

## **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 distract officials, thus causing delays? To approach an answer 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 public works in the treatment group. The monitoring intervention resulted in overall efficiency gains.

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## Introduction

*Lava Jato* or “Operation Car Wash” refers to a major corruption scandal wherein developers colluded with employees of Brazil’s state-owned oil company to win public works contracts (Fuentes 2016). The relevant scholarship had warned that corruption could result in public works being constructed at inflated costs (e.g., Olken 2007; Flyvbjerg and Molloy 2011). However, such warnings were ignored, and so the people involved in the scheme exchanged some \$2 billion in bribes and stole an estimated \$700 million from the public treasury (Connors and Magalhaes 2015; Leahy 2016; Cooper 2017). Prosecutors further revealed that the scheme extended to other nearby countries (DOJ 2016). In Peru, \$29 million were paid in bribes as they to secure public works contracts worth nearly five times that amount (ibid.).

Thus, *Lava Jato* is a prominent example of corruption, a problem that is well documented by political scientists who research Latin America (e.g., Weyland 1998; Pérez-Liñán 2007; Blake and Morris 2009). Avoiding similar scandals in the future is thought possible by promoting what is known as answerability and enforcement (O'Donnell 1994 61; Schedler 1999 14-15 & 17; Mainwaring 2003 7). Answerability is the requirement that officeholders explain their actions (Dahl 1971 3 & 20; Day and Klein 1987 4; Stokes 2001 6), while enforcement is the assurance that officeholders will be held responsible for their behavior (Manion 2004 16; Mungiu-Pippidi 2015 33). Among the mechanisms that promote answerability, there are two that are highlighted both in the literature and in this study: anticorruption audits (Manin, Przeworski and Stokes 1999 24), and online platforms that track government activity (Meijer 2009 258-59).

Whatever mechanism is used, however, oversight will only improve accountability if it actually ensures that wrongdoers are punished (Becker 1968; Becker and Stigler 1974). This is an idea that receives some attention in the empirical literature. For instance, in Buenos Aires, one study finds that government crackdowns on corruption reduce price padding and kickbacks in government procurement by up to 18% (Di Tella and Schargrotsky 2003). Another study analyzes local corruption data obtained from audits conducted by the Brazilian federal government (Ferraz and Finan 2011). The authors show that the interaction between corruption allegations and the risk of being removed from office significantly reduces malfeasance (ibid.). In India, a field experiment centered around polluting factories finds 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 (Duflo et al. 2013).

While the contribution of these and related studies should not be minimized, there are questions that the existing research still leaves unanswered. For one, 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). Some have warned 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” (Klitgaard, Maclean-Abaroa and Parris 2000 35). 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 costs (Rose-Ackerman and Palifka 2016 205-06).

Building on a few assumptions, I evaluate the costs and benefits of anti-corruption monitoring of public works with a field experiment conducted in Peru. One of the guiding assumptions is that, as the beneficiaries of tax-funded infrastructure, citizens have a vested interest in the effective supervision of government performance. In this sense, they are the least susceptible to corruption, which explains why some have championed their involvement in promoting accountability (e.g., Smulovitz and Peruzzotti 2000). However, these same citizens often lack the time and expertise required to oversee the execution of public works. Therefore, they should trust civil society organizations (CSOs) with some of the responsibility of monitoring government. After all, CSOs are often perceived as playing a legitimate role in connecting citizens with the state (Hochstetler 2008 35), but also as breaking with the state's monopoly on oversight (Goetz and Jenkins 2001 365). Moreover, case studies offer anecdotal evidence that CSOs can, in fact, contribute to reducing corruption and improving service delivery (Ostrom 1996; Lam 1996).

An additional consideration is that anti-corruption agencies have vast areas of responsibility and insufficient resources to monitor all areas of vulnerability (Maor 2004 5). Thus, even as these agencies maintain the exclusive power and responsibility of punishing corruption, they can advance their official goals by supporting CSO oversight. Some have referred this approach as a *hybrid form* or *sandwich strategy* of accountability (Goetz and Jenkins 2001 364; Fox 2015 347). Building on such an approach, I argue that CSO monitoring that is backed by the relevant authorities will result in the timely and cost-effective execution of public works.

To test my argument, I entered into a formal collaboration with two organizations in Peru. The first is *Proética*, a reputable CSO based in Lima that enjoys considerable 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 were, thus, left untouched by the study's intervention. In contrast, the other half received letters from the collaborating civil society organization and from the national anticorruption agency. These letters announced that specific infrastructure projects under the district governments' charge were being audited by the CSO with the support of the agency.

Following the intervention, the results show no significant difference in the rate of execution of public works between the two experimental groups. However, public works in the treatment group appear to be considerably less expensive than their untreated counterparts. Randomization inference with covariates suggests that, on average, the intervention reduced the cost of public works 297,900 soles (approx. 91,000 USD). This result is statistically significant at the five percent level, and it indicates that the monitoring intervention resulted in a 15.05% decrease in the cost of infrastructure development. Thus, all things considered, there is evidence that the collaboration between the CSO and the relevant authority was efficiency-enhancing.

Looking ahead, the paper proceeds as follows. Section II reviews the relevant literature, paying special attention to the literature on corruption in public works. 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 & Inefficiency in Public Works**

Both corruption and inefficiency are symptoms of an unaccountable bureaucracy. They are closely related pathologies that may result in the execution of public works at inflated costs. Given this challenge, in this section, I elaborate on the argument that one of the strategies available for improving bureaucratic accountability is to empower organized civil society with both information and the support of the relevant authorities.

### *Understanding the Problem*

A bureaucracy is deemed accountable when its members act in the public interest. 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.

Given the controversy surrounding the idea of a public interest, there is an advantage to recognizing that the idea of government failure is less contentious. In this sense, some have altered the conceptual focus and directed it toward understanding unaccountability. Among this group of scholars, Besley (2006 101) notes that there is widespread agreement that corruption and

inefficiency are symptoms of an unaccountable government.<sup>1</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, say, building new roads, inefficiency occurs when resources—such as time, energy, or capital—are not expended in a manner that most directly furthers the official goals of an agency.

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>2</sup> It is, thus, unsurprising that anti-corruption agencies—including the one featured in this study—have the dual mandate of fighting both corruption *and* inefficiency.<sup>3</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 sidewalks—built with at least some government funding.<sup>4</sup> For centuries, public works have been known to play a fundamental role

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<sup>1</sup> With regards to corruption, a survey finds that a vast majority of countries' citizens condemn the practice (Gatti, Paternostro and Jamele 2003; Dong, Dulleck and Torgler 2012; Torgler and Valev 2010; Simpson 2015).

