

# Measuring Corruption Using Governmental Audits: A New Framework and Dataset\*

Michael Denly<sup>†</sup>

June 29, 2021

For the most recent version of this paper, please visit:

[www.mikedenly.com/files/audit-measurement.pdf](http://www.mikedenly.com/files/audit-measurement.pdf)

## Abstract

For about 25 years, empirical scholarship on corruption has primarily relied on perceptions data, but the drawbacks of these measures are ample and well-known. More recently, analyses centered on Brazil have showcased the utility of randomly assigned audits as a more objective alternative to perception-based measures. However, Brazil is the only country with randomized audits and has many unique institutional features that limit the external validity of the numerous studies using the Brazil data. In this paper, I provide a new framework to assess the quality of audit data even when they are not randomly assigned. Specifically, I show that it is acceptable to use experimental or observational audit data to measure corruption when: 1) the auditing institution is legally independent from the executive branch; 2) the distribution of audits is not biased against opposition party politicians, especially following close elections; and 3) the intensity/dosage is consistent across similar types of audits. I demonstrate the utility of the framework by analyzing a massive new dataset of subnational audits from India, Mexico, Honduras, and Guatemala. The new data and framework proposed in this paper will help researchers undertake more objective analyses of governmental corruption around the world.

---

\*For funding, I thank the Texas Politics Project as well as the Wilson Endowment at the University of Texas at Austin. For extraordinary research assistance, I thank Maria Eugenia Blanco and the following current and former Research Affiliates and Graduate Research Fellows at UT Austin's Innovations for Peace and Development: Adityamohan Tantravahi, Akshat Gautam, Alejandra Zuniga, Alessandro Rey Acosta, Amila Lulo, Ana Ramirez, Ana Suarez, Anoushka Ramesh, Awab Ahmed, Blaine Finstein, Braden Holt, Brayan Salgado, Briana Rocha, Caleb Rudow, Calista LaMotte, Carmen Magana, Caroline Hastings, Caroline Woodman, Connor Hanna, Dalia Dabbagh, David Tibaquira, David Zulli, Debasmita Bhakta, Dorna Abdi, Elena Solimano, Emily Ibarra, Erin Eggleston, Ethan Tenison, Evan Shimek, Evelin Caro Gutierrez, Fabiola Ramirez, Felipa Mendez, Francesca D'Annunzio, Grace Thomas, Isabel Campos, Iulia Tothezan, Isabel Ayala, Ishani Pandya, Ivana Jelensky, Jenny Rodriguez, Joelean Hall, Jonah Isaac, Josh Meuth Alldredge, Jude Rios, Judy Lane, Kais Bhandari, Karan Kanatala, Kate Hopp, Katya Bandouil, Katherine Alonso, Kelsia Adil, Lissette Almanza, Luca Venegoni, Luisa Venegoni, Magdalena Ibarra, Marco Mejia, Maria Fernanda Guerrero, Marianne Nader, Mary White, Mishan Kara, Mobin Piracha, Mohamed Abulfalgha, Monserrat Ramon, Nathan Stern, Nick Hoffman, Nicole Domingo, Nicky Pownall, Paige Johnson, Preston Saunders, Rachel Boles, Rachel Rosenburg, Ryan Jabra, Saamia Imtiaz, Samuel Gilette, Sara Lowe, Sterling Mosley, Tara Jackson, Temi Ajibola, Thomas Boswell, Vanessa Gonzales, Vanessa Lizcano, and Veronica Lulu Stracher. For advice or feedback, I thank Akshat Gautam, Arun Manuja, Ilona Wysmulek, Jan Pierskalla, John Gerring, John Ogallo, Lorenzo Crippa, Mike Findley, Ken Greene, Serge Nkuindja, and Xiaobo Lu. All errors are those of the author.

<sup>†</sup>PhD Candidate, Department of Government, University of Texas at Austin. [mdenly@utexas.edu](mailto:mdenly@utexas.edu)

Since the publication of Mauro's (1995) seminal study just over 25 years ago, empirical scholarship on governmental corruption has primarily relied on perceptions data.<sup>1</sup> As numerous studies have demonstrated, that is a grave problem: perceptions data suffer from myriad methodological challenges that make them unsuitable for advancing new theory and knowledge (e.g., Kurtz and Schrank, 2007*a,b*; Andersson and Heywood, 2009; Hollyer, 2018). Nevertheless, the empirical findings underpinning some of the most prominent recent theoretical advances on corruption continue to be based mainly off perceptions data (e.g., Mungiu-Pippidi, 2015; Schwindt-Bayer and Tavits, 2016).

Over the past 10-15 years, many objective measures of corruption have emerged as alternatives to perceptions data (e.g., procurement red flags, abnormal asset growth, tax evasion), but violations contained in governmental audit reports are perhaps the most promising. Corruption is a multifaceted, complex phenomenon, and audits capture that complexity—everything from the aforementioned objective measures to fraud, theft, and nepotism. Given that audits are specific to individuals or institutions, they also overcome the level-of-analysis problems that plague most country-based research using perceptions data (see Gingerich, 2013*a*).

To date, however, scholars using audit data have focused almost exclusively on the randomly assigned audits of Brazil's municipal transfer spending.<sup>2</sup> On the one hand, these data from Brazil are useful because they overcome selection/endogeneity problems and allow for causal estimation. On the other hand, scholars' constant use of these same data has generated knowledge with severe external validity challenges. Notably, Brazil is the only country in the world with randomized audits, and the country has a very unique “web” of institutions supporting its audit agency (Ferraz and Finan, 2018). Fortunately, some

<sup>1</sup> So many studies rely on corruption perceptions data that it is impossible to mention them all here, but some of the most pertinent ones include Mauro (1995) on growth; Gerring and Thacker (2004, 2005), Kunicová and Rose-Ackerman (2005), and Lederman, Loayza and Soares (2005) on institutions; and Treisman (2000, 2007) on culture, economic development, and democracy.

<sup>2</sup> See, for example, Ferraz and Finan (2008, 2011), Ferraz, Finan and Moreira (2012), Melo, Pereira and Figueiredo (2009), Brollo et al. (2013), Pereira and Melo (2015), Brollo and Troiano (2016), Avis, Ferraz and Finan (2018), and Cavalcanti, Daniele and Galletta (2018).

other countries disseminate subnational audit data, but researchers need a framework for discerning the validity of these data given that they are not randomly assigned.

In this article, I demonstrate how researchers can profitably use subnational audit data to objectively measure corruption for observational, experimental, and quasi-experimental research. Three pillars underpin my framework for assessing the utility of audit data. First, the institution performing the audits must be independent from a country’s executive branch, which can be assessed through legal and budgetary protections. Second, given that most countries’ audit institutions have discretion to perform risk-based audits, the distribution of audits must not be biased against opposition party politicians—especially following close elections. Third, the most credible audit data will also be able to empirically show fairness in the intensity/dosage of audits. For example, opposition party politicians should not be subject to more intense or stringent audits than ruling-party politicians. Since relevant quantitative data will not always be available to assess intensity/dosage, it is at least necessary to qualitatively examine auditor codes of ethics/conduct to prevent corrupt behavior.

I demonstrate the utility of my framework by collecting and analyzing a massive, new, micro-level dataset of subnational audit findings from India, Mexico, Honduras, and Guatemala. The specific data vary by country, but the panel dataset covers infractions committed, misappropriated or stolen money, follow-up on audit recommendations, whistleblower complaints received, and relevant information on the sector and sub-sector of the corruption activity. Overall, the new data and framework proposed in this paper will help researchers undertake more objective analyses of governmental corruption around the world.

The paper proceeds as follows. In Section 1, I lay out the challenges to measuring corruption and explain why perceptions-based indicators cannot usefully advance new theory and knowledge. Section 2 describes the benefits of audit data in measuring corruption and the external validity challenges associated with over-relying on the Brazilian audit data. Section 3 details the framework and data central to this paper. Using the novel data that I collected from India, Mexico, Honduras, and Guatemala, in Section 4 I analyze the extent

to which the data from each country meet the framework. The final section concludes.

## 1. Measuring Corruption with Observational, Perception-Based Data

Corruption entails “the misuse of public office for private gain”,<sup>3</sup> and many analysts define the phenomenon to be much broader (e.g., [Gingerich, 2013b](#); [Mungiu-Pippidi, 2015](#)). Irrespective of how one defines corruption, though, one thing is certain: by its very nature, corruption is a clandestine activity, so it is very difficult to measure.

The International Country Risk Guide (ICRG), Transparency International (Corruption Perceptions Index-CPI), and the World Bank (Control of Corruption score-Worldwide Governance Indicators) constructed the first widely-available corruption measures. Each of these indexes embarked on measuring corruption by aggregating and re-scaling survey data from businesspeople. Over time, as more data became available, Transparency International and the World Bank greatly diversified the data from which they constructed their corruption measures (e.g., [Kaufmann, Kraay and Mastruzzi, 2011](#), 225). In the process, the measures gained significant conceptual intention,<sup>4</sup> which is especially useful because corruption is multidimensional concept with experience-near and experience-distant meanings.<sup>5</sup>

Although development of the perceptions indexes represented major steps forward in terms of measuring corruption, they never were suitable for theory development and testing ([Hollyer, 2018](#)). ICRG developed its index for the purposes of helping businesses make decisions about corruption risks related to foreign investment, so the measure is necessarily

<sup>3</sup> This is probably the most-commonly accepted definition of corruption. For more on the definition of corruption, see, for example, [Rose-Ackerman and Palifka \(2016\)](#).

<sup>4</sup> Intention is a synonym for connotation, meaning the “ensemble of characteristics and/or properties associated with, or included in, a given word, term, or concept” ([Sartori, 1984](#), 24).

<sup>5</sup> “Experience-distant concepts are ones that specialists of one sort or another... employ to forward their scientific, philosophical, or and practical aims. Experience-near concepts, in contrast, are one[s] that someone might himself naturally and effortlessly use to define what he or his see, feel, think, imagine, and so on, which he would readily understand when similarly applied by others ([Schaffer, 2016](#), 2).”

limited in terms of content validity.<sup>6</sup> Among its many limitations, Transparency International CPI data are not suitable for over time comparisons, which severely scholars ability to use them for theory (Andersson and Heywood, 2009, 758). The World Bank's Control of Corruption score is perhaps the the most sophisticated of the three measures and is suitable for over time comparisons. Still, the measure uses questionable error structures,<sup>7</sup> has limited construct validity,<sup>8</sup> and suffers from information leakage,<sup>9</sup> halo effects,<sup>10</sup> and content opacity (Kurtz and Schrank, 2007*a,b*; Langbein and Knack, 2010; Thomas, 2010; Bersch and Botero, 2014; Gisselquist, 2014; Hollyer, 2018; Magnusson and Tarverdi, 2020).<sup>11</sup>

Information leakage, halo effects, content opacity, questionable error structures, and low construct validity are very problematic from the perspective of theory and knowledge-building (Hollyer, 2018). All of these deficits are related, too. For example, when participants respond to survey questions about corruption, it is difficult for them to exclude extraneous information and concepts that may overlap such as democracy (Hollyer, 2018). Along these lines, Kurtz and Schrank (2007*a,b*) show that countries' growth trajectories cloud survey respondents' answers on governance-related questions. Such problems compound as perceptions indexes include more sources, too, which not only complicates measure error structures but also makes the precise scope of perception-based measures necessarily opaque. With

<sup>6</sup>“Content validity assesses the degree to which an indicator represents the universe of content entailed in the systematized concept being measured” (Adcock and Collier, 2001, 537).

<sup>7</sup> By “questionable error structures”, I mean that the Worldwide Governance Indicators aggregate multiple measures that are drawn from the same sources but assume that errors are independent across those sources. As Magnusson and Tarverdi (2020) demonstrate, allowing for cluster dependence among the errors leads to substantively different conclusions in at least two prominent studies.

<sup>8</sup> Construct validity concerns whether the concepts measures what it is supposed to measure (Trochim, 2006). In particular, the Worldwide Governance Indicators have trouble with a component of construct validity called discriminant validity. It concerns whether measures are not associated with measures that they are not supposed to be associated with. The Worldwide Governance Indicators lack discriminant validity because the correlation among indicators is so high that one may ask whether they are really different (Langbein and Knack, 2010; Thomas, 2010).

<sup>9</sup> Information leakage refers to when a survey taker's perspective on one phenomenon is influence by something else.

<sup>10</sup> Halo effects specifically refer to when positive effects about something color or influence a person's opinion in a positive way about something else.

<sup>11</sup> Kurtz and Schrank (2007*a,b*) also critique the Worldwide Governance Indicators for systematic measurement error, sampling bias, and cultural biases, but those critiques are less convincing nowadays, particularly since Kaufmann, Kraay and Mastruzzi (2011) have included more sources and countries.

opaque measures, it is impossible to precisely verify the degree of construct validity: that is, whether concepts measure what they are supposed to measure (Trochim, 2006; Thomas, 2010). Which begs the question: how can a measure without construct validity be useful for theorizing? In short, its ability to do so is very limited, especially when investigating proximate and endogenous phenomena like democracy and corruption.

More recently, scholars have developed useful, Bayesian-based improvements to the perception indexes (Bersch and Botero, 2014; Standaert, 2015; Coppedge et al., 2020).<sup>12</sup> The most sophisticated of these measures is the Varieties of Democracy (V-Dem) Project's hybrid approach (Marquardt and Pemstein, 2018; Coppedge et al., 2020). V-Dem uses both fact-based and perceptions data, and complements them with targeted measures to improve reliability and validity. Nevertheless, any index relying on perceptions-based measures cannot fully overcome the aforementioned mentioned trade-offs, because they still exist—albeit to a smaller degree (Hollyer, 2018, 118, 128).

## 2. Audit Findings as Objective Measures of Corruption, and the External Validity of the Brazil Studies

Generally, objective measures of any phenomenon, including corruption, do not capture as much conceptual intention as the perception-based ones, but audit-based measures are not as susceptible to such a drawback. The reason pertains to the diversity of violations that audit reports can reveal. Procurement red flags, ghost firms, theft, nepotism, spending misappropriations, and tax evasion are just some corrupt violations that audit reports examined for this study and others reveal (e.g., Ferraz and Finan, 2008; Brollo et al., 2013).

Since audit-based corruption measures, like any other objective measure, refer to ac-

<sup>12</sup> The benefits and drawbacks of Bayesian statistics as compared to their frequentist counterparts greatly exceed the scope of this paper. In brief, the Bayesian measurement models of corruption such as Bersch and Botero (2014), Standaert (2015), and Coppedge et al. (2020) allow for less missing data, incorporation of prior data, and are more attuned to measuring intractable, unobservable concepts like corruption (Fariss, Kenwick and Reuning, 2020).

tual instances of corruption, they also do not suffer from the same information leakage, halo effects, and construct validity challenges as perception-based measures. Accordingly, objective measures are more useful for theorizing and knowledge creation than perceptions-based measures (Hollyer, 2018). Perhaps equally as significant, objective measures such as audit violations can solve the level-of-analysis problem that plagues most country-level perceptions data: that is, the fact that within-country variation often overwhelms national-level variation (Gingerich, 2013a, 505, 538). Aside from equivalence considerations,<sup>13</sup> the use of subnational data also tends to facilitate natural experiments and causal inferences—as opposed to correlational analyses with regression (Stanig, 2018, 150-151).

On the subject of innovative corruption measurement techniques that use natural experiments at the right level of aggregation, Ferraz and Finan's (2008) study of randomized municipal audits in Brazil pioneered an entire research agenda.<sup>14</sup> From the perspective of measurement, these objective data on corrupt acts like procurement fraud or over-invoicing from Brazil measure true corruption, not perceptions of it (Ferraz and Finan, 2008, 710). Also, due to the fact that the audits are randomly assigned, they obviate the many endogeneity concerns that corruption typically engenders (Escaleras, Anbarci and Register, 2007). In turn, from the perspective of knowledge creation, these data enabled Ferraz and Finan (2008) to conclusively show—for the first time—that information about politicians' corruption levels can hurt their re-election prospects. Other important results stemming from the Brazilian audit infractions data include that: re-election incentives condition politicians' corruption levels (Ferraz and Finan, 2011); getting audited nudges subnational government entities to reduce their future corruption levels—although effects are sectorally heterogeneous (Avis, Ferraz and Finan, 2018; Zamboni and Litschig, 2018); malfeasance revelations affect the types of candidates that parties put forth on party lists (Cavalcanti, Daniele and Galletta, 2018); and female politicians are less corrupt than their male counterparts (Brollo

<sup>13</sup> For more on equivalence, see Locke and Thelen (1995) and Stegmueller (2011).

<sup>14</sup> In this article, I focus on audits. However, there were many other innovations to measuring corruption using, for example, objective data from procurement (e.g., Broms, Dahlström and Fazekas, 2019; Fazekas and Kocsis, 2020), asset declarations (e.g., Eggers and Hainmueller, 2009; Fisman, Schulz and Vig, 2014), and taxes/duties (e.g., Rijkers, Baghdadi and Raballand, 2017; Naritomi, 2019).

and Troiano, 2016).

The above studies are all very precisely estimated with objective data, but how much external validity do they have? In other words, how certain can scholars be that the results apply equally to other settings, time periods, units (e.g., countries), mechanisms, as well as different operationalizations of the treatment and outcomes (Findley, Kikuta and Denly, 2021)? For practical, substantive, and methodological considerations, the corruption literature needs to move beyond Brazil.

## 2.1. Substantive and Practical External Validity Concerns with the Brazil Studies

Brazil is the only country in the world with randomized subnational audits. In turn, that means Brazil is the only country where scholars can be certain that partisan considerations do not influence who gets audited and at what time. Unequivocally, that is very useful from the perspective of causal inference. By the same token, even countries with Weberian bureaucracies like Sweden are subject to partisan pressures (Dahlström and Holmgren, 2019). Accordingly, understanding the extent of impartiality in the distribution of subnational audits is part and parcel of answering the question of whether audits deter political corruption.<sup>15</sup>

Practically, most countries' supreme audit institutions (SAIs) need to use their own discretion to choose where to audit through risk-based audits. High-corruption areas, or ones for which SAIs receive whistleblower complaints, simply need more attention than low-corruption areas. Similarly, it is practically unreasonable for large, populous cities with large budgets to always have the same probability of receiving an audit as villages with smaller budgets. Simple randomization is not always fair or useful without some sort of blocking

<sup>15</sup> Olken (2007), Duflo, Hanna and Ryan (2012), and Alm, Martinez-Vazquez and McClellan (2016) show that audits work in other contexts, but Dizon-Ross, Dupas and Robinson (2017) and Dhaliwal and Hanna (2017) have also shown that audits demotivate qualified staff, resulting in many qualified staff to leave their positions.

strategy or stratified sampling,<sup>16</sup> which is something that the Brazilian government has not implemented.

At least three additional substantive features make the external validity of the Brazil studies limited. First, the country's media facilitates collective action by exposing corrupt politicians.<sup>17</sup> Indeed, both Ferraz and Finan (2008) and Cavalcanti, Daniele and Galletta (2018) show that their results are stronger when there is greater local media presence, which is something that not all relatively corrupt countries enjoy. Second, the country has compulsory voting that contributes to relatively large voter turnout and more engagement in politics than in many countries. Third, at least since 1988, the country has a “web” of institutions (i.e., Comptroller General, Federal Audit Court, Regional Audit Courts, Public Ministry, Federal Police) that promote horizontal accountability in anti-corruption (Ferraz and Finan, 2018, 255).<sup>18</sup> Clearly, not all countries with challenges controlling corruption have such a robust institutional presence. That is especially significant because there is scholarly consensus that institutions are the fundamental cause of development, growth, and corruption (Acemoglu and Robinson, 2012; Fisman and Golden, 2017, 18).

## 2.2. Methodological Challenges with the External Validity of the Brazil Studies

Methodologically, there are concerns with over-relying on one country as well. To understand why, first examine how the samples of the Brazil Studies in Table 1 differ from their population and target inference counterparts. As is apparent, the gaps are often quite wide to make general statements. To precisely understand how these gaps can result in biased inference, consider the simple difference-in-means estimator,  $\hat{\delta}_S$ . Assuming a binary

<sup>16</sup> Block randomization refers to a randomizing strategy that entails dividing treatment and control groups into equally-sized groups. Stratification refers to sampling on the basis of strata or groups (Gerber and Green, 2012).

<sup>17</sup> For more on how the media plays a crucial role in exposing corruption and fostering electoral accountability, see Besley and Burgess (2002), Snyder and Strömberg (2010), and Larreguy, Marshall and Snyder (2020).

