

Bureaucratic Incentives and Administrative Data Production

Tara Slough*

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Abstract

One core but understudied task of bureaucrats globally is the production of state data. When central governments rely on data reported by decentralized governments to make policy or target resources, decentralized bureaucrats and their political principals may face incentives to report strategically, thereby altering the quality of administrative data. This paper documents how these incentives shape decentralized bureaucrats' data production behavior by pairing original surveys with rich administrative microdata on two data-collection processes in Colombia. Specifically, I conduct surveys of bureaucrats in municipal governments who are responsible for submitting data on contracts and possible social program beneficiaries to the central government. By linking survey responses to public administrative microdata submitted by each municipality, I detect variation in reporting behavior that varies with bureaucrats' conditions of employment. These distortions are small to moderate in magnitude, but are nevertheless likely to have non-trivial distributive consequences.

*Assistant Professor, New York University, tara.slough@nyu.edu. Thanks to Karen Rojas, Carolina Torreblanca, and Meghna Yadav for expert research assistance. This research was supported by a grant from the IPA Research Methods Initiative.

1 Theoretical Framework: Agency Problems in the Collection of Data

A common assumption in literature on decentralization holds that local governments have more information about local populations and territory than does the central government (Oates, 1972). Advocates of decentralization hold that this informational advantage should facilitate more efficient administration of public goods and services by local—rather than central—governments. In theory and in practice, however, not all government functions or programs can or should be implemented by local governments (Oates, 1999). Information about local populations and territories should also be useful for central government policymaking and administration of these programs. As a result, central governments routinely rely on local governments to provide information or data inputs.

Data collection constitutes a frequent, but understudied, interaction between national and local bureaucracies. Summarizing the state of the bureaucratic politics literature, Brierley et al. (2023) emphasize a disjunction between recent studies of policymaking by national bureaucrats (largely in the US) and studies of policy implementation/service delivery by frontline local bureaucrats (largely outside the US). The production of state data represents a distinct output that occupies substantial time of local bureaucrats (e.g., Kalaj, Rogger, and Somani, 2020) and represents a strategic interaction between bureaucracies at multiple levels of government (Garbiras-Díaz and Slough, 2022). Like existing works on bureaucratic politics, I focus on principal-agent problems within bureaucracies, both national and local (Gailmard and Patty, 2012). But there also exists an additional agency problem between national and local governments when central governments collect data from local governments in order to distribute funds or enforcement to those localities.

In unitary governments, these data collection processes require consideration of four classes of actors: a national political principal (e.g., an executive), national bureaucrats, local political principals, and local bureaucrats. Figure 1 provides a stylized illustration of the relationships of interest in the context of a national government and two local governments. Two features are worth

note. The national principal selects and oversees national bureaucrats (within constraints imposed by public sector personnel laws). Similarly, local politicians select and oversee local bureaucrats. In contexts in which national and local politicians are selected by distinct processes—e.g., when both are elected—national politicians have limited means with which to oversee or control local bureaucrats, the actors who ultimately submit the data.

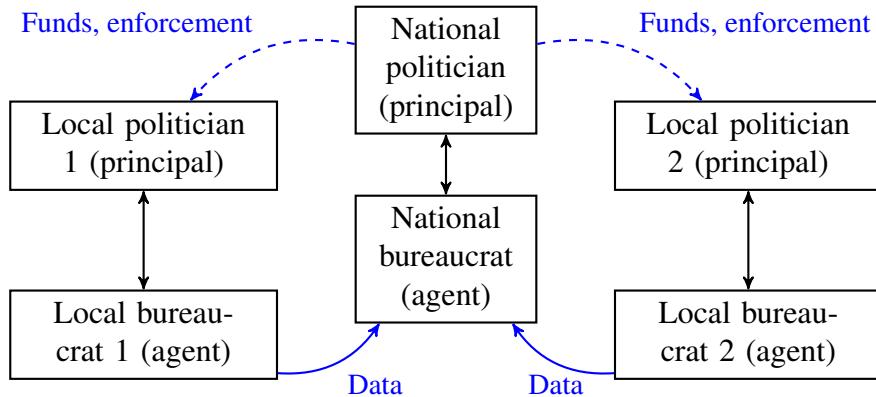


Figure 1: Schematic of the strategic relationships described in this project in unitary systems.