<sup>2</sup> In fact, 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).

<sup>3</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>4</sup> For the technical definition of term "infrastructure" see Prud'homme (2005).

(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). In recognition 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 fact, during the construction stage, developers can scheme to increase the contract sum in an attempt to raise profits or to recover whatever was paid in bribes during the procurement stage (*ibid.*).

On the subject of bribes, since the Foreign Corrupt Practices Act was enacted, infrastructure has featured prominently in prosecutions (Ernst & Young 2012). The problem is so acute that 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; Olken 2007). 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>5</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).

### *Reducing Information Asymmetries*

There are two reasons 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, the sector relies on idiosyncratic capital, meaning that it is difficult to standardize the cost of projects. This

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<sup>5</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).

lack of standardization, in turn, allows developers and government officials to take advantage of taxpayers' ignorance about the cost of building infrastructure.<sup>6</sup>

To get ahead of the so-called information asymmetry, researchers have developed new methods for uncovering and measuring corruption in the construction sector. For instance, Golden and Picci (2005; 2006) index 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).

A different measurement strategy involves the collection of original data. 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 by villagers.

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

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<sup>6</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).

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. From a normative standpoint, another issue to consider is that involving local communities in monitoring government is important to realizing democratic principles.<sup>7</sup>

Still, there are notable challenges associated with grassroots monitoring. 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 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, research conducted in Uganda and Brazil find 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, a recent wave of research shows that offering members of the public

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<sup>7</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; Ackerman 2005; Johnston 2014).

information on performance has no effect (Humphreys and Weinstein 2012; Lieberman, Posner and Tsai 2014; Dunning et al. 2019); an effect that is limited to where electoral pressure runs high (Grossman and Michelitch 2018); or even a negative effect on electoral turnout (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 to promote government accountability (Diamond 1994 6), but only if they have the ability to threaten malfeasant officials with punishment (Lagunes 2012 142-86). 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**

From a political standpoint, Peru is considered a democracy (Freedom House 2017); however, it has a history checkered with personalistic and authoritarian rule (Mainwaring, Brinks and Pérez-Liñán 2001 49; Weyland 1998). Electoral campaigns lack programmatic content, and clientelism remains a common practice (Muñoz 2019). Political parties in the country are inordinately weak (Levitsky and Cameron 2003; Levitsky and Zavaleta 2016).

Similar to its peers in Latin America, Peru is organized into three levels of government. At the lowest tier, there are 1,646 municipalities or districts (INEI 2015). Local candidates in these

districts tend to run as part of loose political coalitions. If elected, they are expected to hold office for four-year terms without the immediate possibility of reelection.<sup>8</sup> Notwithstanding these term limits, starting in 2002, mayors have gained influence through the process of decentralization. One concern with this dynamic is that decentralization has had the unintended consequence of spreading corruption (Muñoz 2014 4-5 & 9). Data reveals that the vast majority (54.73%) of corruption claims involve district governments (6).

Overall, corruption is deemed one of Peru's most pressing problems (Panfichi and Alvarado 2011 9).<sup>9</sup> According to Transparency International (2016), Peru ranks 101<sup>st</sup> out of 176 countries, lagging behind six of its regional neighbors. 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

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<sup>8</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).

<sup>9</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.

the *Lava Jato* scandal referenced in the introduction (The Economist 2017; Flores 2017).<sup>10</sup> This same scandal also reached the doorsteps of former presidents Alejandro Toledo and Ollanta Humala (Reuters 2017). Then, in 2018, President Pedro Pablo Kuczynski resigned from office as the *Lava Jato* scandal raised questions of conflicts of interest (The Economist 2018).<sup>11</sup>

That a national scandal would emerge involving public works was, perhaps, unsurprising. Peru's leading anti-corruption authority had long-identified this area 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; 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 claims per 10,000 inhabitants. Thus, even if the map on the left shows Piura and Lima as concentrating the greatest number of

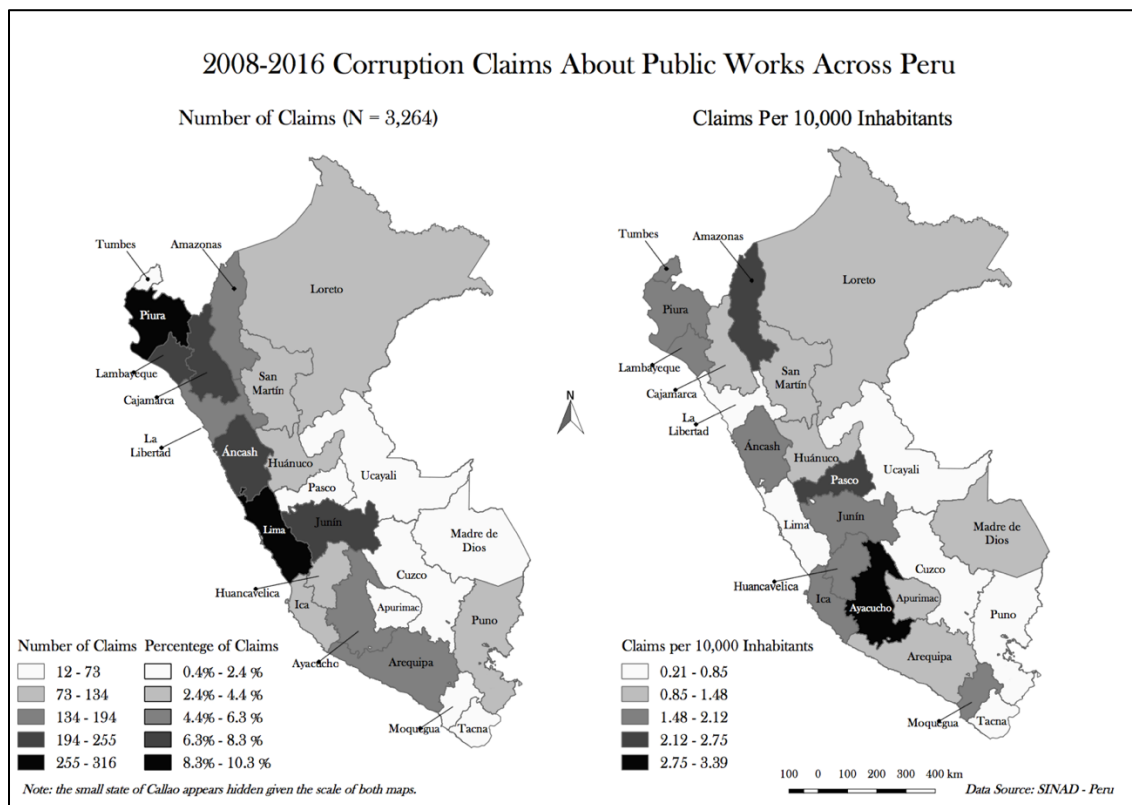
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<sup>10</sup> The Peruvian press also took issue with Garcia's *narco indultos*—that is, the decision to pardon four-hundred convicted drug traffickers (Tatone 2013).