<sup>18</sup> Horizontal accountability refers to the ability of the bureaucracy to exert checks and balances on itself (O'Donnell, 1998).

Table 1: External Validity Dimensions of the Brazil Studies

Dimension	Sample(s)	Population(s)	Target(s)
Mechanism	Local media, election proximity, politician quality (education level)		
Settings	Comptroller General audit lotteries program on use of federal transfers	Regular municipal audits, audits of other programs, experiments, or other types designs	All countries in the world
Treatment	Municipalities receiving an audit, mayor ability to run for reelection, being a female mayor	Subnational unit receiving an audit, politician ability to run for reelection, being a female politician in Brazil	Getting audited, reelection, being a female politician in any country
Outcome	Corrupt infractions or misappropriations in use of federal transfers	Subnational political corruption in Brazil	Subnational political corruption in all other countries
Unit	Municipalities receiving an audit, municipalities with politicians seeking reelection or all municipalities in Brazil below certain populations	All municipalities in Brazil	All subnational political corruption in countries with reelection
Time	2004-a few years before the publication of each respective study	2004-present	All years

Note: “Brazil Studies” refer to [Ferraz and Finan \(2008, 2011\)](#), [Brollo et al. \(2013\)](#), [Brollo and Troiano \(2016\)](#), and [Avis, Ferraz and Finan \(2018\)](#). Other studies employ the same data, but the above studies correspond to those using corruption as a dependent variable.

treatment, [Findley, Kikuta and Denly \(2021\)](#) show that it is possible to decompose  $\hat{\delta}_S$  using the potential outcomes framework as follows:<sup>19</sup>

$$\hat{\delta}_S = \delta_P + b_{S1} + b_{S2} + b_P + b_V. \quad (1)$$

---

<sup>19</sup> For an overview of the potential outcomes framework, refer to [Imbens and Rubin \(2015\)](#).

In Equation (1),  $\delta_P$  corresponds to the Population Average Treatment Effect (PATE) or Target (population) Average Treatment Effect (TATE),<sup>20</sup> which is the ideal quantity of theoretical interest,<sup>21</sup>  $b_{S1}$  refers to the selection bias;<sup>22</sup>  $b_{S2}$  is the difference in the strength of the treatment effects between the treatment and control groups—i.e., within-sample effect heterogeneity;  $b_P$  is the bias due to non-random sample selection; and  $b_V$  refers to variable heterogeneity bias—i.e., in treatments, outcomes, and mechanisms.

The only bias that randomization in the assignment of Brazilian municipal audits data solves is  $b_{S1}$ . The extent to which randomization solves  $b_{S2}$  depends on the size of the treatment and control groups in the sample. Given that the Brazilian Comptroller General only randomly audits 30-60 municipalities per year out of a total of 5,570 municipalities, it is difficult to argue that  $b_{S2} = 0$  in the Brazil Studies. The unique institutional features described in Section 2.1 enter into Equation (1) through  $b_P$  and  $b_V$ —i.e., what Findley, Kikuta and Denly (2021) term “external validity bias”. Under many circumstances, it is feasible that the external validity bias can overwhelm the internal validity bias, represented by  $b_{S1}$  and  $b_{S2}$ . In short, while the Brazil studies represent excellent contributions to the corruption literature, random assignment is not sufficient for external validity or general knowledge creation more broadly. Scholars still need more evidence from other countries, time periods as well as settings with potentially different treatments, outcomes, and mechanisms to assess the extent to the which results transport to other contexts. Notably, these future studies will need to take into account how politics conditions the results.

---

<sup>20</sup> Studies that make inferences that aim to generalize to a larger population examine the PATE. By contrast, studies aiming to make inferences for other target populations, for which the sample is not a member, concern the TATE.

<sup>21</sup> Not all (quantitative) studies will aim to estimate the PATE or TATE. However, given that the ultimate goal of social science is to make inferences beyond the data at hand (King, Keohane and Verba, 1994, 8,34), having an estimate correspond to the PATE or TATE is an implicit goal in social science.

<sup>22</sup> Selection bias corresponds to the bias due to lack of random assignment (Angrist and Pischke, 2008).

### 3. New Audit-Related Corruption Data and A Framework for Assessing their Utility

There is a dearth of political corruption studies employing audit data outside of Brazil.<sup>23</sup> One reason likely pertains to the lack of easily-accessible audit data. A second reason is that scholars do not have systematized ways of discerning the validity of audit data, especially when audits are not randomly assigned. In the absence of randomly assigned audits, it is feasible that presidents or prime ministers can use their control of the executive branch, which includes the bureaucracy, to unfairly audit political opponents. The risk is particularly high in poor, developing democracies and countries with low horizontal accountability<sup>24</sup>—that is, exactly the types of countries where corruption tends to be high as well.

In this section, I attempt to address both of the above gaps in the literature. First, I provide a new, three-pillar framework for assessing the utility of audit data. The framework is especially useful for when audits are not randomly assigned, but all three of its pillars are also relevant for experiments or natural experiments that randomly assign audits. Second, I provide a wealth of new, micro-level audit data to demonstrate the utility of the framework and facilitate further audit-based corruption research using these objective data.

#### 3.1. A New Framework

Three pillars underpin my new framework for discerning the utility of audit-related corruption data—regardless of whether they are randomly assigned. The first pillar concerns legal independence from the executive branch. The second pillar focuses on the frequency,

---

<sup>23</sup> Bobonis, Cámara Fuertes and Schwabe (2016), Bo, Wu and Zhong (2020), Larreguy, Marshall and Snyder (2020), Ajzenman (2021), and Nieto and Rios (2021) are, to my knowledge, the only such studies outside of Brazil using administrative data—aside from those on one-off programs, such as Di Tella and Schargrodsky (2003), Olken (2007), and Nikolova and Marinov (2017).

<sup>24</sup> Horizontal accountability concerns the ability to keep checks on itself—i.e., the executive branch. For new data on horizontal accountability, refer to Lührmann, Marquardt and Mechkova (2020). For more on the poor performance of poor democracies, see Keefer (2007a,b).

selection, and distribution of audits, and whether partisanship affects any of these measures. The third and final pillar pertains to potential biases in implementation in audit intensity or dosage. I describe each of these pillars in turn.

### 3.1.1. Legal Independence from the Executive Branch

Generally, it is possible to verify that independence from the executive branch through legal and budgetary provisions. As highlighted by the [International Organization of Supreme Audit Institutions \(2019\)](#), the strongest legal provisions regarding audit independence are those in a country's constitution. In particular, an independent audit institution will have clear rules and tenure security for the agency head, budget autonomy, and discretion to audit without securing approval from politicians. For example, if a country's President or Prime Minister can easily fire and replace the audit agency head at will, it will be difficult for the audit process to be apolitical. The same is true for budgets: if audit agencies receive smaller outlays after undertaking unpopular audits, then independence becomes more elusive. That is why there is less risk if audit agencies report to Congress or a parliament instead of a president or prime minister. This way, there is less possibility for a single individual to unduly influence the audit process.

### 3.1.2. Frequency, Selection, and Distribution of Audits

Audits must not be biased against opposition party politicians—especially following close elections. Although many observers may argue that randomization immediately solves this second pillar, some forms of random assignment are more credible than others. Complete random assignment,<sup>25</sup> block randomization, or a well-justified, stratified sampling strategy<sup>26</sup> can help meet the pillar for experimental studies. Simple randomization,<sup>27</sup> such as in the

<sup>25</sup> In complete random assignment, units are randomly assigned into equally-sized treatment and control groups.

<sup>26</sup> In stratified random sampling, the researcher devises a strategy to sample

<sup>27</sup> By simple randomization, I mean independent random draws (think: coin flips) to decide whether a unit is assigned to the treatment or control group. In simple randomization, there is no guarantee that the

Brazil studies, is generally sufficient but less credible.

For observational studies to meet this second pillar on audit distribution fairness, quantitative analysis is necessary. If all units (e.g., states, municipalities) in a sample do not receive the same number of audits for the given time interval, then it is necessary to perform a maximum likelihood regression (see [King, 1998](#)). When the dependent variable refers to a count of the number of audits received during an interval, then a poisson or negative binomial regression is germane. If not all units receive an audit during the particular interval, a logistic regression model is appropriate. In either scenario, especially given that SAIs' non-randomly assigned audits are supposed to be "risk-based", it is useful to control for demographics population (more populated places will generally have more vulnerable revenue) and past corruption (either lags or cumulative sums), and revenue amounts.

Regardless of what the maximum likelihood regressions show, it is necessary to complement the above analyses with a regression discontinuity design (RDD). Specifically, the latter needs to follow the setup of [Brollo and Nannicini \(2012\)](#) and examine whether co-partisanship or party alignment between the executive and lower-level government units predicts audit frequency after close elections. The RDD not only allows for quasi-causal estimation but is particularly relevant because countries' presidents may wish to use their control of the bureaucracy to target audits at electorally vulnerable opposition party politicians. If either the maximum likelihood regressions or the RDD consistently show that opposition/unaligned subnational units are more likely to receive audits, then it is clear that the data are biased.

### 3.1.3. Intensity/Dosage

Intensity/dosage concerns whether all units in the sample (municipalities, politicians, etc.) receive audits that are similarly stringent. If, for example, politicians aligned with the president receive less stringent audits than those given to opposition party politicians, then it is difficult to assert that the audit process is fair. By the same token, it is necessary to

---

treatment and control groups are equally-sized.

note that some more stringent types of audits, such as forensic audits, may be necessary to complement financial or compliance audits under some circumstances (e.g., a whistleblower complaint).

In many ways, the third criterion on intensity/dosage is the hardest to verify and might be the easiest to ignore. Not coincidentally, I did not find a single published study that attempted to examine audit intensity/dosage. One reason is likely that not every country will have the requisite quantitative data on the number of auditors sent to a place, duration of the audit, amount of money of audited as percent of the total, etc. When audit duration data are available, researchers can analyze them through various survival/event history analysis techniques. Auditor counts can be analyzed with poisson or negative binomial regression, and shares of money audited can be fruitfully examined with linear or beta regression.<sup>28</sup>

Researchers can undertake relevant qualitative analysis of audit intensity/dosage as well. In fact, given that quantitative data on audit intensity/dosage will not always be accessible, qualitative data will often provide the only recourse assess audit intensity/dosage. Particularly relevant qualitative data include those related auditor codes of ethics/conduct. They are most credible when their scope is quite broad, especially regarding conflicts of interest, and there are frequent internal or external audits with consequences for auditor noncompliance.<sup>29</sup> Some very skilled qualitative researchers may also undertake interviews of auditing staff, but adequately convincing readers that social desirability bias<sup>30</sup> is not driving auditors' responses will be challenging. Ethnographic studies of auditors may be the most credible qualitative method to assess dosage. However, the skills required to avoid Hawthorne effects<sup>31</sup> may be prohibitively high for most non-ethnographers.<sup>32</sup>

<sup>28</sup> Note: there is no agreed upon method for beta regression with fixed effects, which is why scholars generally use linear regression when estimating a fixed effects model with a fractional dependent variable. For more information, see Papke and Wooldridge (2008).

<sup>29</sup> External audits are especially important in instances of high state capture.

<sup>30</sup> Social desirability bias refers to when respondents are unwilling to admit to socially unacceptable behavior and thus provide inaccurate responses to enumerators.

<sup>31</sup> Hawthorne effects refer to the when participants change their behavior because they know that they are under study.

<sup>32</sup> The extensive set of skills and techniques required to undertake a credible ethnographic study fall outside this scope of the present one.

### 3.2. New Subnational Audit Data

Table 2: Summary of Original Data Collected

	<b>Honduras</b>	<b>Guatemala</b>	<b>Mexico</b>	<b>India</b>
Administrative Level	Municipal	Municipal	Municipal	State
Funds Covered by Audits	all	all	Federal only	all
Years Covered	2002-2018	2004-2018	2000-2018	2004-2018
Number of Audits	900	3,500	2,300	1,100
Sector	No	No	Yes	Yes
Sub-sector	No	No	No	Yes
Infractions	Yes	Yes	Yes	Yes
Precise Details of Infractions	Yes	No	Yes	Partial
Money Stolen/Missing	No	Yes	Yes	Yes
Follow-up on Audit Recommendations	No	No	No	Yes
Whistleblower Complaints	No	Yes	No	No
Charges Filed	No	Yes	Yes	No
Money Audited	No	No	Yes	Yes
Money Outside Audit	No	No	Yes	No

#### 3.2.1. Case Selection and Overview

I systematically selected the country cases for this study, focusing on members of the International Organization of Supreme Audit Institutions (INTOSAI), which has 195 full member countries as of 2021. I focused on INTOSAI members because it has specific provisions in its Mexico and Lima Declarations regarding audit independence and data transparency for its member countries ([International Organization of Supreme Audit Institutions, 1977, 2007](#)). By the same token, most INTOSAI member countries do not make their subnational audit easily accessible to citizens or researchers. For example, searches and emails to all of the SAIs from English-, French-, and Spanish-speaking African countries only yielded a limited amount of subnational audit data from Kenya. Against this backdrop of extremely limited data availability, I selected data from the SAIs of Guatemala (2004-2018), Mexico (2007-2018), Honduras (2002-2014), and India (2000-2017).

Institutionally, Guatemala, Honduras, and Mexico are presidential democracies, whereas

India is parliamentary democracy. Although Guatemala, Honduras, and Mexico are all located in Central America, they exhibit meaningful variation. For example, only Mexico has political variation at the state level, because the presidents of Guatemala and Honduras appoint governors from their own parties. Additionally, Mexican mayors were not eligible for reelection for the period under study (see [Motolinia, 2021](#)).

[Table 2](#) summarizes the original audit data that I collected and cleaned with the help of a large team of research assistants. The audit data from Guatemala, Honduras, and Mexico correspond to the municipal level, whereas those from India correspond to the state level. The scope of the Guatemalan, Honduran, and Indian audits is quite broad, covering all potential expenses. By contrast, the Mexican municipal audits examined in this study are more limited in scope.

### 3.2.2. Mexican Audit Data

Each municipality in Mexico can receive an audit from either the federal supreme audit institution (ASF, *la Auditoría Superior de la Federación*) or the respective state-level auditing entity (EFSE, *las Entidades de Fiscalización Superior Estatales*).<sup>33</sup> However, the EFSEs often lack independence from powerful state governors, consistent budgets, standardized procedures, and the ability to trigger disciplinary proceedings, so the effectiveness EFSE audits in combating corruption is limited ([OECD, 2017](#); [Zachary and Spaniel, 2020](#)). Accordingly, the present study relies on the more neutral ASF audits (see also Section [4.4](#)).

Similar to the randomized municipal Brazilian audits first examined by [Ferraz and Finan \(2008\)](#) that now comprise the basis of much knowledge on patterns of local-level corruption, the ASF audits only pertain to the municipal use of federal funds. Table [D2](#) provides a breakdown of these audits by fund type. To date, existing studies using these data by [Larreguy, Marshall and Snyder \(2020\)](#) and [Ajzenman \(2021\)](#) focus exclusively on audits of the Fund for Municipal Social Infrastructure (FISM, *el Fondo de Infraestructura*

---

<sup>33</sup> EFSEs are also called *las Entidades de Fiscalización Superior Locales* (EFSLS).

*Social Municipal*), which comprise circa 26% of the audits in the present dataset.

Although the ASF audits in this dataset only pertain to the municipal use of federal funds, the ASF has a great diversity of audits and takes many different types of actions after these audits (see Tables D3 and D4). Appendix D provides a full codebook of the Mexican audits dataset.

### **3.2.3. Guatemalan Audit Data**

The Guatemalan audit data cover all municipality expenses for circa 320 of the country's 338 municipalities from 2004-2019. As Table 2 shows, the audits yield data on infractions (*sancciones*), whistleblower complaints (*denuncias*), and charges filed (*informes/pliegos de cargos*). For each of these categories, the data provide not just a count of these categories but also the amount of stolen/misappropriated money associated with them, which I deflated to constant 2013 Quetzales. Appendix C provides a full codebook of these data.

### **3.2.4. Honduran Audit Data**

Unlike the other SAIs described above, Honduras' SAI (*El Tribunal Superior de Cuentas*) does not provide detailed lists of audit infractions. Instead, it only provides the actual municipal audits reports. Accordingly, a large team of research assistants and I inspected each infraction in every available report for corruption using a typology loosely based on the World Bank's (2016) Anti-Corruption Guidelines (see Table A2). Given that the World Bank's (2016) Anti-Corruption Guidelines are primarily designed for sanctioning companies, we supplemented their primary categories of bribery, collusion, fraud, obstruction, and coercion with the additional categories of theft, nepotism, cronyism, and grand corruption (see Table A2).

Not all mismanagement is corruption, though. To distinguish between corruption and mismanagement, the team and I only classified instances under any of the above categories

of corruption when there was clear intent from the perpetrators. Especially in developing country contexts, bureaucrats often lack training and equipment (e.g., computers), and these impediments can lead to mismanagement and clerical errors that are distinct from corruption.<sup>34</sup> Against this backdrop, the dataset entails a count of the total number of infractions as well as the number of corrupt infractions meeting the definitions in Table A2. Appendix A provides further details about these data and their coding procedure.

### 3.2.5. Indian Audit Data

In contrast to the SAIs of Guatemala and Mexico, the Comptroller and Auditor General (CAG) of India does not provide comprehensive audit information at the municipality or Gram Panchayat level each year. However, the CAG does make available a wealth of panel audit data at the state level. These data notably include disaggregated information at the sector, receipt, and department levels (see Table 2).

The main challenge with the Indian audit data is that, similar to Like Honduras, the CAG does not provide the data in tabular format. A large team and I thus extracted the data from the individual audits reports, which usually span hundreds of pages in length. As the Codebook in Appendix B describes, the data contain information on the number of infractions and amounts of stolen/misappropriated money. The CAG disaggregates these data into larger Inspection Reports (IR) and more specific paragraphs (infractions) within those IRs.

Perhaps of most interest to researchers is that the data include information on the extent to which state governments resolve the infractions and return the stolen/misappropriated money from year-to-year (see Appendix B). Past research already indicates that audits are perhaps the most effective tool in reducing corruption (Gans-Morse et al., 2018), but these

<sup>34</sup> In interviews that I conducted in Honduras in 2016, I learned that comptrollers in multiple municipalities that they often had to drive somewhere else to enter required audit information into computers connected to the internet. In turn, the cumbersome process also yielded clerical errors that would sometimes show up in audits as accounting inconsistencies.

new data will help researchers better understand the conditions under which audits themselves are most effective at reducing corruption. Such information will be crucial for advancing scholarly knowledge about corruption, because anti-corruption tools are only effective if corrupt actors take remedial action in response to them.

## 4. Analysis of the Country Cases

In this Section, I apply the framework in Section 3.1 to analyze the extent to which researchers can profitably use the non-randomized, subnational audit data from India, Mexico, Guatemala, and Honduras. As above, I analyze the legal independence of the audit institution from the executive branch, the partisan distribution of the audits, and their intensity/dosage.

### 4.1. India

#### 4.1.1. Legal Basis for Independence from the Executive Branch (India)

There is a plethora of legislation that protects the legal independence of the CAG and its Auditor General, who serves a term of six years. The relevant legislation protecting the Auditor General from political interference dates back to Audits and Accounts Order of 1936, which the Companies Act of 1956 and Duties, Powers, and Conditions (DPC) Act of 1971 reinforce. Articles 148-151 of the Indian Constitution further protect the independence of the CAG (see [Elkins et al., 2014](#)). Although the president appoints the Auditor General after nomination from the Prime Minister, the Parliament determines the salary and office requirements of the Auditor General. Additionally, the process for removing the Auditor General is akin to that of a Supreme Court Justice, and the Auditor General is not eligible for further political office after his or her term at the CAG ends. Given that the constitution grants the Auditor General even more autonomy in terms of day-to-day operations, it is

clear that the Auditor General has significant legal independence from the executive branch to carry out unbiased auditing.

#### **4.1.2. Frequency, Selection, and Distribution of Audits (India)**

Each year, India's CAG publishes audit reports for all of India's 29 states on its website. Accordingly, analysts can use these state-level audits data from India without concern of distributional bias along political party lines.

#### **4.1.3. Intensity/Dosage (India)**

CAG audits take place on a fiscal year timetable that starts in April and ends the following in March. Because all audits follow this timetable, there is no obvious concern regarding the potential time intensity/dosage of the audits.