1.1 Data and Intergovernmental Transfers

The blue arrows in Figure 1 indicate that the central government collects data in order to allocate some type of transfer to local (subnational) governments. I conceive of transfers quite broadly. They could be intergovernmental transfers or grants from national to subnational governments, transfers to constituents of localities, targeted tax assessments, or enforcement or oversight directed to local governments. In other words, the important aspect is that the national government uses data inputs to distribute some type of cost or benefit to local governments.

For transfers of this form, policy design has two broad attributes. First, policies specify the transfer instrument (e.g., funds or enforcement). Second, and more important for thinking about data production, these policies determine how data is collected and mapped into these transfers. When considering a national government's preferences over data reported by local governments, I assume that the national politician is purely *accuracy motivated*. This characterization does not

mean that the national politician is welfare-maximizing or technocratic. Rather, I simply assume that a politician's ideological or distributive goals are baked into the design of the measurement instrument and the mapping from measures to data.¹

In contrast to the national politician, the local politician's motivation in producing or submitting data is to *maximize transfers*. In other words, to the extent that the national government's algorithm for mapping data into distributive outputs is clear, local politicians would, in principle, prefer to report the data that maximizes benefits (or reduces costs) to their locality. One implication of this goal is that if the algorithm were public and symmetric across localities, we would expect the resultant data to be largely uninformative about conditions of a given locality.

In practice, however, we rarely observe the degree of pooling (of reports from multiple localities) that we might expect if a politician could simply submit this transfer-maximizing report in all cases. It is worthwhile to consider what constrains reports of local governments? First, national governments often try to conceal the algorithm used to map data submissions into policy outputs. This concealment generates uncertainty on the part of local governments, limiting their ability to identify the optimal report that maximizes transfers. Second, local governments or government officials may anticipate oversight and punishment by the national government if irregularities are detected in the data (Garbiras-Díaz and Slough, 2022; Cook and Fortunato, 2022). Finally, local politicians rely on bureaucrats to collect, collate, and report data to the national government. With this in mind, national governments may try to communicate directly with local bureaucrats, limiting national politicians' interference in data collection. Moreover, misaligned preferences between the politician and the bureaucrat may limit the local politician's ability to submit her ideal report. This remainder of this paper focuses on this final constraint: agency problems in local governments.

¹The design of these data collection and distributive policies is an interesting problem that is beyond the scope of this paper.

1.2 Agency Problems in Local Governments

In decentralized data collection processes of the sort that I study, bureaucrats in local governments are ultimately tasked with reporting information to the central government. As a result, bureaucrats must exert costly effort in order to

Selection

possibility of preference misalignment between local politicians and local bureaucrats
effort, preferences, expertise

2 Case Context

This study examines agency problems in the production of administrative data in Colombia. The Colombian context offers a number of advantageous features for the study of decentralized information production. Colombia is the most populous unitary state in the Americas. The unitary system allows for the study of decentralized data production in a streamlined organizational environment consistent with Figure 1. In contrast to unitary systems, decentralized data production in federal systems sometimes involves state- or province-level politicians and bureaucracies as intermediaries between national and local government institutions (see Figure XX for an illustration and Figure XX for an example from health data collection by the United States Centers for Disease Control). In the past 30 years, Colombia has devolved many functions to local (or territorial) governments, simultaneously increasing the reliance of these expanded local bureaucracies for information. Collectively, these characteristics suggest that the Colombian case offers a tractable case in which to measure some of the more general incentives that feed into data production. Moreover, as these processes are very common in Colombia, this study sheds light on the strategic dynamics of other data collection processes in that context.

