

Street-level rule of law: Prosecutor presence and the fight against corruption*

Guillermo Toral[†]

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Abstract

Empowering autonomous prosecutor's offices is increasingly seen as a promising strategy to fight corruption. Yet we lack systematic evidence about whether they are effective at reducing corruption, and if so why. I argue that prosecutors' use of the tools that can make them effective anti-corruption actors (including autonomy, discretion, and timeliness) benefits from physical proximity to the communities they monitor. I test this theory through a causal event study of state prosecutors in Brazil, leveraging administrative data on their deployment and behavior across municipalities. I find that prosecutor presence causes more anti-corruption action targeted at the local government. In response to prosecutor presence, local politicians hire more bureaucrats in the civil service, rather than on temporary contracts – a common vehicle for corruption in this setting. I combine these quasi-experimental findings with insights from a survey of politicians and in-depth interviews with prosecutors. Together, results suggest that physical presence can make prosecutors more effective at fighting corruption, and provide rare causal evidence of the impact of prosecutor's offices on local governance outcomes.

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[†]Assistant Professor of Political Science at IE University: guillermo.toral@ie.edu.

1 Introduction

Corruption is a major obstacle to economic and human development everywhere. In the European Union alone, corruption costs up to 1 trillion US dollars, about 5% of GDP, per year (Hafner et al., 2016). The problem is global and has far-reaching consequences, especially for poorer countries and more vulnerable populations. Accordingly, the UN Secretary-General referred to corruption as “an assault on the values of the United Nations.”¹ International organizations, government agencies, and civil society organizations invest major resources to limit corruption, but the problem has proven very difficult to solve for a variety of political, institutional, economic, and cultural reasons (Rose-Ackerman and Palifka, 2016).

Empowering and protecting the autonomy of prosecutors is often seen as a promising policy to fight corruption. Indeed, experts have identified a global trend of reforms empowering prosecutors (Langer and Sklansky, 2017; Voigt, 2021). Yet, while the power and discretion of prosecutors in criminal justice systems has been widely studied (Fionda, 1995; Davis, 2007; Wright and Miller, 2010), we have little systematic evidence about prosecutors’ behavior and effectiveness in the fight against corruption.² The recent emergence of cases of abuse by top-level prosecutors (for example in Guatemala and Peru) highlights the importance of understanding the sources of prosecutorial autonomy, its effects, and how it is exercised by rank-and-file prosecutors.³

Two main reasons explain the scarcity of evidence about the effectiveness of prosecutors in fighting corruption. First, the strength of prosecutors is typically understood as a macro-level variable, and consequently empirical designs rarely go beyond observational or qualitative comparisons across countries (Van Aaken et al., 2010; Gutmann and Voigt, 2019) or states in a federation (Mueller, 2010). These designs limit our ability to learn about the impact of autonomous prosecutor’s offices, separate from other good-governance institutions that correlate with them. Second, we do not typically observe prosecutor’s actions taking place outside the judicial system, and thus it

¹UN News, 2018, “The costs of corruption: values, economic development under assault, trillions lost, says Guterres” (available at <https://news.un.org/en/story/2018/12/1027971>).

²The exception is the rich literature about US Attorneys. These federal prosecutors are hardly autonomous, since they are appointed by the president and serve at their pleasure. Accordingly, research has shown significant bias in the use of prosecutorial discretion against corruption by US Attorneys (Gordon, 2009; Nyhan and Rehavi, 2018; Davis and White, 2021).

³In a recent column, Freeman (2023) discusses recent cases of abuse by attorney-generals and other top-level prosecutors across the Americas. He suggests a number of reforms, including the protection of career prosecutors’ autonomy from their superiors.

is hard to trace hypothesized causal chains and to test observable implications of arguments about prosecutors' role in the fight against corruption. As a result, "empirical studies of prosecutorial processes, decision making, and outcomes based on original empirical research are almost nonexistent" (Tonry, 2012, 26).

This paper contributes to fill this gap. I start by theorizing what enables strong and autonomous prosecutors to fight corruption. I argue that prosecutors have an advantage, relative to other accountability actors like judges and auditors, because they have more power and discretion, can make use of a wider range of tools (including informal pressures and extra-judicial bargains and agreements), and because they can act "in real time" to deter malfeasance. Their effectiveness at using these tools depends on them being insulated from politics, a feature that cross-national research has emphasized (Van Aaken et al., 2010; Gutmann and Voigt, 2019). The core of my argument is that the effectiveness of autonomous prosecutors benefits from physical proximity to the communities they monitor, a factor that previous research has overlooked. Physical presence aids effectiveness because it helps prosecutors obtain information and exert formal and informal pressures on government officials, and because it can raise politicians' perceived probability of detection.

My argument builds on previous studies that have examined the role of "presence" in the control of corruption and other bureaucratic tasks. Using an instrumental variable strategy, Litschig and Zamboni (2019) show that Brazilian municipalities that are the judiciary district headquarter have lower levels of corruption.⁴ Other studies have found positive effects of proximity on service delivery⁵ or tax collection.⁶ In contrast to these previous studies, this paper focuses on the physical presence of a specific kind of accountability actor, and traces its effects on both anti-corruption action and government officials' decisions at the local level.

⁴In contrast to this paper, Litschig and Zamboni (2019) focus on a bundled treatment combining the presence of judicial and prosecutorial teams, and examine only effects on corruption. This makes it hard to identify what component of the treatment drive the measured impacts on corruption, and through what mechanisms.

⁵For example, Bozcaga (2020) shows that in Turkey, bureaucratic effectiveness at the local level benefits from geographic and social proximity among bureaucrats, which decreases transaction costs and thus facilitates service delivery. Other studies have found social embeddedness to undermine bureaucratic effectiveness, for instance among civil servants of the Indian Administrative Service (Xu et al., 2023).

⁶Balan et al. (2022) demonstrate with a field experiment that local chiefs in Congo are more effective at tax collection than centrally-deployed state agents, arguably thanks to their better information and higher ability to induce compliance. On the other hand, other studies have found centrally-deployed bureaucrats superior, for instance in historical state building in Latin America (Soifer, 2015).

Empirically, I focus on Brazil, a large federal democracy where prosecutors are extraordinarily autonomous and strong, especially when compared to other countries in the global south.⁷ I leverage variation across municipalities and years in the presence of state prosecutors, using an imputation-based causal event study approach (Liu et al., 2022). To measure prosecutors' presence and the anti-corruption actions they take for each municipality-year observation, I use administrative data scraped from the websites of the prosecutor's offices in eight states that cover over half of Brazil's population. I complement that data with detailed administrative data on municipal employment.

The event study results demonstrate that the arrival of a prosecutor to a municipality causes a significant increase in anti-corruption actions targeted at the local government, including investigations, recommendations, and extra-judicial agreements. Consistent with local government officials responding to prosecutors' pressures stemming from their local presence, treated municipalities also see a higher incidence of civil service hiring, as opposed to hiring on temporary contracts. Civil servants' selection and careers are insulated from politics, and the prevalence of the civil service is often associated to better government performance and reduced corruption (Charron et al., 2017; Aneja and Xu, 2023). In contrast, bureaucrats whose contracts are controlled by politicians are more easily amenable to rent seeking and corruption (Brierley, 2020). I complement these quasi-experimental findings with observational findings from an online survey of politicians I did in 2019, and with insights from in-depth qualitative interviews of prosecutors, politicians and bureaucrats conducted between 2016 and 2023.⁸

In sum, this article advances our understanding of how autonomous prosecutors can be effective at fighting corruption, by highlighting prosecutors' unique advantages and how their exercise benefits from physical proximity to the communities they monitor. This is an under-appreciated driver of the effectiveness of prosecutor's offices that previous research has overlooked. More generally, the paper provides some of the first plausibly causal evidence about the effectiveness of prosecutors in the fight against corruption outside the United States, leveraging detailed administrative data on anti-corruption actions and on governance outcomes at the local level.

⁷In a recent measure of prosecutorial independence across 97 countries (Gutmann and Voigt, 2019), Brazil is placed in the upper quartile of the distribution. All countries with higher scores of prosecutor independence are high-income countries. Several high-income democracies (including the United States, South Korea, France and Spain) score worse than Brazil.

⁸I interviewed 15 state prosecutors in Ceará, Minas Gerais, Pernambuco, Rio Grande do Norte, and São Paulo. Details on interviews are included in Appendix A.

2 Prosecutors' advantage in the fight against corruption, and proximity as a source of their effectiveness

Prosecutors are a central figure in the fight against corruption, and of the rule of law more broadly. Recent research has documented “a strikingly broad trend around the globe in vesting greater discretion and greater responsibility in prosecutors” ([Langer and Sklansky, 2017](#), 1). This trend coincides with a global, upward trend in the conviction of politicians for corruption ([Da Ros and Gehrke, 2023](#)).⁹ Are these two trends causally related? Although anecdotal accounts of strong prosecutors leading to successful anti-corruption action are common, we have little systematic theory and evidence of whether, and how, prosecutor's offices constrain malfeasance.

I argue that three factors provide prosecutors a critical advantage in the fight against corruption, especially when compared to other accountability actors: they have more power and discretion; they can make use of a wide range of tools, both judicial and extrajudicial; and they can use their combination of power and discretion to deter malfeasance before it occurs. I detail each of these advantages in the paragraphs below.

Prosecutors generally enjoy wide power and discretion. For instance, they typically get to decide who to prosecute, how harshly to do so, and whether and how to negotiate. In many countries, prosecutors also have the monopoly of prosecution over at least some forms of malfeasance. The power and discretion of prosecutors is best appreciated by contrasting them to other accountability actors, including judges, external auditors, and internal auditors. First-instance judges, for example, generally have little to no control over their docket of cases. When making decisions, judges follow high standards of proof and can have their rulings undone by higher instances. As a result, it may take a long time for corrupt politicians to be punished in court. External auditors generally act on a constrained mandate, are limited to examining mispending ex post, and their reports often do not have a direct effect over political careers. While audits have been shown to be effective in contexts like Indonesia ([Olken, 2007](#)) and Brazil ([Ferraz and Finan, 2011](#); [Avis et al., 2018](#); [Zamboni and Litschig, 2018](#)), audit weaknesses and capacity issues have been shown to limit the effectiveness in other contexts ([De la O et al., 2023](#); [Cuneo et al., 2023](#)). Because audits focus on only one dimension of public management, they can induce distortions in other, non-audited dimensions ([Gerardino et al., 2023](#)). The effectiveness of internal auditors, in turn, depends on their selection

⁹[Da Ros and Gehrke \(2023\)](#) document a large number of convictions of former heads of government for corruption charges all around the world: 30 in the 2010s alone.

and careers being insulated from politics, a rare institutional arrangement ([Fernández-Vázquez, 2018](#); [Vannutelli, 2023](#)). In contrast, prosecutors often have significant power and discretion, unparalleled to other accountability actors, as often noted by legal scholars:

“Prosecutors are potentially the most powerful figures in any country’s criminal justice system. They decide what crimes to prosecute; whom to charge; what to charge; whether to plea-bargain, offer concessions, or divert a case; how aggressively to seek a conviction; and what sentence to propose. Police arrest people, but prosecutors decide whether those arrests lead to charges. Judges preside over trials and sentence convicted offenders, but only those whom prosecutors bring before them.” ([Tonry, 2012](#), 1)

Second, prosecutors often have a wide range of tools they can use in the fight against corruption, including investigations, court actions, and extra-judicial bargains and agreements. While this diverse set of tools and their discretionary use has been noted to lead to abuse in the criminal justice system ([Davis, 2007](#); [Sklansky, 2018](#)), it does give prosecutors an advantage in the fight against corruption, which involves detecting, punishing and deterring multiple forms of malfeasance that are often easy to conceal, precisely because they involve powerful political actors.

Third, the combination of power and discretion makes prosecutors more capable of deterring malfeasance before it takes place. Whereas auditors and judges examine the facts *ex post*, prosecutors can act “in real time”, based on weaker but more immediate sources of evidence (such as a citizen report). While courts and auditors can also deter corruption, they do so only indirectly by contributing to an environment where politicians perceive a higher probability of detection and punishment of malfeasance. Prosecutors, in contrast, can intervene in particular instances, when or even before malfeasance occurs, by providing timely information, making credible threats of judicial action (and eventual convictions), and providing extra-judicial inducements.

The advantage of prosecutors in the fight against corruption depends on them being insulated from politics. It is therefore not surprising that in many countries prosecutors are subject to varying degrees of control from the executive power. In a cross-national study, [Van Aaken et al. \(2010\)](#) show that *de facto* prosecutorial independence is negatively correlated with corruption perceptions. In the United States, where the selection of prosecutors is essentially political,¹⁰ researchers have found significant bias in the targeting of anti-corruption efforts ([Gordon, 2009](#); [Davis and White,](#)

¹⁰US Attorneys are appointed by the president, whereas district attorneys are elected.

2021), their timing (Nyhan and Rehavi, 2018), and the allocation of resources to support them (Alt and Lassen, 2012).

I argue that, in settings where prosecutors are sufficiently insulated from politics, their use of the power, discretion, and tools of their office to fight corruption benefits from being physically present in the locality they monitor. This argument complements the common political economy view of effective rule of law as a matter of insulation and capacity, and draws attention to the organizational and relational foundations of effective accountability institutions.