There are similarly no ostensible concerns regarding the scope intensity/dosage of the audits. The CAG also has an extensive auditor code of ethics, emphasizing integrity, independence, objectivity, impartiality, confidentiality, and competence as key ethical principals ([Comptroller and Auditor General of India, 2012](#)). When combined with the similarly broad CAG Regulations on Audits and Accounts, Auditing Standards, and Audit Quality Management Framework ([Comptroller and Auditor General of India, 2015, 2017, 2020](#)), it is clear that auditors can conduct audits to their full extent without issues of missing information or other hindrances.

## **4.2. Honduras**

#### **4.2.1. Legal Basis for Independence from the Executive Branch (Honduras)**

The Supreme Tribunal of Accounts (TSC, *Tribunal Superior de Cuentas*) is the institution responsible for government audits in Honduras. Articles 205, 222-227, and 240 of the

Honduran Constitution and the Organic Law of the TSC (2002, revised 2011) provide the legal basis of the TSC (see Elkins et al., 2014). Overall, its legal basis is strong. Notably, the TSC reports to Congress, not the President, so the chance that any one individual can control the TSC is low. That is especially the case because the Organic Law of the TSC specifically stipulates that the TSC head is not eligible for reelection after serving the initial term; staff are prohibited from political participation, except voting; and numerous politicians, including the President, are not eligible to be a member of the TSC (El Congreso Nacional de Honduras, 2002).<sup>35</sup> From an operational autonomy perspective, the TSC's independence is similarly robust. The Organic Law of the TSC supersedes all other laws, except those in the Constitution, so the TSC can engender compliance with its operations, and the Organic Law grants the TSC broad scope to do so (El Congreso Nacional de Honduras, 2002).

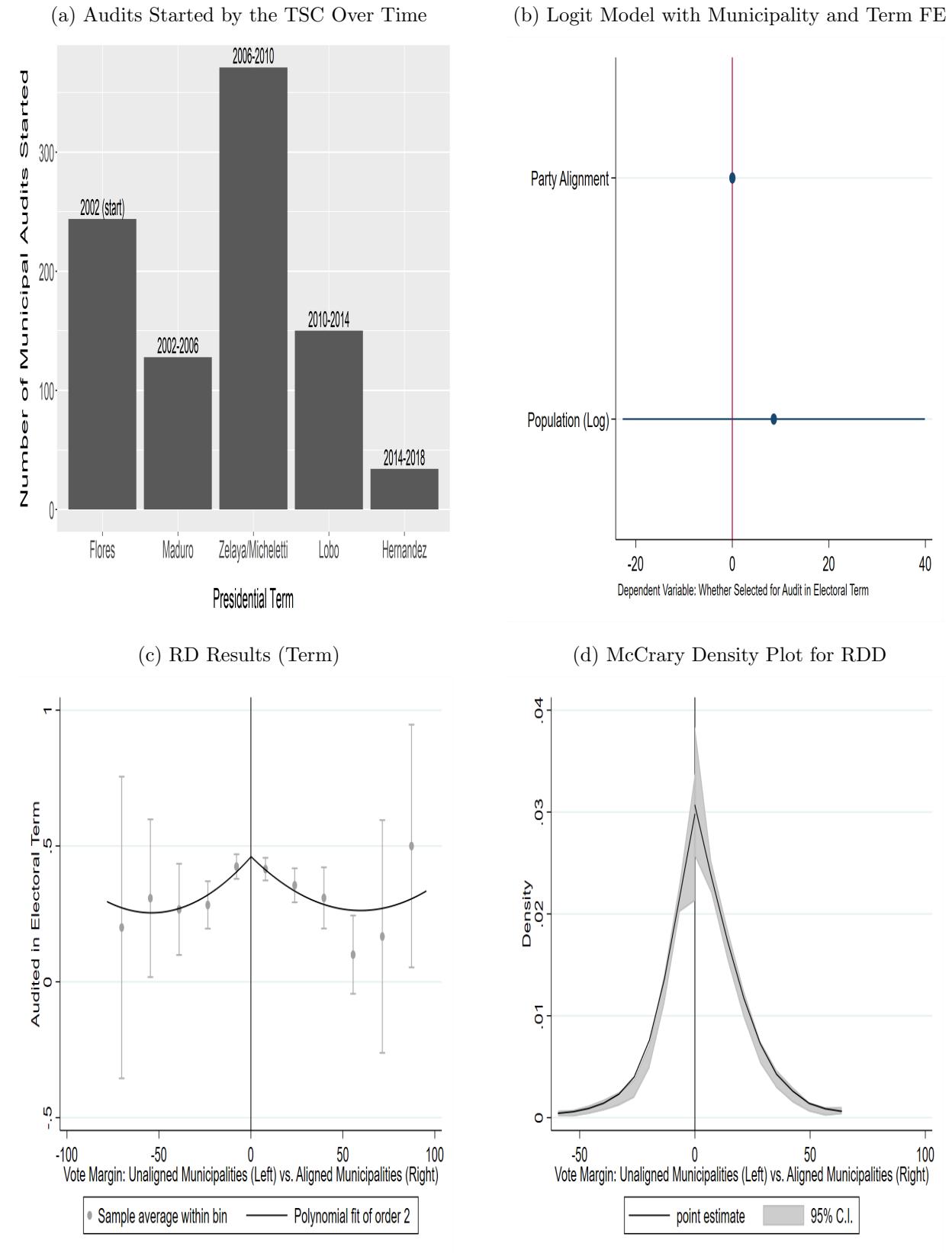
The one area where the autonomy of the TSC is weaker pertains to its budget. Per the Law of Municipalities, the TSC is supposed to receive a budget akin to one percent of municipal revenues in the previous year (El Congreso Nacional de Honduras, 2011). In 2011, the government revised the Organic Law of the TSC in order to allow for contributions from various other sources as well, including foreign aid. However, according to author interviews with various mayors as well as a TSC transparency request response, the budget is a recurring challenge in Honduras more broadly, and the TSC is no exception.

#### 4.2.2. Frequency, Selection, and Distribution of Audits (Honduras)

The TSC performs numerous audits of both municipalities and state-owned enterprises each year. However, as compared to the SAIs from other countries examined in this paper, the TSC undertakes relatively few municipal audits. Honduras has 298 municipalities but

<sup>35</sup> Other politicians who are not eligible to be part of the TSC include the Secretaries of State, the members of the Board of Directors of the National Congress, the Judges of the Supreme Court of Justice, the Attorney General of the Republic, the members of the National Elections Court, the Superintendent of Concessions and Licenses, the Attorney General of the Republic, and the National Commissioner of Human Rights (El Congreso Nacional de Honduras, 2002, Article 16).

Figure 1: Main Results: Honduras' Municipal Audit Distribution



only in 2002—when the TSC became a formal SAI—did the country start more than 200 audits in a year (see Figure 1a). Since then—and particularly over the course of Juan Orlando Hernandez’s two-term presidency (2014-present)—the number of municipal audits undertaken by the TSC has dropped steadily. A caveat is that many audits take place over the course of multiple years, and the final reports from the audits only become available years after the audits ends. Accordingly, the number of audits during the Hernandez Presidency will increase slightly as the TSC releases more multi-year audits reports on its website. Nevertheless, the relative paucity of municipal audits compared to Guatemala and Mexico is still significant.

In terms of the relationship between party affiliation and auditing decisions, the logit model in Figure 1b shows that partisan motivations are not driving which municipalities receive audits each electoral (presidential) term. I focus on results by electoral term, not the year, given both the low audit frequency and the fact that Honduras’ General Elections take place every four year on the same timetable for most positions. I also only examine mayor-president party alignments because Honduras’ president appoints governors from his/her own party, so there is no relevant political variation at the department (state/province-equivalent) level.

Consistent with the framework detailed in Section 3.1, I run a regression discontinuity design along the lines of [Brollo and Nannicini \(2012\)](#) as well. It uses random variation in close elections—using an automatically derived bandwidth following [Calonico, Cattaneo and Titiunik \(2014\)](#)—to assess whether party alignment between the president and mayors is driving auditing decisions. Overall, I find the same pattern in Figure 1b and Figure 1c: party alignment does not affect auditing decisions. As shown in Figure 1d, the regression discontinuity analysis passes the [McCrary \(2008\)](#) density test, too, so random variation in close elections is smoothly distributed, and there are no signs of electoral fraud that could skew the results.

Table 3: Survival Analysis: Does Party Alignment Affect the Intensity of Audits?

	(1) Cox	(2) Exp	(3) Weib	(4) Gomp	(5) L-N	(6) L-L
Party Alignment	0.440 (0.316)	0.587 (0.381)	0.497 (0.347)	0.470 (0.332)	-2.632 (1.957)	-3.170 (2.260)
Population (log)	0.505*** (0.0961)	0.607*** (0.131)	0.546*** (0.111)	0.522*** (0.103)	-3.869*** (0.647)	-3.959*** (0.743)
Constant		-19.22*** (1.662)	-11.63*** (1.437)	-10.24*** (1.334)	79.08*** (6.620)	79.60*** (8.312)
p (log)			-1.907*** (0.0275)			
Gamma				-0.953*** (0.0201)		
Sigma (log)					2.565*** (0.0670)	
Gamma (log)						1.854*** (0.0477)
Constant		-19.22*** (1.662)	-11.63*** (1.437)	-10.24*** (1.334)	79.08*** (6.620)	79.60*** (8.312)

Clustered, robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note: All specifications contain term fixed effects.

#### 4.2.3. Intensity/Dosage (Honduras)

Unlike the audit data from other countries examined in this paper, Honduras' TSC both does not have fixed timetables for its audits and provides start and end dates for each audit. It is thus possible to analyze whether party alignment affects whether opposition municipalities receive audits that are longer and, presumably presumably, more stringent. A potential challenge is that the start and end dates often only differ by one day, and the audits often last for multiple years, indicating that only the audit start dates are meaningful for analysis.

Irrespective of these potential challenges, Table 3 examines potential partisanship-related biases in audit intensity through Cox, Exponential, Weibull, Gompertz, Log-Normal, and Log-Logistic regression. I use these various functional forms because it is too difficult to theorize about the correct functional form of survival models (Blossfeld, Golsch and Rohwer,

2007). Regardless of what the most accurate functional form may be, all of the models yield the same result: partisanship does not affect the duration of audits. Appendix E provides further technical details behind the analysis.

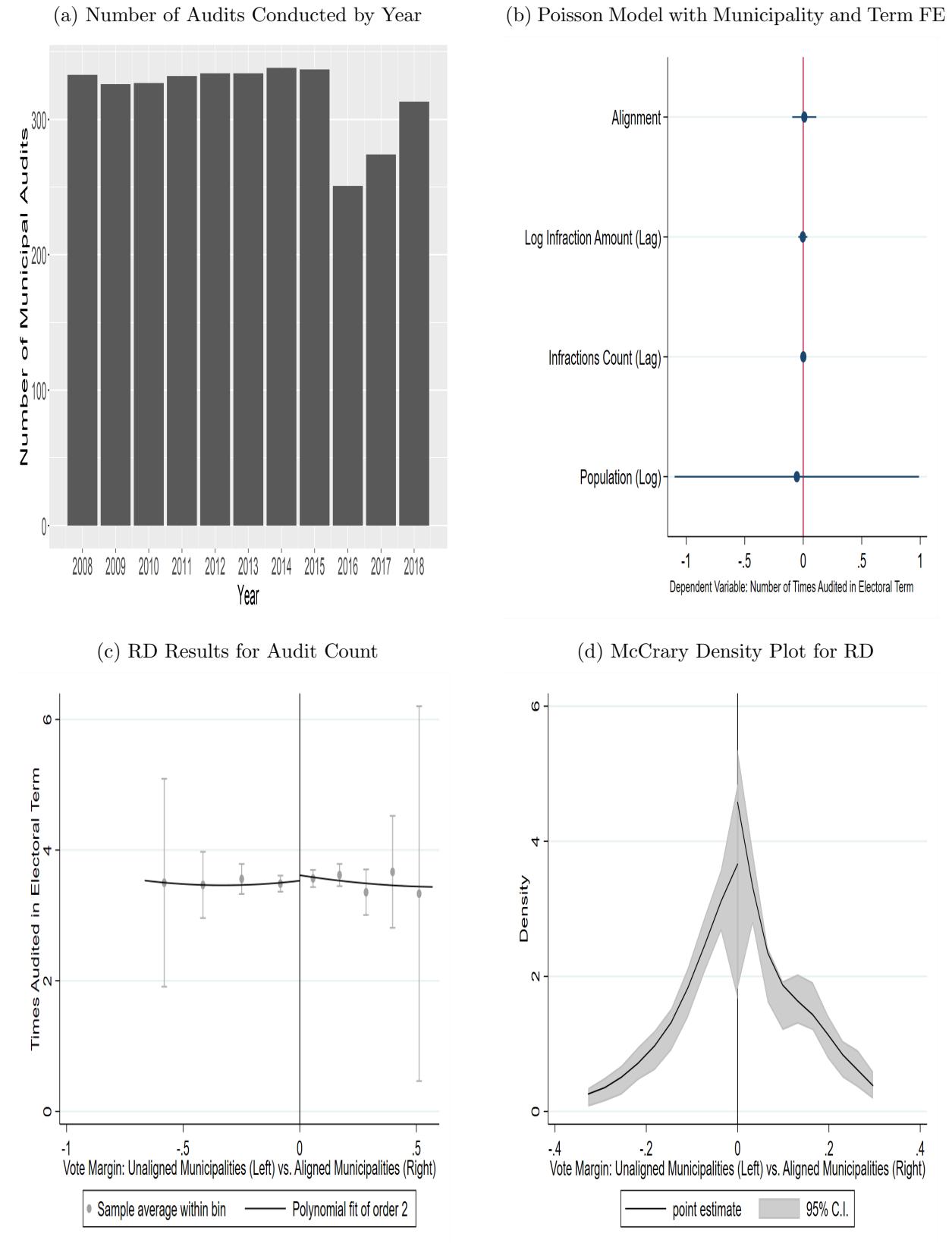
On the qualitative side, the TSC has a very comprehensive staff code of ethics, containing hundreds of articles regarding conflict of interests, bribery, nepotism, collusion, and other impediments to unbiased auditing ([Tribunal Superior de Cuentas de Honduras, 2018](#)). All violators of the code of ethics needs to answer to the TSC's Probity and Ethics Committee, which has the authority to conduct investigations. These investigations can also be quite broad given that the code of ethics specifically references the Code of Ethical Conduct of Public Servants, the Code of Conduct Regulations Ethics of the Public Servants, and the Regime of the Career of the Officials and Employees of the TSC ([Tribunal Superior de Cuentas de Honduras, 2018](#)).

## 4.3. Guatemala

### 4.3.1. Legal Basis for Independence from the Executive Branch (Guatemala)

Guatemala's SAI, the Comptroller General of Accounts (CGC, *Contraloría General de Cuentas*), is the institution responsible for audits in Guatemala. Articles 232-236 of Guatemala's 1985 Constitution provides the basis for the office's independence and ability to audit all uses of public funds throughout the country (see [Elkins et al., 2014](#)). Notably, these articles stipulate that Congress, not the President, elects the Comptroller General of Accounts (*Controlador de Cuentas*) to non-renewable, four-year terms. Removing the Comptroller General of Accounts is also uniquely within the purview of the Congress. It can only remove the Comptroller General of Accounts by majority vote only for reasons pertaining to "negligence, crime, and lack of aptitude." The Organic Law of the CGC further supports the provision elaborated in the Constitution, too ([Contraloría General de Cuentas de Guatemala, 2002](#)).

Figure 2: Main Results: Guatemala's Municipal Audit Distribution



#### 4.3.2. Frequency, Selection, and Distribution of Audits (Guatemala)

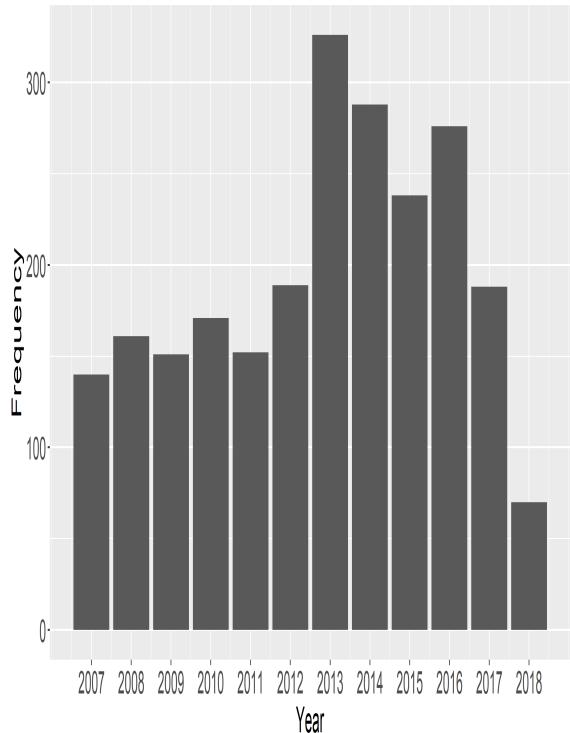
Each year, the CGC audits circa 300 of Guatemala's 340 municipalities (see Figure 2a). Because there is not much variation in which municipalities the CGC audits each year, it is more appropriate to assess the potential political bias with a count model, such as poisson regression, instead of a logit model. As shown in Figure 2b, past corruption (lagged infractions and log amounts attached to those infractions), partisanship, and demographics (population) are all similarly poor predictors of how many audits a municipality receives in a given year. Like Honduras, Guatemala also does not have political variation at the department (state-equivalent) level, so it is possible to analyze mayor-president party alignments directly. When switching to a regression discontinuity design in Figure 2c, the predictive power of alignment is similarly poor. Because the regression discontinuity estimates pass the McCrary (2008) density test as well (see Figure 2d), it is safe to conclude that the audit distribution is fair.

#### 4.3.3. Intensity/Dosage (Guatemala)

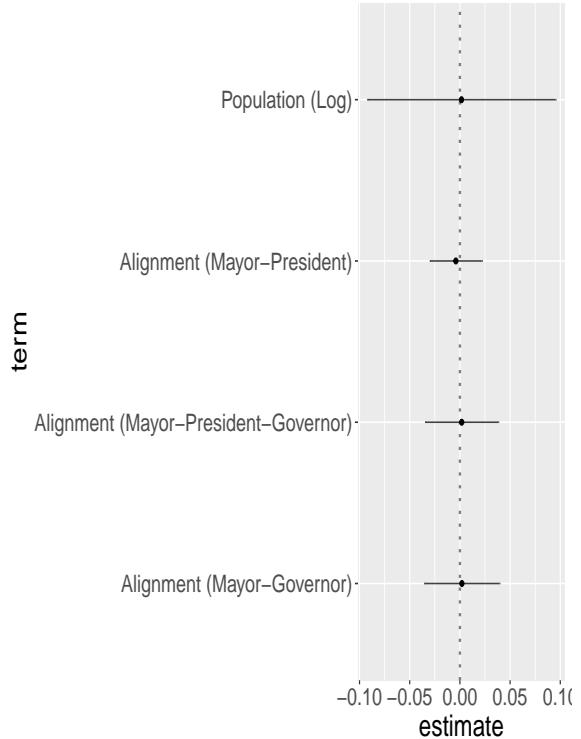
Guatemala's CGC does not provide quantitative data for assessing audit intensity/dosage, but it does have an extensive code of ethics/conduct for all employees ([Contraloría General de Cuentas de Guatemala, 2018](#)). It regulates personal and political conflicts of interest, bribery, and favors of any kind. Articles 40, 41, and 73 of the Organic Law further specify the relevant sanctions for staff ([Contraloría General de Cuentas de Guatemala, 2002](#)), so it is clear that the CGC has relevant regulations and laws to facilitate unbiased auditing.