<sup>11</sup> For a review of the events surrounding the *Lava Jato* scandal in Peru see de Mattos and Greene (2018).

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. 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>12</sup>

Figure 1



<sup>12</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 district 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>13</sup> Among them, the Office of the Comptroller General (or, in Spanish, *Contraloría General de la República*) leads the effort to oversee the country's public administration, mainly, by conducting audits. Audits that discover irregularities may be followed by a penalty, such as a formal admonishment, suspension, demotion, or dismissal. The Office of the Comptroller General can also refer cases for criminal prosecution.

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, a branch that some have characterized as, "unwilling or unable to contribute meaningfully to the politics of the day" (Brinks and Blass 2018 44).

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). Out of nearly seven thousand

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<sup>13</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).



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 277-78), 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 seems 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. 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.

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 on infrastructure development by the state. Proetica, as one of a CSO that frequently uses the INFObras platform, is worth highlighting, especially since it serves as a node in Transparency International's global advocacy network.

Founded in 2002, Proetica commonly conducts corruption investigations—the results of which it makes available to the relevant authorities. 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.

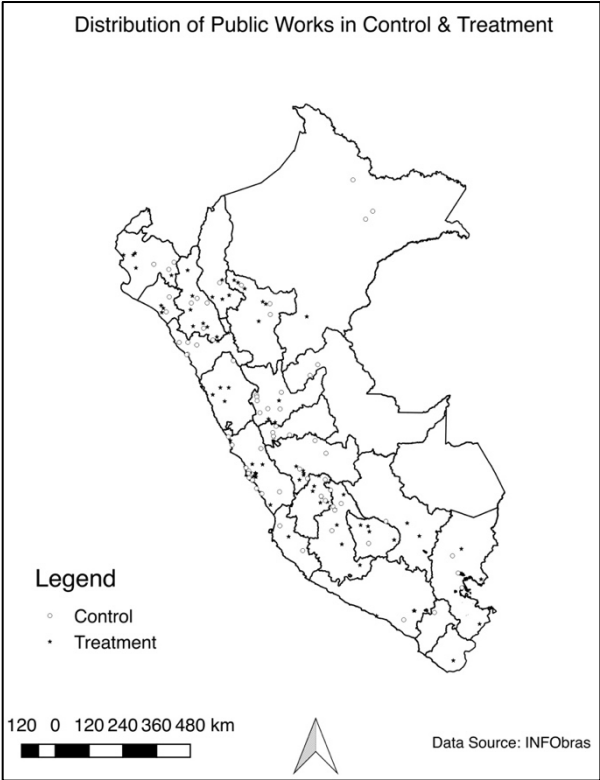
#### **IV. Methodology**

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 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.

Figure 2



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>14</sup>

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. This initial letter served two purposes. First, for districts in the control group, the letter served as placebo. Second, the letter reminded all mayors in the experimental sample that the law required them 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 experimental sample.

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 forty-four variables, only four present differences. These four variables are among the covariates included in the statistical analyses of the results.

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<sup>14</sup> The states benefiting the least from the PMIB program are Madre de Dios, Moquegua, Tacna, and Tumbes.