I hypothesize three key channels connecting prosecutorial presence to anti-corruption actions and effectiveness. First, prosecutors have easier access to information about potential malfeasance in localities where they work. This is both because they can more directly obtain information (through observation, informal conversations, or investigations), and because affected parties (e.g., citizens, opposition politicians, or bureaucrats) can more directly report malfeasance to the prosecutor's office and provide supporting evidence. Second, physical proximity makes it easier for prosecutors to exert formal and informal pressures on government officials, be it through meetings, information requests, and more locally-relevant actions that build on richer information about local governance. Third, in localities where the prosecutor is present, government officials may perceive a higher probability of detection (and eventual punishment) of malfeasance, and thus adjust their behavior even in the absence of explicit prosecutorial action.

Identifying the role of presence on prosecutorial effectiveness is important because it can help us better understand what makes rule of law institutions effective in practice. It is not uncommon for prosecutor's offices and other accountability institutions to be decentralized,¹¹ yet this is often thought as a merely organizational matter and not as a potential source of effectiveness. Moreover, by leveraging variation across districts, rather than across prosecutor agencies or countries, a focus on presence can help us obtain plausibly causal evidence of the impact of prosecutors, and explore the effects of alternative institutional arrangements. This can illuminate both theoretical and policy debates about the optimal design of effective anti corruption institutions.

¹¹For example, in the United States each US Attorney is responsible for a federal judicial district. In the European Public Prosecutor's Office, the European Delegated Prosecutors are deployed to and work within each member state.

3 Institutional setting

I focus on prosecutors in Brazil, a large federal democracy where prosecutors have extraordinarily high levels of capacity, autonomy, resources and discretion when compared to those of other countries (Kerche, 2008). Partly as a result of a decades-long building of bureaucratic autonomy (Arantes, 2002; Coslovsky and Nigam, 2016), the Constitution and multiple laws guarantee Brazilian prosecutor's offices autonomy from the executive, legislative, and judicial powers,¹² and grant high levels of discretion and autonomy to individual prosecutors. This section describes the key details of how prosecutor's offices are designed, the environment of municipal politics where they operate, and the prosecution of local politicians.

3.1 State prosecutor's offices

State prosecutor's offices (*Ministério Público dos Estados*, MP) are in charge of prosecuting most corruption charges in Brazil.¹³ This stems from their constitutional mandate to protect "inalienable social and individual interests,"¹⁴ including "diffuse rights", i.e., public goods that do not have a single individual or entity affected by potential breaches of the law, such as the environment, consumer rights, and good governance. While prosecutors are also in charge of prosecuting crime, many are increasingly concerned and focused on fighting corruption (Arantes, 2002).

Each of Brazil's 26 states has its own prosecutor's office,¹⁵ all of them autonomous from state executive, legislative and judicial powers. While state prosecutor's offices follow their own rules and organization, there is significant isomorphism among them, partly because they all operate under a common legal framework¹⁶ and follow the guidelines of a national coordinating body, the National Council of Prosecutor's Offices (*Conselho Nacional do Ministério Público*, CNMP).

¹²Prosecutor's offices in Brazil are legally considered to be outside all three branches of government (Garcia, 2017).

¹³The exception is cases of corruption in the use of federal transfers, which are dealt with by the federal prosecutor's office (*Ministério Público Federal*).

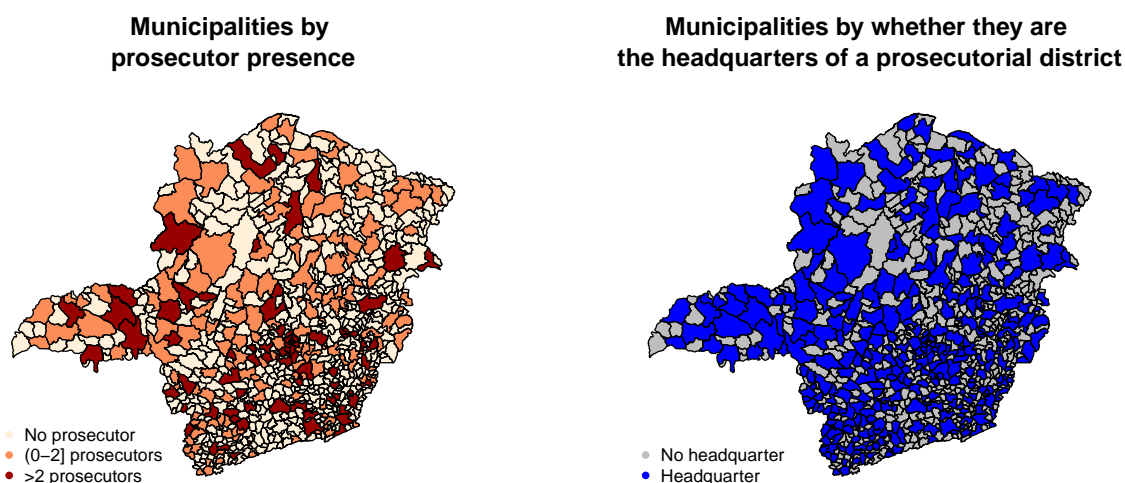
¹⁴Article 127 of the Constitution, which also charges prosecutor's office with the "defense of the legal order" and of "the democratic regime."

¹⁵The federal district has its own prosecutor's office which, together with the federal, military, and labor prosecutor's office make up the Union Prosecutor's Office (*Ministério Público da União*).

¹⁶Including a national law of the prosecutor's offices: the 1993 Law 8,625, *Lei Orgânica Nacional do Ministério Público*, available at https://www.planalto.gov.br/ccivil_03/leis/18625.htm.

Each state prosecutor's office is territorially organized in districts (*comarcas*).¹⁷ Each of these districts typically corresponds to a medium or large municipality (or part of it), or to a group of smaller municipalities. In the latter case, the district has a headquarter in the most prominent municipality, where the prosecutor's office typically has an office and deploys its bureaucrats. Large districts have many prosecutors, often working in offices dedicated to specialized topics (e.g., healthcare, environment, or labor issues). The smaller districts typically have one prosecutor who, with a support team, takes care of all issues in the district. In any case, prosecutors are expected to live in the district to which they are deployed.¹⁸ The design I exploit in this paper leverages variation across municipalities and years in the presence of prosecutors in the headquarters of small prosecutorial districts.¹⁹ This variation is illustrated with maps of the southeastern state of Minas Gerais in Figures 1 and 2 below.

Figure 1: Prosecutorial presence and district headquarters in the state of Minas Gerais in 2020



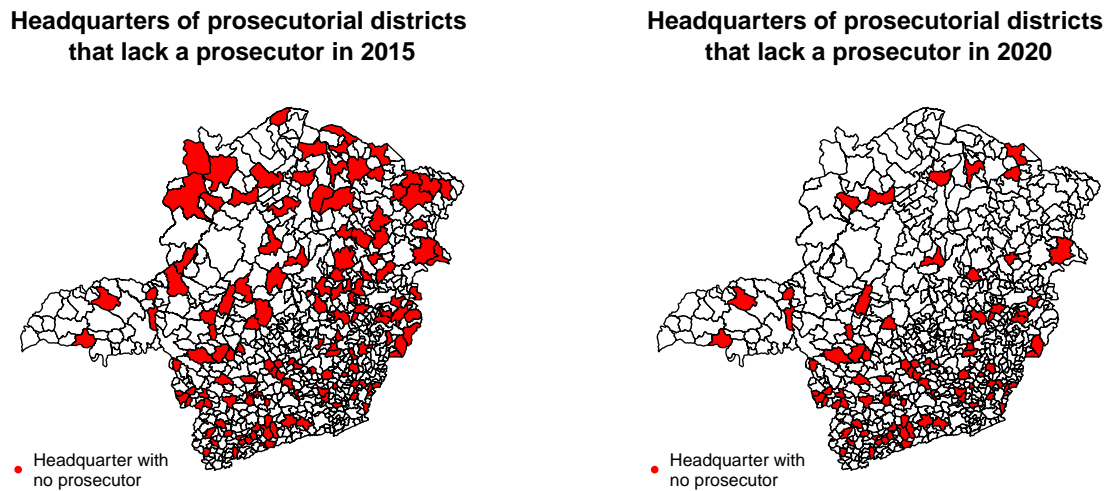
Prosecutor presence is measured with monthly payroll files. For every municipality, I count 1 prosecutor present for every 12 monthly payroll records of a prosecutor deployed to it.

¹⁷Prosecutorial districts often but not always coincide with the judicial districts (*comarcas judiciárias*).

¹⁸Article 129 of the Constitution, and article 43 of Law 8,625. This obligation was further developed in Resolution 26 of the CNMP (available at <https://www.cnmp.mp.br/portal/images/Resolucoes/Resoluo-0261.pdf>), which allows for exceptions as long as they are authorized by the state's chief prosecutor (*Procurador Geral*). These authorizations follow a written process, are extraordinary, and can be revoked at any time. As a result, most prosecutors do reside in the district where they work. In the northeastern state of Ceará, only 56 out of 453 prosecutors (12.4%) are authorized to live in a different district, as of May 2023.

¹⁹Municipalities that are not district headquarter do not have prosecutors deployed to them, whereas large districts such as state capitals always have a strong prosecutorial presence.

Figure 2: Absence of prosecutors in district headquarters in Minas Gerais in 2015 and 2020



Prosecutor presence is measured with monthly payroll files. I consider a municipality lacks a prosecutor when there are less than 12 monthly payroll records of a prosecutor deployed to it.

Seven institutional design features protect the autonomy of prosecutors from political influence and enhance their commitment to a bureaucratic ethos. First, prosecutors are selected through highly competitive, merit-based civil service examinations.²⁰ Second, once selected and after a two-year probationary period, prosecutors are appointed for life.²¹ Third, prosecutors cannot be moved from their post – once they take an office anywhere in the state, they cannot be forced to leave it.²² Fourth, prosecutors advance in their career (and move towards more desirable posts

²⁰To enter the selection process, candidates must be Brazilian citizens, have an undergraduate law degree, and have at least three years of professional legal experience (article 129 of the Constitution). The selection process includes written and oral tests on law, and are generally seen as objective and free from manipulation. A recent study of Brazilian judges, who are selected through a very similar civil service examination process, has shown that performance in these tests is associated to on-the-job performance (Dahis et al., 2023).

²¹Tenured prosecutors can only lose the job after a court ruling, in cases of crimes deemed incompatible with their role (article 38 of Law 8,625).

²²The only exception would be if a majority of the state prosecutor's office board, the *Conselho Superior do Ministério Público*, voted in favor of moving a colleague based on reasons of public interest (article 128 of the Constitution).

if they so desire) based mostly on seniority²³ and the availability of posts.²⁴ Fifth, prosecutors enjoy very high salaries. For example, prosecutors in the southeastern state of Minas Gerais were paid in 2020 an average net monthly salary of over 41,000 Brazilian reais (about 8,000 US dollars with the exchange rate at the time).²⁵ High salaries arguably make it harder for prosecutors to be captured by special interests, and ensure prosecutors' long-term commitment to the career.²⁶ Sixth, the chiefs of state prosecutor's offices (the *Procuradores-Gerais de Justiça*) are selected by the governor (the head of the state's executive power) but from a list of three prosecutors resulting from an internal election. Finally, prosecutors are forbidden from engaging in any partisan or political activity, charging any legal fees, or having any participation in firms (except as a stockholder).²⁷

In sum, the institutional design of Brazilian prosecutor's offices protects the autonomy of

²³When there are vacant posts to be filled, state prosecutor's offices issue a public call for promotion or transfer. These calls are decided alternately on the criteria of seniority or merits. In practice, most calls based on merit are decided based on seniority, given the difficulty of assessing merits. In any case, merits are assessed on objective criteria and assessments are public (Resolution 244 of the CNMP, available at <https://www.cnmp.mp.br/portal/images/Resolucoes/2021/Resoluo-n-244-2022.pdf>). The criteria for each call, the candidates, their ranking, and the criteria for such ranking are all public in the internal prosecutor's office website, which allows prosecutors to monitor the process.

²⁴The career of prosecutors is typically organized in three main ranks. After being selected, entrants in the career are typically appointed as "substitute prosecutors" (*promotores substitutos*), essentially being deployed for short periods of time to work at a place with a particularly high demand, either on their own or supporting more experienced prosecutors. After two years they are given tenure and promoted to prosecutors (*promotores titulares*). Their first deployment is to a entry-level district (*comarca de entrância inicial*). These are typically small districts grouping several municipalities, with low or no level of specialization, and where there is often only one prosecutor. Then, based on the availability of posts, seniority, and merits, prosecutors can move to other entry-level districts or promoted to medium-level districts (*comarcas de entrância intermediária*), in larger municipalities with more complexity and specialization; or final-level districts (*comarcas de entrância final*), typically in the state capital and sometimes in other large cities. Senior prosecutors can opt to be promoted (based on seniority, merits, and sometimes an internal examination) to the senior-level rank of *procurador*. The main difference is that *procuradores* can act before high-level courts, whereas *promotores* cannot.

²⁵Salaries vary with seniority. For instance, entry-level prosecutors (*promotores substitutos*) were paid on average about BRL 33,000, whereas prosecutors at the top of the career (*procuradores*) received on average BRL 47,000. These figures come from complete individual payroll reports obtained from the transparency portal of the state prosecutor's office. The averages I report here include base salary as well as extras and benefits, and are net of income tax withholdings.

²⁶In the United States context, [Boylan and Long \(2005\)](#) show that in districts where the private sector pays higher salaries assistant US attorneys are more likely to take cases to court as a way to gain trial experience in order to get a job in the private sector. They also show that in those districts, assistant US attorneys have higher turnover rates.