2.1 National-Local Government Relations in Colombia

Beginning in the late 1980s, Colombia pursued a series of political, fiscal, and administrative decentralization reforms (Falleti, 2005). Municipal budgets grew as municipal governments became responsible for a wide range of services. Through this process, municipal bureaucracies became larger and more professionalized (Fizbein, 1997). The informational advantages of local bureaucrats about local conditions arguably increased over this period. Decentralized data production aims to leverage this local information to improve the efficiency and accuracy of national government data and statistics. At the same time, the increased responsibilities of local governments increased the size and importance of central-to-local transfers. Further, control entities within the national government (e.g., the Attorney-Inspector General and Comptroller General) maintain oversight over the use of these funds and adherence to laws and regulations.

Requests for information from national government entities to localities or other decentralized public sector entities are a regular feature of national-local government communication in Colombia (Garbiras-Díaz and Slough, 2022). So frequent are these requests, in fact, that the World Bank has proposed centralizing requests to reduce redundancies, which would limit demands on local bureaucrats.²

2.2 Municipal Bureaucracies

Municipal governments in Colombia are led by an elected mayor (the local principal) and staffed by local bureaucrats. Mayors are elected every four years in local elections. Incumbent mayors are barred from immediate re-election and thus cannot serve consecutive terms. The cohort of mayors at the time of the survey was elected in Fall 2019 and took office on January 1, 2020.

Mayors oversee the hiring and performance of local bureaucrats. Bureaucrats can be hired as civil servants or as contractors. Civil servants are afforded tenure protections whereas contractors are typically hired (and rehired) on short contracts that last an average of three months (Slough,

²This insight comes from an interview with a former World Bank contractor.

2022). Since mayors typically oversee contracting (Rueda and Ruiz, 2022), they typically have greater power to select and fire contractors than civil servants. This is reflected in the survey data (described in greater detail below). Among the bureaucrats in the present surveys, 52% of civil servants but only 20% of contractors began their current employment in their respective *alcaldía* before the mayor took office (two years before the survey). Indeed, among respondents, 13% of civil servants and 33% of contractors were hired in the first month of the mayor’s term. Empirical CDFs of respondent hiring date (and thus tenure) in the left panel of Figure 2 also shows smaller discontinuous spikes in hiring at the beginning of past mayoral terms.

In addition to variation in tenure, bureaucrats observe variation in the punishments applied to contractors versus civil servants. The right panel of Figure 2 depicts responses to the question “In your experience in the *alcaldía*, how have contractors been disciplined for underperformance?” Respondents were then asked to check all that apply. The figure shows that respondents were much likelier to have seen contractors than civil servants fired. This suggests that contractors do indeed face stiffer punishments for low performance. Importantly these observations do not vary as a function of a respondent’s own employment status in the *alcaldía* (see Figure XX).

Beyond institutional variation induced by variation in contracting, it is important to note that mayors vary in their managerial practices. Recent surveys of politicians aim to measure variation in politicians’ ability motivate and oversee the bureaucracy in multiple contexts (Carreri, 2021; Carreri and Payson, 2023). The present survey documents substantial variation in mayors’ goal setting, oversight, and management of bureaucrats from the perception of bureaucrats.

2.3 Administrative Data Under Consideration

This paper considers two large-scale administrative datasets that are regularly used in policymaking and public administration. Both datasets are continuously updated by bureaucrats working in *alcaldías*. The data entered has stakes for local governments in national-local government relations. The public procurement data is used to target investigations, oversight, and enforcement