Figure 3

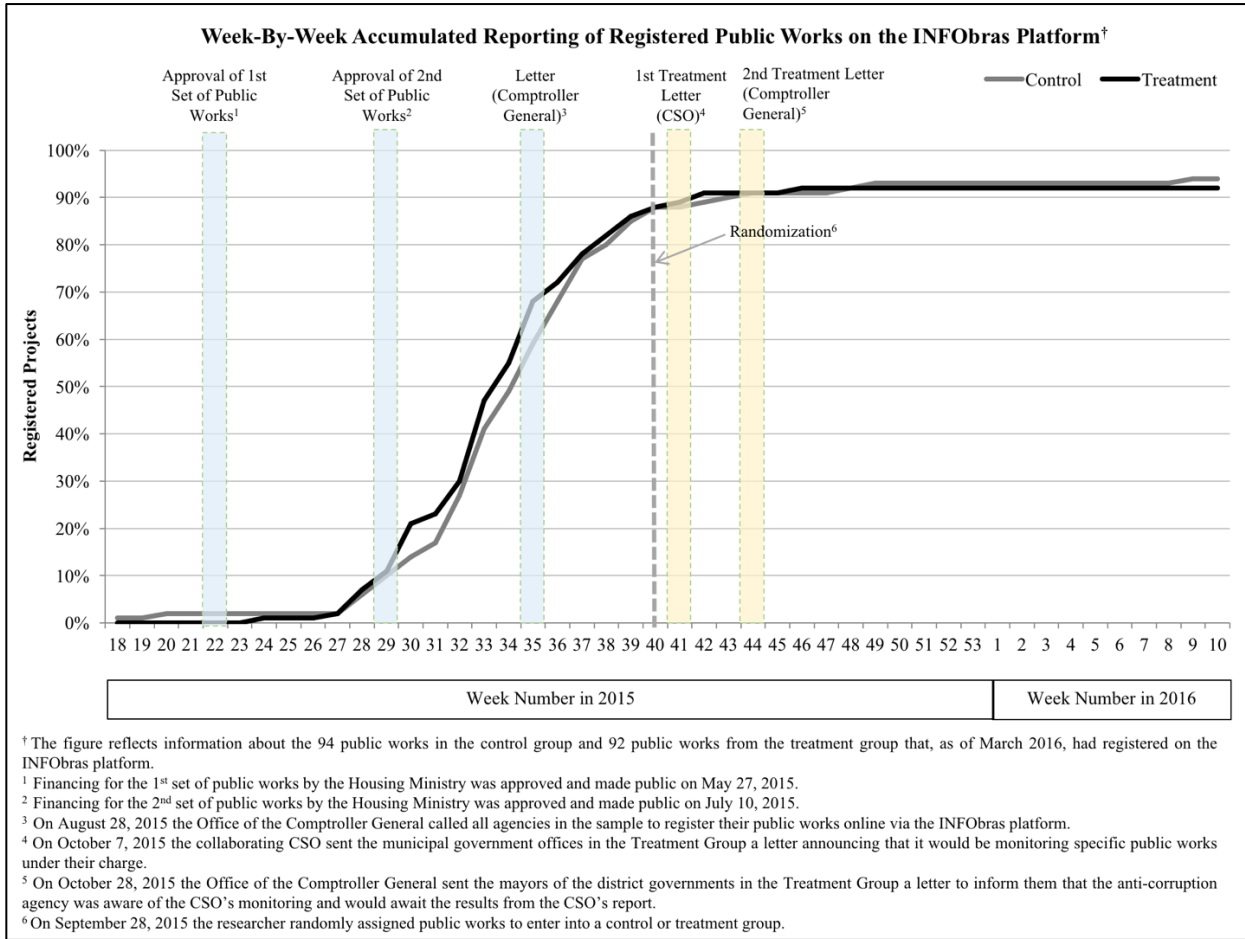


Table 1

<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	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
Mayor is in First Term of Office	114	56.70	59.60	-2.89	0.79
Female Mayor	5	4.12	1.01	3.11	0.21
Mayor Makes Asset Disclosure Public	116	65.98	52.53	13.45	0.06*
Previous Judicial Sentence Against the Mayor	21	11.34	10.10	1.24	0.82
Mayor Belongs to Regional Movement	113	50.44	49.56	0.88	1.00
Mayor Belongs to Political Party	65	52.31	47.69	4.62	0.65
Mayor Belongs to Same Party as President	0	0.00	0.00	0.00	---
Mayor Belongs to Local Organization	9	44.00	56.00	-12.00	1.00
Mayor Belongs to an Electoral Alliance	9	22.00	78.00	-56.00	0.1*
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
Project Budget Was Modified	166	87.50	82.83	4.67	0.69
Project Budget Was Modified to the Legal Limit	4	2.08	2.02	0.06	1.00
<b>Variables with Continuous Values</b>					
Variable	Mean	Control (C) Mean	Treatment (T) Mean	Difference (C-T)	P-value (Two-Tailed) <sup>2</sup>
Distance to Lima (kms.)	445.89	422.31	465.73	-43.42	0.35
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
Voter Turnout in the 2014 Municipal Elections	0.84	0.84	0.84	0.00	0.93
Vote Share for Mayor Elected in 2014	35.47	36.09	34.87	1.22	0.37
Mayor's Margin of Victory in 2014 Election	10.37	11.60	9.16	2.44	0.12
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
No. of Corruption Complaints	9.63	10.24	9.04	1.20	0.68
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
District Budget for 2014	17,516,297.00	16,641,248.00	18,373,668.00	-1,732,420.00	0.58
PMIB 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.

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 possible 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 further constrained by the fact that over 40% of mayors do not make their asset declarations public and 10.72% have a criminal record. Moreover, only twenty-six out of two-hundred districts have an internal auditing unit.<sup>15</sup>

On the subject of oversight, the bottom half of 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 biased the study's results.

A few additional variables are worth highlighting from the table. For instance, *land ruggedness* represents the standard deviation for elevation data.<sup>16</sup> Thus, a smooth area in Peru 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

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<sup>15</sup> Audit data was provided by the Office of the Comptroller General.

<sup>16</sup> The inspiration to analyze land ruggedness data came from reading García-Ponce (2017). Land ruggedness data was obtained from the Food and Agriculture Organization of the United Nations (Fischer et al. 2008).

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>17</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>18</sup> This suggests that the studied districts are, for the most part, poorly administered.

Beyond the descriptive statistics, Table 1 highlights three imbalanced variables that, because of their importance, must be added as controls to the statistical analysis.<sup>19</sup> However, overall, the table suggests general balance between the two study groups. Therefore, 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 intervention.<sup>20</sup> As to the districts in the treatment group, these received a total of four letters over the course of fourteen months.

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<sup>17</sup> This data is a relatively common measure of overall government performance (Pique 2017; Loayza, Rigolini and Calvo-González 2014; Vasquez 2015).

<sup>18</sup> Corruption complaints data was provided by the Office of the Comptroller General.

<sup>19</sup> The three variables are: (1) district mayor makes his/her asset disclosure public; (2) project type (road, exercise court, etc.); and (3) project verified budget.

<sup>20</sup> However, it is 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.



In early October of 2015, 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 districts 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 (author's translation).

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 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. The letter avoided giving the impression that the Office of the Comptroller was abdicating its responsibility of 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.<sup>21</sup> 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 expected to improve the efficiency with which public works in the treatment group were executed. The treatment's impact was, thus, measured looking at the amount of time and funds required to complete the public works.

Notably, the study's design builds on the researcher's previous field experiment on corruption control in the built environment, 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

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<sup>21</sup> 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 sought to demonstrate the 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 that the CSO had available to monitor the physical progress of a public work.

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 superior.

The field experiment in Peru tests whether the findings from the Mexico study apply in a different national context and in a different area of government. 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 relied on for the main analysis, while the alternate data is used for robustness tests.

Besides missing four values, another issue worth highlighting about the INFObras data is that it is generated by an official recorder in each of the district governments. In other words, INFObras relies on self-reported information. But there are three reasons one might trust the reliability of the data. First, Peruvian auditors are required by law 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.<sup>22</sup> Third, the researcher also examined high-resolution satellite imagery of public works to verify their completion (see Figure 4).

Yet another issue worth addressing is that of spillover effects. I tested for potential spillover effects by looking at the number of firms that were, at once, executing 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>23</sup>

The next question is whether mayors in the treatment group shared news about the letters with their political associates in control districts. In light of this concern, it is worth noting that

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<sup>22</sup> All except for one of the public works visited were in the treatment group, since the priority was testing whether what appeared to be a treatment effect could be trusted as such. 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>23</sup> More than one-thousand kilometers (or more than six-hundred miles) separated these two projects.

few mayors in the sample are affiliated with the same political organization. Indeed, amongst the mayors in the studied districts there are 80 different political affiliations.

Therefore, all things considered, the probability that the study suffers from spillover effects is limited. But assuming that 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 statistical finding.