²⁷Article 128 of the Constitution.

prosecutors from political influence. This contrasts with the design of prosecutor's offices in many high-income countries, where prosecutors are often dependent on the executive power (or, in the case of district attorneys in the US, on voters), do not have a career separate from that of judges, or are not empowered to act in the defense of collective interests such as good governance (Aken et al., 2004; Tonry, 2012).

3.2 Municipal governments

Brazil has 5,570 municipalities, distributed in 26 states and a federal district. Municipal governments are responsible for providing primary services in areas like education, healthcare, and social assistance. Partly due to their responsibilities in service delivery, the municipal workforce is typically large. On average, municipal governments hired in 2016 4.9% of the local population and 38.2% of those employed in the formal labor market.²⁸ Municipal employees enjoy a wage premium relative to the private sector (Colonnelli et al., 2020, 3090), similarly to other developing contexts (Finan et al., 2017). Employment opportunities in the typical municipality, which is small and relatively poor, are scarce.²⁹ Therefore, public employment is highly valued and can be mobilized for a variety of political purposes.

Mayors (who are elected by majority rule every four years, and can only be re-elected once) and the secretaries they appoint have some discretion over the hiring and firing of bureaucrats. Such discretion differs significantly between the civil service and other hiring modes with fewer employment protections. The Constitution mandates all permanent staffing needs to be filled with civil service contracts,³⁰ which have tenure for life after a short probationary period.³¹ About a third of municipal employees are hired on temporary contracts,³² which can legally be used to hire political appointees for management or leadership positions, or to fill short-term or urgent staffing needs.³³ In practice, temporary hiring is often used where the civil service should prevail, often as a vehicle for political appointments.³⁴

²⁸Figures are from the administrative labor data described below.

²⁹According to the 2010 census, the median municipality had fewer than 12,000 inhabitants and a per capita income of less than 500 Brazilian reais (about USD284 at the exchange rate at the time).

³⁰Article 37.II of the Constitution.

³¹Tenured employees can only be fired on extraordinary circumstances, e.g., after a corruption conviction.

³²I use the term temporary contracts to refer to all non-civil service contracts. These contracts can use a variety of labor regimes, all of which lack tenure.

³³Article 37.IX of the Constitution.

³⁴In a face-to-face survey of bureaucrats I did in Rio Grande do Norte in 2018, 58% of respondents

The abuse of hiring outside the civil service has been shown to help politicians reward political supporters after getting to office (Colonnelli et al., 2020), build legislative coalitions (Mignozzetti et al., 2022), and mobilize supporters ahead of a re-election campaign (Toral, 2023a). It has also been shown to be detrimental for citizen welfare: bureaucrats selected under temporary contracts often have worse qualifications and experience (Colonnelli et al., 2020; Toral, 2023b), and their turnover, induced by political turnover, depresses the quality of public services (Akhtari et al., 2022; Toral, 2023c).

3.3 Prosecution of local politicians

Given the centrality of public employment in local politics, and the strong legal basis for mandating hiring in the civil service, prosecutors often seek to constrain local officials' use of temporary contracts. A prosecutor I interviewed in the northeastern state of Ceará referred to temporary contracts as “political currency.”³⁵ A prosecutor I interviewed in the southeastern state of São Paulo reported a task-force was established to monitor the political appointment of bureaucrats.³⁶

For politicians, the consequences of being charged for violating legal rules on public employment are potentially very severe. If found guilty, they are subject to important penalties, including the loss of their post, having their political rights suspended, substantive fines, and even imprisonment.³⁷

Prosecutors have at their disposal a variety of tools to fight corruption at the local level, both judicial and extrajudicial. They can open formal investigations, issue recommendations, negotiate and sign extra-judicial agreements, and file public civil actions in court.³⁸ They can also use more informal tools, like meetings, phone calls, and e-mails. A prosecutor I interviewed in the southeastern state of Rio Grande do Norte acknowledged that sometimes such informal pressures can have an effect on local government officials.³⁹

In practice, it is not uncommon for politicians to be charged for corruption. Lambais and expressed the highest level of agreement with the statement “political connections influence the hiring of temporary bureaucrats” (Toral, 2023b).

³⁵State prosecutor interviewed in Ceará in August of 2017.

³⁶State prosecutors interviewed in the state of São Paulo in September of 2018.

³⁷The legal penalties for breaches of public employment laws are contained in the Constitution, the Administrative Impropriety Law, the Electoral Law, and the Penal Code, among other legal instruments.

³⁸More details about each of these anti-corruption actions are included in Section 4.3 below.

³⁹Prosecutor interviewed in Rio Grande do Norte in June 2018.

Sigstad (2023) estimate that about 7.7% of mayoral election winners or runner-ups are involved in a court case accused of corruption charges. Bento et al. (2021) document 1,716 judicial cases involving mayors and former mayors between 1992 and 2016 in the southern state of Rio Grande do Sul, which has 497 municipalities. In the state of São Paulo, 40% of municipalities had their mayors or former mayors convicted of corruption charges in just one year; 83% of them had to pay fines, and 68% of them had their political rights suspended (Anuário da Justiça, 2016). Because convictions are not rare, prosecutors can often induce compliance through extra-judicial measures, including recommendations and agreements.

4 Research design

To measure the impact of prosecutors on local governance, I leverage variation across years and municipalities in the physical presence of a prosecutor in the municipality. Using a novel, imputation-based causal event study approach (Liu et al., 2022) that bypasses some of the well-known issues with traditional two-way fixed-effects specifications (Baker et al., 2022; Roth et al., 2023),⁴⁰ I identify the causal effect of a prosecutor being deployed to a municipality on anti-corruption action and on public employment. The findings, which leverage administrative data for all municipalities in eight states across Brazil, suggest that prosecutorial presence increases anti-corruption action targeted at the local government and increases the prevalence of civil service hiring, often seen as a safeguard against corruption.

4.1 Identification

To identify the causal effect of prosecutorial presence, I exploit variation across municipality and years in the deployment of prosecutors. Several factors drive this variation in treatment. First, most state prosecutor offices lack enough prosecutors to staff all district headquarters. Over time,

⁴⁰Other recently developed approaches to causal inference in panel settings are inappropriate in this setting, either because they assume staggered adoption of treatment without reversals (Callaway and Sant'Anna, 2021; Sun and Abraham, 2021) or a balanced panel (Imai et al., 2023; De Chaisemartin and d'Haultfoeuille, 2020). The Liu et al. (2022) method is very similar to the imputation event study method developed in parallel by Borusyak et al. (2023). Chiu et al. (2023) replicate 38 panel data studies in top political science journals and show that, in practice, these new estimators often lead to similar estimates to each other and to the traditional two-way fixed effects specification.

with the hiring of junior prosecutors growing at a higher rate than the retirement of senior ones, more district heads have been staffed.⁴¹ Second, the prosecutorial districts that go from untreated to treated or vice versa are the relatively small and remote entry-level districts, typically staffed by junior prosecutors. As they advance in their careers, prosecutors seek to move to the capital city or close to it, where their living conditions can be better and more specialized prosecutor offices exist.

Municipalities under control (i.e., without a prosecutor deployed to it) are subject to exactly the same rules and are monitored by a prosecutor in a nearby district, who is paid extra in exchange for the additional work. This prosecutor will typically travel to the district from time to time (e.g., once a week). In any case, districts without a prosecutor deployed to it still have a physical infrastructure and prosecutorial staff working in it.

The [Liu et al. \(2022\)](#) imputation-based estimator of treatment effects is unbiased and consistent⁴² under a strict exogeneity assumption.⁴³ This assumption involves the absence of time-varying confounders, anticipation effects, and carryover effects ([Imai and Kim, 2019](#)).⁴⁴ A key advantage of the imputation method of [Liu et al. \(2022\)](#) is that we can test for the validity of these identifying assumptions. These tests, presented below, all fail to detect violations.

Five substantive reasons make the strict exogeneity assumption reasonable in this setting. First, variation in prosecutor presence is mostly driven by entry-level districts, and thus by the hiring of new prosecutors and the advancement in the career of more experienced ones. Second, moves by junior prosecutors are mostly driven by the availability of posts and by seniority. Third, prosecutor deployments are not announced ex ante. Fourth, the boundaries of prosecutorial districts are largely constant across time,⁴⁵ and set according to administrative criteria. Finally, state prosecutor's offices are autonomous and do not report to or depend on municipal governments.

⁴¹Prosecutor offices' recruitment capacity is limited, because recruitment is done through highly competitive examinations. Both limits in the ability or performance of candidates for those jobs, and the organization's intention of limiting recruitment numbers to maintain its image could explain the limited number of spots that are opened each year or two.

⁴²Assuming spherical errors, the imputation method is also the most efficient among all linear and unbiased estimators ([Borusyak et al., 2023](#)).

⁴³The strict exogeneity assumption implies the parallel trends assumption.

⁴⁴The assumption of no anticipation effects would be violated if past potential outcomes directly affected current treatment. The assumption of no carryover effects would be violated if past treatment directly affected current potential outcomes.

⁴⁵In the states for which I have assembled historical district data, there is only a handful of cases of district creation or reform. Using the same event study design, I find that when a municipality becomes the headquarters of a prosecutorial district it is more likely to have prosecutors deployed to it ([Appendix E](#)).

4.2 Estimation and inference

The [Liu et al. \(2022\)](#) estimator follows an imputation procedure. Using only untreated observations (i.e., municipality-year observations without a prosecutor), municipality and year fixed effects are fitted, and then used to impute the counterfactual potential outcomes for treated units under control. The individual treatment effect for each treated observation (ITE) is estimated by taking the difference between its observed outcome and its imputed counterfactual outcome: $\hat{\tau}_{it} = Y_{it} - \hat{\alpha}_i - \hat{\beta}_t$.⁴⁶ ITEs are then aggregated to obtain dynamic treatment effects for each period (DTEs) and overall average treatment effects on the treated (ATT).

For inference, the [Liu et al. \(2022\)](#) procedure uses non-parametric block bootstrap clustered at the unit level. In this case, that implies clustering at the level of the municipality, which is appropriate since municipalities are where treatment is assigned ([Abadie et al., 2023](#)). The block bootstrap procedure essentially entails resampling many times,⁴⁷ with replacement, an equal number of municipalities from the original sample and re-doing the imputation and estimation of the ATT and DTEs with each bootstrap. Standard errors and confidence intervals are obtained from the standard deviation and percentiles of the resulting distributions of block-bootstrapped estimates.

4.3 Data

To analyze the impacts of prosecutor presence, I built a panel of municipality-year observations, leveraging administrative data from state prosecutors offices and from the federal government.

To obtain data on prosecutors' presence and activity, I scraped the transparency portals of state prosecutor's offices. I use data for eight states displayed in [Figure 3](#): São Paulo, Minas Gerais, Bahia, Rio Grande do Sul, Pernambuco, Goiás, Piauí and Tocantins.⁴⁸ These states are in all of Brazil's 5 regions, and together cover 110.9 million residents in 3,205 municipalities. This corresponds to 54.6% of Brazil's population and 57.5% of its municipalities ([Table 1](#)).

⁴⁶The imputation method can be used with more complex specifications (e.g., with an interaction between unit and period fixed effects) and with control variables. I follow the guidance of [Liu et al. \(2022\)](#) and use the simple two-way fixed effects specification since results pass diagnostic tests.

⁴⁷I use 1,000 block bootstraps.

⁴⁸The sample includes some of the largest states, in number of municipalities and/or population, in each region.