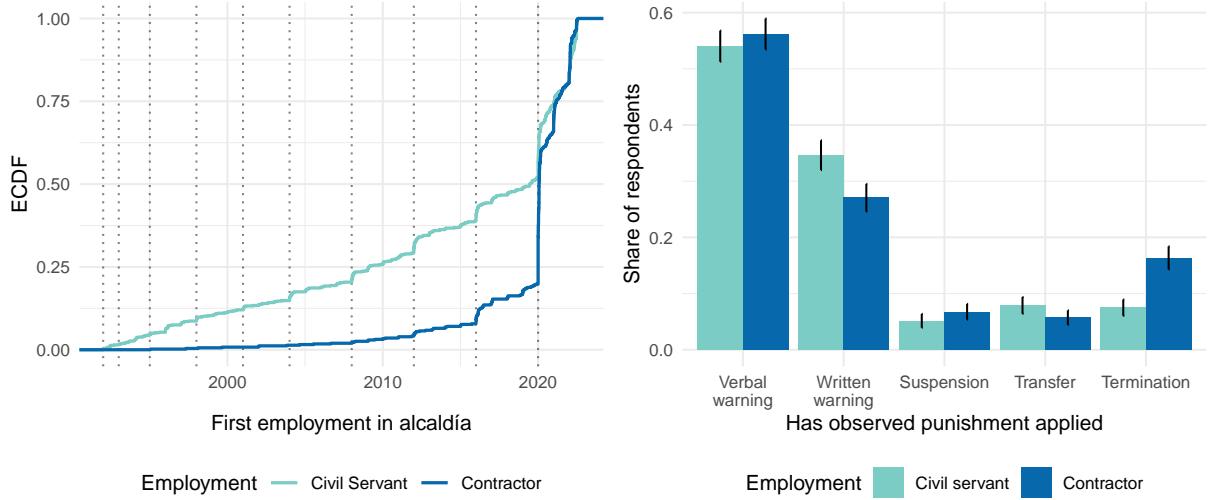


Figure 2: Variation in bureaucratic incentives as a function of employment status (civil servant or contractor). The left plot reports the empirical CDFs of bureaucrat tenure as by employment status in the survey sample. The right plot reports the share of respondents who have observed each punishment applied to an employee of each status.

whereas the means-testing data is used to target social program benefits to local politicians’ constituents. These data are also used by scholars who study governance and public administration in Colombia.

Public procurement data: The first administrative data, SECOP-I and SECOP-II, are Colombia’s electronic government procurement (eGP) databases. By law, all public sector entities—both national and territorial (decentralized)—must report their contracts in one of these eGP databases (Ruiz, 2021). However, there exists straightforward evidence that compliance with these reporting requirements is mixed. The focus here is on the contracts input by local *alcaldías*. At the national level, this procurement database is directed by the national government entity, Colombia Compra Eficiente. However, the resultant data is used widely by control entities including the PGN and the Contraloría General de la República.

SECOP-I, Colombia’s first eGP database, was enacted in response to Ley 1150 de 2007 (Gomez Cabrera et al., 2019). SECOP-I includes *alcaldía* contracts that back-dated to 2000 in some cases. Arranging municipalities by the date of the first contract entered in SECOP-I, the first contract of