Figure 4

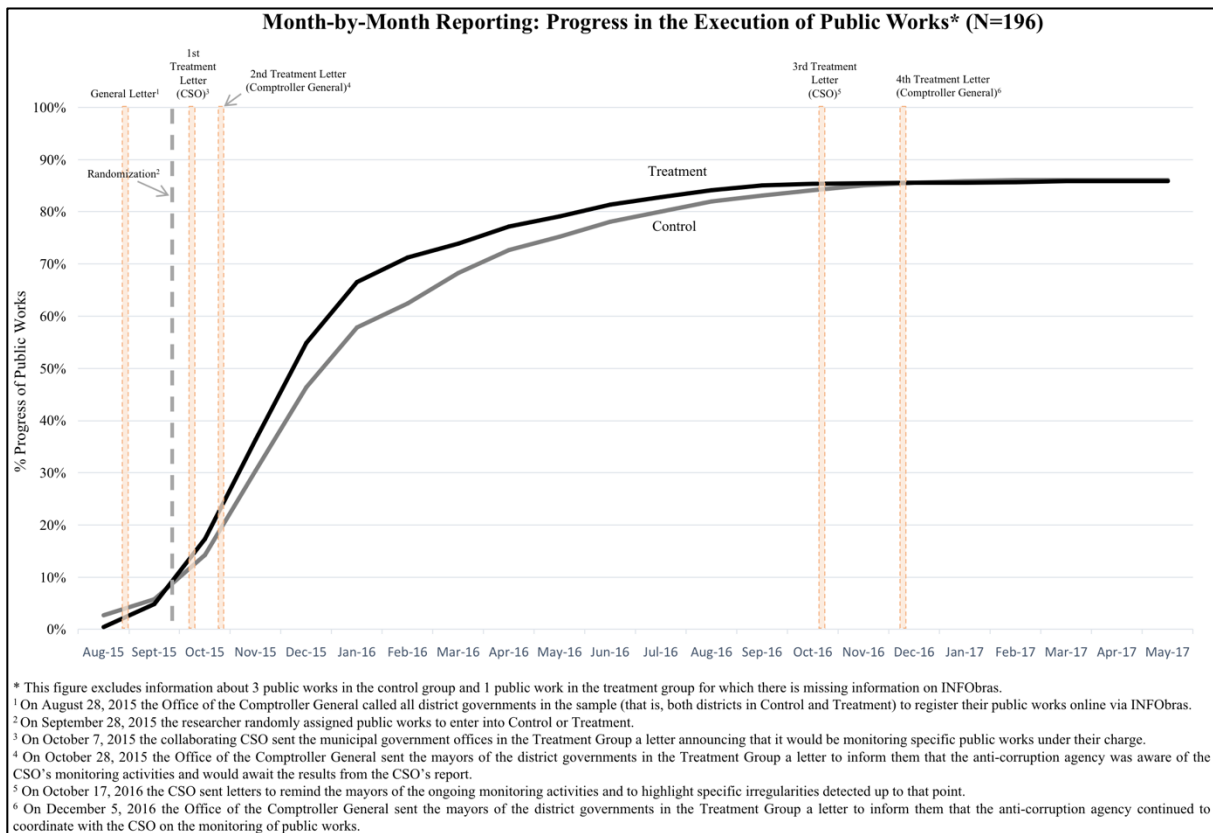


Images obtained via Google Earth (<https://www.google.com/earth/>)

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 had

reached completion. Moreover, during the seven months that preceded the last round of data collection, the average rate of completion for all public works had remained relatively stable (see Figure 5). Thus, based on these results, the first conclusion 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 considered, one can still say with confidence that there is no evidence that the anti-corruption intervention decelerated the construction of public works.

Figure 5



With regards to the financial data, randomization inference without controls shows that, on average, the treatment reduced the cost of public works by 455,370 Peruvian soles (or approx.

140,300 USD). With all the relevant controls, the average treatment effect equals 297,900 soles (approx. 91,000 USD). These results are statistically significant at the five-percent, respectively (see Models 1 and 3 in Table 2). That being said, while these results are robust to estimating the treatment effect with cost data provided by the country's Ministry of the Economy (Model 5 in Table 2), they lose significance when only adding controls for imbalanced variables or when excluding a particularly expensive public work in the control group (Models 2 and 4 in Table 2).

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 accounts 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.

Taken together, there is evidence to suggest that the monitoring intervention resulted in overall efficiency gains. However, this conclusion only holds if the corruption is contained and not displaced by the treatment—at least in theory, the additional scrutiny over one public work can lead officials to shift the corruption to another public work. To test for this possibility, it is worth examining districts in the treatment group that had more than one public work receiving central government funding. The question, then, is whether non-monitored public works in treated districts cost more than monitored public works in those same districts. Figure 7 suggests that there were no displacement effects.

Table 2

Treatment Effect on the Accumulated Cost of Public Works <sup>†</sup>					
Model	May 2017 (i.e., over four months after completing the second wave of the treatment)				
	1	2	3	4	5
Source of Cost Data	INFObras				MEF
N	196	196	196	195	196
Analysis Includes Imbalanced Control Variables	No	Yes	Yes	Yes	Yes
Analysis Includes All Relevant Control Variables <sup>‡</sup>	No	No	Yes	Yes	Yes
Analysis Includes the Outlier in the Control Group	Yes	Yes	Yes	No	Yes
Average Treatment Effect	- 455,370**	-107,900	-297,900**	-119,900	-285,200**
S.E.	276,476.00	181,300.00	161,500.00	133,300.00	175,700.00
P-Value	0.049	0.271	0.031	0.181	0.049

<sup>†</sup> Randomization inference was run on the sample encompassing 196 public works spread across Peru. In other words, the analysis excludes the four projects missing on INFObras. The p-values reported here are for one-tailed tests. Significance levels for the results are set at \*  $p \leq 0.1$ , \*\*  $p \leq 0.05$ .

<sup>‡</sup> All covariates based on pre-treatment data. The imbalanced covariates added in the regressions are: (1) district mayor makes his/her asset disclosure public; (2) project type (road, exercise court, etc.); and (3) project verified budget. The additional covariates added in the regressions are: (4) district socioeconomic level; (5) mayor's in first term of office; (6) previous judicial sentence against the mayor; (7) district has an internal auditing unit; (8) project budget was modified; (9) distance to lima in kilometers; (10) provincial land ruggedness; (11) district land ruggedness; (12) district population; (13) number of public works executed by the district; (14) district investment efficiency; (15) number of corruption complaints; (16) total number of audits; (17) number of sanctioned officials; and (18) PMIB funding allocation for 2015.