Figure 3: States included in the dataset

States with data on prosecutor presence



States with data on prosecutor activity



Table 1: Descriptive statistics of the states included in the dataset

	SP	MG	BA	RS	PE	GO	PI	TO	All
Residents (in millions)	44.4	20.5	14.1	10.9	9.1	7.1	3.3	1.5	110.9
Municipalities	645	853	417	497	184	246	224	139	3,205
Prosecutorial districts	318	297	203	164	152	127	64	41	1,366
Prosecutors	2,058	1,063	586	695	443	414	161	108	5,528
Data on prosecutor presence	✓	✓	✓	✓	✓	✓	✓	✓	
Data on prosecutor activity	✓	✓	✓	✓	✗	✗	✓	✗	

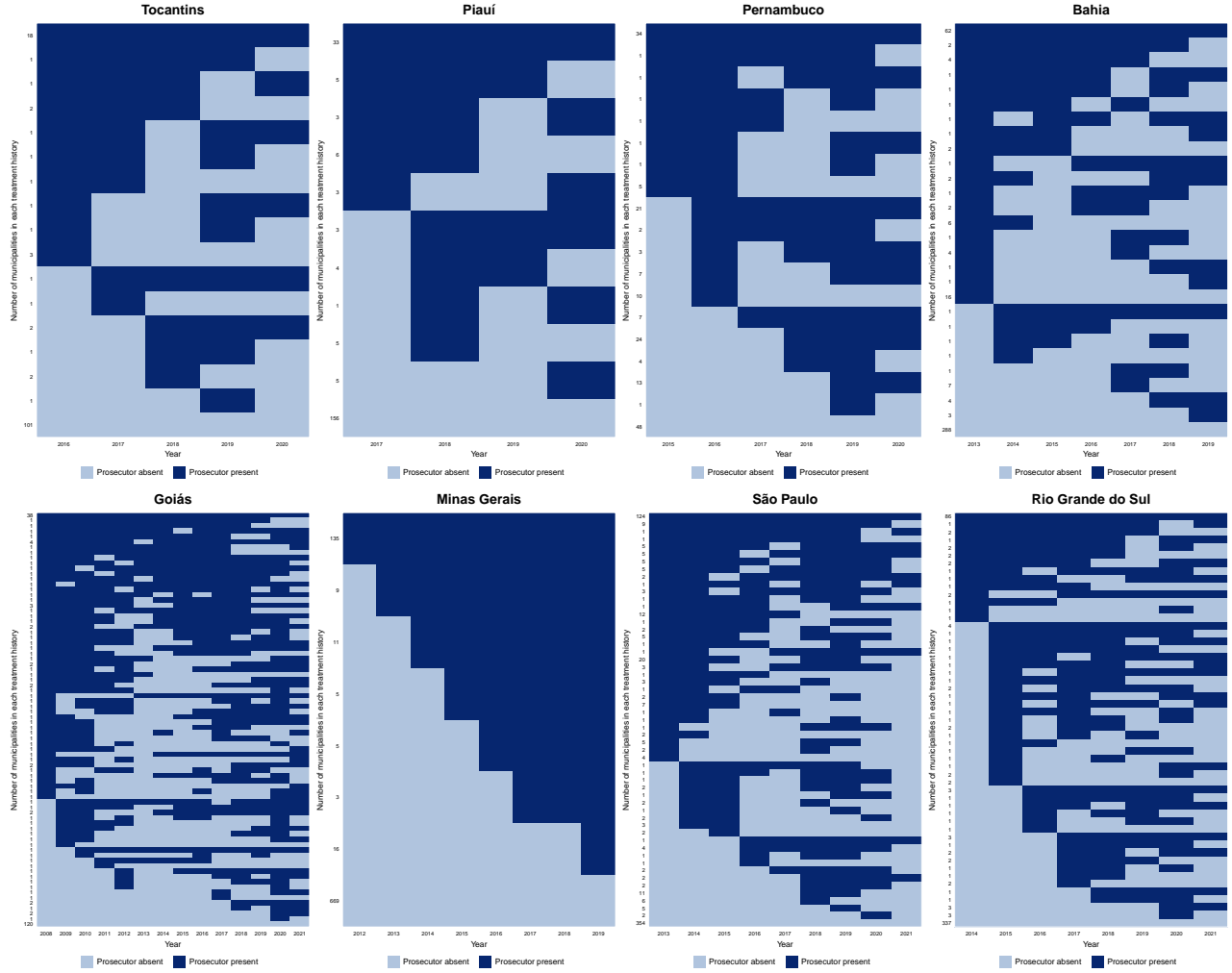
Population figures correspond to the 2022 census. Figures on municipalities, prosecutorial districts, and prosecutors refer to 2020. Prosecutor counts only include those active in the career. SP = São Paulo; MG = Minas Gerais, BA = Bahia, RS = Rio Grande do Sul, PE = Pernambuco, GO = Goiás, PI = Piauí, TO = Tocantins.

I measure the deployment of prosecutors by leveraging monthly staffing and payroll files. I identify a municipality-year observation as treated if there are at least 12 unique prosecutor-month records assigned to it.⁴⁹ In total, I have prosecutor presence data for about 25,000 municipality-year observations, 27.7% of which are treated. Figure 4 displays variation across municipalities and year in the treatment indicator by state.

Treatment effect estimates are driven largely by municipalities that switch from not having

⁴⁹Results are similar using other thresholds to define prosecutor presence, e.g., 6 or 9 prosecutor-month records.

Figure 4: Treatment status changes across the 8 states in the sample



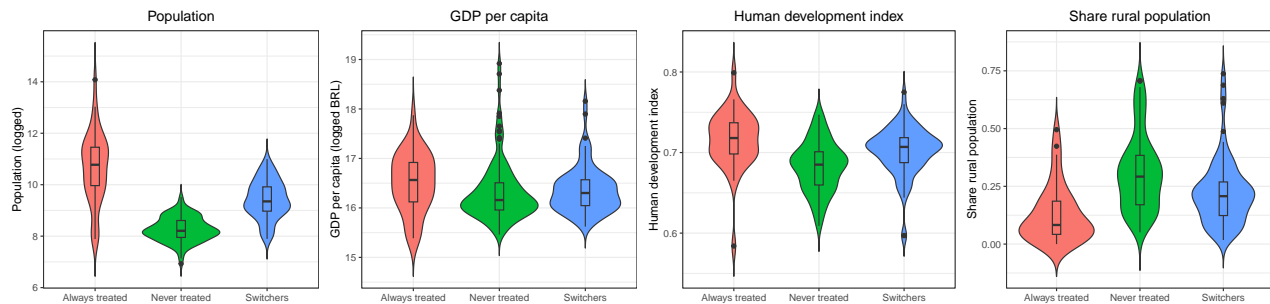
Each row in each subplot corresponds to a unique treatment history in that state, which in turn often corresponds to multiple municipalities. Darker (lighter) cells correspond to treated (untreated) observations, i.e., municipalities where a prosecutor is (not) present. The individual treatment histories of all municipalities in the sample are visualized in Appendix B.

a prosecutor to having a prosecutor present.⁵⁰ These municipalities (*switchers*) are systematically different from both those that always have a prosecutor present (*always treated*) and those that never do (*never treated*), as shown in Figure 5. While there is significant overlap, always-treated

⁵⁰Untreated observations are used to estimate the counterfactual for treated observations. Always-treated municipalities are disregarded completely by the imputation method, and dropped at the pre-processing stage, because estimating their counterfactual would require strong assumptions (Liu et al., 2022).

municipalities tend to be larger, wealthier, more developed, and less rural than switchers; the opposite applies for never-treated municipalities. Practically all switcher municipalities correspond to prosecutorial district headquarters.⁵¹

Figure 5: Distribution of municipal characteristics by treatment group



Distributions in red, green and blue correspond to always-treated, never-treated, and switcher municipalities, respectively. Covariates are from the Human Development Atlas published by UNDP, and correspond to 2010.

To measure the effect of prosecutor presence on anti-corruption actions, I use scraped data for the five states in the sample where such activity can be identified at the municipality-year level.⁵² In particular, I examine four types of anti-corruption action that prosecutors can take in the fight against corruption: preliminary proceedings, investigations, recommendations, and agreements. I count the number of each of these actions by municipality and year,⁵³ excluding all those that are not related to mismanagement or corruption.⁵⁴

I examine two main types of investigations by prosecutors. Preparatory proceedings (*procedimentos preparatórios*) are preliminary investigations to gather evidence and to examine the facts and the potential for prosecutorial action.⁵⁵ Civil investigations (*inquéritos civis*), in turn, are more formal, are generally notified to the affected parties (except when the law allows for confidential-

⁵¹In states for which I have historical prosecutorial district data, 99.8% of treated municipality-year observations correspond to district headquarters.

⁵²The transparency portals of the state prosecutor offices of Pernambuco, Goiás and Tocantins only allow identifying prosecutor activity at the level of the district, not of the municipality.

⁵³I assign each anti-corruption action to the year of its establishment only.

⁵⁴To select anti-corruption actions, I use prosecutor office's topical classification of actions and keep only those including key words such as public assets (*patrimônio público*), public mismanagement (*improbidade administrativa*), or administrative law (*direito administrativo*).

⁵⁵Preparatory proceedings may last up to 180 days, as per the 2017 Resolution 23 of the CNMP (available at <https://www.cnmp.mp.br/portal/images/Normas/Resolucoes/Resolucao-0232.pdf>).

ity), and can be extended longer in time.⁵⁶ At any point during preparatory proceedings or civil investigations, the prosecutor may archive the case or file a public civil action (*ação civil pública*) in court. Both preparatory proceedings and formal investigations can be established at the discretion of the prosecutor, unprovoked or after a request from an affected party.⁵⁷

I also examine two types of extra-judicial actions that prosecutors can take in the fight against corruption. In the context of preparatory proceedings or civil investigations prosecutors may issue formal recommendations (*recomendações*).⁵⁸ Recommendations can request that a party (e.g., a mayor, a secretary, or a bureaucrat) do something or cease to do something to ensure compliance with the law. Recommendations must include a rationale, a specific action requested, and a deadline.⁵⁹ Prosecutors can also negotiate and sign agreements (*termos de ajustamento de conducta*, TACs), which –unlike recommendations– are binding.⁶⁰ Agreements must contain specific obligations, and a daily fine the affected party will be subject to for breaches after the deadline. Agreements are intended to enhance compliance of public officials with the law and the compensation for the damages (including financial damage to government budgets) while avoiding the slow and costly procedures of a public civil action in court.

To measure how prosecutorial presence affects local governance outcomes I look at municipal employment. I use the Ministry of the Economy's Annual Social Information Report (RAIS, *Relação Anual de Informações Sociais*). All formal employers –including municipal governments– are legally obliged to report all their contracts to the Ministry of the Economy every year. RAIS therefore contains data on the universe of municipal employees, including contract type, start and end dates, salary, reason for termination, and professional category, among other variables. I count the number of new hires⁶¹ in each municipality-year observation (between 2000 and 2020), by whether they have a civil service contract or a temporary one.⁶² With this data, I examine the effects of prosecutor

⁵⁶Civil investigations may last up to 2 years (Resolution 23 of the CNMP).

⁵⁷Requests to establish an investigation may be declined by the prosecutor in written with a justification.

⁵⁸In urgent cases, recommendations can also be issued before the establishment of preparatory proceedings or a civil investigation (Resolution 28 of the CNMP, available at <https://www.cnmp.mp.br/portal/images/Resolucoes/Resolu%C3%A7%C3%A3o-164.pdf>).

⁵⁹Recommendations sometimes also include the consequences that not following it may have.

⁶⁰Once signed, agreements have the same executive force as a court order. They are similar to the consent decrees used by prosecutors in the United States.

⁶¹I exclude contracts for less than 35 hours a week (the mean of the distribution of weekly hours in municipal jobs, and roughly equivalent to a full-time job) so as to not double count employees that have several part-time jobs.

⁶²I code as civil service contracts those in the *regime jurídico único de servidores públicos*, and as temporary all other employees, who are hired through a variety of legal regimes. Unfortunately, RAIS

presence on the number of new hires in the civil service, the number of new hires on temporary contracts, and the share of new hires in the civil service.⁶³

5 Results

The event study estimates presented below demonstrate that the presence of a prosecutor in a municipality leads to an increase in anti-corruption action targeted at the local government (including preparatory proceedings, investigations, recommendations, and agreements). Consistent with public officials responding to prosecutorial pressures, prosecutor presence also causes an increase in the prevalence of civil service hiring. Tests for the identifying assumptions all lend support to the validity of the design.

5.1 Effects of prosecutor presence on anti-corruption action targeted at the local government

Causal event study estimates suggest that prosecutorial presence in a municipality causes an increase of anti-corruption action targeted at the local government. Figure 6 shows that, in average, the arrival of a prosecutor leads to an increase of 0.74 preparatory proceedings and 1.59 formal investigations on corruption and mismanagement by the local government ($p < 0.001$). These effects correspond to about 0.20 and 0.17 standard deviations of the number of preparatory proceedings and investigations in municipalities without a prosecutor.⁶⁴

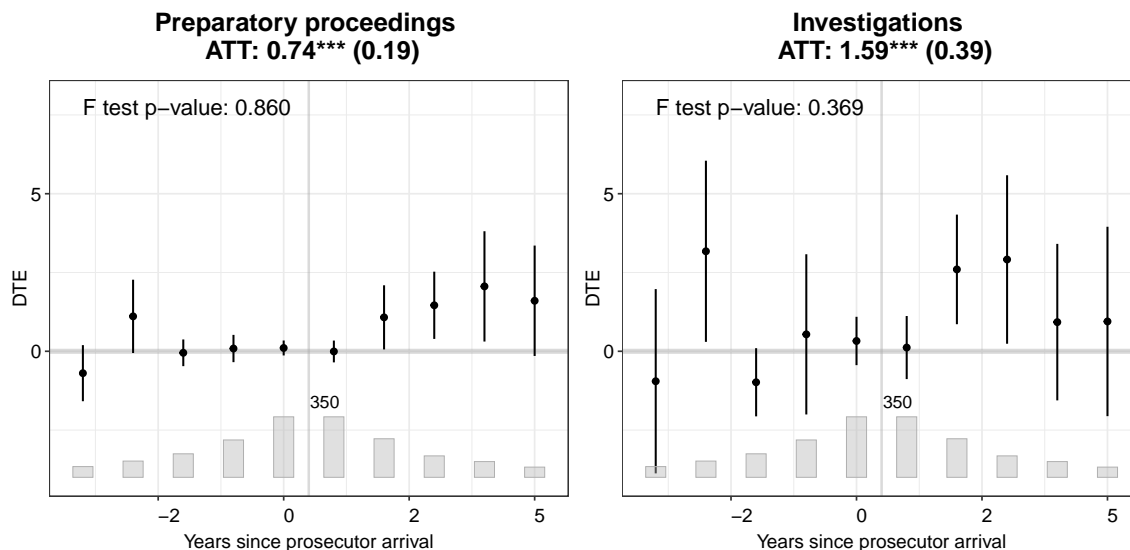
The increase in prosecutorial action is not restricted to mere investigations. Figure 7 shows that the arrival of a prosecutor also causes an increase in the number of recommendations issued to local government officials, and extra-judicial agreements signed with them. In particular, recommendations increase by 0.19 on average ($p < 0.01$) and agreements increase by 0.09 on average (p

does not allow a reliable identification of temporary workers who are politically appointed (e.g., *cargo comissionado*, *função de confiança*).