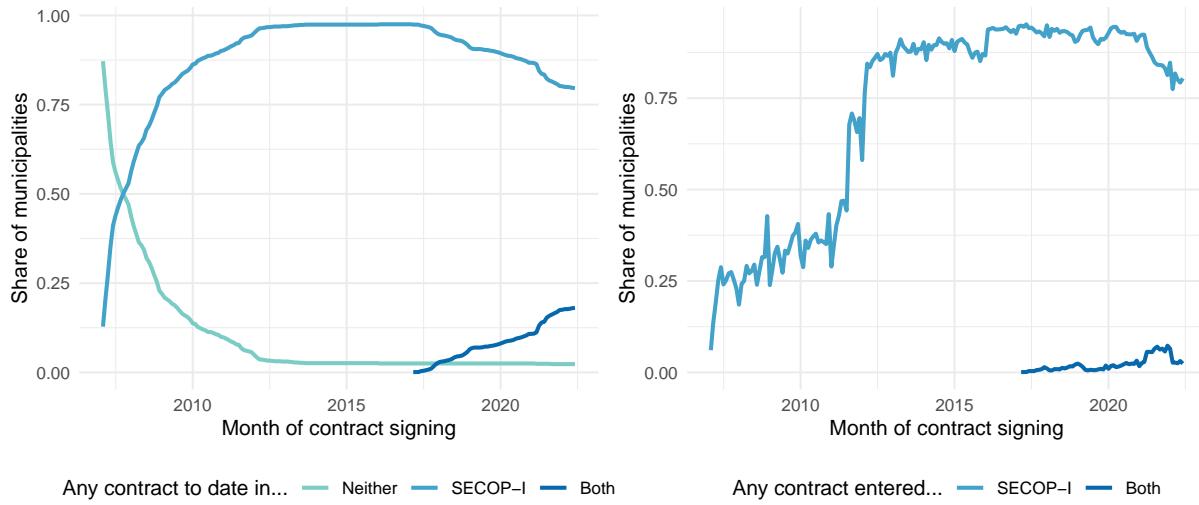


Figure 3: Municipal use of SECOP-I and SECOP-II to date (left) and for contracts dated in a given month (right).

the median municipality is dated November 2007 (Figure 3, left panel). By 2013, approximately 75% of municipalities reported a contract in SECOP-I in any given month; this high rate of use persisted until 2022. SECOP-II was introduced in 2015 in response to concerns of corruption that stemmed from the prevalence of non-competitive contracts in SECOP-I (Gade, Penagos, and Brown, 2020). In contrast to SECOP-I, SECOP-II is a fully transactional eGP, which means that it tracks the progress of contracts throughout their lifecycle (as opposed only the signing of a contract). SECOP-II has been adopted slowly by municipalities. By 2019, only 6.8% of municipalities had entered a contract in SECOP-II and by July 2022, only 18% had entered a contract in SECOP-II. Both panels suggest that as of mid-2022 (and indeed, as of today), the adoption of SECOP-II has not kept pace with the decline in the use of SECOP-I by municipal governments. These raw measures of contracts input suggest selection into reporting as well as selection into the adoption of SECOP-II which suggests incomplete reporting.

Contracting data from the SECOP databases is widely used by scholars studying governance and public administration in Colombia. For example, Ruiz (2021), Rueda and Ruiz (2022), Gulzar, Rueda, and Ruiz (2022), Harding et al. (2023), and Carreri and Martinez (2023) use SECOP-I

data to study questions related to the distribution of government contracts by local mayors. More broadly, analogous eGP data from other contexts has been used in national contexts including Hungary (Szucs, 2023), Italy (Coviello, Guglielmo, and Spagnolo, 2018), Lithuania (Baltrunaite, 2019), and the United States (Decarolis et al., 2020; Dahlström, Fazekas, and Lewis, 2021).

Means testing for social programs: The second national data source, the System of Identification of Social Program Beneficiaries (SISBÉN) is a means-testing program that scores households in terms of need or vulnerability (Rosero, Castaño, and Sarmiento, 2015). Municipal bureaucrats are tasked with conducting surveys of household assets—data collection—and submitting it to National Department of Planning (DNP) for processing. Under the current iteration of the index (SISBÉN IV), the DNP applies an undisclosed algorithm to these surveys to classify households into four groups (with 51 subgroups) on the basis of household capacity to generate income. Households (or members thereof) qualify for various means-tested social programs on the basis this classification.

Since Colombia's largest and best-funded social programs are national, SISBÉN scores effectively draw national government funds to municipal residents. Thus, municipal governments can draw funds into the municipality by providing citizens access to social services if scores meet program criteria. Past iterations of the index have been undermined by manipulation of scores by local politicians and bureaucrats. In their study of SISBÉN-I—the first iteration of the means-testing index—Camacho and Conover (2011) show bunching under threshold for social program eligibility (to increase the number of households that qualify) after the formula was released to local bureaucrats. This bunching was especially pronounced in municipalities in which mayors had won in competitive elections.

Subsequent iterations of SISBÉN were designed in response to manipulation or perceived limits to the performance of the indices in the targeting of social programs. The current iteration, SISBÉN IV, was introduced in 2018 and rolled out across municipalities by 2021. Importantly, SISBÉN IV aims to cross-reference the household surveys with other administrative data to, among

other things, “validate [the information] reported in the survey” (Sistema de Identificación de Potenciales Beneficiarios de Programas Sociales, 2023). This indicates a continuing concern about the possibility for manipulation of survey data.

