
District has an Internal Auditing Unit	26	14.43	12.12	2.31	0.68
Project Type: Road	45	22.68	23.23	-0.55	1.00
Project Type: Sidewalk	1	1.03	0.00	1.03	0.49
Project Type: Road and Sidewalk	86	52.58	35.35	17.22	0.02**
Project Type: Market	20	5.15	15.15	-10.00	0.03**
Project Type: Exercise Court	40	15.46	25.25	-9.79	0.11
Project Type: Other	4	3.09	1.01	2.08	0.37
<b>Variables with Continuous Values</b>					
Variable	Mean	Control (C) Mean	Treatment (T) Mean	Difference (C-T)	P-value (Two-Tailed) <sup>2</sup>
Provincial Land Ruggedness	658.70	662.10	655.40	6.70	0.92
District Land Ruggedness	325.30	323.20	327.30	-4.10	0.88
District Population (2007)	28,850.00	25,840.00	31,770.00	-5,930.00	0.36
Percent of the Population that is Literate (2007)	76.03	76.81	75.27	1.54	0.27
Percent of the Population with a College Degree	3.29	3.38	3.20	0.18	0.38
No. of Public Works Executed by the District <sup>‡</sup>	13.34	12.95	13.72	-0.77	0.27
District Investment Efficiency (for 2014)	74.23	75.76	72.73	3.04	0.35
District Cost-Overrun Tendency	0.87	0.89	0.86	0.03	0.14
Total Number of Audits (2012-2016)	2.07	1.94	2.19	-0.25	0.42
Total Number of Audits (2012-2015)	1.51	1.41	1.55	-0.14	0.18
Total Number of Audits (2016)	0.56	0.45	0.66	-0.21	0.58
No. of Sanctioned Officials (2012-2016)	14.16	14.43	13.90	0.53	0.55
PMB Funding 2015	1,609,000.00	1,754,000.00	1,468,000.00	286,000.00	0.14
Project Verified Budget	2,789,000.00	3,147,000.00	2,438,000.00	709,000.00	0.06*

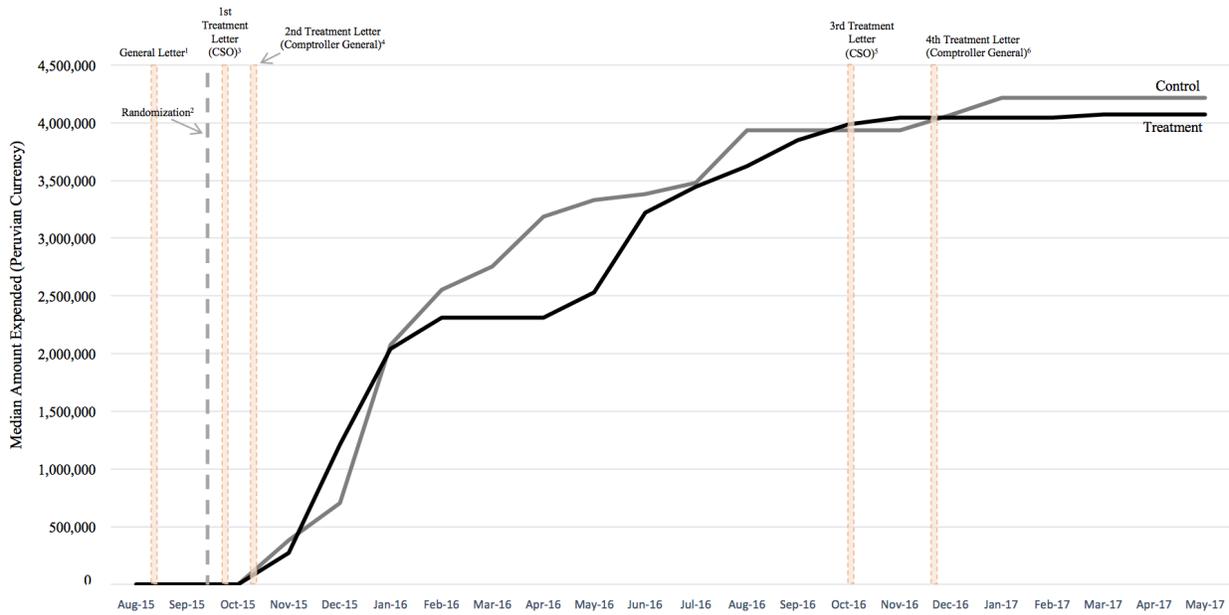
<sup>†</sup> The balance tests exclude information about 3 public works in the control group and 1 public work in the treatment group for which there is missing information on INFObras. Thus, the total N = 196. Significance levels set at \* p<0.1, \*\* p<0.05.