⁶³In order to keep all observations, I assign that share to zero when there are no new hires, but results are similar when dropping those observations.

⁶⁴In municipality-observations under control, prosecutors file on average 0.75 preparatory proceedings and 3.38 investigations.

Figure 6: Dynamic and average treatment effects of prosecutor presence on the number of preparatory proceedings and investigations filed



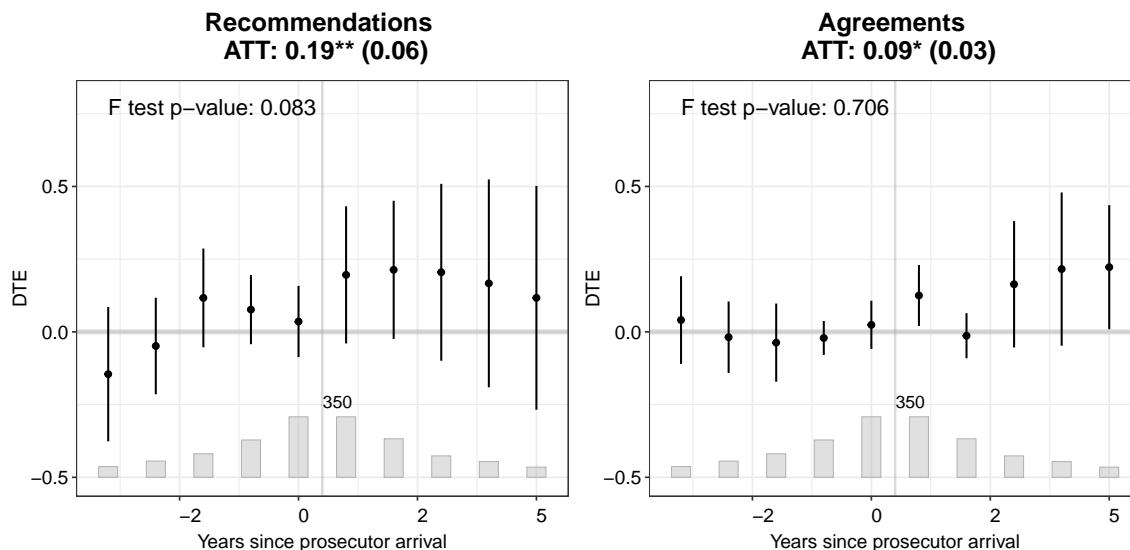
Each subplot presents the estimated dynamic treatment effects (DTE) for switcher municipalities in each period (indexed relative to the year of prosecutor arrival) as a dot, and its block-bootstrapped 95% confidence interval as a vertical line. The overall average treatment effect on the treated (ATT) is reported below each subplot's title together with its standard error in brackets (\cdot $p < 0.10$; $*$ $p < 0.05$; $**$ $p < 0.01$; $***$ $p < 0.001$). The bar plot at the bottom represents the number of treated units in each period. Periods where the number of treated observations is less than 15% of the number of observations at the period of prosecutor arrival are omitted from the subplots. The F test p -value reported in the upper left corner of each plot corresponds to the test of no pre-trend.

< 0.05), which is equivalent to increases of about 0.22 and 0.12 standard deviations, respectively.⁶⁵

Multiple pieces of evidence lend support to the validity of the design. First, the pre-treatment DTEs are generally insignificant. Second, the F test for no pre-trend returns high p -values in all cases, as seen in the upper left corner of the plots. Third, placebo tests that re-estimate DTEs and the ATT assuming that the prosecutors arrive 1, 2 or 3 years before they actually do return statistically insignificant results, as shown in Figure 8. Tests for the no carryover assumption that re-estimate DTEs and the ATT assuming that prosecutors stay 1 or 2 years after they actually depart also return insignificant results (Figure 9.) Last, results are unlikely to be driven by a misspecification of potential outcomes. As shown in Appendix C, ATT estimates are similar (in both substantive and statistical significance) using binary or logged measures of the outcomes.

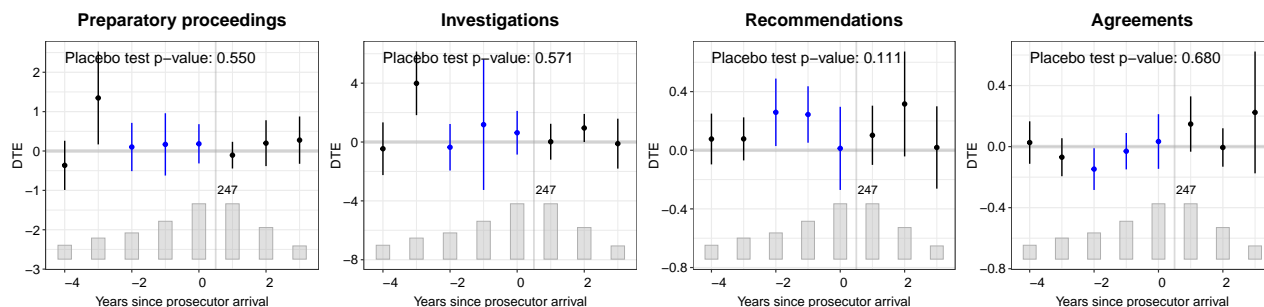
⁶⁵In municipality-observations under control, prosecutors file 0.19 recommendations and sign 0.11 agreements, on average.

Figure 7: Dynamic and average treatment effects of prosecutor presence on the number of recommendations issued and agreements signed



See notes under Figure 6.

Figure 8: Placebo tests for the effect of prosecutor presence on anti-corruption actions

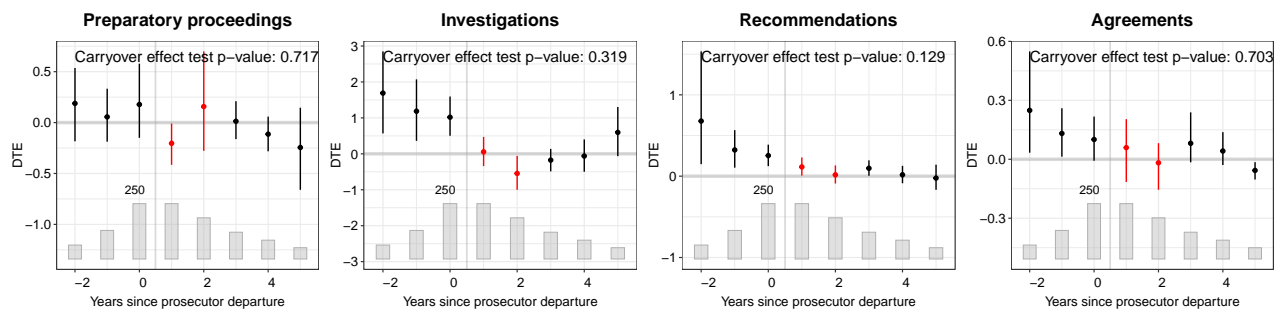


Bars and confidence intervals in blue (2, 3 and 1 years before actual prosecutor arrival) correspond to placebo tests. See notes under Figure 6.

Taken together, these results show that the presence of a prosecutor in a municipality leads to an increase of anti-corruption actions targeted at the local government. These actions include not just investigations, but also recommendations and even agreements that generate binding obligations for public officials. These treatment effects suggest that indeed presence makes it easier for prosecutors to detect malfeasance, and highlight the role of physical proximity for accountability and rule of law institutions.

This is consistent with what some prosecutors reported in interviews. A prosecutor I interviewed in the northeastern state of Rio Grande do Norte said: “it makes a big difference if the prosecutor

Figure 9: Carryover tests for the effect of prosecutor presence on anti-corruption actions



Bars and confidence intervals in red (1 and 2 years after actual prosecutor departure from a treated municipality) correspond to carryover tests. Observations are indexed relative to the time of actual prosecutor departure. See notes under Figure 6.

is in the district.”⁶⁶ Unprompted about the issue, a prosecutor I interviewed in the southeastern state of Minas Gerais said: “if the prosecutor does not spend a lot of time in the district it can lead to trouble; the population needs to feel that their reports [of malfeasance of corruption] will be taken care of; [...] the prosecutor needs to understand the local reality and its political conflicts.”⁶⁷ When I asked how physical presence helped throughout investigations, this prosecutor mentioned the collection and assessment of evidence and the negotiation of extra-judicial agreements. While municipalities without a prosecutor deployed to it are covered by a prosecutor in a nearby district and have lower-level staff working locally, prosecutorial pressure and capacity is diminished. Several prosecutors I interviewed in Minas Gerais and São Paulo said in interviews that when a prosecutor is not present, the area of corruption and public management suffers most.

These effects are also consistent with efforts by state prosecutor’s offices to further extend their presence throughout the territory, and to ensure that prosecutors generally reside where they work. The state prosecutor’s office of Minas Gerais, for example, has run since 2010 a program called “traveling prosecutor’s office”, which brings prosecutors, workshops, and events to small municipalities that are not district headquarters.⁶⁸ When the CNMP regulated the constitutional mandate for prosecutors to live in the district where they work, one of its members stated: “only the constant presence of the prosecutor, with their effective integration into the local social fabric, leads to the perception of issues affecting the community, enabling the appropriate representation

⁶⁶Prosecutor interviewed in Rio Grande do Norte in June of 2018.

⁶⁷Prosecutor interviewed in Minas Gerais in November 2023.

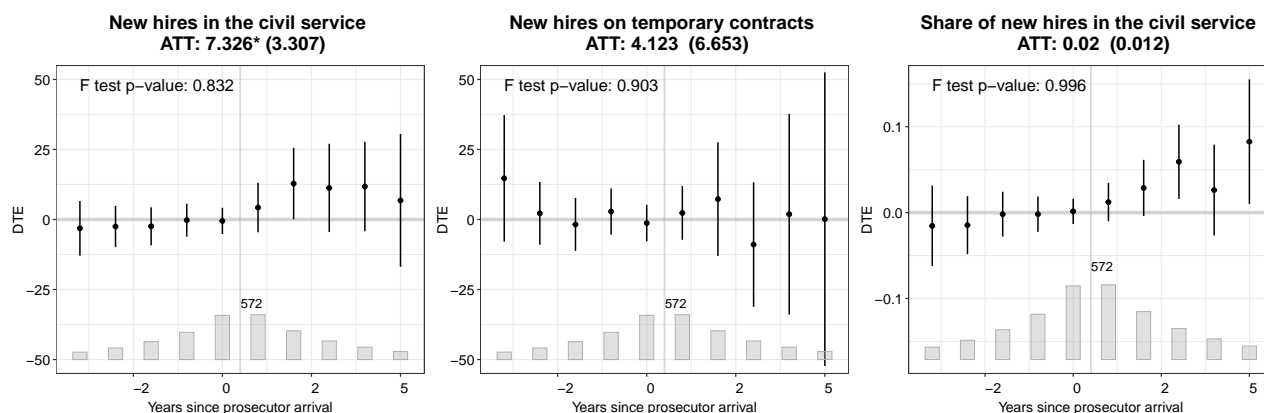
⁶⁸Similar projects exist in other states. More information about the one in Minas Gerais can be found at <https://www.mpmg.mp.br/portal/menu/areas-de-atuacao/cidadania/inclusao-e-mobilizacao-sociais/ministerio-publico-itinerante.shtml>.

of diffuse and collective interests.”⁶⁹

5.2 Effects of prosecutor presence on local municipal employment

Does the presence of prosecutors change local government officials’ decisions? Event study estimates of effects of prosecutor presence on municipal employment suggest that they do. Figure 10 shows that municipalities with a prosecutor present hire, on average, 7.3 more bureaucrats on the civil service than those without a prosecutor ($p < 0.05$). On the other hand, prosecutor presence does not lead to any discernible increases in the number of temporary hires. As a result, the share of new employees who are hired with civil service contracts appears to increase with prosecutor presence, although again that difference is marginally insignificant ($p = 0.08$). The magnitude of the absolute and relative increases in civil service hiring is not trivial: the ATTs shown on the left- and right-hand panels of Figure 10 correspond to about 10.3% and 5.1% of a standard deviation of the distributions under control.

Figure 10: Dynamic and average treatment effects of prosecutor presence on municipal employment



See notes under Figure 6.

These analyses with municipal employment outcomes also pass the validity tests: pre-treatment DTEs in Figure 10 are insignificant, the F test for no pre-trend returns high p -values, and the placebo and carryover effect tests are passed (Figures 11 and 12, respectively). On the other hand, the findings here, unlike those for anti-corruption action, are sensitive to the specification of the outcome. As shown in Appendix C, the results using binary and logged measures of employment

⁶⁹CNMP, 2007, “Conselho regulamenta residência na Comarca” (available at <https://www.cnmp.mp.br/portal/todas-as-noticias/1070-conselho-regulamenta-residencia-na-comarca>).

outcomes are all statistically insignificant, although they move in the same direction as those reported in Figure 10.

Figure 11: Placebo tests for the effect of prosecutor presence on municipal employment



See notes under Figure 8.

Figure 12: Carryover tests for the effect of prosecutor presence on municipal employment



See notes under Figure 9.