Figure 3: Main Results: Mexico's Municipal Audit Distribution

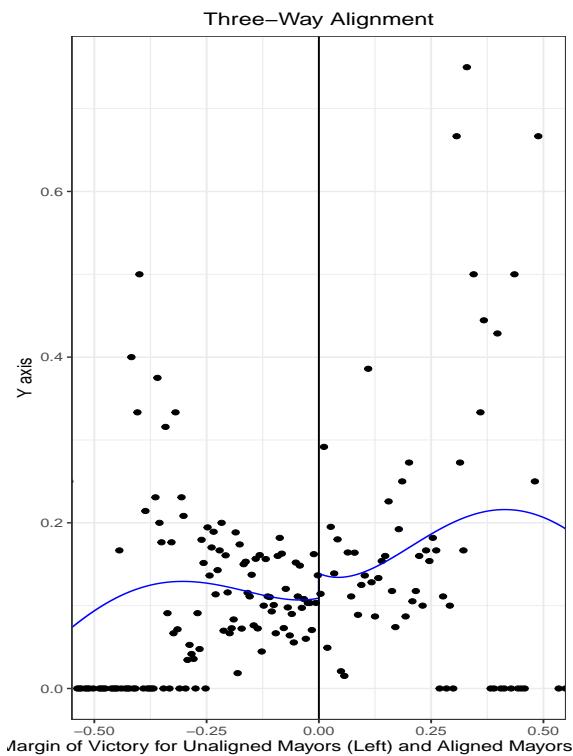
(a) Municipalities Receiving Audits by Year



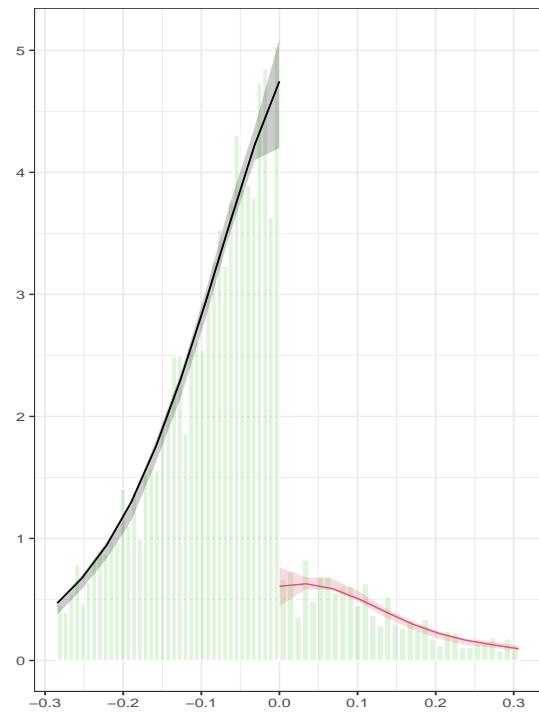
(b) Logit Model with Municipality and Year FE



(c) RD Results (Year)



(d) McCrary Density Plot for RD



## 4.4. Mexico

### 4.4.1. Legal Basis for Independence from the Executive Branch (Mexico)

Mexico's SAI, the Supreme Audit Institution of the Federation (ASF, *Auditoría Superior de la Federación*), receives its charter directly from Articles 74, 79, and 113 of the Mexican Constitution (see Elkins et al., 2014). Technically, the ASF is part of the Chamber of Deputies, so it does not report to the President. Despite being part of the Chamber of Deputies, the “Constitution grants the ASF technical, managerial, and functional autonomy” (OECD, 2017, 18). The one more challenging area pertains to the budget, which prevents the ASF from conducting more audits (OECD, 2017).

### 4.4.2. Frequency, Selection, and Distribution of Audits (Mexico)

The ASF does not audit all of Mexico's 2,400 municipalities each year. Instead, the ASF conducts risk-based audits, which are decided upon by the ASF planning commission in consultation with the Chambers of Deputies. According to an analysis by the OECD (2017), the decision process is robust, but it still useful to undertake relevant quantitative tests of partisan alignment patterns.

In contrast to Guatemala and Honduras, for which electoral term regressions are more appropriate to discern potential patterns of partisan biases in audits, year-wise regressions are more appropriate for Mexico. The reason is that, at least until 2018,<sup>36</sup> Mexico's mayoral, gubernatorial, and presidential elections did not take place on the same calendar. Essentially, the electoral term is not as meaningful to examine alignment patterns in countries without general elections on the same calendar, which included Mexico until 2018.

Also unlike Guatemala and Honduras, Mexico has governors from different political parties. It is necessary to account for that state-level political variation in quantitative analyses, because it could confound empirical estimates. Against this backdrop, the logit model

---

<sup>36</sup> For more on the relevant electoral reform, see Motolinia (2021).

depicted in Figure 3b controls for all types of coalitional party alignment configurations, including those of mayor-president, mayor-governor, governor-president, and mayor-governor-president. All of these alignment patterns are coalitional, not always direct, because many mayors run on multi-party coalitions in Mexico. Following Benton (2019), I assign the alignment status on the basis of one party in the coalition is aligned, which is a germane coding decision because the aligned party is generally the most powerful one in each coalition.

In the corresponding regression discontinuity design model using three-way party alignment in Figure 3c,<sup>37</sup> there is a slight jump on the right-side of the plot, indicating that aligned municipalities are more likely to receive an audit. That jump, however, is not statistically significant, and the McCrary (2008) density test in Figure 3d does not pass. It is thus difficult to conclude that there is any partisan bias in the audit distribution.

#### 4.4.3. Intensity/Dosage (Mexico)

Mexico provides credible quantitative data from which to assess the intensity/dosage of audits. For each audit, Mexico's ASF provides the amount of money in Mexican pesos in the audit sample as well as the overall amount of money that it could have audited. If membership in an opposition party predicts a higher share of funds audited, it suggests that opposition parties are receiving more stringent audits. As results from Figure 4 suggest, that does not appear to be the case for Mexico. Both the linear regression model and regression discontinuity approach reach the same conclusion.

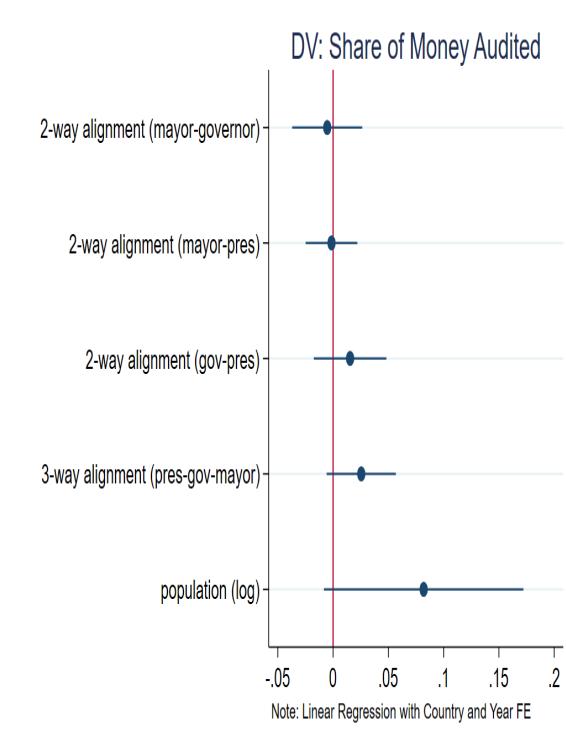
Mexico's ASF also has an extensive Integrity Policy, comprising a code of ethics, code of conduct, and directives on conflicts of interest (Auditoría Superior de la Federación de México, 2013). In future iterations, I will analyze the Integrity Policy in further detail.

---

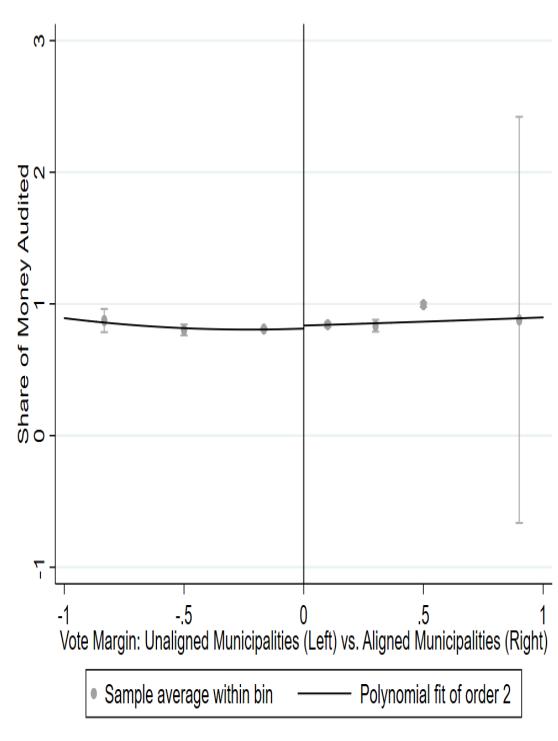
<sup>37</sup> Note: results are similar for the other alignment configurations.

Figure 4: Mexico's Audit Intensity/Dosage

(a) Linear Regression Model with Municipality and Year FE



(b) RDD Results (3-Way Alignment)



## 5. Discussion and Broader Applicability of the Framework

Table 4: Overview of Results

Country	Independence	Distribution	Intensity	Caveats
Guatemala	Yes	Yes	Yes	
Honduras	Yes	Yes	Yes	Budgetary challenges.
India	Yes	Yes	Yes	
Mexico	Yes	Yes	Yes	Limited ASF mandate and budget.

Table 4 provides an overview of the results discussed in the previous section. All of the countries in the sample have sufficient legal independence from the executive branch on paper, thereby fulfilling the first pillar of the framework. The SAIs of Mexico and Honduras, however, have limited budgets, and Mexico’s ASF also has a limited remit. With respect to the second pillar on the audit distribution, quantitative analysis does not uncover any issues of partisan bias. The framework’s third pillar on audit intensity/dosage is perhaps the most difficult to analyze. Nevertheless, the relevant quantitative measures—e.g., audit duration and share of money audited—as well as qualitative analysis of codes of ethics do not suggest any potential biases. By the same token, it is worth noting that the present analysis focuses on available data, none of the SAIs examined provide accessible data on auditor sanctions or biases (see Chu et al., 2021),<sup>38</sup> and there may be some additional implementation challenges that only a skilled interviewer or ethnographer could uncover.

As more SAIs release their subnational data and thereby fulfill their INTOSAI membership obligations (see International Organization of Supreme Audit Institutions, 1977, 2007), the above framework should prove particularly useful for governmental audit data from other countries with democratic institutions. Single-party authoritarian regimes such as China also conduct subnational audits (e.g., Bo, Wu and Zhong, 2020), and the framework’s pillars relating to independence and intensity/dosage remain relevant for such countries. The

---

<sup>38</sup> Even transparency requests to India and Honduras’ SAIs did not yield any data on auditor sanctions.

same is true for the analysis of state-owned enterprise (SOE) audits. However, future research is likely be necessary to discern if additional pillars or considerations are necessary for both single-party authoritarian regimes and audits relating to SOEs.

## 6. Conclusion

Audit data do not provide the only objective alternative to measuring corruption with perceptions data. For example, scholars have convincingly measured corruption using data from the stock market,<sup>39</sup> procurement,<sup>40</sup> asset declarations,<sup>41</sup> taxes,<sup>42</sup> and customs duties.<sup>43</sup> However, audit data standout from the above measures for a simple reason: audits reveal a greater diversity of corrupt activities. Ghost firms, theft, nepotism, fraud, violations related to all of the above measures, and many other types of corruption are all within the purview of audits.

The challenge with audit-related corruption measures to date is that, with very few exceptions, scholars have focused almost exclusively on the municipal audit data from Brazil. The numerous Brazil studies using these data have produced some very useful causal findings, notably due to the random assignment of audits to individual municipalities. Nevertheless, the external validity of these studies remains a concern due Brazil's unique institutional features and the fact that Brazil is the only country in the world with randomized audits.

Overall, the new data and framework advanced in this paper will help analysts undertake sophisticated analyses of corruption across the world. In the process, researchers will use perceptions-based data less, move beyond Brazil, and better understand the diverse

---

<sup>39</sup> See, for example, Fisman (2001), Faccio (2006), and Fisman and Wang (2015)

<sup>40</sup> See, for example, Bandiera, Prat and Valletti (2009), Mironov and Zhuravskaya (2016), Fazekas (2017), Fazekas, Cingolani and Tóth (2018), Baltrunaite (2019), Broms, Dahlström and Fazekas (2019), and Fazekas and Kocsis (2020).

<sup>41</sup> See, for example, Eggers and Hainmueller (2009) and Fisman, Schulz and Vig (2014).

<sup>42</sup> See, for example, Kleven et al. (2011), Khan, Khwaja and Olken (2016), Bilicka (2019), and Naritomi (2019).

<sup>43</sup> See, for example, Fisman and Wei (2004, 2009), Sequeira and Djankov (2014), and Rijkers, Baghdadi and Raballand (2017).

causes and consequences of corruption.

## References

- Acemoglu, Daron and James A. Robinson. 2012. *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. New York: Crown Business.
- Adcock, Robert and David Collier. 2001. “Measurement Validity: A Shared Standard for Qualitative and Quantitative Research.” *American Political Science Review* 95(3):529–546.
- Ajzenman, Nicolás. 2021. “The Power of Example: Corruption Spurs Corruption.” *American Economic Journal: Applied Economics* 13(2):230–257.
- Alm, James, Jorge Martinez-Vazquez and Chandler McClellan. 2016. “Corruption and Firm Tax Evasion.” *Journal of Economic Behavior and Organization* 124:146–163.
- Andersson, Staffan and Paul M. Heywood. 2009. “The Politics of Perception: Use and Abuse of Transparency International’s Approach to Measuring Corruption.” *Political Studies* 57(4):746–767.
- Angrist, Joshua D. and Jörn-Steffen Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist’s Companion*. Princeton, New Jersey: Princeton University Press.
- Auditoría Superior de la Federación de México. 2013. “Política Institucional de Integridad de la ASF.”.
- Avis, Eric, Claudio Ferraz and Frederico Finan. 2018. “Do Government Audits Reduce Corruption? Estimating the Impacts of Exposing Corrupt Politicians.” *Journal of Political Economy* 126(5):1912–1964.
- Baltrunaite, Audinga. 2019. “Political Contributions and Public Procurement: Evidence from Lithuania.” *Journal of the European Economic Association* 18(2):541–582.
- Bandiera, Oriana, Andrea Prat and Tommaso Valletti. 2009. “Active and Passive Waste in Government Spending: Evidence from a Policy Experiment.” *American Economic Review* 99(4):1278–1308.
- Bauhr, Monika and Nicholas Charron. 2018. “Insider or Outsider? Grand Corruption and Electoral Accountability.” *Comparative Political Studies* 51(4):415–446.
- Benton, Allyson Lucinda. 2019. “Party Leader or Party Reputation Concerns? How Vertical Partisan Alignment Reins in Subnational Fiscal Profligacy.” *Journal of Politics* 81(1):201–214.
- Bermeo, Nancy. 2016. “On Democratic Backsliding.” *Journal of Democracy* 27(1):5–19.
- Bersch, Katherine and Sandra Botero. 2014. “Measuring Governance: Implications of Conceptual Choices.” *European Journal of Development Research* 26(1):124–141.
- Besley, Timothy and Robin Burgess. 2002. “The Political Economy of Government Responsiveness: Theory and Evidence from India.” *Quarterly Journal of Economics* 117(4):1415–1451.

- Bilicka, Katarzyna Anna. 2019. "Comparing UK Tax Returns of Foreign Multinationals to Matched Domestic Firms." *American Economic Review* 109(8):2921–2953.
- Blossfeld, Hans-Peter, Katrin Golsch and Götz Rohwer. 2007. *Event History Analysis with Stata*. New York: Psychology Press: Taylor and Francis Group.
- Bo, Shiyu, Yiping Wu and Lingna Zhong. 2020. "Flattening of Government Hierarchies and Misuse of Public Funds: Evidence from Audit Programs in China." *Journal of Economic Behavior and Organization* 179(71673174):141–151.
- Bobonis, Gustavo J., Luis R. Cámara Fuertes and Rainer Schwabe. 2016. "Monitoring Corruptible Politicians." *American Economic Review* 106(8):2371–2405.
- Brollo, Fernanda and Tommaso Nannicini. 2012. "Tying Your Enemy's Hands in Close Races: The Politics of Federal Transfers in Brazil." *American Political Science Review* 106(4):742–761.
- Brollo, Fernanda, Tommaso Nannicini, Roberto Perotti and Guido Tabellini. 2013. "The Political Resource Curse." *American Economic Review* 103(5):1759–1796.
- Brollo, Fernanda and Ugo Troiano. 2016. "What Happens When a Woman Wins an Election? Evidence from Close Races in Brazil." *Journal of Development Economics* 122:28–45.
- Broms, Rasmus, Carl Dahlström and Mihály Fazekas. 2019. "Political Competition and Public Procurement Outcomes." *Comparative Political Studies* 52(9):1259–1292.
- Calonico, Sebastian, Matias D. Cattaneo and Rocío Titiunik. 2014. "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs." *Econometrica* 82(6):2295–2326.
- Cavalcanti, Francisco, Gianmarco Daniele and Sergio Galletta. 2018. "Popularity Shocks and Political Selection." *Journal of Public Economics* 165:201–216.
- Chu, Jian, Raymond Fisman, Songtao Tan and Yongxiang Wang. 2021. "Hometown Ties and the Quality of Government Monitoring: Evidence from Rotation of Chinese Auditors." *American Economic Journal: Applied Economics* 13(3):38.
- Comptroller and Auditor General of India. 2012. "Code of Ethics for the IAAD Office of the Comptroller and Auditor General of India." .
- Comptroller and Auditor General of India. 2015. "Audit Quality Management Framework." .
- Comptroller and Auditor General of India. 2017. "CAG's Auditing Standards." .  
**URL:** [https://cag.gov.in/sites/default/files/cag\\_pdf/Auditing\\_Standards\\_new.pdf](https://cag.gov.in/sites/default/files/cag_pdf/Auditing_Standards_new.pdf)
- Comptroller and Auditor General of India. 2020. "Regulations on Audits and Accounts." .
- Contraloría General de Cuentas de Guatemala. 2002. "Ley Orgánica de la Contraloría General de Cuentas." .

Contraloría General de Cuentas de Guatemala. 2018. “Código de Ética de Contraloría General de Cuentas.”.

Coppedge, Michael, John Gerring, Adam N. Glynn, Carl Henrik Knutsen, Staffan I. Lindberg, Daniel Pemstein, Brigitte Seim, Svend-Erik Skaaning and Jan Teorell. 2020. *Varieties of Democracy: Measuring Two Centuries of Political Change*. Cambridge: Cambridge University Press.

Dahlström, Carl and Mikael Holmgren. 2019. “The Political Dynamics of Bureaucratic Turnover.” *British Journal of Political Science* 49(3):823–836.

Dhaliwal, Iqbal and Rema Hanna. 2017. “The Devil is in the Details: The Successes and Limitations of Bureaucratic Reform in India.” *Journal of Development Economics* 124:1–21.

Di Tella, Rafael and Ernesto Schargrodsky. 2003. “The Role of Wages and Auditing during a Crackdown on Corruption in the City of Buenos Aires.” *Journal of Law and Economics* 46(1):269–292.

Dizon-Ross, Rebecca, Pascaline Dupas and Jonathan Robinson. 2017. “Governance and the Effectiveness of Public Health Subsidies: Evidence from Ghana, Kenya and Uganda.” *Journal of Public Economics* 156:150–169.

Duflo, Esther, Rema Hanna and Stephen P. Ryan. 2012. “Incentives Work: Getting Teachers to Come to School.” *American Economic Review* 102(4):1241–1278.

Eggers, Andrew C. and Jens Hainmueller. 2009. “MPs for Sale? Returns to Office in Postwar British Politics.” *American Political Science Review* 103(4):513–533.

El Congreso Nacional de Honduras. 2002. “Ley Orgánica del Tribunal Superior de Cuentas.”.

El Congreso Nacional de Honduras. 2011. “Ley de Municipalidades.”.

Elkins, Zachary, Tom Ginsburg, James Melton, Robert Shaffer, Juan F. Sequeda and Daniel P. Miranker. 2014. “Constitute: The World’s Constitutions to Read, Search, and Compare.” *Journal of Web Semantics* 27-28:10–18.

Escaleras, Monica, Nejat Anbarci and Charles A. Register. 2007. “Public Sector Corruption and Major Earthquakes: A Potentially Deadly Interaction.” *Public Choice* 132(1-2):209–230.

Faccio, Mara. 2006. “Politically Connected Firms.” *American Economic Review* 96(1):369–386.

Fariss, Christopher J., Michael R. Kenwick and Kevin Reuning. 2020. Measurement Models. In *SAGE Handbook of Research Methods in Political Science and International Relations*, ed. Luigi Curini and Robert J. Franzese. London: Sage Publications chapter 20, pp. 353–370.