<sup>‡</sup> The number of public works executed is based on INFObras data covering April 7, 2001 to September 7, 2015.

<sup>1</sup> For binary values all P-values are calculated by conducting Fisher's exact test.

<sup>2</sup> For continuous values all P-values are calculated by conducting two-tailed means comparison tests using the Wilcoxon Mann-Whitney method.

### Month-by-Month Reporting: Median Amount Expended on the Most Expensive Public Works\*



\* This figure is based on the top 20% of public works according to the size of their verified budgets. In other words, based on what was originally projected by the district governments in the sample, these public works were planned to be the most expensive.

<sup>1</sup> On August 28, 2015 the Office of the Comptroller General called all district governments in the sample (that is, both districts in Control and Treatment) to register their public works online via INFObras.

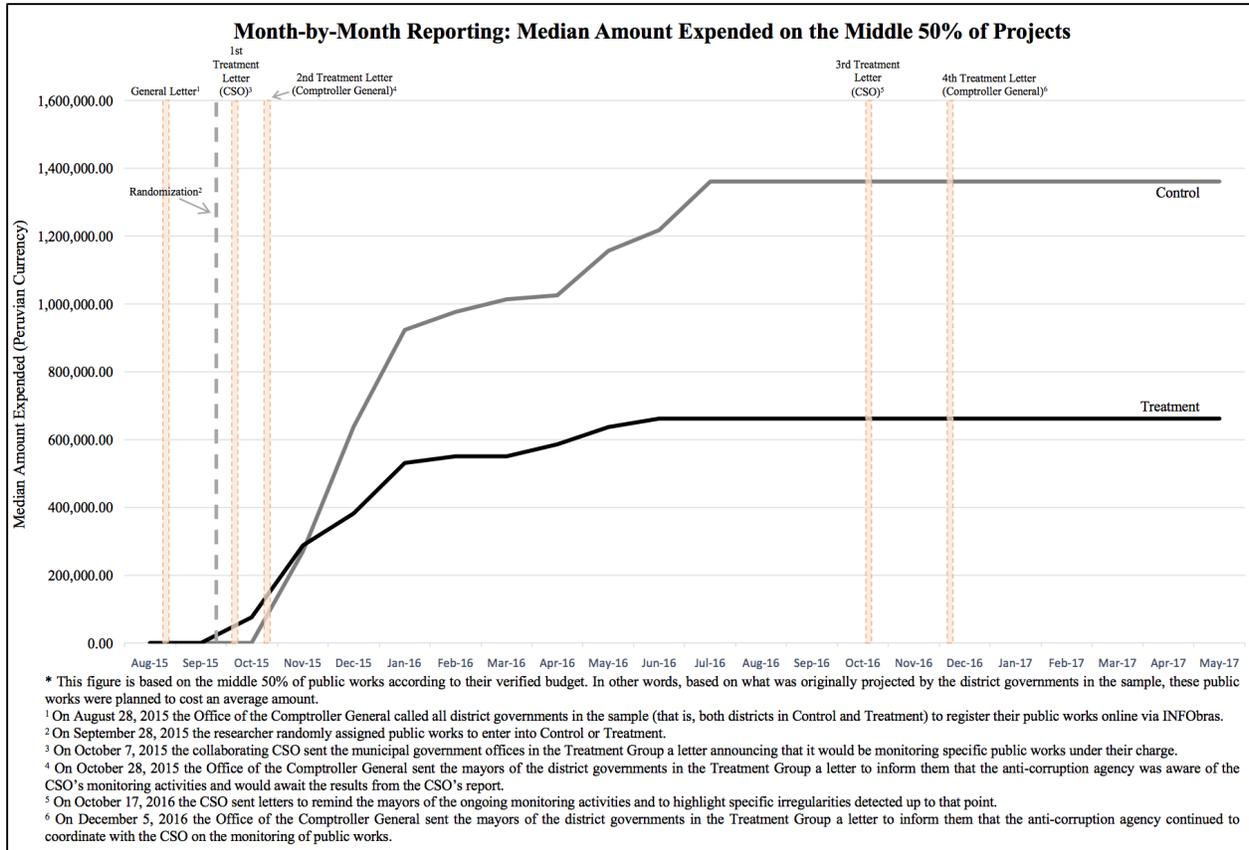
<sup>2</sup> On September 28, 2015 the researcher randomly assigned public works to enter into Control or Treatment.