These results suggest that local government officials do respond to prosecutor presence and adjust their decisions in one of the most important dimensions of public management in this setting – public employment. This is consistent with qualitative evidence from interviews with bureaucrats and politicians who explained changes in hiring practices were driven by pressures from the state prosecutor’s office. For example, two municipal school directors I interviewed in the southeastern state of Rio de Janeiro said that while their school’s teaching force had largely been on temporary contracts, the share of civil servants had increased significantly as a response from pressures from the state prosecutor in the locality.⁷⁰

Public employment is indeed often central to prosecutors’ work in the area of corruption and public management, as shown by interviews and administrative data. In interviews, prosecutors

⁷⁰Municipal school directors interviewed in the state of Rio de Janeiro in February of 2017.

themselves often highlight the importance of the civil service, and refer to processes to impose a civil service process and/or to reduce the incidence of hiring through other modalities. This also shows on administrative data on their action. Of all the extra-judicial agreements in this area in the state of São Paulo, 43.5% include in their thematic classification employment-related terms.⁷¹

Three reasons make the effects of prosecutorial pressure on the prevalence of civil service hiring meaningful. First, they imply a reduction in the relative prevalence of temporary hiring, which sometimes allows politicians to use public employment for private gain, be it by rewarding supporters (Colonnelli et al., 2020), building and sustaining legislative coalitions (Mignozzetti et al., 2022), or mobilizing supporters ahead of elections (Toral, 2023a). Second, the growth in civil service hiring can further constrain local government's ability to engage in corruption, both in the short and in the long term. For instance, when politicians have direct control over bureaucratic careers, it is easier for them to manipulate procurement processes (Charron et al., 2017; Brierley, 2020). Finally, having a larger share of the bureaucracy on civil service contracts has the potential to improve public service delivery (Aneja and Xu, 2023). A key mechanism connecting civil service contracts to government performance is that they lessen the connection between political and bureaucratic turnover, which has been shown to depress service delivery in Brazil (Akhtari et al., 2022; Toral, 2023c).

6 Additional evidence from a survey of local politicians

Observational results from an online survey of local politicians provide additional evidence about the impacts of prosecutorial presence, consistent with the mechanisms outlined in section 2. In particular, politicians in municipalities with prosecutor presence report more meetings with prosecutors, and are more likely to believe that the prosecutor's office knows the local reality.

I did the survey in early 2019 in partnership with the audit court of the northeastern state of Rio Grande do Norte. The primary purpose of the survey was to measure intermediate outcomes of a field experiment that randomized an information treatment sent by the state audit court (Toral, 2019), but I included some questions about the state prosecutor's office. The survey was sent by the court to the mayor and the secretaries of education, healthcare, social assistance, finance,

⁷¹These include terms for employee (*servidor, empregado*), temporary hiring (*temporário, cargo comissionado*) and civil service hires (*concursado*).

Table 2: Correlation between prosecutorial presence and politician survey responses

	Met with a prosecutor in the past 3 months	<i>Agreement with statement:</i>		
		"The MP knows this municipality"	"The MP detects irregularities here"	"I trust the MP"
Prosecutor present	0.257*** (0.056)	0.091* (0.042)	-0.044 (0.053)	-0.056 (0.049)
Constant	0.337*** (0.034)	0.765*** (0.027)	0.613*** (0.031)	0.801*** (0.026)
Observations	450	455	455	455
R-squared	0.060	0.011	0.002	0.004

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Municipality-clustered standard errors in brackets. The dependent variables are dummies for whether the respondent reports having met at least once with a prosecutor over the previous 3 months, and whether the respondent's level of agreement is at or above the median for the following statements: "The prosecutor's office knows the reality of this municipality", "The prosecutor's office detects the management irregularities that take place in this municipality", and "I trust the prosecutor's office."

and administration of all 167 municipalities in the state. 455 politicians from 142 municipalities completed the survey (including 50 mayors and 405 secretaries), for a response rate of 45% – a high value for a survey of elites.⁷²

Correlational analyses reported in Table 2 suggest that politicians in municipalities where a prosecutor was present⁷³ were 25.7 percentage points more likely to report having held a meeting with a prosecutor in the previous three months ($p < 0.001$). This difference is equivalent to about half of a standard deviation. Politicians in municipalities where a prosecutor was present were 9.1 percentage points more likely to agree with the statement "the prosecutor's office knows the reality of this municipality" ($p < 0.05$), a difference of roughly a quarter of a standard deviation. On the other hand, there is no statistically significance difference in respondents' agreement about the statements "the prosecutor's office detects the management irregularities that take place in this municipality" or "I trust the prosecutor's office."⁷⁴

These correlations suggest that prosecutorial presence increases contact between prosecutors

⁷²Appendix F has a link to the survey instrument, details on respondent recruitment and non-response, and descriptive statistics.

⁷³I measure prosecutor presence using payroll files from December 2018, gathered from the transparency portal of the prosecutor's office of Rio Grande do Norte.

⁷⁴Results are similar when using the continuous rather than binary measures of the outcome, when controlling for municipality population, or when excluding municipalities with more than one prosecutor, although only the coefficient for meetings retains statistical significance (Appendix F.3).

and politicians. This contact may help prosecutors collect richer information about potential malfeasance and mismanagement, and induce accountability pressures on local government officials. The fact that politicians in municipalities with prosecutor presence are not more likely to report that the prosecutor's office detects local irregularities, or that they trust the prosecutor's office, is consistent with the uneasy feelings about the prosecutor's office that local politicians often report in interviews. A former municipal secretary of administration in the northeastern state of Rio Grande do Norte told me in an interview: "the prosecutor's office thinks it's almighty and wants to meddle in everything; they should run for election."⁷⁵

7 Conclusion

Corruption is a major obstacle to economic and social development. While it takes many forms, it affects all countries around the world. Empowering independent prosecutor's offices has recently emerged as a promising avenue of reform, yet evidence about the effectiveness of prosecutors (and its mechanisms) is rare. This paper contributes to fill this gap by articulating a theory of how independent prosecutors can use their unique discretion and autonomy (unparalleled to that of any other accountability actor) to fight corruption, and why physical proximity to the communities they monitor makes that task easier.

Estimates from an imputation-based causal event study design demonstrate that prosecutor presence leads to an increase in anti-corruption action targeted at the local government. These effects are significant both statistically and substantively, and include increases in investigations, recommendations, and extra-judicial agreements. The design also uncovers suggestive evidence of local government officials responding to prosecutor presence by adjusting their decisions on a key area of governance in this context – public employment. Estimates suggest that prosecutor presence increases the prevalence of civil service hiring, which has potential wide-ranging implications for politicians' ability to engage in corruption through public employment and other means. I complement these findings with correlations from an original survey of politicians, and with insights from in-depth interviews with prosecutors.

The paper makes three key contributions. First, it articulates a theory of prosecutor's advantage in the fight against corruption, emphasizing the role of a hitherto under-appreciated source

⁷⁵Former municipal secretary of administration interviewed in Rio Grande do Norte in June of 2018.

of prosecutor effectiveness – physical presence. Second, it provides causal evidence of the effect of prosecutor presence on anti-corruption action and local governance outcomes. More generally, it presents plausibly causal evidence of the effects of prosecutors on anti-corruption efforts and on corruption. As far as I know, this is the first quasi-experimental study to present evidence on prosecutor effectiveness outside the United States, a context marked by the political selection of prosecutors.

The paper has some important limitations that will be addressed in future iterations. First, the data coverage is limited. Although the panel I use includes over 25,000 municipality-year observations, many of them are not directly leveraged for causal inference, since variation across municipalities and time in prosecutor presence is rare. To ameliorate coverage and statistical power, I plan to include more states and more years. Second, the current version of the paper examines a limited set of anti-corruption and governance outcomes. In the future I plan to also examine effects on public civil actions and on convictions, although the effects of presence on those outcomes are not immediately clear since extra-judicial efforts by prosecutors may decrease rather than increase reliance on courts. I also plan to examine effects on other governance outcomes such as spending and procurement. Third, evidence of mechanisms is limited. I plan to leverage heterogeneity analyses and additional interviews and surveys to assess what may be driving the effects presented in this paper.

Finally, the paper has important policy implications. First, it suggests that empowering autonomous prosecutor's offices may be an effective way to deter corruption at the local level. Second, it suggests that efforts at decentralizing autonomous prosecutor's offices may lead to important gains in effectiveness. More generally, the results presented here suggest that the internal organization and relational capacity of rule of law institutions may be an important complement to their independence.

References

- Aaken, Anne Van, Eli Salzberger, and Stefan Voigt (2004). The prosecution of public figures and the separation of powers. Confusion within the executive branch - A conceptual framework. *Constitutional Political Economy* 15, 261–280.
- Abadie, Alberto, Susan Athey, Guido W Imbens, and Jeffrey M Wooldridge (2023). When should you adjust standard errors for clustering? *The Quarterly Journal of Economics* 138(1), 1–35.
- Akhtari, Mitra, Diana Moreira, and Laura Trucco (2022). Political turnover, bureaucratic turnover, and the quality of public services. *American Economic Review* 112(2), 442–93.
- Alt, James E and David Dreyer Lassen (2012). Enforcement and public corruption: Evidence from the American states. *The Journal of Law, Economics, and Organization* 30(2), 306–338.
- Aneja, Abhay and Guo Xu (2023). Strengthening State Capacity: Civil Service Reform and Public Sector Performance during the Gilded Age. Working paper, available at <https://www.guoxu.org/> (last accessed on 12/15/2023).
- Justiça, SPAnuário da (2016). Moralidade municipal. *Anuário da Justiça de São Paulo*, 34–36.
- Arantes, Rogério Bastos (2002). *Ministério Público e política no Brasil*. Sumaré.
- 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.
- Baker, Andrew C, David F Larcker, and Charles CY Wang (2022). How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics* 144(2), 370–395.
- Balan, Pablo, Augustin Bergeron, Gabriel Tourek, and Jonathan L Weigel (2022). Local elites as state capacity: How city chiefs use local information to increase tax compliance in the democratic republic of the Congo. *American Economic Review* 112(3), 762–797.
- Bento, Juliane Sant’Ana, Luciano Da Ros, and Bruno Alex Londero (2021). Condenando políticos corruptos? Análise quantitativa dos julgamentos de prefeitos municipais pelo Tribunal de Justiça do Rio Grande do Sul (1992-2016). *Civitas-Revista de Ciências Sociais* 20, 348–376.
- Borusyak, Kirill, Xavier Jaravel, and Jann Spiess (2023). Revisiting event study designs: Robust and efficient estimation. Accepted at Review of Economic Studies, arXiv preprint arXiv:2108.12419, available at <https://arxiv.org/abs/2108.12419> (last accessed on 12/15/2023).
- Boylan, Richard T and Cheryl X Long (2005). Salaries, plea rates, and the career objectives of federal prosecutors. *The Journal of Law and Economics* 48(2), 627–651.
- Bozcaga, Tugba (2020). The social bureaucrat: How social proximity among bureaucrats affects local governance. Working paper.
- Brierley, Sarah (2020). Unprincipled principals: Co-opted bureaucrats and corruption in Ghana. *American Journal of Political Science* 64(2), 209–222.

- Callaway, Brantly and Pedro HC Sant'Anna (2021). Difference-in-differences with multiple time periods. *Journal of econometrics* 225(2), 200–230.
- Charron, Nicholas, Carl Dahlström, Mihaly Fazekas, and Victor Lapuente (2017). Careers, connections, and corruption risks: Investigating the impact of bureaucratic meritocracy on public procurement processes. *The Journal of Politics* 79(1), 89–104.
- Chiu, Albert, Xingchen Lan, Ziyi Liu, and Yiqing Xu (2023). What to do (and not to do) with causal panel analysis under parallel trends: Lessons from a large reanalysis study. Working paper, available at <https://yiqingxu.org/> (last accessed on 12/15/2023).
- Colonnelli, Emanuele, Mounu Prem, and Edoardo Teso (2020). Patronage and selection in public sector organizations. *American Economic Review* 110(10), 3071–3099.
- Coslovsky, Salo and Amit Nigam (2016). Building prosecutorial autonomy from within: the transformation of the Ministério Público in Brazil. Working paper, available at <https://salocoslovsky.wordpress.com/> (last accessed on 12/15/2023).
- Cuneo, Martina, Jetson Leder-Luis, and Silvia Vannutelli (2023). Government audits. NBER working paper, available at <https://www.nber.org/papers/w30975> (last accessed on 12/15/2023).
- Da Ros, Luciano and Manoel Gehrke (2023). Convicting politicians for corruption: The politics of criminal accountability. Forthcoming in *Government and Opposition*, available at <https://manoelgehrke.com/> (last accessed on 12/15/2023).
- Dahis, Ricardo, Laura Schiavon, and Thiago Scot (2023). Selecting top bureaucrats: Admission exams and performance in Brazil. *Review of Economics and Statistics*, 1–47.
- Davis, Angela J (2007). *Arbitrary justice: The power of the American prosecutor*. Oxford University Press.
- Davis, Lewis and KR White (2021). Is justice blind? Evidence from federal corruption convictions. *Public Choice* 186, 63–95.
- De Chaisemartin, Clément and Xavier d'Haultfoeuille (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *American Economic Review* 110(9), 2964–2996.
- O, AnaDe la , Pablo Fernández-Vázquez, and Fernando Martel García (2023). Federal and state audits do not increase compliance with a grant program to improve municipal infrastructure: A pre-registered field experiment. *Journal of Development Economics* 162, 103043.
- Fernández-Vázquez, Pablo (2018). Accountability from Within: Politically Insulated Bureaucrats and Incumbent Rent-Seeking. Working paper.
- Ferraz, Claudio and Frederico Finan (2011). Electoral accountability and corruption: Evidence from the audits of local governments. *The American Economic Review* 101(4), 1274–1311.
- Finan, Federico, Benjamin A Olken, and Rohini Pande (2017). The personnel economics of the developing state. *Handbook of Economic Field Experiments* 2, 467–514.
- Fionda, Julia (1995). *Public prosecutors and discretion: A comparative study*. Oxford University Press.