Figure 5

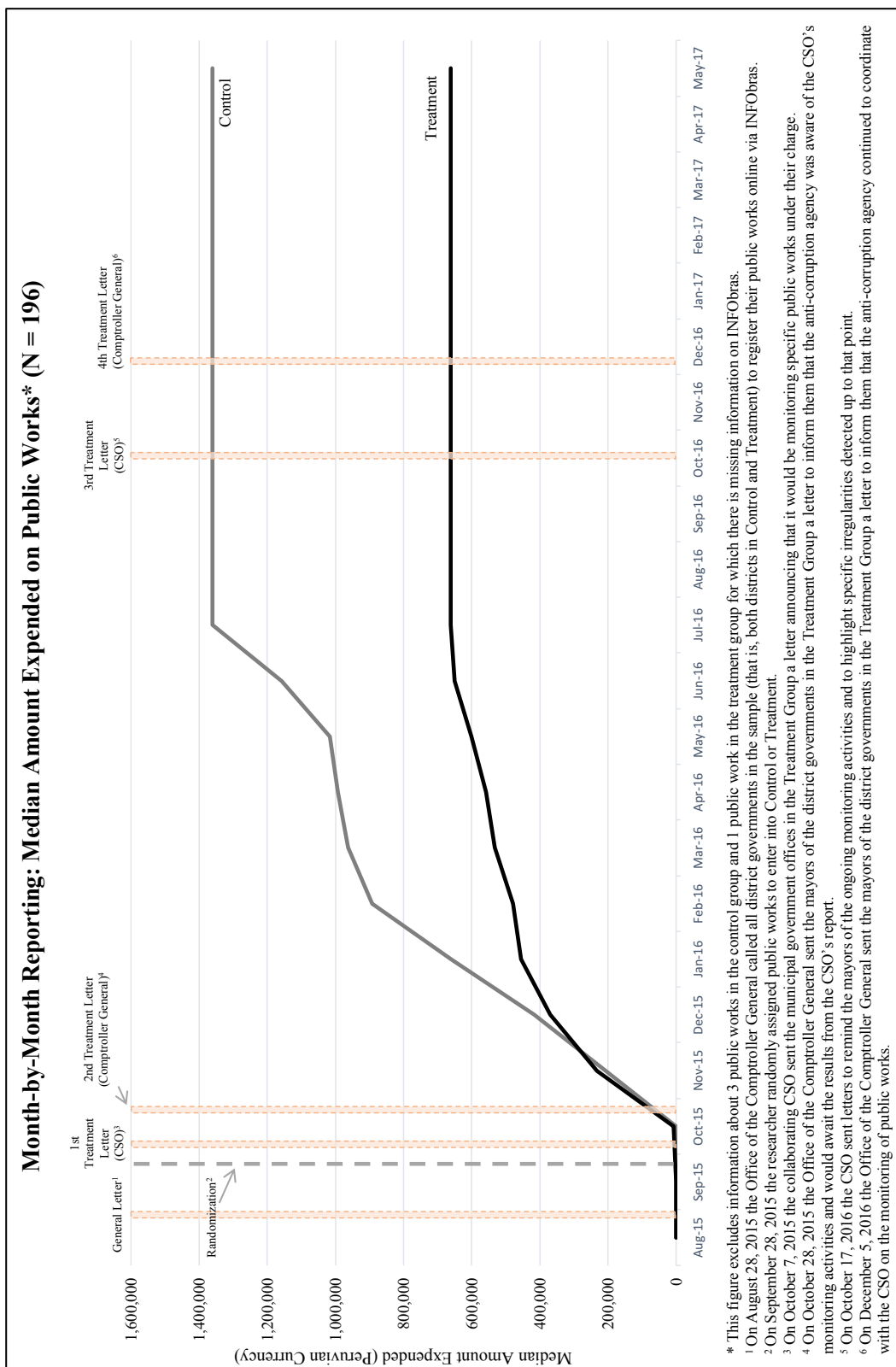


Figure 6

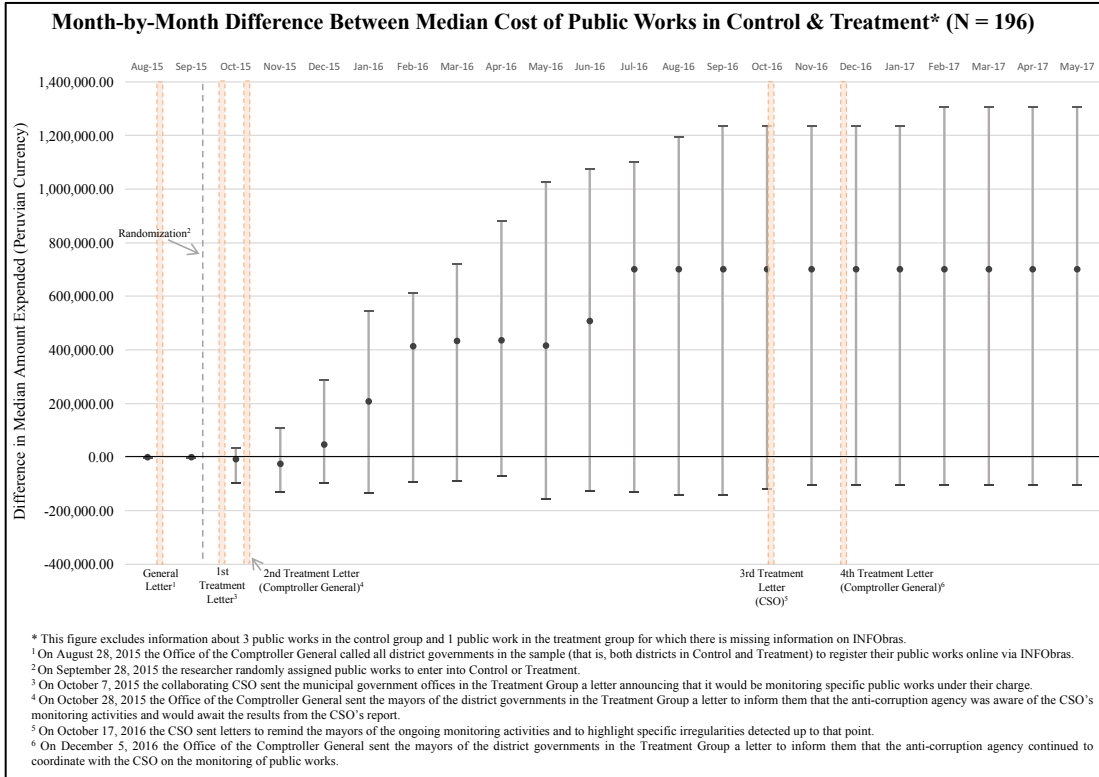
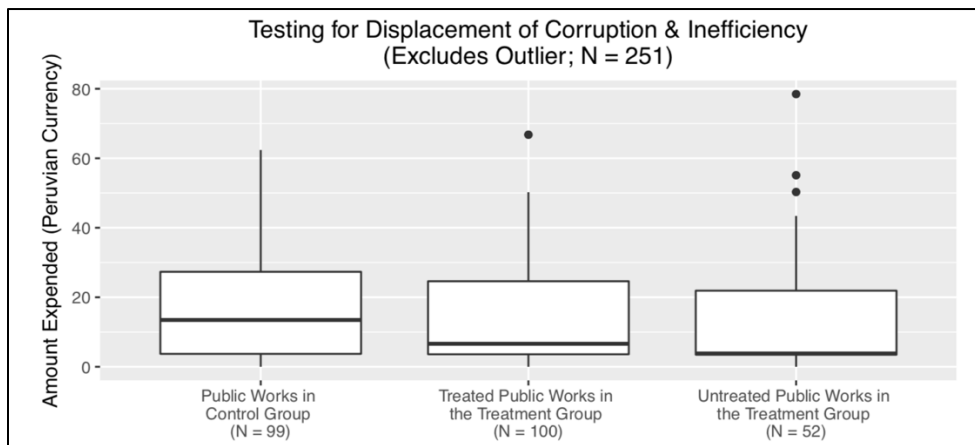