- Fazekas, Mihály. 2017. “Red Tape, Bribery and Government Favouritism: Evidence from Europe.” *Crime, Law and Social Change* 68(4):403–429.
- Fazekas, Mihály and Gábor Kocsis. 2020. “Uncovering High-Level Corruption: Cross-National Objective Corruption Risk Indicators Using Public Procurement Data.” *British Journal of Political Science* 50(1):155–164.
- Fazekas, Mihály, Luciana Cingolani and Bence Tóth. 2018. Innovations in Objectively Measuring Corruption in Public Procurement. In *Governance Indicators: Approaches, Progress, Promise*, ed. Helmut Anheier, Matthias Haber and Mark Andreas Kayser. Oxford: Oxford University Press chapter 7, pp. 154–185.
- Ferraz, Claudio and Frederico Finan. 2008. “Exposing Corrupt Politicians: The Effects of Brazil’s Publicly Released Audits on Electoral Outcomes.” *Quarterly Journal of Economics* 123(2):703–745.
- Ferraz, Claudio and Frederico Finan. 2011. “Electoral Accountability and Corruption: Evidence from the Audits of Local Governments.” *American Economic Review* 101(4):1274–1311.
- Ferraz, Claudio and Frederico Finan. 2018. Fighting Political Corruption: Evidence from Brazil. In *Institutions, Governance, and the Control of Corruption*, ed. Kaushik Basu and Tito Cordella. Cham, Switzerland: Palgrave Macmillan chapter 9, pp. 253–284.
- Ferraz, Claudio, Frederico Finan and Diana B. Moreira. 2012. “Corrupting Learning: Evidence from Missing Federal Education Funds in Brazil.” *Journal of Public Economics* 96(9-10):712–726.
- Findley, Michael G., Kyosuke Kikuta and Michael Denly. 2021. “External Validity.” *Annual Review of Political Science* 24:365–93.
- Fisman, Raymond. 2001. “Estimating the Value of Political Connections.” *American Economic Review* 91(4):1095–1102.
- Fisman, Raymond, Florian Schulz and Vikrant Vig. 2014. “The Private Returns to Public Office.” *Journal of Political Economy* 122(4):806–862.
- Fisman, Raymond and Miriam A. Golden. 2017. *Corruption: What Everyone Needs to Know*. Oxford: Oxford University Press.
- Fisman, Raymond and Shang-Jin Wei. 2004. “Tax Rates and Tax Evasion: Evidence from Missing Imports in China.” *Journal of Political Economy* 112(2):471–496.
- Fisman, Raymond and Shang-Jin Wei. 2009. “The Smuggling of Art, and the Art of Smuggling: Uncovering the Illicit Trade in Cultural Property and Antiques.” *American Economic Journal: Applied Economics* 1(3):82–96.
- Fisman, Raymond and Yongxiang Wang. 2015. “Corruption in Chinese Privatizations.” *Journal of Law, Economics, and Organization* 31(1):1–29.

- Gans-Morse, Jordan, Mariana Borges, Alexey Makarin, Theresa Mannah-Blankson, Andre Nickow and Dong Zhang. 2018. “Reducing Bureaucratic Corruption: Interdisciplinary Perspectives on What Works.” *World Development* 105:171–188.
- Gerber, Alan S. and Donald P. Green. 2012. *Field Experiments: Design, Analysis, and Interpretation*. W.W. Norton & Company.
- Gerring, John and Strom C. Thacker. 2004. “Political Institutions and Corruption: The Role of Unitarism and Parliamentarism.” *British Journal of Political Science* 34(2004):295–330.
- Gerring, John and Strom C. Thacker. 2005. “Do Neoliberal Policies Deter Political Corruption?” *International Organization* 59(01):233–254.
- Gingerich, Daniel W. 2013a. “Governance Indicators and the Level of Analysis Problem: Empirical Findings from South America.” *British Journal of Political Science* 43(July 2013):505–540.
- Gingerich, Daniel W. 2013b. *Political Institutions and Party-Directed Corruption in South America: Stealing for the Team*. New York: Cambridge University Press.
- Gisselquist, Rachel M. 2014. “Developing and Evaluating Governance Indexes: 10 Questions.” *Policy Studies* 35(5):513–531.
- Hollyer, James R. 2018. Measuring Governance: Objective and Perceptions-Based Governance Indicators. In *Governance Indicators: Approaches, Progress, Promise*, ed. Helmut Anheier, Matthias Haber and Mark Andreas Kayser. Oxford: Oxford University Press chapter 5, pp. 103–133.
- Imbens, Guido W. and Donald B. Rubin. 2015. *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction*. New York: Cambridge University Press.
- International Organization of Supreme Audit Institutions. 1977. “The Lima Declaration.”
- International Organization of Supreme Audit Institutions. 2007. “Mexico Declaration on Supreme Audit Institutions (SAI) Independence.”
- International Organization of Supreme Audit Institutions. 2019. “Independence of Supreme Audit Institutions.”
- URL:** [https://www.intosai.org/fileadmin/downloads/focus\\_areas/independence/EN\\_0219\\_Handout\\_Independence.pdf](https://www.intosai.org/fileadmin/downloads/focus_areas/independence/EN_0219_Handout_Independence.pdf)
- Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi. 2011. “The Worldwide Governance Indicators: Methodology and Analytical Issues.” *Hague Journal on the Rule of Law* 3(2):220–246.
- Keefer, Philip. 2007a. “Clientelism, Credibility, and the Policy Choices of Young Democracies.” *American Journal of Political Science* 51(4):804–821.
- Keefer, Philip. 2007b. The Poor Performance of Poor Democracies. In *Oxford Handbook of Comparative Politics*, ed. Carles Boix and Susan C. Stokes. Oxford: chapter 36, pp. 886–909.

- Khan, Adnan Q., Asim Ijaz Khwaja and Benjamin A. Olken. 2016. "Tax Farming Redux: Experimental Evidence on Performance Pay for Tax Collectors." *Quarterly Journal of Economics* pp. 219–271.
- King, Gary. 1998. *Unifying Political Methodology: The Likelihood Theory of Statistical Inference*. Ann Arbor, Michigan: University of Michigan Press.
- King, Gary, Robert Keohane and Sydney Verba. 1994. *Designing Social Inquiry: Scientific Inference in Qualitative Research*. Princeton, New Jersey: Princeton University Press.
- Kleven, Henrik Jacobsen, Martin B. Knudsen, Claus Thustrup Kreiner, Søren Pedersen and Emmanuel Saez. 2011. "Unwilling or Unable to Cheat? Evidence From a Tax Audit Experiment in Denmark." *Econometrica* 79(3):651–692.
- Kunicová, Jana and Susan Rose-Ackerman. 2005. "Electoral Rules and Constitutional Structures as Constraints on Corruption." *British Journal of Political Science* 35(May):573–606.
- Kurtz, Marcus J. and Andrew Schrank. 2007a. "Growth and Governance: A Defense." *Journal of Politics* 69(2):563–569.
- Kurtz, Marcus J. and Andrew Schrank. 2007b. "Growth and Governance: Models, Measures, and Mechanisms." *Journal of Politics* 69(2):538–554.
- Langbein, Laura and Stephen Knack. 2010. "The Worldwide Governance Indicators: Six, One, or None?" *Journal of Development Studies* 46(2):350–370.
- Larreguy, Horacio, John Marshall and James M. Snyder. 2020. "Publicizing Malfeasance: When Media Facilitates Electoral Accountability in Mexico." *Economic Journal* 130(631):2291–2327.
- Lederman, Daniel, Norman V. Loayza and Rodrigo R. Soares. 2005. "Accountability and Corruption: Political Institutions Matter." *Economics and Politics* 17(1):1–35.
- Locke, Richard M. and Kathleen Thelen. 1995. "Apples and Oranges Revisited: Contextualized Comparisons and the Study of Comparative Labor Politics." *Politics and Society* 23(3):337–367.
- Lührmann, Anna, Kyle L. Marquardt and Valeriya Mechkova. 2020. "Constraining Governments: New Indices of Vertical, Horizontal, and Diagonal Accountability." *American Political Science Review* 114(3):811–820.
- Magnusson, Leandro M. and Yashar Tarverdi. 2020. "Measuring Governance: Why Do Errors Matter?" *World Development* 136:105061.
- Marquardt, Kyle L. and Daniel Pemstein. 2018. "IRT Models for Expert-Coded Panel Data." *Political Analysis* 10(4):431–456.
- Mauro, Paolo. 1995. "Corruption and Growth." *Quarterly Journal of Economics* 110(3):681–712.

- McCrary, Justin. 2008. "Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test." *Journal of Econometrics* 142(2):698–714.
- Melo, Marcus André, Carlos Pereira and Carlos Mauricio Figueiredo. 2009. "Political and Institutional Checks on Corruption: Explaining the Performance of Brazilian Audit Institutions." *Comparative Political Studies* 42(9):1–28.
- Mironov, Maxim and Ekaterina Zhuravskaya. 2016. "Corruption in Procurement and the Political Cycle in Tunneling: Evidence from Financial Transactions Data." *American Economic Journal: Economic Policy* 8(2):287–321.
- Motolinia, Lucia. 2021. "Electoral Accountability and Particularistic Legislation: Evidence from an Electoral Reform in Mexico." *American Political Science Review* 115(1):97–113.
- Mungiu-Pippidi, Alina. 2015. *The Quest for Good Governance: How Societies Develop Control of Corruption*. New York: Cambridge University Press.
- Naritomi, Joana. 2019. "Consumers as Tax Auditors." *American Economic Review* 109(9):3031–3072.
- Nieto, Fernando and Viridiana Rios. 2021. "Corruption as a Human Resource Management Problem: Evidence from Mexico." *Public Administration* .
- Nikolova, Elena and Nikolay Marinov. 2017. "Do Public Fund Windfalls Increase Corruption? Evidence From a Natural Disaster." *Comparative Political Studies* 50(11):1455–1488.
- O'Donnell, Guillermo. 1998. "Horizontal Accountability in New Democracies." *Journal of Democracy* 9(3):1112–1126.
- OECD. 2017. *Mexico's National Auditing System: Strengthening Accountable Governance*. Paris: OECD.
- Olken, Benjamin A. 2007. "Monitoring Corruption: Evidence from a Field Experiment in Indonesia." *Journal of Political Economy* 115(21):200–249.
- Papke, Leslie E. and Jeffrey M. Wooldridge. 2008. "Panel Data Methods for Fractional Response Variables with an Application to Test Pass Rates." *Journal of Econometrics* 145(1-2):121–133.
- Pereira, Carlos and Marcus André Melo. 2015. "Reelecting Corrupt Incumbents in Exchange for Public Goods: Rouba mas faz in Brazil." *Latin American Research Review* 50(4):88–115.
- Rijkers, Bob, Leila Baghdadi and Gael Raballand. 2017. "Political Connections and Tariff Evasion: Evidence from Tunisia." *World Bank Economic Review* 31(2):459–482.
- Rose-Ackerman, Susan and Bonnie Palifka. 2016. *Corruption and Government: Causes, Consequences, and Reform*. Second ed. New York: Cambridge University Press.

- Sartori, Giovanni. 1984. *Social Science Concepts: A Systematic Analysis*. Beverly Hills: Sage Publications.
- Schaffer, Frederic Charles. 2016. *Elucidating Social Science Concepts: An Interpretivist Guide*. New York: Routledge.
- Schwindt-Bayer, Leslie A. and Margit Tavits. 2016. *Clarity of Responsibility, Accountability, and Corruption*. New York: Cambridge University Press.
- Sequeira, Sandra and Simeon Djankov. 2014. “Corruption and Firm Behavior: Evidence from African Ports.” *Journal of International Economics* 94(2):277–294.
- Snyder, James M. and David Strömberg. 2010. “Press Coverage and Political Accountability.” *Journal of Political Economy* 118(2):355–408.
- Standaert, Samuel. 2015. “Divining the Level of Corruption: A Bayesian State-Space Approach.” *Journal of Comparative Economics* 43(3):782–803.
- Stanig, Piero. 2018. Considerations on the Method of Constructing Governance Indices. In *Governance Indicators: Approaches, Progress, Promise*, ed. Helmut Anheier, Matthias Haber and Mark Andreas Kayser. Oxford: Oxford University Press chapter 6, pp. 134–153.
- Stegmueller, Daniel. 2011. “Apples and Oranges? The Problem of Equivalence in Comparative Research.” *Political Analysis* 19(4):471–487.
- Thomas, Melissa A. 2010. “What Do the Worldwide Governance Indicators Measure?” *European Journal of Development Research* 22(1):31–54.
- Treisman, Daniel. 2000. “The Causes of Corruption: A Cross-National Study.” *Journal of Public Economics* 76(3):399–457.
- Treisman, Daniel. 2007. “What Have We Learned About the Causes of Corruption from Ten Years of Cross-National Empirical Research?” *Annual Review of Political Science* 10(1):211–244.
- Tribunal Superior de Cuentas de Honduras. 2018. “Código de Conducta Ética del Tribunal Superior de Cuentas de Honduras.”
- Trochim, William. 2006. “The Research Methods Knowledge Base, 2nd Edition.” .  
**URL:** <http://www.socialresearchmethods.net/kb/>
- World Bank. 2010. “Fraud and Corruption Awareness Handbook.” .
- World Bank. 2016. “Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants.” .
- Zachary, Paul and William Spaniel. 2020. “Getting a Hand by Cutting Them Off: How Uncertainty over Political Corruption Affects Violence.” *British Journal of Political Science* 50(2):457–480.

Zamboni, Yves and Stephan Litschig. 2018. "Audit Risk and Rent Extraction: Evidence from a Randomized Evaluation in Brazil." *Journal of Development Economics* 134(April):133–149.

<b>Appendix A Honduran Audits Codebook</b>	<b>App-3</b>
A.1 Overview and Scope . . . . .	App-3
A.2 Variables in the Honduran Audits Dataset . . . . .	App-3
A.3 Finding and Cataloging the Municipal Audit Reports . . . . .	App-4
A.4 Coding Process for the Municipal Audit Reports . . . . .	App-6
 <b>Appendix B Indian Audits Codebook</b>	<b>App-10</b>
B.1 Overview and Scope . . . . .	App-10
B.2 Variables in the Indian Audit Datasets . . . . .	App-12
B.3 Coding Procedure . . . . .	App-14
B.3.1 Revenue and All Sectors . . . . .	App-14
B.3.2 Assessment, Levy and Collection of Major and Minor Mineral Receipts	App-16
B.3.3 Civil Sector, Commercial Sector, Civil and Commercial Sector . . .	App-17
B.3.4 Collection of Motor Vehicles Taxes, Fees, and Fines . . . . .	App-18
B.3.5 Economic Sector . . . . .	App-19
B.3.6 Mahatma Gandhi National Rural Employment Guarantee Scheme .	App-20
B.3.7 Non-Public Sector Undertakings . . . . .	App-20
B.3.8 State Finance Sector . . . . .	App-21
B.3.9 Taxes and Duties Sector . . . . .	App-24
B.3.10 Transport and Infrastructure . . . . .	App-25
B.3.11 Union Territory Finances . . . . .	App-26
 <b>Appendix C Guatemalan Audits Codebook</b>	<b>App-28</b>
C.1 Overview and Scope . . . . .	App-28
C.2 Variables in the Dataset . . . . .	App-28
C.3 Coding Process . . . . .	App-28

<b>Appendix D Mexican Audits Codebook</b>	<b>App-30</b>
D.1 Overview and Scope . . . . .	App-30
D.2 Variables in the Dataset . . . . .	App-31
 <b>Appendix E Technical Appendix: Survival Analysis of the Honduran Audit Distribution</b>	 <b>App-34</b>
E.1 Data for Survival Analysis . . . . .	App-34
E.2 Survival/Event History Methods . . . . .	App-34

## Appendix A Honduran Audits Codebook

### A.1 Overview and Scope

The present codebook details the coded Honduran audits. The only audits in the dataset pertain to those of municipalities. Municipal-owned enterprises are not a part of this dataset.

### A.2 Variables in the Honduran Audits Dataset

Table A1: Variables in the Dataset

Variable	Definition
<code>unique_number</code>	Unique identifier for the municipal audit. On occasions where an audit is divided into an “A” and “B”, we merge the “A” and “B” into one audit based on the unique list of infractions without double counting. The dataset also only includes municipal audits, not audits of state-owned enterprises taking place in specific municipalities.
<code>municipio</code>	Municipality where the audit took place.
<code>departamento</code>	Department (state/province equivalent) where the audit took place.
<code>audit_start_date</code>	Date when the audit started.
<code>audit_end_date</code>	Date when the audit ended.
<code>audit_duration</code>	Duration in days of the audit.
<code>total_infractions</code>	Total number of infractions in the audit.
<code>corrupt_infractions</code>	Total number of infractions in the audit.
<code>severity_infractions</code>	Severity of infractions in the audit. These qualitative assessments take the form of an ordinal score from 1 (not severe) to 7 (high severity).

### A.3 Finding and Cataloging the Municipal Audit Reports

To access the PDF files with the municipal audit reports, visit <https://www.tsc.gob.hn/web/>, and click on “Informes de Auditorías”.



Next, click on “Informes de Auditorías”, and select the respective *departamento* (department).



The screenshot shows a web page with the header "República de Honduras" and the logo of the Superior Court of Accounts of Honduras (Tribunal Superior de Cuentas). The main content area is titled "INFORMES DE AUDITORÍAS MUNICIPALES" and includes a sub-section titled "Codigo / Departamento". A list of 11 departments is provided, each with a link:

- [\(01\) Atlántida](#)
- [\(02\) Colón](#)
- [\(03\) Comayagua](#)
- [\(04\) Copán](#)
- [\(05\) Cortés](#)
- [\(06\) Choluteca](#)
- [\(07\) El Paraíso](#)
- [\(08\) Francisco Morazán](#)
- [\(09\) Gracias a Dios](#)
- [\(10\) Intibucá](#)
- [\(11\) Islas de La Bahía](#)

Now, go to to the respective audit and save it in the Google Drive. Note: the *Tribunal Superior de Cuentas* (Supreme Audit Institution) organizes the audits by their end date.

The screenshot shows a web page with the header "República de Honduras" and the logo of the Superior Court of Accounts of Honduras (Tribunal Superior de Cuentas). The main content area is titled "ATLÁNTIDA" and includes a sub-section titled "INFORMES DE AUDITORÍAS PRACTICADAS EN EL DEPARTAMENTO DE ATLÁNTIDA". A list of audit reports is provided, each with a link:

<a href="#">INFORME N° 077-2014-DAM-CFTM-AM-A PROCESADORA MUNICIPAL DE CARNE (PROMUC) LA CEIBA</a>
<a href="#">INFORME N° 076-2014-DAM-CFTM-AM-B DIMATELA</a>
<a href="#">INFORME N° 076-2014-DAM-CFTM-AM-A DIMATELA</a>
<a href="#">INFORME N° 073-2014-DAM-CFTM-AM-A ESPARTA</a>
<a href="#">INFORME N° 066-2014-DAM-CFTM-AM-A JUTIAPA</a>
<a href="#">INFORME N° 062/2014-DAM-CFTM-AM-B LA CEIBA</a>
<a href="#">INFORME N° 052/2014-DAM-CFTM-AM-A ARIZONA</a>
<a href="#">INFORME N° 044/2014-DAM-CFTM-AM-B TELA</a>
<a href="#">INFORME N° 059/2012-DAM-CFTM-AM-A SAN FRANCISCO</a>

Finally, before entering the audit on the Google Sheet with the relevant details, make sure

that the audit is not already there. We do not want any duplicates. You can spot any duplicates, in particular, by the audit start and end dates.

unique_number	missing link?	link	municipio	departamento	audit_start_date	audit_end_date
19	missing from MTURK		la ceiba	atlantida	12/19/2007	5/31/2014
20		<a href="http://www.tsc.gob.hn/Auditorias/Informes_de_Auditoria/Sector_municipal/Atlantida/032-2008-DASM.pdf">http://www.tsc.gob.hn/Auditorias/Informes_de_Auditoria/Sector_municipal/Atlantida/032-2008-DASM.pdf</a>	la masica	atlantida	11/4/2005	7/8/2008
21		<a href="http://www.tsc.gob.hn/Auditorias/Informes_de_Auditoria/Sector_municipal/Atlantida/013-2012-DAM-CFTM-AM-A.pdf">http://www.tsc.gob.hn/Auditorias/Informes_de_Auditoria/Sector_municipal/Atlantida/013-2012-DAM-CFTM-AM-A.pdf</a>	la masica	atlantida	7/9/2008	1/31/2012

## A.4 Coding Process for the Municipal Audit Reports

Generally, each audit report opens up with a declaration of what the auditor covers in his report. A table of contents follows and can sometimes be helpful in pinpointing where infractions are located. However, it's better to review each individual page to ensure each infraction is accounted for.