- Freeman, Will (2023). Information, oversight, and compliance: A field experiment on within-government accountability in Brazil. *Americas Quarterly*, November 23 2023, available at <https://www.americasquarterly.org/article/do-latin-americas-top-prosecutors-have-too-much-power/> (last accessed on 12/15/2023).
- Garcia, Emerson (2017). *Ministério Público: Organização, atribuições e regime jurídico*. Saraíva.
- Gerardino, Maria Paula, Stephan Litschig, and Dina Pomeranz (2023). Distortion by audit: Evidence from public procurement. NBER working paper, available at <https://www.nber.org/papers/w23978> (last accessed on 12/15/2023).
- Gordon, Sanford C (2009). Assessing partisan bias in federal public corruption prosecutions. *American Political Science Review*, 534–554.
- Gutmann, Jerg and Stefan Voigt (2019). The independence of prosecutors and government accountability. *Supreme Court Economic Review* 27(1), 1–19.
- Hafner, Marco, J Taylor, E Disley, S Thebes, M Barberi, M Stepanek, and M Levi (2016). The Cost of Non-Europe in the Area of Organised Crime and Corruption. European Parliament Research Services, available at [https://www.europarl.europa.eu/RegData/etudes/STUD/2016/579319/EPRS_STU\(2016\)579319_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2016/579319/EPRS_STU(2016)579319_EN.pdf) (last accessed on 12/15/2023).
- Imai, Kosuke and In Song Kim (2019). When should we use unit fixed effects regression models for causal inference with longitudinal data? *American Journal of Political Science* 63(2), 467–490.
- Imai, Kosuke, In Song Kim, and Erik H Wang (2023). Matching methods for causal inference with time-series cross-sectional data. *American Journal of Political Science* 67(3), 587–605.
- Kerche, Fábio (2008). Autonomy and discretionary power of the Public Prosecutor's Office in Brazil. *Dados* 4(SE), 0–0.
- Lambais, Guilherme and Henrik Sigstad (2023). Judicial subversion: The effects of political power on court outcomes. *Journal of Public Economics* 217, 104788.
- Langer, Máximo and David Alan Sklansky (2017). *Prosecutors and democracy: A cross-national study*. Cambridge University Press.
- Litschig, Stephan and Yves Zamboni (2019). Judicial presence and rent extraction. Working paper, available at <https://ideas.repec.org/p/ngi/dpaper/19-20.html> (last accessed on 12/15/2023).
- Liu, Licheng, Ye Wang, and Yiqing Xu (2022). A practical guide to counterfactual estimators for causal inference with time-series cross-sectional data. *American Journal of Political Science*.
- Mignozzetti, Umberto, Gabriel Cepaluni, and Danilo Freire (2022). Legislature Size and Welfare: Evidence from Brazil. *American Journal of Political Science*, Forthcoming.
- Mueller, Bernardo (2010). The fiscal imperative and the role of public prosecutors in Brazilian environmental policy. *Law & Policy* 32(1), 104–126.

- Nyhan, Brendan and M. Marit ReHAVI (2018). Tipping the Scales? Testing for Political Influence on Public Corruption Prosecutions. Working paper, available at <https://www.law.northwestern.edu/research-faculty/events/colloquium/law-economics/documents/fall18rehavi2.pdf> (last accessed on 12/15/2023).
- Olken, Benjamin A (2007). Monitoring corruption: Evidence from a field experiment in Indonesia. *Journal of political Economy* 115(2), 200–249.
- Rose-Ackerman, Susan and Bonnie J Palifka (2016). *Corruption and government: Causes, consequences, and reform*. Cambridge University Press.
- Roth, Jonathan, Pedro HC Sant'Anna, Alyssa Bilinski, and John Poe (2023). What's trending in difference-in-differences? A synthesis of the recent econometrics literature. *Journal of Econometrics*.
- Sklansky, David Alan (2018). The problems with prosecutors. *Annual Review of Criminology* 1, 451–469.
- Soifer, Hillel David (2015). *State Building in Latin America*. Cambridge University Press.
- Sun, Liyang and Sarah Abraham (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics* 225(2), 175–199.
- Tonry, Michael (2012). Prosecutors and politics in comparative perspective. *Crime and Justice* 41(1), 1–33.
- Toral, Guillermo (2019). Information, oversight, and compliance: A field experiment on within-government accountability in Brazil. *Working paper*.
- Toral, Guillermo (2023a). Can anti-corruption policies curb political budget cycles? Evidence from public employment in Brazil. Working paper, available at <https://www.guillermotoral.com> (last accessed on 12/15/2023).
- Toral, Guillermo (2023b). How patronage delivers: Political appointments, bureaucratic accountability, and service delivery in Brazil. *American Journal of Political Science*, Early view.
- Toral, Guillermo (2023c). Turnover: How lame-duck governments disrupt the bureaucracy and service delivery before leaving office. *Journal of Politics*, forthcoming.
- Van Aaken, Anne, Lars P Feld, and Stefan Voigt (2010). Do independent prosecutors deter political corruption? An empirical evaluation across seventy-eight countries. *American law and economics review* 12(1), 204–244.
- Vannutelli, Silvia (2023). From Lapdogs to Watchdogs: Random Auditor Assignment and Municipal Fiscal Performance. Working paper, available at <https://sites.google.com/view/silviavannutelli/> (last accessed on 12/15/2023).
- Voigt, Stefan (2021). Prosecutors: A Cross-National Political Perspective. In *Oxford Research Encyclopedia of Politics*.
- Wright, Ronald F and Marc L Miller (2010). The worldwide accountability deficit for prosecutors. *Washington & Lee's Law Review* 67, 1587.

Xu, Guo, Marianne Bertrand, and Robin Burgess (2023). Organization of the state: Home assignment and bureaucrat performance. *The Journal of Law, Economics, and Organization* 39(2), 371–419.

Zamboni, Yves and Stephan Litschig (2018). Audit risk and rent extraction: Evidence from a randomized evaluation in Brazil. *Journal of Development Economics* 134, 133–149.

Appendices

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A Additional details on in-depth interviews

In-depth interviews with local actors gave origin to the hypotheses tested in this article, but many of them were part of a larger empirical study of patronage in Brazil. Over 19 months of fieldwork in the period 2016-2023 I conducted 133 in-depth, semi-structured interviews with municipal bureaucrats and politicians, with prosecutors, and with other accountability actors. I recruited interviewees at their offices, and collected their oral consent after providing information about the research project and their rights as participants. I conducted interviews in Portuguese, face-to-face, and at the interviewee's office. I chose not to record interviews because some of the topics discussed were highly sensitive, including corrupt and illegal uses of public employment. While recording interviews would have allowed for more complete transcripts, it would have seriously hindered the reliability of the data and subjects' willingness to participate. Some subjects agreed to participate on the condition of anonymity or confidentiality. When quoting interviewees, I specify only their position, the state, and the month of the interview in order to safeguard their identity. In total, I interviewed 51 municipal politicians, 59 municipal bureaucrats, and 23 horizontal accountability actors.⁷⁶ Interviews were done in 45 municipalities in 7 states across 3 different regions of Brazil.⁷⁷ Locations were chosen to ensure diversity in political and socioeconomic variables.

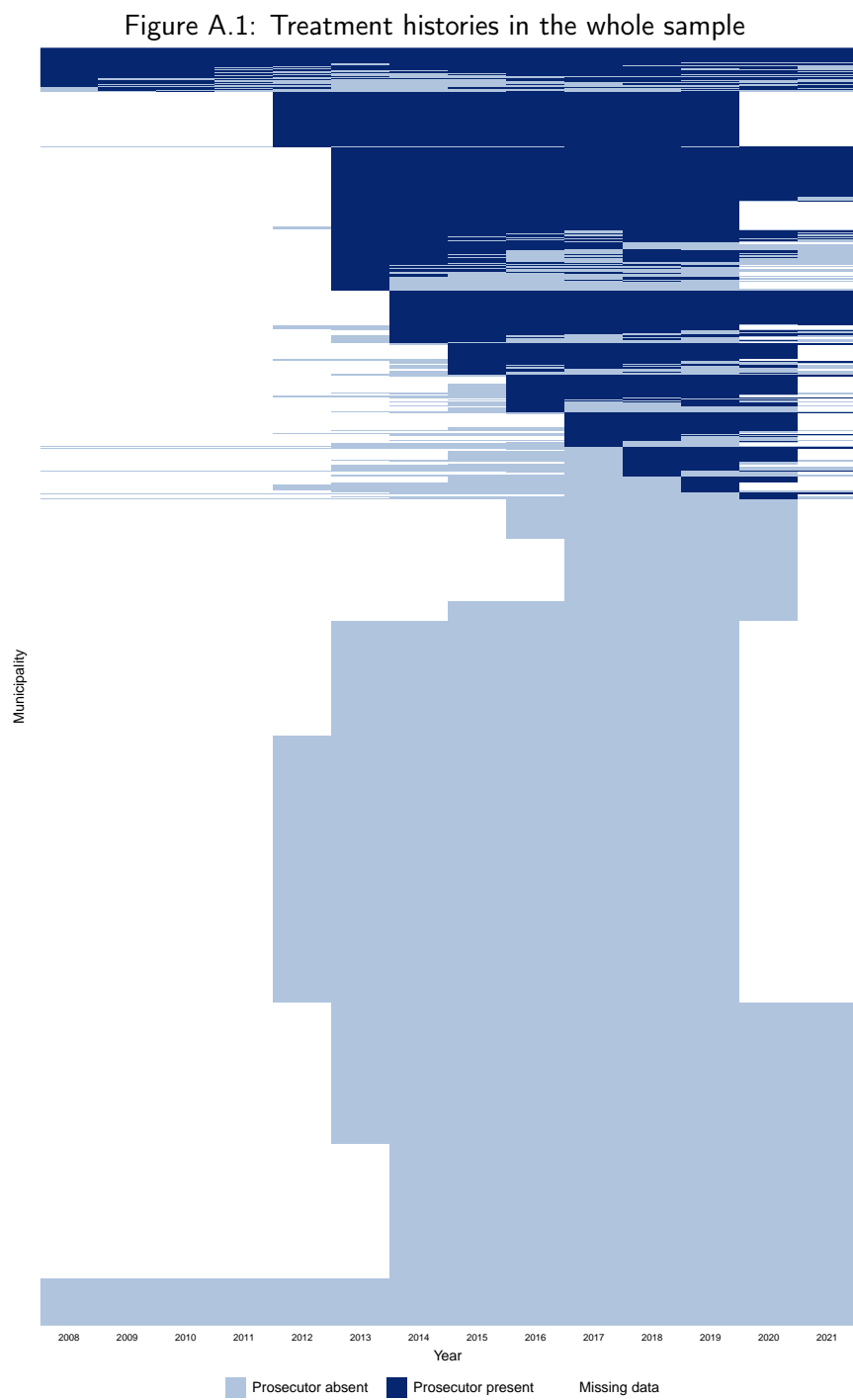
Within each municipality, fieldwork focused on the center, where government offices are. I approached potential interviewees at their offices and requested an interview after introducing myself and the research project. No compensation of any sort was offered or given to participants. Most subjects that I managed to speak to directly agreed to participate.⁷⁸ Interviews were semi-structured, and usually started as an open conversation about the interviewee's background, the challenges they faced in their position, and their perception of public services in the municipality. As the conversation advanced, I followed up with questions about the local dynamics of public employment, including in some cases specific questions about the connection between political turnover, bureaucratic turnover, and public service delivery. I took handwritten notes during and after the interviews. The median duration of interviews was one hour.

⁷⁶41 of the 59 politicians were secretaries. 46 of the 54 bureaucrats were school directors, clinic managers, and social assistance center coordinators. Of the 23 horizontal accountability actors, 15 were state prosecutors.

⁷⁷Interviews were done in the states of Ceará (43 interviews), Rio Grande do Norte (21), Paraíba (15), Pernambuco (1), Rio de Janeiro (19), Minas Gerais (10), São Paulo (3), and Goiás (12).

⁷⁸Some refused, mostly arguing they did not have time. Two refused due to the research topic.