Figure 7



## VI. Discussion & Conclusion:

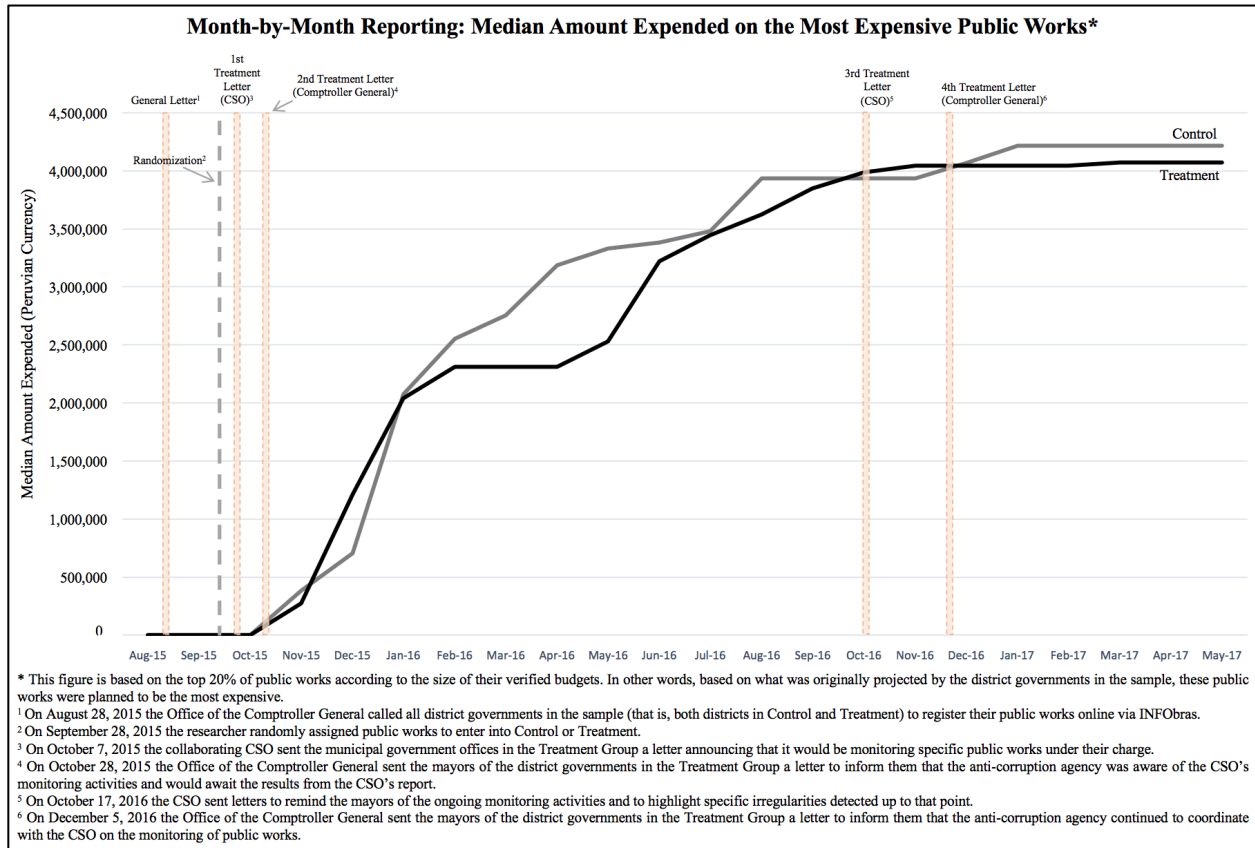
Oversight mechanisms and a credible system of punishment are important tools for controlling corruption. However, some warn that monitoring in the form of audits involve costs. Indeed, it is said that audits and similar mechanisms of oversight are often expensive to conduct and may even paralyze the work of a bureaucracy. In response to this concern, I examined the impact of a *hybrid* approach to anti-corruption whereby a CSO and the relevant authority worked together to monitor the execution of public works in Peru.