Para las categorías de control interno mencionadas anteriormente, se obtuvo una comprensión de su diseño y funcionamiento; y se observó hechos que se dan a conocer debido al efecto adverso que pueden tener para las operaciones de esa entidad y se detallan a continuación:

1. Ingresos recaudados y no depositados 24 horas después de su recaudación;
2. El personal que labora en la procesadora Municipal de Carnes (PROMUC) no está debidamente identificado;
3. La Administración de la Procesadora Municipal de Carnes (PROMUC) no cuenta con un Reglamento o Manual de Funciones;
4. Diferencias determinadas al analizar los ingresos mensuales registrados en detalle del Estado de Resultado con relación a los valores cuantificados según documentación soporte;
5. La administración de Procesadora Municipal de Carnes (PROMUC) no cuenta con formato de orden de pago;
6. Algunos Funcionarios y Empleados no cuentan con expediente de personal y otros están incompletos;

Skimming through the document, you will start to notice numbered lists. These are often the infractions that the auditor will provide further detail on in the coming pages. Said infractions are then supplemented with a recommendation from the auditor. The screenshot below captures what an infraction looks like within a report:

The screenshot shows a web page from tsc.gob.hn with a dark header bar. Below it, the main content area has a white background. At the top left, there's a bold section heading "B. DEFICIENCIAS DE CONTROL INTERNO". Underneath it, a numbered list item "1. INGRESOS RECAUDADOS Y NO DEPOSITADOS 24 HORAS DESPUÉS DE SU RECAUDACIÓN" is shown in bold. To its right is a detailed explanatory paragraph. Below the paragraph is a table with three columns: "Fecha de Recaudación", "Fecha de Depósito", and "Valor del Depósito". The table contains five rows of data. Further down, there are two more paragraphs of explanatory text. At the bottom, a bold section heading "RECOMENDACIÓN N°1" is visible.

Copy and paste the Caps locked infraction alongside the brief paragraph description into the “Original Spanish Infractions” column on the Google Sheet.

The screenshot shows a Google Sheets document titled "honduran\_audits". The top menu includes File, Edit, View, Insert, Format, Data, Tools, Add-ons, Help, and "All changes saved in Drive". The sheet itself has several rows of data. Row 1 contains the header "list infractions and page numbers (avoid duplicates)" and "Original Spanish infractions". Rows 20 and 21 contain detailed audit findings. Row 20 spans across both columns and includes a large explanatory paragraph. Row 21 continues the findings from row 20. The bottom of the sheet shows a navigation bar with tabs for "original audits", "Pivot Table 2", "Pivot Table 3", and "short\_infractions".

After pasting the infraction and its description into the Google Sheet, include the page number of the infraction at the end of the pasted statement. Please translate each infraction, and classify each infraction according to the typology of Table A2. Note that it is important to consider whether the audit report indicates corrupt intent. Often, intent is very difficult discern. When the intent is unclear, we generally do not classify the infraction as corrupt. The only exception is if the infraction is so egregious that it could not be construed as other than corrupt behavior. Regardless, we separately count the overall number of infractions as well as the number of corrupt infractions. Additionally, we make a ordinal, 1-7 assessment of the severity of the infractions in each audit.

L	M	N	O
total infractions	corrupt infractions	severity of infractions (1=not, 7=very)	list infractions and page numbers (avoid duplicates)
43	5	3	Monthly bank statements were not produced (p11). Municipal staff did not prepare budget reports (p11). Taxpayers arrears were not registered in the accounts (p11). Revenues and expenditures were not updated (p12). Municipal revenues were not deposited intact (p12). Many municipal transactions were paid in cash (p12). There was no small municipal account for minor expenses (p13). No regular cash balance reviews (p13). Revenues from land sales were placed in the checking account for covering functioning costs (p13). Insufficient documentation of subsidy receipts (p13). Interest earned on savings accounts not documented in revenue accounting (p14). Treasurer works on issues outside of her official charge (p15). Municipality did not submit tax receipt income documents to the Tribunal Superior (p16). Municipal Secretary cannot show attendance lists of aldermen allowance meetings (p16). Municipal bulletin on local government actions was not published (p17). Tax documents were not prenumbered as required (p17). Taxpayer IDs not updated because treasurer did not send income statements to Cadastre Dept. in a timely manner (p17). Taxpayer IDs were not reviewed or reconciled with taxable values (p18). Taxpayer IDs had been marked up with pencil (p18). Cadastre Dept. did not send information to tax collectors about taxpayer debt (p18). Municipality did not have formal register

Because of the assessments regarding the corrupt behavior are challenging, all reports were reviewed by a senior coder. In some more difficult cases, a third coder performed a final review.

Table A2: Typology of Corrupt Activities

Term	Definition
Bribery	“Offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party” ( <a href="#">World Bank, 2016</a> , 3). Also, we can think of corruption simply as the abuse of public office for private gain. Don’t forget to code the use of agents/intermediaries or shell/suspicious companies here.
Fraud	“Any act or omission, including a misrepresentation, that knowingly or recklessly attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation” ( <a href="#">World Bank, 2016</a> , 3). This includes fraudulent contract management: that is, “fraudulent implementation including misrepresentation of goods, works, and services as having been delivered according to specifications” ( <a href="#">World Bank, 2010</a> ). You see these types of things in fraudulent invoices (e.g., overcharging), not completing the work that you say you did, government supervising officials signing-off on poor quality work.
Obstruction	(i) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede an audit or investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or (ii) acts intended to materially impede the exercise of the state or an auditor’s contractual rights of audit or access to information” ( <a href="#">World Bank, 2016</a> , 3).
Coercion	“impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party” ( <a href="#">World Bank, 2016</a> , 3).
Collusion	“an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party” ( <a href="#">World Bank, 2016</a> , 3). Here we must count specification rigging: tailoring a procurement tender so that only 1 firm is qualified to win. Another important thing to count here is bid-rigging: this is usually when firms work together in an oligopolistic manner to keep bid prices low. Alternatively, what they do is one firm agrees to not bid on the contract, but one firm agrees to subcontract out arrangements downstream in the contract cycle. This is what we call splitting. This includes insider information sharing.
Theft	embezzlement of funds not covered under “fraud”.
Nepotism	Hiring of family members.
Cronyism	Hiring of friends.
Grand corruption	“Collusion among the highest levels of government that involves major public sector projects, procurement, and large financial benefits among high-level public and private elites” ( <a href="#">Bauhr and Charron, 2018</a> ).

## Appendix B Indian Audits Codebook

### B.1 Overview and Scope

This section provides an overview of the dataset. To obtain objective data on corruption, we coded audit reports undertaken by the Comptroller and Auditor General (CAG) of India. Although the CAG undertakes yearly audits of states, local bodies, and union territories, the present dataset only covers state-level audits. By state, the CAG also conducts various types of audits each year: compliance, financial, and performance. We attempted to code all of these types of audits, but compliance and performance audits do not have similar formats to facilitate consistent coding, so the present dataset focuses on financial audits.

The first year for which audit reports are publicly available on the [CAG website](#) is 2001. The present dataset thus starts in 2001. To date, we have coded all available audit reports through 2019.

The CAG conducts its annual state-level audits by sector. Accordingly, the primary unit of analysis for this dataset is the state-sector-year. By each state-sector-year, the **main dataset** of the dataset provides users with data on the:

1. Number of outstanding Inspection Results (IRs). This is an aggregate-level measure of the number of cases/investigations related to a set of irregularities that are not immediately resolved.
2. Number of outstanding audit observations/paragraphs. This is a disaggregated measure of the total number of irregularities in the outstanding IRs. “Observations” and “paragraphs” are used interchangeably throughout the reports.
3. Amount of revenue involved in crore. This is a measure of the monetary value of the irregularities. A crore corresponds to 10,000,000 rupees.

The dataset also provides for a more disaggregated view of the audit data at the subsector,

department, and receipts levels. Similar to the data on the main dataset, the department-level data consists of data on the number of outstanding Inspection Results (IRs), number of outstanding audit observations, and amount of revenue involved in crore. The receipts data correspond to a more disaggregated view of the department-level data.

The subsector level provides the most disaggregated view of the data, including the ability to track the evolution of audit infractions over time. As Appendix B.2 describes, there are data on the:

1. Number of Inspection Results (IRs) at *opening*.
2. Number of audit observations/paragraphs at *opening*.
3. Amount of revenue involved in crore at *opening*.
4. Number of **additional** Inspection Results (IRs).
5. Number of **additional** audit observations/paragraphs.
6. Amount of **additional** revenue involved in crore.
7. Number of Inspection Results (IRs) at *clearance*.
8. Number of audit observations/paragraphs at *clearance*.
9. Amount of revenue involved in crore at *clearance*.
10. Number of Inspection Results (IRs) at *closing*.
11. Number of audit observations/paragraphs at *closing*.
12. Amount of revenue involved in crore at *closing*.

Some of the subsector-level audits do not provide the same level of detail. Instead, they simply provide data on the:

13. Number of **pending** Inspection Results (IRs).
14. Number of **pending** audit observations/paragraphs.

## B.2 Variables in the Indian Audit Datasets

Table B1: Variables in the Main Dataset

Variable	Definition
state	State where the audit took place.
year	Year that the audit finalized.
IR_pending	Total number of Inspection Reports (IRs)/investigations pending for settlement.
outstanding_observations	Total number of infractions in the audit.
revenue_involved	Amount of revenue involved in the irregularities in crore. Note: one crore is 10,000,000 rupees.

Table B2: Variables in the Department Dataset

Variable	Definition
state	State where the audit took place.
department	Department within the state where the audit took place.
year	Year that the audit finalized.
outstanding_IRs	Total number of Inspection Reports (IRs)/investigations pending for settlement.
outstanding_observations	Total number of infractions in the audit.
revenue_involved	Amount of revenue involved in the irregularities in crore. Note: one crore is 10,000,000 rupees.

Table B3: Variables in the Department Dataset

Variable	Definition
state	State where the audit took place.
department	Department within the state where the audit took place.
nature_receipt	Area/subject of the receipt.
year	Year that the audit finalized.
outstanding_IRs	Total number of Inspection Reports (IRs)/investigations pending for settlement.
outstanding_observations	Total number of infractions in the audit.
revenue_involved	Amount of revenue involved in the irregularities in crore. Note: one crore is 10,000,000 rupees.

Table B4: Variables in the Subsector Dataset

<b>Variable</b>	<b>Definition</b>
<code>state</code>	State where the audit took place.
<code>sector</code>	Sector where the audit took place.
<code>subsector</code>	Economic sector where the audit took place.
<code>year</code>	Year that the audit finalized.
<code>IR_opening</code>	Total number of Inspection Reports (IRs)/investigations pending for settlement at audit opening.
<code>paragraphs_opening</code>	Total number of paragraphs/irregularities pending for settlement at audit opening.
<code>moneyvalue_opening</code>	Money value of the paragraphs/irregularities in crore at audit opening. Note: one crore is equivalent to 10,000,000 rupees.
<code>IR_addition</code>	Total number of additional Inspection Reports (IRs)/investigations pending for settlement during this audit.
<code>paragraphs_addition</code>	Total number of additional paragraphs/irregularities pending for settlement during this audit.
<code>moneyvalue_addition</code>	Money value of the additional paragraphs/irregularities in crore at audit opening. Note: one crore is equivalent to 10,000,000 rupees.
<code>IR_clearance</code>	Total number of cleared Inspection Reports (IRs)/investigations that were pending settlement at audit opening.
<code>paragraphs_clearance</code>	Total number of cleared paragraphs/irregularities were pending settlement at audit opening.
<code>moneyvalue_clearance</code>	Money value of the cleared paragraphs/irregularities in crore that were pending settlement at audit opening. Note: one crore is equivalent to 10,000,000 rupees.
<code>IR_closing</code>	Total number of Inspection Reports (IRs)/investigations pending for settlement at audit closing.
<code>paragraphs_closing</code>	Total number of paragraphs/irregularities pending for settlement at audit closing.
<code>moneyvalue_closing</code>	Money value of the paragraphs/irregularities in crore at audit closing. Note: one crore is equivalent to 10,000,000 rupees.
<code>IR_pending</code>	Total number of Inspection Reports (IRs)/investigations pending for settlement at audit closing.
<code>paragraphs_pending</code>	Total number of paragraphs/irregularities pending for settlement at audit closing.

## B.3 Coding Procedure

The procedure for coding the audits differs slightly by sector. Most audits, however, follow the Revenue sector.

### B.3.1 Revenue and All Sectors

**main dataset.** Code the three values of the column of the most recent date. In the table below, code the values in the June 2010 column:

	June 2008	June 2009	June 2010
Number of outstanding IRs	1362	1364	1518
Number of outstanding audit observations	3710	3685	4033
Amount involved (₹ in crore)	683.71	711.53	767.23

**Department Dataset.** Code the name of the state, report number, page number, department names found in column 2, year of the report audited, and the three numerical values found in columns 4-6. For department rows that have multiple numerical values, add the values together. For example, the Finance (Taxation) department has three values for the Number of Outstanding IRs, so add the values of 152, 8, and 68 to get the total.

SL No.	Name of the Department	Nature of receipts	Number of outstanding IRs	Number of outstanding audit observations	Money value involved (₹ in crore)
1.	Finance (Taxation)	(a) Taxes/VAT on sales, trade, etc.	152	697	299.94
		(b) Agriculture income tax	8	30	2.02
		(c) Entry tax, Electricity duty, Entertainments tax, and luxury tax, etc.	68	76	2.62
2.	Excise	State excise	61	167	11.42
3.	Revenue	Land revenue	605	1442	208.97
4.	Transport	Taxes on motor vehicles	192	493	20.01
5.	Stamps and registration	Stamps and registration fees	154	308	16.13
6.	Mines and geology	Non-ferrous mining and metallurgical industries	9	37	79.71
7.	Forest and environment	Forestry and wild life	269	783	126.41
<b>Total</b>			<b>1,518</b>	<b>4,033</b>	<b>767.23</b>

**Subsector dataset.** Code the state, the report number, page number table, year the report was published, the general sector (in this case the Revenue sector), the economic sector (indicated in the below sentence - Finance (Taxation) Department), year audited (column 1), and all of the numerical values. For the year audited (column 1), we only input the second year out of the range.

Year	Opening balance			Addition during the year			Clearance during the year			Closing balance during the year			(₹ in crore)
	IRs	Para-graphs	Money value	IRs	Para-graphs	Money value	IRs	Para-graphs	Money value	IRs	Para-graphs	Money value	
2000-01	214	800	6,448.21	55	249	2,625.61	19	108	1,169.33	250	941	7,904.49	
2001-02	250	941	7,904.49	39	115	1,704.89	18	58	477.85	271	998	9,131.53	
2002-03	271	998	9,131.53	57	162	1,958.23	11	102	437.99	317	1,058	10,651.77	
2003-04	317	1,058	10,651.77	70	237	5,607.70	93	350	1,503.31	294	945	14,756.16	
2004-05	294	945	14,756.16	37	216	4,099.05	49	140	1,442.43	282	1,021	17,412.78	
2005-06	282	1,021	17,412.78	67	224	9,252.86	67	134	355.22	282	1,111	26,310.42	
2006-07	282	1,111	26,310.42	42	189	6,251.86	41	317	4,740.79	283	983	27,821.49	
2007-08	283	983	27,821.49	65	300	11,135.80	47	100	8,659.96	301	1,183	30,297.33	
2008-09	301	1,183	30,297.33	45	335	3,336.28	103	469	4,246.29	243	1,049	29,387.32	
2009-10	243	1,049	29,387.32	46	254	8,799.31	13	75	2,113.75	276	1,228	36,072.88	

**Notes.** The table below would be coded in the subsector dataset. The relevant information found in the main dataset would fill columns A-G. For column H, you would put the “year of issue of Inspection Reports”. The 3rd column in this table would go in IR\_opening (Column I) and paragraphs\_opening (Column J). The 4th column in this table would be coded as IR\_addition and paragraphs\_addition. The “Total” column in the table below would not be coded. The 6th column in the table below would be coded as IR\_clearance and paragraphs\_clearance. The last column in this table would be coded as IR\_pending and paragraphs\_pending. There may be multiple of these tables in the report, so code all of them.

**Table-13**  
**Position of pending IRs/ Paras**

Sl. No.	Year of issue of Inspection Reports	Outstanding IRs/ Paras as on 31 March 2014		Addition		Total		No. of IRs/ paras settled during 2014-15		No. of outstanding IRs/Paras as on 31 03.2015.	
		IRs	Paras	IRs	Paras	IRs	Paras	IRs	Paras	IRs	Paras
1.	Upto 2010-11	99	673	-	-	99	673	-	48	99	625
2.	2011-12	14	138	-	-	14	138	-	20	14	118
3.	2012-13	15	175	-	-	15	175	1	36	14	139
4.	2013-14	17	218	-	-	17	218	-	-	17	218
5.	2014-15	-	-	14	144	14	144	-	-	14	144
<b>Total</b>		<b>145</b>	<b>1,204</b>	<b>14</b>	<b>144</b>	<b>159</b>	<b>1,348</b>	<b>1</b>	<b>104</b>	<b>158</b>	<b>1,244</b>

### B.3.2 Assessment, Levy and Collection of Major and Minor Mineral Receipts

The table below would be coded in the subsector dataset. The only column that would be coded is “Amount Accepted” because we are only interested in the number of cases that were recognized as legitimate by the government. The cases would be coded as paragraphs\_opening (Column I) and the amount would be coded as moneyvalue\_opening (Column J). If necessary, convert the money amount to crore.

Year of Inspection Report	No. of units audited	(₹ in crore)					
		Amount objected		Amount accepted		Amount recovered	
		Cases	Amount	Cases	Amount	Cases	Amount
2006-07	11	21	335.00	16	221.00	4	0.42
2007-08	13	640	68.09	470	56.62	5	0.29
2008-09	12	764	20.09	473	1.45	1	0.14
2009-10	7	396	4.64	335	2.33	45	4.83
2010-11	9	302	23.71	149	6.14	61	0.06
<b>Total</b>	<b>52</b>	<b>2123</b>	<b>451.53</b>	<b>1443</b>	<b>287.54</b>	<b>116</b>	<b>5.74</b>

### B.3.3 Civil Sector, Commercial Sector, Civil and Commercial Sector

**main dataset.** This sector does not have a table suited for the main dataset.

**Departments and Receipts Tabs.** The table below would be coded under the Department Dataset.

Sl.No.	Department	Inspection Reports	Audit Paragraphs
1	<b>Health and Family Welfare</b>	116	690
2	<b>Law</b>	16	44
3	<b>Industries</b>	2	4
4	<b>Fisheries &amp; Animal Husbandry</b>	13	44
5	<b>Home, Prohibition and Excise</b>	10	100
6	<b>Commercial Taxes</b>	1	2
7	<b>Town and Country Planning</b>	1	9
8	<b>Higher Education</b>	28	225
9	<b>Tourism &amp; Culture</b>	11	36
10	<b>Archaeology</b>	4	15
11	<b>Transport</b>	6	9
12	<b>Youth and Sports Development</b>	1	3
13	<b>Planning &amp; Development</b>	4	24
14	<b>Tamil Development and Religious Endowment</b>	12	26
15	<b>Handlooms, Handicrafts, Textiles and Khadi</b>	3	11
16	<b>School Education</b>	21	108
17	<b>Revenue</b>	22	165
18	<b>Labour &amp; Employment</b>	7	22
19	<b>Agriculture</b>	104	373
20	<b>Co-operation &amp; Consumer Protection</b>	32	115
21	<b>Social Welfare</b>	28	135
22	<b>Backward Classes, Most Backward Classes &amp; Minority Welfare</b>	3	20
23	<b>Adi Dravidar &amp; Tribal Welfare</b>	9	102
24	<b>Public Works Department</b>	5	10
<b>Total</b>		<b>459</b>	<b>2,292</b>

Department	Position of IRs issued upto September 2005 but not settled at the end of March 2006			Position of IRs and paragraphs not settled for more than 10 years			(Rupees in crore) Position of IRs in respect of which first reply not received from March 1992 to March 2006		
	No. of IRs	No. of paragraphs	Money value	No. of IRs	No. of paragraphs	Money value	No. of IRs	No. of paragraphs	Money value
<b>Finance</b>									
a) Sales Tax	79	258	10.68	37	140	1.24	16	81	3.41
b) Professions Tax	3	4	0.06				1	3	0.06
c) Stamp Duty and Registration Fees	4	4	0.13				1	1	0.01
d) Electricity Duty	182	728	28.73	34	139	1.18	43	274	4.98
e) Agricultural Income Tax	1	2					NIL	NIL	NIL
f) Amusements Tax	4	10	0.13	1	1	0.02	5	11	0.16
<b>Forest</b>									
Forest Receipts	95	260	16.01	32	169	2.11	27	140	3.60
<b>Land and Land Reforms</b>									
Land Revenue	2	2	0.04				1	1	0.02
<b>Excise</b>									
State Excise	9	12	0.70	1	1	1.38	3	5	0.09
<b>Transport</b>									
Motor Vehicles	14	63	12.99				9	46	10.69
<b>Total</b>	<b>393</b>	<b>1343</b>	<b>69.47</b>	<b>105</b>	<b>450</b>	<b>5.93</b>	<b>106</b>	<b>562</b>	<b>23.02</b>

The above table would be coded in both the departments and the receipts tabs. The only columns that would be coded are those under “Positions of IRs not settled at the end of March 2006” because we are only interested in outstanding IRss. For the department tabs, the name of the department would be the bolded term and the subterms would be added up. For the receipts dataset, each individual row (sales tax, professions tax, etc.) would be

a receipt.