<sup>3</sup> On October 7, 2015 the collaborating CSO sent the municipal government offices in the Treatment Group a letter announcing that it would be monitoring specific public works under their charge.

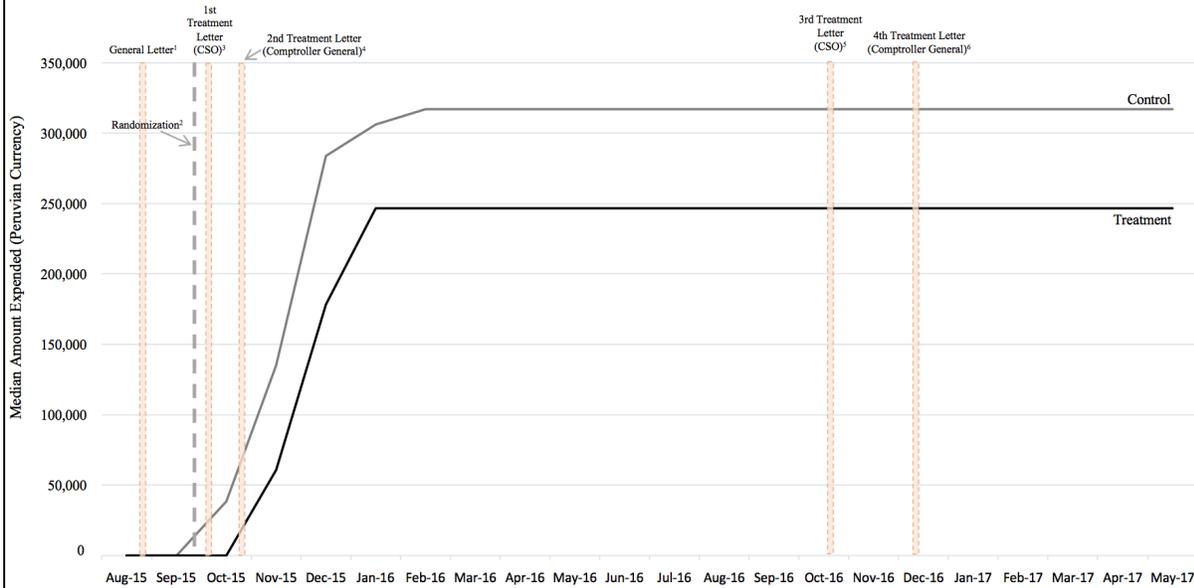
<sup>4</sup> On October 28, 2015 the Office of the Comptroller General sent the mayors of the district governments in the Treatment Group a letter to inform them that the anti-corruption agency was aware of the CSO's monitoring activities and would await the results from the CSO's report.

<sup>5</sup> On October 17, 2016 the CSO sent letters to remind the mayors of the ongoing monitoring activities and to highlight specific irregularities detected up to that point.

<sup>6</sup> On December 5, 2016 the Office of the Comptroller General sent the mayors of the district governments in the Treatment Group a letter to inform them that the anti-corruption agency continued to coordinate with the CSO on the monitoring of public works.



### Month-by-Month Reporting: Median Amount Expended on the 40 Cheapest Public Works\*



\* This figure is based on the bottom 20% of public works according to their verified budgets. In other words, based on what was originally projected by the district governments in the sample, these public works were planned to be the most expensive.

<sup>1</sup> On August 28, 2015 the Office of the Comptroller General called all district governments in the sample (that is, both districts in Control and Treatment) to register their public works online via INFObras.

<sup>2</sup> On September 28, 2015 the researcher randomly assigned public works to enter into Control or Treatment.

<sup>3</sup> On October 7, 2015 the collaborating CSO sent the municipal government offices in the Treatment Group a letter announcing that it would be monitoring specific public works under their charge.

<sup>4</sup> On October 28, 2015 the Office of the Comptroller General sent the mayors of the district governments in the Treatment Group a letter to inform them that the anti-corruption agency was aware of the CSO's monitoring activities and would await the results from the CSO's report.

<sup>5</sup> On October 17, 2016 the CSO sent letters to remind the mayors of the ongoing monitoring activities and to highlight specific irregularities detected up to that point.

<sup>6</sup> On December 5, 2016 the Office of the Comptroller General sent the mayors of the district governments in the Treatment Group a letter to inform them that the anti-corruption agency continued to coordinate with the CSO on the monitoring of public works.

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