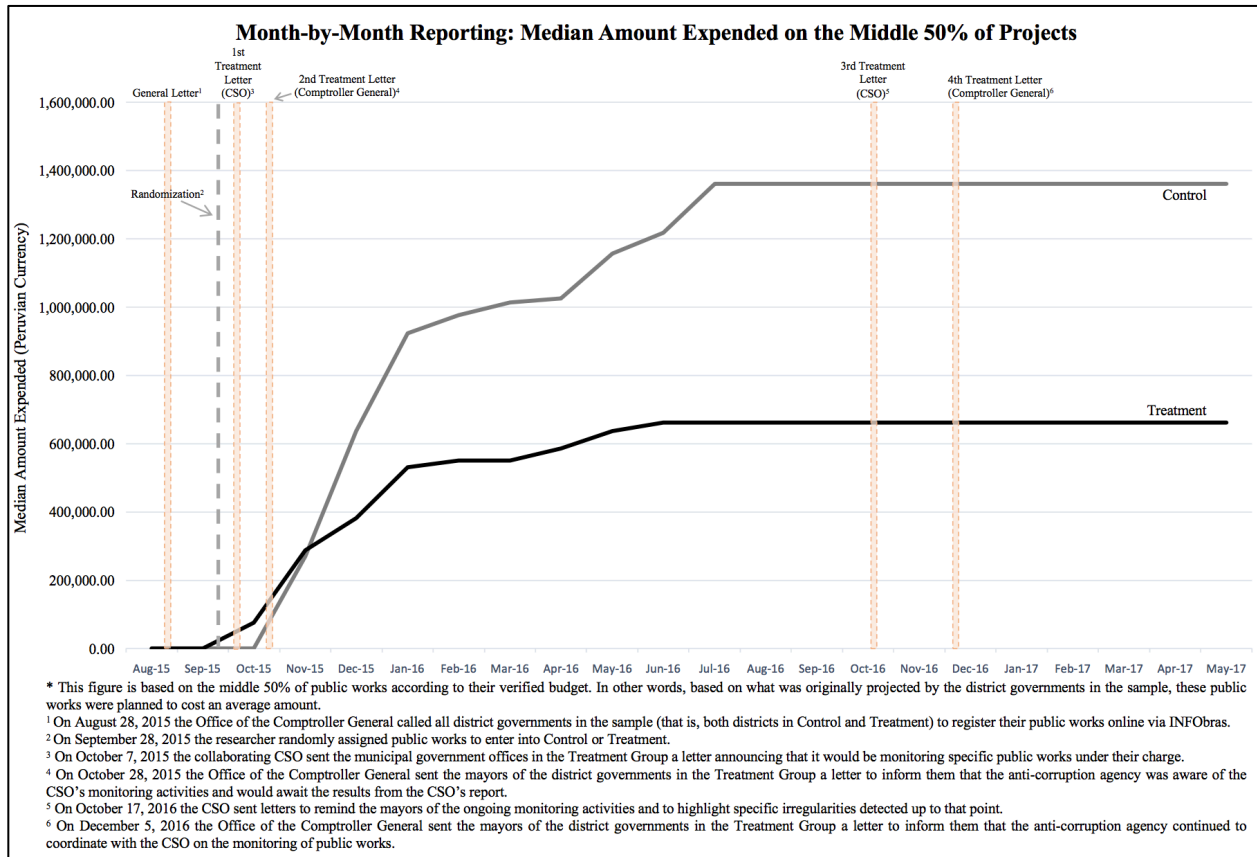
On the one hand, CSOs often have the expertise and the motivation to fight corruption, but they lack the authority to impose administrative and criminal sanctions on wrongdoers. On the other hand, anti-corruption agencies wield the power to punish malfeasant government officials, but they are incapable of monitoring all aspects 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.

Some districts were randomly selected to enter into a control group and, except for the placebo, were left untouched by the study's intervention. In contrast, another set of districts received letters from the collaborating CSO and from the national anticorruption agency. The courier provided stamped evidence that the letters reached their destination. While visiting one of the districts in the treatment group, I also managed to trace the path of the letters sent to the district's mayor. The letters were being held in one of the most powerful offices in the district government (i.e., the *Secretaría General*), which I took as a promising sign that the treatment reached its target.

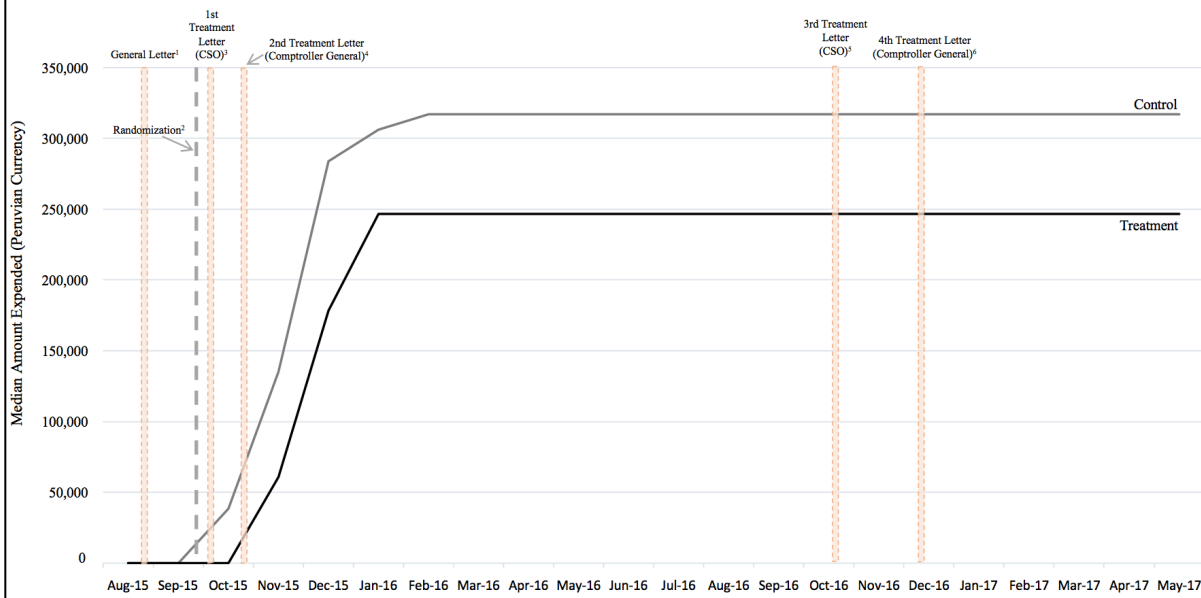
The treatment examined the effect of monitoring and risk of punishment jointly, since a previous field experiment showed that monitoring by itself is ineffective (Lagunes 2012). The results suggest that, compared to districts in the control group, districts that received the intervention completed public works at a similar rate and at a lower cost. Because the INFObras database does not provide line-by-line cost information for all public works, I was unable to identify where the savings are concentrated. That being said, considering that the field experiment cost no more than \$130,000 and considering that the intervention appears to have saved the Peruvian treasury nearly \$9 million, the monitoring scheme seems worthwhile from the returns on investment perspective.

## Appendix:





### 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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