**Subsector dataset.** Below are examples of tables that would be coded under the subsector dataset.

Year	Inspection Reports	Audit Paragraphs
Up to 2004-05	119	186
2005-06	394	782
2006-07	691	1,490
2007-08	1,175	3,679
2008-09	1,104	5,258
Total	3,483	11,395

Year	Opening balance		Addition during the year		IRs/paragraphs settled during the year		IRs/paragraphs outstanding at the close of the year	
	IRs	Paragraphs	IRs	Paragraphs	IRs	Paragraphs	IRs	Paragraphs
2004-05	66	124	37	75	11	22	92	177
2005-06	92	177	50	105	04	10	138	272
2006-07	138	272	12	29	-	-	150	301
2007-08	150	301	10	41	19	48	141	294
2008-09	141	294	07	23	10	17	138	300

### B.3.4 Collection of Motor Vehicles Taxes, Fees, and Fines

**main dataset.** The table below would be coded under the main dataset.

	June 2008	June 2009	June 2010
Number of outstanding IRs	121	128	100
Number of outstanding audit observations	347	349	267
Amount involved (Rupees in crore)	12.52	22.24	9.44

**Subsector dataset.** In the table below, code the values in the IR\_opening, paragraphs\_opening,

and moneyvalue\_opening columns respectively. If necessary, convert lakhs or rupees to crore.

Year	Number of outstanding IRs	Number of outstanding paragraphs	Money value involved (Rupees in lakh)
1998-99	2	2	1.92
1999-2000	5	8	13.88
2000-01	9	16	130.81
2001-02	11	24	165.07
2002-03	13	37	130.54
2003-04	14	49	121.70
2004-05	16	41	51.52
2005-06	10	47	196.71
2006-07	8	19	20.42
2007-08	5	9	10.91
2008-09	5	9	98.04
2009-10	2	6	2.58
<b>Total</b>	<b>100</b>	<b>267</b>	<b>944.10</b>

### B.3.5 Economic Sector

**main dataset.** This sector does not have a table suited for the main dataset.

**Department Dataset.** Below is a unique table that could arguably be coded in either the department or subsector dataset. As a team, we collectively decided to code it in the department dataset. More specifically, we decided to code 15 rows for the 15 departments with the year 2004 as the year audited. Then, we repeated those 15 rows five more times to input the data from years 2005, 2006, 2007, 2008, and 2009.

SL No.	Department	Year upto 2003-04			2004-05			2005-06			2006-07			2007-08			2008-09		
		IRs	Paras	Amt.	IRs	Paras	Amt.	IRs	Paras	Amt.	IRs	Paras	Amt.	IRs	Paras	Amt.	IRs	Paras	Amt.
1	Public Works	467	1514	801.94	63	264	148.86	79	417	177.42	77	335	662.66	82	423	1471.14	83	378	1811.68
2	Water Resources	557	1322	503.7	89	298	284.8	118	414	1085.46	114	452	516.72	129	478	485.26	119	425	1705.7
3	Narmada Valley Development Authority	92	192	143.7	17	42	129.09	21	50	127.4	18	42	33.14	29	69	135.4	29	62	233.88
4	Panchayat & Rural Development (MPRRDA)	18	61	34.82	14	105	84.07	19	51	107.05	31	108	86.36	45	163	252.07	46	177	493.09
5	Forest	0	0	0	0	0	0	0	0	59	56	23.24	15	20	3.58	12	14	15.92	
6	Farmer Welfare & Agriculture Development	98	168	43.8	37	42	6.74	25	60	33.07	38	76	45.7	71	153	42.3	39	65	71.11
7	Co-operative	136	379	61.34	5	11	1.54	9	21	10.14	1	4	3.15	6	11	1.01	2	5	6.44
8	Animal Husbandry	145	276	20.89	6	12	0.37	20	66	22.24	24	62	0.22	21	66	19.02	39	119	18.04
9	Fisheries	10	11	0.39	1	2	0.08	5	12	2.46	0	0	0	2	3	0.11	2	4	0.44
10	Rural Industries	49	107	69.68	12	27	63.82	5	19	23.92	10	52	56.07	15	46	18.07	9	32	47.02
11	Commerce, Industries & Employment	42	85	114.79	1	6	14.21	11	24	53.23	63	134	249.55	3	12	21.34	8	17	35.27
12	Energy	10	13	211.86	1	1	0.04	0	0	0	0	0	0	0	0	0	0	0	0
13	Tourism	2	2	0.59	1	5	7.08	1	5	6.92	1	2	2.2	0	0	0	1	7	9.23
14	Civil Aviation	4	27	27.24	1	4	3.57	0	0	0	0	0	0	0	0	0	1	4	3.37
15	Horticulture and Food Processing	28	62	52.26	11	27	27.23	25	134	79.97	3	8	12.67	9	21	21.42	3	8	13.73
	<b>Total</b>	<b>1658</b>	<b>4219</b>	<b>2087</b>	<b>259</b>	<b>846</b>	<b>771.5</b>	<b>338</b>	<b>1273</b>	<b>1729.28</b>	<b>439</b>	<b>1331</b>	<b>1691.68</b>	<b>427</b>	<b>1465</b>	<b>2470.72</b>	<b>393</b>	<b>1317</b>	<b>4464.92</b>

**Receipts and Subsector datasets.** There are no tables suited for the receipts and sub-

sector coding.

### B.3.6 Mahatma Gandhi National Rural Employment Guarantee Scheme

These two tables would not be coded because we are only interested in departments, not districts.

Name of the district	2008-09		Open with 2009-10		2010-11		2011-12		Total	
	No. of cases	Amount	No. of cases	Amount	No. of cases	Amount	No. of cases	Amount	No. of cases	Amount
Bidar	17	0	-	-	5	0	-	-	22	0
Chikkaballapur	-	-	1	9.10	-	-	-	-	1	9.10
Dharwad	-	-	1	3.58	-	-	-	-	1	3.58
Koppal	-	-	-	-	-	-	14	0	14	0
Raichur	1	1.39	-	-	-	-	-	-	1	1.39
Tumkur	-	-	3	40.18	-	-	-	-	3	40.18
<b>Total</b>	<b>18</b>	<b>1.39</b>	<b>5</b>	<b>52.86</b>	<b>5</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>42</b>	<b>54.25</b>

#### (b) Details of civil cases

Name of the district	2008-09		2009-10		2010-11		2011-12		Total	
	No. of cases	Amount	No. of cases	Amount	No. of cases	Amount	No. of cases	Amount	No. of cases	Amount
Bangalore (Rural)	-	-	-	-	8	12.01	3	1.22	11	12.23
Bangalore (Urban)	-	-	6	12.86	-	-	-	-	6	12.86
Belgaum	-	-	-	-	-	-	1	0	1	0
Bidar	12	0	6	0	28	0	-	-	46	0
Chickmagalur	-	-	-	-	4	0.80	-	-	4	0.80
Chitradurga	1	4.21	-	-	-	-	-	-	1	4.21
Dharwad	-	-	-	-	1	12.91	58	1.80	59	14.71
Gadag	-	-	-	-	5	1.14	3	8.37	8	9.51
Hassan	-	-	-	-	7	20.80	1	0	8	20.80
Haveri	-	-	1	0.01	5	9.55	1	0	7	9.56
Uttara Kannada	-	-	-	-	1	0	-	-	1	0
Kodagu	-	-	2	0.16	5	1.11	-	-	7	1.27
Koppal	-	-	5	0	17	0	14	0	36	0
Mandy	-	-	2	15.47	2	3.96	1	0	5	19.43
Mysore	-	-	1	4.50	3	74.10	0	-	4	79.60
Shimoga	-	-	3	4.93	1	0.39	0	-	4	5.32
Yadgir	-	-	-	-	2	23.59	3	4.67	5	28.26
<b>Total</b>	<b>13</b>	<b>4.21</b>	<b>26</b>	<b>37.93</b>	<b>89</b>	<b>160.36</b>	<b>85</b>	<b>16.06</b>	<b>213</b>	<b>218.56</b>

Source: Information furnished by the RDPR department

### B.3.7 Non-Public Sector Undertakings

The table below would be coded in subsector. The year audited would be the year in the very top row.

**Table 1.4: Outstanding Inspection Reports/paragraphs**

Particulars	Prior to April 2009	2009-10	2010-11	2011-12	2012-13	2013-14	Total
Inspection Reports	13221	1175	1232	1342	1583	1676	20229
Paragraphs	17953	2489	2800	4051	5674	8008	40975

### B.3.8 State Finance Sector

**Department Dataset.** The tables below would be coded in the departments dataset. As before, make sure to convert all currency values into crore.

**Table 3.4: Department-wise break-up of misappropriations, losses, defalcations, etc.**

(Rupees in lakh)

Sl. No.	Name of the Department	Number of cases	Amount
1.	Forest	13	196.93
2.	Revenue	1	0.85
3.	Animal Resources Development	1	0.73
4.	Health and Family Welfare	3	198.38
5.	Agriculture	2	1.45
<b>Total :</b>		<b>20</b>	<b>398.34</b>

(Reference : Paragraph 3.5; Page 52)

**Department/category wise details in respect of cases of loss to Government due to theft, misappropriation/loss of Government material**

Name of Department	Theft Cases		Misappropriation/ Loss of Government Material		Total	
	Number of Cases	Amount (₹ in lakh)	Number of Cases	Amount (₹ in lakh)	Number of Cases	Amount (₹ in lakh)
PWD	-	-	5	1749.75	5	1749.75
Medical	-	-	3	17.90	3	17.90
Employment & Craftsman	-	-	1	1.92	1	1.92
Education	-	-	6	2960.42	6	2960.42
Treasuries & Accounts	-	-	1	460.89	1	460.89
Rural Development	-	-	1	126.82	1	126.82
Irrigation & Flood	-	-	1	386.00	1	386.00
Development Authority of Nagaland	-	-	1	100.00	1	100.00
Urban Development	-	-	1	545.00	1	545.00
DUDA	-	-	1	47.50	1	47.50
Food & Civil Supplies	-	-	1	266.25	1	266.25
Registrar of Co-operative Societies	-	-	1	10.81	1	10.81
Transport Commissioner	-	-	2	146.57	2	146.57
Vigilance Commission	1	1.20	-	-	1	1.20
<b>Total</b>	<b>1</b>	<b>1.20</b>	<b>25</b>	<b>6819.83</b>	<b>26</b>	<b>6821.03</b>

Similarly, the table below would be coded in the department dataset. They are relevant because they show paragraphs/infringements as well as money amounts. When coding the table below, you would disregard rows 1-20: they are too low-level. Only focus on the last row, total.

**Appendix-3.7**  
**(Reference: Paragraph 3.5; Page 49)**

**Statement showing irregularities commented upon in the outstanding Inspection Reports and paragraphs as on 31 March 2011**

Sl. No	Type of irregularities	Education				Cooperation		Industry		Police		Total	
		Secondary Education		HPU		Para	Amount	Para	Amount	Para	Amount	Para	Amount
		Para	Amount	Para	Amount								
1	Drawal of funds in advance of requirement	29	243.99	7	54.06	0	0	4	81.26	15	1642.78	55	2022.09
2	Non-adjustment of contingent advances	24	8.59	24	973.04	1	0.12	0	0	0	0	49	981.75
3	Excess/irregular expenditure for want of sanctions	1169	10041.12	81	1414.35	12	28.07	7	1394.71	11	45.99	1280	12924.24
4	Wasteful/ infructuous/ unfruitful expenditure	85	1169.11	13	1262.09	2	3.70	8	2318.70	3	188.55	111	4942.15
5	Diversion of funds	3	2.03	2	46.74	0	0	0	0	1	73.63	6	122.40
6	Overpayment, non-recovery of rent, advances/ miscellaneous recoveries	1915	1699.08	43	199.92	19	226.89	20	366.96	30	3256.73	2027	5749.58
7	Non-production of actual payees' receipts	61	220.50	6	17.46	6	8.25	0	0	2	13.12	75	259.33
8	Outstanding loans	1	0.09	3	171.13	5	345.18	19	1011.73	0	0	28	1528.13
9	Idle machinery/ equipment including vehicles	30	34.06	10	248.45	1	0.37	1	8.54	5	144.68	47	436.10
10	Non-accounting/ shortage of stores/cash, etc.	235	342.88	8	11.82	3	0.30	4	1.07	3	1109.89	253	1465.96
11	Non-recoupment of expenditure	3	0.08	8	200.05	0	0	1	107.94	1	24.04	13	332.11
12	Misappropriation of stores/ cash/ funds	83	86.73	6	50.36	2	0	3	0.32	1	1.93	95	139.34
13	Incomplete/ abandoned works	25	1331.50	7	292.71	5	97.56	12	548.36	13	5622.99	62	7893.12
14	Loss/theft embezzlement/ defalcation, etc.	228	102.84	16	365.55	4	49.58	4	309.94	7	7.94	259	835.85
15	Non-production of UCs	12	73.78	6	37.03	1	0	8	1719.86	0	0	27	1830.67
16	Non-disposal of unserviceable articles of stores	163	586.98	8	2.74	3	0.55	1	5.15	2	19.99	177	615.41
17	Non-reconciliation with treasuries/ banks	154	339.86	2	0.01	1	0.01	0	0	0	0	157	339.88
18	Non-utilization of Grants-in-aid	72	994.31	5	58.29	2	22.85	8	844.18	1	1.50	88	1921.13
19	Non-deposit of interest in treasuries	39	11.36	10	28.19	1	1.14	8	947.72	2	51.29	60	1039.70
20	Miscellaneous irregularities	804	1444.11	58	2632.18	14	299.71	8	233.99	12	304.22	896	4914.21
<b>Total</b>		<b>5135</b>	<b>18733.00</b>	<b>323</b>	<b>8066.17</b>	<b>82</b>	<b>1084.28</b>	<b>116</b>	<b>9900.43</b>	<b>109</b>	<b>12509.27</b>	<b>5765</b>	<b>50293.15</b>

Sl. No.	Name of Departments	Defalcation, misappropriation loss, theft, fraudulent and excess payment	
		Number	Amount
1	Education	04	1.50
2	Energy	02	0.05
3	Panchayati Raj	01	0.21
4	Registration, Excise and Prohibition	02	0.56
5	Rural Development	03	0.12
6	Rural Works	02	0.54
7	Urban Development and Housing	03	0.60
<b>Total</b>		<b>17</b>	<b>3.58</b>

(Reference: Paragraph 3.5; Page 48)

**Department/category-wise details of loss to Government due to theft, misappropriation, shortage etc.**

Sl.No.	Name of the department	Theft		Misappropriation/ shortage of Government material		Total	
		Number of cases	Amount (₹ in lakh)	Number of cases	Amount (₹ in lakh)	Number of cases	Amount (₹ in lakh)
1.	Agriculture	8	1.53	139	477.36	147	478.89
2.	Animal Husbandry	9	0.25	5	88.77	14	89.02
3.	Higher Education	9	1.47	16	37.69	25	39.16
4.	Commercial Tax	..	..	3	127.68	3	127.68
5.	Co-operation	1	0.02	1	0.14	2	0.16
6.	Health and Family Welfare	4	4.27	36	237.12	40	241.39
7.	Elementary Education	1	..	6	540.17	7	540.17
8.	Election	..	..	1	0.23	1	0.23
9.	Labour and Employment	6	4.04	9	58.47	15	62.51
10.	Energy	1	0.07	1	68.14	2	68.21
11.	Finance	1	0.90	5	66.86	6	67.76
12.	Home	1	0.97	9	33.01	10	33.98
13.	Horticulture	..	..	6	14.68	6	14.68
14.	Inspector of factories	..	..	1	1.43	1	1.43
15.	Museum	..	..	1	14.57	1	14.57
16.	Public	..	..	2	1.04	2	1.04
17.	Rural Development and Panchayati Raj	1	3.60	7	11.69	8	15.29
18.	Revenue	..	..	144	108.34	144	108.34
19.	School Education	1	0.02	22	74.89	23	74.91
20.	Sericulture	1	0.05	3	1.75	4	1.80
21.	Social Welfare	2	2.93	9	3.08	11	6.01
22.	Planning and development	1	0.09	..	..	1	0.09
23.	Transport	1	1.97	1	12.80	2	14.77
24.	Environment and Forests	1	0.01	3	2.31	4	2.32
25.	Highways	..	..	2	16.79	2	16.79
26.	Industries	1	..	..	..	1	..
27.	Public Works	..	..	10	4.26	10	4.26
28.	Personnel and Administrative Reforms	..	..	1	1.91	1	1.91
<b>Total</b>		<b>50</b>	<b>22.19</b>	<b>443</b>	<b>2005.18</b>	<b>493</b>	<b>2027.37</b>

**Subsector.** The table below would be coded under the subsector dataset. The IRs and Paragraphs would go in “IR\_pending” and “paragraphs\_pending”, respectively.

**Appendix-3.6**  
**(Reference: Paragraph 3.5; Page 49)**

**Year-wise break up of outstanding Inspection Reports/Paras upto March 2011 of selected DDOs**

Period	Education				Cooperation		Industry		Police		Total	
	Secondary Education		Himachal Pradesh University									
	IRs	Paras	IRs	Paras	IRs	Paras	IRs	Paras	IRs	Paras	IRs	Paras
Upto March 2001	776	1634	6	103	14	17	16	20	5	6	817	1780
2001-02	88	234	1	4	2	3	1	2	1	2	93	245
2002-03	104	269	1	11	3	5	1	1	4	6	113	292
2003-04	94	266	1	11	3	10	4	7	5	6	107	300
2004-05	83	260	2	42	3	3	3	8	4	15	95	328
2005-06	201	648	1	31	1	1	4	5	3	8	210	693
2006-07	249	814	1	21	4	6	5	12	9	28	268	881
2007-08	210	606	1	14	6	16	4	10	6	13	227	659
2008-09	96	278	1	64	3	11	5	13	4	6	109	372
2009-10	22	58	2	12	1	5	1	3	1	3	27	81
2010-11	25	68	1	10	1	5	6	35	6	16	39	134
Total	1948	5135	18	323	41	82	50	116	48	109	2105	5765

### B.3.9 Taxes and Duties Sector

**main dataset.** The table below would be coded under the main dataset with the totals added up. For IR\_pending the number would be 2732 (919 + 891 + 922), for outstanding\_observations the number would be 5865 (1936 + 1944 + 1985), and for revenue\_involved the number would be 540.78 (178.58 + 173.54 + 188.66).

Details of IRs	June 2013	June 2014	June 2015
Number of IRs pending for settlement	919	891	922
Number of outstanding audit observations	1,936	1,944	1,985
Amount of revenue involved (₹ in crore)	178.58	173.54	188.66

**Department Dataset.** For departments, code the name of the state, report number, page number, department names found in column 2, year of the report audited, and the three numerical values found in columns 4-6. For department rows that have multiple numerical values, add the values together.

Sl. No	Name of the Department	Nature of receipts	Numbers of outstanding IRs	Numbers of outstanding audit observations	Money value involved
1.	Finance	Taxes on Sales, Trade etc. and luxury tax etc. Entertainment	445 10	1,131 15	111.75 0.15
2.	Excise	State Excise	67	114	29.58
3.	Transport	Taxes on motor vehicles	103	266	35.63
4.	Stamp and Registration	Stamp and registration fees	297	459	11.55
		Total	922	1,985	188.66

**Receipts Dataset.** Using the same table above, code the name of the state, report number, page number, department names found in column 2, nature of receipts found in column 3, year of the report audited, and the three numerical values found in columns 4-6. The receipts dataset is meant to indicate the breakdown of the departments' values that we added together in the department dataset. If the department and receipts dataset's values are the same, code it as is.