B Treatment histories in the sample



C Alternative specifications of outcomes

Figure A.2: Dynamic and average treatment effects of prosecutor presence on anti-corruption action: Binary outcomes

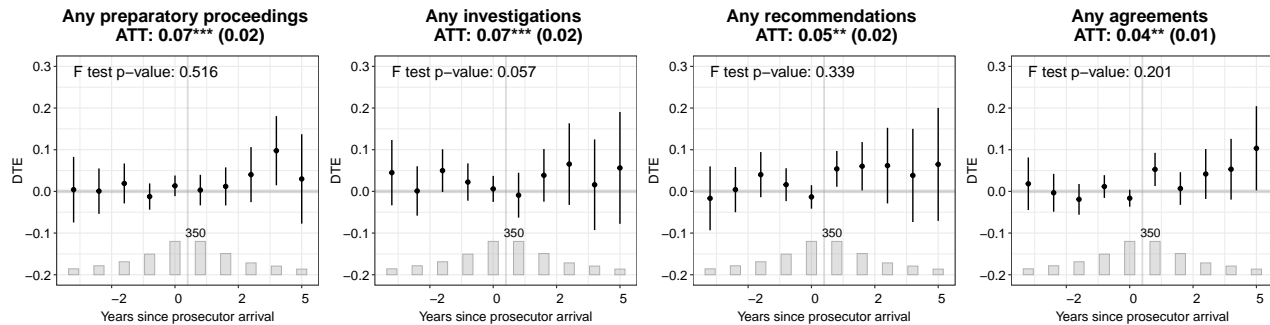


Figure A.3: Dynamic and average treatment effects of prosecutor presence on anti-corruption action: Logged outcomes

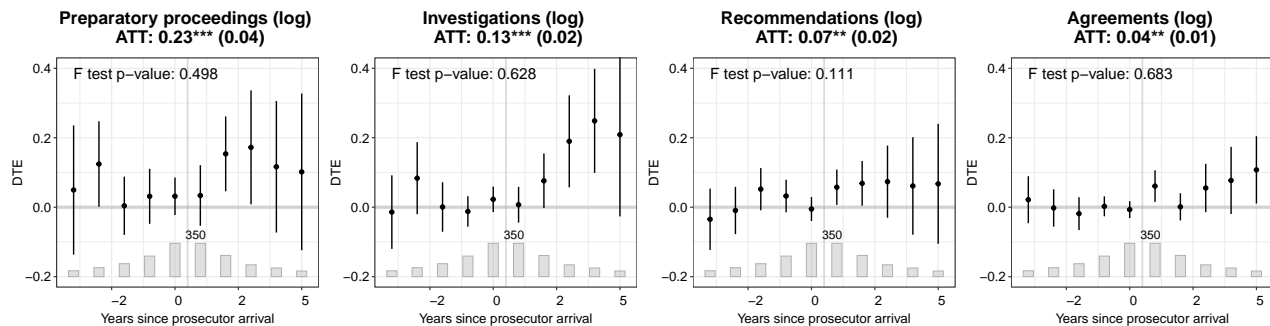
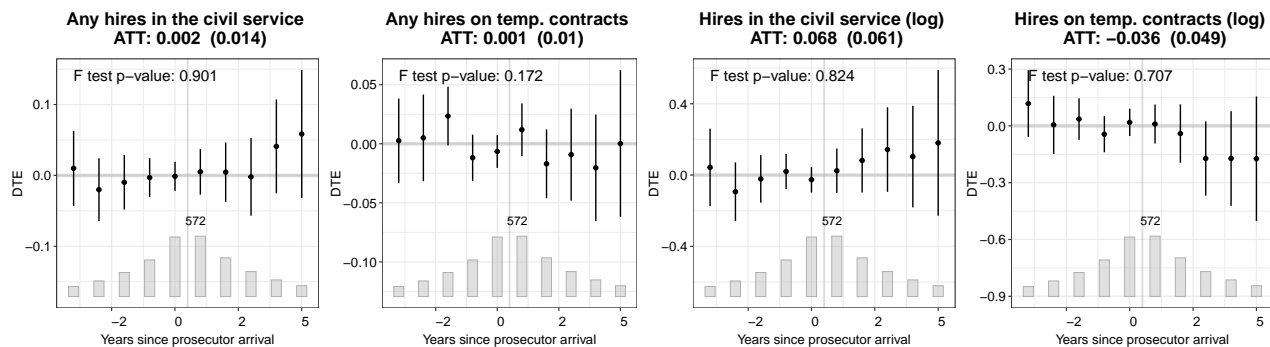


Figure A.4: Dynamic and average treatment effects of prosecutor presence on new hires: Binary and logged outcomes



D Heterogeneity of treatment effects across time

Figure A.5: Heterogeneity across time of dynamic and average treatment effects of prosecutor presence on anti-corruption action

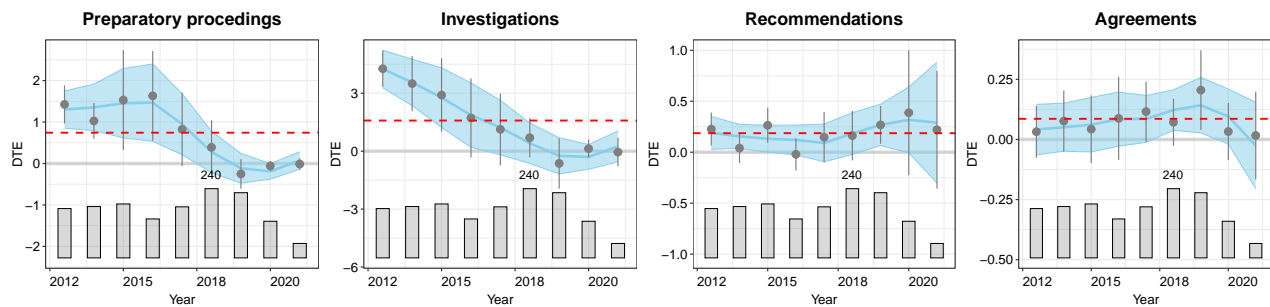
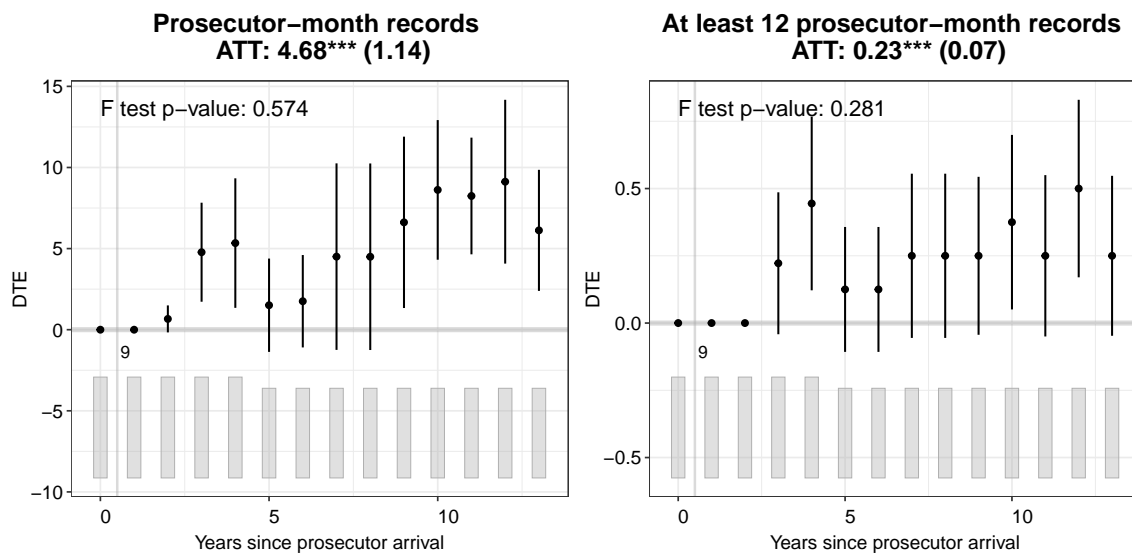


Figure A.6: Heterogeneity across time of dynamic and average treatment effects of prosecutor presence on municipal public employment



E Effect of prosecutorial district creation on prosecutor presence

Figure A.7: ATT estimates of the effect of prosecutorial district creation on prosecutor presence



F Additional details on the politician survey

The survey instrument (in English and Portuguese) is available [here](#).

F.1 Respondent recruitment and non-response

Table A.1: Correlates of the number of responses per municipality

	Respondents (log)	No respondents (dummy)	Respondents (log) w/o zeroes
Population (logged)	0.042 (0.056)	−0.008 (0.032)	0.040 (0.042)
GDP per capita (logged)	−0.209 (0.127)	0.118 (0.085)	−0.071 (0.117)
Deaths per thousand	0.036 (0.037)	−0.027 (0.019)	−0.003 (0.033)
Mayor was reelected in 2016	0.260 (0.114)*	−0.137 (0.046)**	0.072 (0.100)
Constant	2.466 (1.207)*	−0.652 (0.762)	1.710 (1.035)
R-squared	0.049	0.063	0.009
Observations	167	167	142

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. HC1 standard errors in brackets.

The state audit court of Rio Grande do Norte sent the survey to all mayors and to secretaries of five key areas (education, healthcare, social assistance, finance, and human resources) in the 167 municipalities of the state through its online platform.⁷⁹ Participation was voluntary. A total of 455 politicians participated and finished the survey, of which 50 were mayors and 405 secretaries. These respondents come from 142 municipalities. Municipalities where mayors were in their second term were more likely to participate, but conditional on some politicians responding there are no significant correlations between the number of respondents and basic political and socioeconomic characteristics of the municipality, as shown in Table A.1. Participants were recruited through the court's online platform, where they received information about the research project and their rights as participants. Participants were not compensated in any form.

F.2 Descriptive statistics

⁷⁹The survey was also sent to city councilors, but their responses are excluded here because the theory in this paper focuses on executive politicians. Including city councilors' responses, however, does not alter the results.

Table A.2: Descriptive statistics for the survey of politicians, by position

	All (N=455)		Mayors (N=50)		Secretaries (N=405)	
	Mean	SD	Mean	SD	Mean	SD
Age	42.620	10.611	48.680	11.092	41.872	10.320
Female	0.569	0.496	0.220	0.418	0.612	0.488
High school degree or less	0.099	0.299	0.320	0.471	0.072	0.258
College degree or more	0.789	0.408	0.580	0.499	0.815	0.389
Party member	0.516	0.500	0.980	0.141	0.459	0.499
Experience as bureaucrat (years)	0.721	0.449	0.380	0.490	0.763	0.426
Experience as politician (years)	4.607	4.881	7.260	6.901	4.279	4.474

Table A.3: Correlation between prosecutorial presence and politician survey responses – Continuous outcomes

	Meetings with a prosecutor in the past 3 months	<i>Agreement with statement:</i>		
		"The MP knows this municipality"	"The MP detects irregularities here"	"I trust the MP"
Prosecutor present	0.348*** (0.074)	0.142 (0.087)	-0.039 (0.077)	-0.046 (0.064)
Constant	0.314*** (0.034)	3.119*** (0.050)	3.497*** (0.045)	3.745*** (0.039)
Observations	450	455	455	455
R-squared	0.084	0.006	0.001	0.001

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Municipality-clustered standard errors in brackets. The dependent variables are the logged count of self-reported meetings with a prosecutor over the previous 3 months, and the respondent's level of agreement (on a 4-point scale) with the following statements: "The prosecutor's office knows the reality of this municipality", "The prosecutor's office detects the management irregularities that take place in this municipality", and "I trust the prosecutor's office."

F.3 Alternative specifications

Results are similar when using the continuous measures of the outcome, although the correlation for the question on the MP knowing the municipality is not statistically significant ($p = 0.102$).

Results are similar when excluding municipalities where more than one prosecutor was present in January of 2019. These correspond to large prosecutorial districts, which are unlikely to be vacant. When comparing only municipalities with one or zero prosecutors present, we still see a significant correlation between prosecutorial presence and meetings ($p < 0.05$) and a positive yet insignificant correlation with the statement about the prosecutor's office knowing the reality of the municipality ($p = 0.233$).

Finally, results are similar when controlling for municipal population, a key correlate of pros-

Table A.4: Correlation between prosecutorial presence and politician survey responses – Excluding municipalities with more than one prosecutor

	Met with a prosecutor in the past 3 months	<i>Agreement with statement:</i>		
		"The MP knows this municipality"	"The MP detects irregularities here"	"I trust the MP"
Prosecutor present	0.163* (0.063)	0.061 (0.051)	-0.047 (0.070)	-0.084 (0.065)
Constant	0.337*** (0.034)	0.765*** (0.027)	0.613*** (0.031)	0.801*** (0.026)
Observations	390	394	394	394
R-squared	0.020	0.004	0.002	0.007

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Municipality-clustered standard errors in brackets. The dependent variables are dummies for whether the respondent reports having met at least once with a prosecutor over the previous 3 months, and whether the respondent's level of agreement is at or above the median for the following statements: "The prosecutor's office knows the reality of this municipality", "The prosecutor's office detects the management irregularities that take place in this municipality", and "I trust the prosecutor's office."

Table A.5: Correlation between prosecutorial presence and politician survey responses – Controlling for population

	Met with a prosecutor in the past 3 months	<i>Agreement with statement:</i>		
		"The MP knows this municipality"	"The MP detects irregularities here"	"I trust the MP"
Prosecutor present	0.229*** (0.056)	0.082 (0.043)	-0.042 (0.055)	-0.070 (0.051)
Constant	0.332*** (0.034)	0.763*** (0.027)	0.613*** (0.031)	0.799*** (0.026)
Observations	450	455	455	455
R-squared	0.071	0.013	0.002	0.008

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Municipality-clustered standard errors in brackets. The dependent variables are dummies for whether the respondent reports having met at least once with a prosecutor over the previous 3 months, and whether the respondent's level of agreement is at or above the median for the following statements: "The prosecutor's office knows the reality of this municipality", "The prosecutor's office detects the management irregularities that take place in this municipality", and "I trust the prosecutor's office."

ecutorial presence, although the results for the question on knowledge is marginally insignificant ($p = 0.056$).