**Subsector dataset.** Code the state, the report number, page number table, year the report was published, the general sector, the economic sector, year audited , and all of the numerical values. For the year audited (column 1), we only input the second year out of the range.

Year	Opening Balance			Addition during the year			Clearance during the year			Closing balance during the year		
	IRs	Para graphs	Money value	IRs	Para graphs	Money value	IRs	Para graphs	Money value	IRs	Para graphs	Money value
2010-11	312	751	50.01	54	158	89.37	6	32	0.70	360	877	138.68
2011-12	360	877	138.68	54	192	8.56	12	46	65.94	402	1,023	81.30
2012-13	402	1,023	81.30	37	151	23.79	27	78	11.20	412	1,096	93.89
2013-14	412	1,096	93.89	35	140	21.26	36	156	10.38	411	1,080	104.77
2014-15	411	1,080	104.77	44	135	8.83	17	100	13.12	438	1,115	100.48

### B.3.10 Transport and Infrastructure

Code the table below under the department dataset.

## 5.2 Results of audit

The Revenue and Land Reform Department collected ₹ 83.54 crore during 2014-15. During the period 2014-15 we test checked the records of 20 units out of 307 units of Land Revenue with revenue collection of ₹ 5.69 lakh, revealed non/short levy of cesses and/or interest on arrears of cess, non/short fixation of *salami* and commercial rent, non-settlement of vested lands etc. involving ₹ 3.89 crore in 178 cases. This indicates the near abdication of duty of collection of Land Revenue by 20 units as detailed in **Table – 5.2**.

**Table – 5.2**

Sl. No.	Categories	Number of cases	(₹ in crore)	
			Amount	
1	Non-settlement of vested lands	16	0.10	
2	Non-settlement of <i>sairats</i>	9	0.02	
3	Other cases	153	3.77	
	<b>Total</b>	<b>178</b>	<b>3.89</b>	

### B.3.11 Union Territory Finances

**Department Dataset.** The table below would be coded under the department dataset. We would only code the total number of cases and the total amount for each department. The number of cases would go in outstanding\_observations and the amount would go in money\_involved. Make sure to convert the lakhs to crore, if necessary.

Open with ▾ <b>Department/category-wise pending cases of misappropriation, loss, theft, defalcation etc., of Government material</b>						
SL. No.	Name of the Department	Theft and Loss cases		Misappropriation/ Loss of Government Material		Total
		Number of cases	Amount (₹ in lakh)	Number of cases	Amount (₹ in lakh)	
1	Adi-Dravidar Welfare	3	3.26	1	0.43	4
2	Agriculture	6	1.89	2	8.15	8
3	Animal Husbandry	3	0.06	1	41.57	3
4	Art and Culture	3	0.37	Nil	Nil	3
5	Education	18	1.70	3	43.81	21
6	Electricity	265	4,380.73	1	0.17	266
7	Health and Family Welfare	13	1.37	Nil	Nil	13
8	Information Technology	1	1.15	Nil	Nil	1
9	Labour	2	0.70	Nil	Nil	2
10	Local Administration	5	2.03	1	0.47	6
11	Police	Nil	Nil	2	0.50	2
12	Public Works	2	0.20	2	5.01	4
13	Revenue	2	0.84	Nil	Nil	1
14	Tourism	1	*	Nil	Nil	1
15	Women and Child Development	1	3.75	Nil	Nil	1
	<b>Total</b>	<b>325</b>	<b>4,398.05</b>	<b>13</b>	<b>100.10</b>	<b>338</b>
						<b>4,498.15</b>

Similarly, the table below would be coded under the department dataset. The number of IRs would go in outstanding\_IR and the number of paragraphs would go in outstanding\_observations.

**Details of IRs issued upto March 2016 and paragraphs pending as on September 2016**

<b>Sl.No</b>	<b>Name of the Department/ Directorate/Societies</b>	<b>Inspection Reports</b>	<b>Paragraphs</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
1	Accounts and Treasuries	20	55
2	Adi-Dravidar Welfare	12	73
3	Agriculture	50	238
4	Animal Husbandry and Animal Welfare	10	71
5	Art and Culture	9	48
6	Civil Supplies and Consumer Affairs	14	54
7	Collegiate and Technical Education	77	353
8	Commercial Taxes	63	353
9	Co-operation	16	70
10	Economics and Statistics	3	5
11	Election	3	13
12	Electricity	32	144
13	Fire Service	2	12
14	Fisheries and Fishermen Welfare	34	151
15	Forest and Wild Life	4	13
16	Heads of State	13	46
17	Health and Family Welfare	73	286
18	Hindu Religious Institutions	—	27
19	Industries and Commerce	36	143

**Subsector dataset.** Code the table below under subsector. Code the state, the report number, page number table, year the report was published, the general sector, the economic sector, year audited, and all of the numerical values. For the year audited (column 1), we only input the second year out of the range.

**TABLE 4.10 - POSITION OF INSPECTION REPORTS**

<b>Year</b>	<b>(₹ in crore)</b>											
	<b>Opening balance</b>			<b>Additions during the year</b>			<b>Clearance during the year</b>			<b>Closing balance</b>		
	<b>IRs</b>	<b>Paras</b>	<b>Money value</b>	<b>IRs</b>	<b>Paras</b>	<b>Money value</b>	<b>IRs</b>	<b>Paras</b>	<b>Money value</b>	<b>IRs</b>	<b>Paras</b>	<b>Money value</b>
2006-07	25	54	6.04	2	3	0.03	2	5	Nil	25	52	6.07
2007-08	25	52	6.07	5	10	Nil	3	4	Nil	27	58	6.07
2008-09	27	58	6.07	5	6	0.21	4	7	0.25	28	57	6.03
2009-10	28	57	6.03	2	3	0.16	6	8	0.21	24	52	5.98
2010-11	24	52	5.98	1	2	0.09	1	8	Nil	24	46	6.07
2011-12	24	46	6.07	7	21	132.78	10	20	3.27	21	47	135.58
2012-13	21	47	135.58	6	11	0.41	1	4	0.56	26	54	135.43
2013-14	26	54	135.43	8	23	0.72	Nil	3	0.02	34	74	136.13
2014-15	34	74	136.13	Nil	Nil	Nil	1	3	0.02	33	71	136.11
2015-16	33	71	136.11	3	10	0.82	Nil	Nil	Nil	36	81	136.93

(Source: As per data maintained in the office of the AG (E&RSA), Tamil Nadu)

## Appendix C Guatemalan Audits Codebook

### C.1 Overview and Scope

This section provides an overview of the Guatemalan audit dataset. It covers data on infractions (*sancciones*), lists of charges (*pliegos de cargos/formulación de cargos*), and whistleblower complaints (*denuncias*). For each of these variables, there is both a count and amount of money in Guatemala.

### C.2 Variables in the Dataset

Table C1: Variables in the Guatemalan Audits Dataset

Variable	Definition
<code>department</code>	Department (province/state equivalent) where the audit took place.
<code>municipality</code>	Municipality where the audit took place.
<code>year</code>	Year that the audit finalized.
<code>infractions</code>	Number of infractions in that year's audit(s).
<code>infractions_amount</code>	Amount of stolen or misappropriated money associated with the infractions in that year.
<code>charges_filed</code>	Number of charges filed.
<code>charges_filed_amount</code>	Amount of stolen or misappropriated money associated with the charges filed.
<code>whistleblower_complaints</code>	Number of whistleblower complaints filed in that year.
<code>whistleblower_complaints_amount</code>	Amount of stolen or misappropriated money associated with the whistleblower complaints filed in that year.

### C.3 Coding Process

The Guatemalan audits do not require a complicated coding process. Coders can simply access the audits from the [website of the Comptroller General of Accounts \(Contraloría Gen-](#)

eral de Cuentas), which is the supreme audit institution of Guatemala. Here is a screenshot of the yearly 2007 report.

No.	Municipalidad	SANCIONES		PLIEGOS DE CARGOS		DENUNCIAS	
		Cant	Monto	Cant	Monto	Cant	Monto
1	ACATENANGO	16	280,000.00	3	120,507.76	0	0.00
2	AGUA BLANCA	3	28,000.00	0	0.00	0	0.00
3	AGUACATAN	1	4,000.00	0	0.00	0	0.00

Some of the yearly reports, such as that of 2014 (below), are organized by department.

### DEPARTAMENTO DE IZABAL

No.	Departamento	Denuncias		Sanciones		Formulaciones	
		Cantidad	Monto Q	Cantidad	Monto Q	Cantidad	Monto Q
1	EL ESTOR	0	0.00	5	85,355.00	0	0.00
2	LIVINGSTON	0	0.00	2	24,000.00	0	0.00
3	LOS AMATES	0	0.00	3	25,600.00	0	0.00
4	MORALES	0	0.00	4	32,686.07	0	0.00
5	PUERTO BARRIOS	0	0.00	8	80,700.91	0	0.00
<b>TOTALES</b>		<b>0</b>	<b>0.00</b>	<b>22</b>	<b>248,341.98</b>	<b>0</b>	<b>0.00</b>

Other years, including 2016 (below), have two reports per year. To obtain yearly totals by municipality, I simply added the infractions, charges filed, whistleblower complaints, and their corresponding amounts. As stipulated above, I do not include

No.	MUNICIPALIDADES Y SUS EMPRESAS	SANCIONES		FORMULACIÓN DE CARGOS		DENUNCIAS	
		Cantidad	Monto en Quetzales	Cantidad	Monto en Quetzales	Cantidad	Monto en Quetzales
1	Empresa Municipal de Agua de la Ciudad de Guatemala	10	125,437.50				
2	Empresa Eléctrica Municipal de Guastatoya, El Progreso					2	794,125.06
3	Municipalidad de Aguacatán, Huehuetenango					1	2,163,791.55
4	Municipalidad de Antigua Guatemala, Sacatepéquez			2	605,727.40	2	0.00
5	Municipalidad de Cabricán, Quetzaltenango					1	4,015.00

## Appendix D Mexican Audits Codebook

### D.1 Overview and Scope

Mexico has a two-tiered auditing system. State-level auditing entities (EFSE, *las Entidades de Fiscalización Superior Estatales*) conduct routine municipal audits and report to the respective state governor. The supreme audit institution (ASF, *la Auditoría Superior de la Federación*), which reports to the Mexican Chamber of Deputies, undertakes audits of federal transfers to municipalities. Given that EFSEs tend to be not very independent and effective (OECD, 2017), the present dataset focuses on the ASF audits.

Table D2: ASF Audits Conducted by Fund/Expenditure Category (2007-2018)

	Fund/Expenditure Category	Count	Percent
1	Fund for Strengthening the Boroughs of Mexico City's Social Infrastructure	1313	27.84
2	Fund for Municipal Social Infrastructure	1263	26.78
3	Fund for Strengthening the Boroughs of Mexico City	789	16.73
4	Fund for Subsidizing Public Security for the Boroughs of Mexico City	524	11.11
5	Federal Investments in Municipalities	492	10.43
6	Evaluation System for Performance of Federal Spending	81	1.72
7	Fund for Strengthening of Municipal and State Infrastructure	78	1.65
8	Fund for Paving, Sporting Infrastructure, Public Lighting, and Rehabilitation of Educational Infrastructure for the Boroughs of Mexico City	54	1.14
9	Municipal Institutional Development Trust Fund	35	0.74
10	Compliance with Law of Financial Discipline	31	0.66
11	Fund for Sporting Infrastructure	18	0.38
12	Regional Development Projects	16	0.34
13	Fund for Culture	14	0.30
14	Fund for Paving and Municipal Development	6	0.13
15	Funds from Branch 33 and Their Unspent Balances	1	0.02
16	Habitat Fund	1	0.02
17	Youth Power Program	1	0.02

Table D2 provides a breakdown of the ASF audits by fund type. The ASF also undertakes a great diversity of audits and takes many different types of actions after these audits (see Tables D3 and D4).

Table D3: Types of ASF Audits (2007-2018)

	Audit Type	Count	Percent
1	Financial and Compliance	3667	77.74
2	Compliance	354	7.50
3	Financial Compliance with Performance Focus	252	5.34
4	Financial Compliance	202	4.28
5	Compliance and Performance	134	2.84
6	Performance	97	2.06
7	Physical Investment	6	0.13
8	Forensic	5	0.11

Table D4: Types of ASF Audit Actions (2007-2018)

	Actions	Count	Percent
1	Recommendation	12321	45.85
2	Statement of Financial Irregularities with Presumed Intent	5345	19.89
3	Punitive Noncompliance with Regulations	4854	18.06
4	Financial Irregularity with Required Compensatory Action	1689	6.29
5		1481	5.51
6	Request for Clarification	418	1.56
7	Performance Recommendation	391	1.46
8	Tax Evasion or Financial Regulatory Noncompliance with Presumed Intent	222	0.83
9	Report of Crime	150	0.56

## D.2 Variables in the Dataset

Table D5: Variables in The Dataset

Variable	Definition
<code>state</code>	State where the audit took place.
<code>municipality</code>	Municipality where the audit took place.
<code>year</code>	Year that the audit finalized.
<code>audit_dummy</code>	municipality audited dummy variable.
<code>audit_count</code>	times municipality audited (all funds).
<code>infractions</code>	total number of infractions (all funds).
<code>log_money_missing</code>	Log amount of stolen/misappropriated money (previously deflated to constant 2013 Mexican pesos.)
<code>money_missing</code>	Amount of stolen/misappropriated money in constant 2013 Mexican pesos.

*Continued on next page*

Table D5: Variables in the Dataset – *continued*

Variable	Definition
<code>money_sample</code>	Amount of money audited in constant 2013 Mexican pesos.
<code>money_sample_share</code>	Share of audited money as a percent of the total.
<code>money_universe</code>	Amount of potentially auditable money in constant 2013 Mexican pesos.
<code>audit_compliance</code>	Number of compliance audits.
<code>audit_compliance_and_perf</code>	Number of compliance and performance audits.
<code>audit_financial_and_compli</code>	Number of financial and compliance audits.
<code>audit_financial_compliance</code>	Number of financial compliance audits.
<code>audit_fin_compli_with_perf</code>	Number of financial compliance with performance focus audits.
<code>finding_fin_irreg_payback</code>	Number of definitive financial irregularities with required compensatory actions.
<code>audit_forensic</code>	Number of forensic audits.
<code>audit_performance</code>	Number of performance audits.
<code>audit_physical_investment</code>	Number of physical investment audits.
<code>finding_perf_rec</code>	Number of definitive financial irregularities with required compensatory action.
<code>finding_noncompliance</code>	Number of instances of punitive noncompliance with regulations.
<code>finding_recommendation</code>	Number of audit recommendations.
<code>finding_crime</code>	Number crime reports.
<code>finding_clarification</code>	Number of requests for clarifications.
<code>finding_fin_irreg</code>	Number of statements of financial irregularities with presumed intent.
<code>finding_none</code>	Number of audits without any infractions.
<code>finding_tax_evasion_fin_irreg</code>	Number of instances of tax evasion or financial regulatory noncompliance with presumed intent.
<code>fund_branch33_unspent</code>	Number of audits regarding unspent funds from branch 33.
<code>fund_culture</code>	Number of Culture Fund audits.
<code>fund_eval_perf_fed_spend</code>	Number of audits concerning the evaluation system for the performance of federal spending.
<code>fund_fed_inv_muni</code>	Number of audits concerning federal investments in municipalities.
<code>fund_fism</code>	Number of audits concerning the Fund for Municipal Social Infrastructure.
<code>fund_habitat</code>	Number of audits concerning the Habitat Fund.
<code>fund_law_finan_discipline</code>	Number of audits concerning the law for financial discipline.

*Continued on next page*

Table D5: Variables in the Dataset – *continued*

Variable	Definition
<code>fund_muni_institution_dev</code>	Number of municipal institutional development trust fund audits.
<code>fund_muni_state_infras</code>	Number of fund for municipal and state infrastructure audits.
<code>fund_paving_muni_dev</code>	Number of fund for paving and municipal development audits.
<code>fund_pub_goods_cdmx</code>	Number of fund for paving, sporting infrastructure, public lighting, and rehabilitation of educational infrastructure for the boroughs of Mexico City audits.
<code>fund_region_dev</code>	Number of regional development project audits.
<code>fund_security_cdmx</code>	Number of fund for subsidizing public security for the boroughs of Mexico City audits.
<code>fund_strength_cdmx</code>	Number of fund for strengthening the boroughs of Mexico City audits.
<code>fund_social_infras_cdmx</code>	Number of fund for strengthening the boroughs of Mexico City's social infrastructure audits.
<code>fund_sport_infras</code>	Number of fund for sporting infrastructure audits.
<code>fund_youth_power</code>	Number of fund for youth power audits.

# Appendix E Technical Appendix: Survival Analysis of the Honduran Audit Distribution

This section provides an overview of the data and survival methods used to test whether partisan affiliation affected the intensity or dosage of the municipal audits undertaken by Honduras' Supreme Audit Institution (*Tribunal Superior de Cuentas*, TSC).

## E.1 Data for Survival Analysis

Before conducting the actual survival analysis, it was necessary to transform data described in Section 3.2.4 and Appendix A into municipality-day format. Honduras has general elections for its president, congress, governors, and mayors every four years in November, and there is approximately a two-month delay between the elections and when the politicians take office in late January. As Table E6 shows, the presidential terms start around January 27-28, leaving most of the month of January under the mandate of the previous presidents. Although that is less than one month of the year, those 27-28 days are very significant. For example, all 247 audits under Flores' tenure started between January 25-27, 2002.

In total, expanding the 935 audits that the TSC started from January 25, 2002 - December 31, 2018 resulted in a final dataset of 1.8 million observations. These 1.8 million correspond to the fact that Honduras has 298 municipalities, there are 17 years of available data, and there are 365 days per year in which municipalities could receive a new audit.

## E.2 Survival/Event History Methods

In this paper, I employ a diverse array of event-history models, including the semi-parametric Cox regression as well as parametric Weibull, Gompertz, Exponential, Log-Normal, and Log-Logistic models. Of these methods, my preferred event-history specification

Table E6: Electoral Term Start Dates and Audits by Term

President	Electoral Term Dates	Audits Started
Flores	1/27/1998-1/27/2002	247
Maduro	1/28/2002-1/27/2006	132
Zelaya/Micheletti	1/28/2006-1/27/2010	372
Lobo	1/28/2010-1/27/2014	150
Hernandez	1/28/2014-present	150

Note: Zelaya/Michelletti corresponds to the fact that Honduras had a promisory coup in 2009, during which Micheletti took over for Zelaya and offered to have new elections and not run in them ([Bermeo, 2016](#)). Because Micheletti was from the same party as Zelaya, and Micheletti only served for 9 months, these can be considered as part of the same term.

is the multi-episode semi-parametric Cox proportional hazards model:

$$L^p = \prod_{k \in D} \prod_{i \in \epsilon_k} \frac{\exp(A^{(k)}(t_i)\alpha^{(k)})}{\sum_{l \in R(t_i)} \exp(A^{(k)}(t_l)\alpha^{(k)})} \quad (2)$$

“where  $A^{(k)}(t)$  is the vector of covariates, specified for the transition to destination state  $k$ ,  $\alpha^{(k)}$  is the vector of associated covariates, and  $R$  is the risk set” ([Blossfeld, Golsch and Rohwer, 2007](#), 225). In my case, the risk set corresponds to not being under audit (the origin) and the destination state (being under audit), which can happen more than once. Since there is no intercept in the Cox model, the baseline hazard absorbs the constant. I adjudicate ties with the Breslow method.

I prefer the semi-parametric Cox model to the other event-history ones because I have no specific predictions concerning the time dependence, I have no particular theory concerning how time duration impacts the model, and I am more interested the effects and their direction than time. Given these limitations, it is difficult to hypothesize about the utility of any parametric model for my data. As [Blossfeld, Golsch and Rohwer \(2007\)](#) emphasize, theoretical conjectures about the particular functional form of event-history models are very challenging.

Many analysts would argue that it is necessary to test the proportionality assumption of the Cox model, and choose a parametric model in the case of nonproportionality. In my

case, the proportionality assumption is most certainly violated. That is largely a function of having to disaggregate the data to the municipality-day level, which enlarged my dataset to more than 1.8 million observations with unequal groups sizes.