In the case of SISBÉN, the production of data involves both service provision to citizens and the reporting of the resultant survey data to the national government. When we examine these data, the two actions are not distinguishable. In other words, variation in data quality captures both variation in surveying behavior and in accurately conveying those data to the national government. To the extent that these processes have been studied in earlier iterations of the means-testing program, Slough (2022) documents uneven service provision that may limit access to the survey and Camacho and Conover (2011) shows variation in reporting of data.

3 Research Design

This research design relies on original survey data from data producers in local governments and public administrative data outputs. Importantly, the focus is on survey responses by local bureaucrats to information provided to the central government in recent years.

3.1 Survey of Local Bureaucrats

The populations of interest for the surveys are the municipal bureaucrats responsible for both national government data collection processes. As such, I sought to identify two specific bureaucrats per municipality. Using public data and freedom of information requests, the research team identified bureaucrats working on each program. Of 1,102 Colombian municipalities, we located 1,074 SISBÉN officials and 1,026 SECOP officials. Many of the missing officials come from small municipalities. In sum, we located both officials in 1,004 (91%) of the municipalities. There were only 6 municipalities (0.5%) in which we did not identify either official.

Potential respondents were identified through distinct processes given data limitations and characteristics of each dataset. First, we identified the SISBÉN officials through a freedom of information request to the *Departamento Nacional de Planeación* (National Planning Department,

heretofore DNP) which administers SISBÉN. This data included the complete contact information (both email addresses and phone numbers) for almost all officials. Second, we identified the SECOP officials using open source data available from the Colombian government's *Datos Abiertos* (open data). We used a database that contains contact information for entities (including local governments) that publish data in SECOP. With this data, different entities include different fields. For example, some local governments provide full contact information including a full name, position, phone number, and email for the administrator that sends data to SECOP. For other local governments, only one field was complete. We increase the number of municipalities for which contact information is available using contact information collected by Saavedra (2022).

In order to maximize the response rate, we administered the survey by web and phone. Importantly, this mirrors the two principal means through which the national government solicits data from other government entities, as documented in Garbiras-Díaz and Slough (2022) and XX. The survey was initially distributed to all subjects by email. Two weeks after the distribution of the survey, enumerators began to conduct phone surveys with subjects who had not already completed the online version of the survey. After the phone surveys, we distributed a second invitation to participate in the web survey. In sum, 70.5% of the surveys were completed online and 28.5% of the surveys were completed by phone. All surveys were completed between May 3 and August 22, 2022.

In sum, the surveys yielded responses from 497 of 1,026 municipalities (48.4%) for the SECOP officials and 754/1,074 municipalities (70.2%) for the SISBÉN officials. The disparity in response rates between the two programs may well be driven by variation in the completeness/quality of the list of bureaucrats we obtained as well as the tenure and types of bureaucrats assigned to these positions, as discussed in additional detail below. Nevertheless, these response rates compare favorably to many existing elite surveys. The overall response rate of 60% (across the two programs) falls at the 78th percentile among the 68 elite surveys published in three leading political science

journals for which response rates are reported (Kertzer and Renshon, 2022).³

A second relevant benchmark, given the similarities in the modes of administration, are response rates on other central government data collection processes. While non-response is often not observable in government records, two recent collaborations between researchers and the government prove informative. First, the 2020 National Transparency Index collected by the Attorney-Inspector General's office (*Procuraduría General de la Nación*) achieved a 87% response rate among all local governments (*alcaldías*) to an online survey instrument disseminated by email from national government entities (Garbiras-Díaz and Slough, 2022). Second, a new index of territorial governments collected by the Department of Social Prosperity (*Prosperidad Social*) in late 2022 achieved a 82% response rate among all local governments. While these response rates are higher, both data collection processes had stakes for the municipalities that were absent in the present survey. The former is used in the Attorney-Inspector General's preventative investigative mandate; the latter will, in principle, be used to target resources and programming. The surveys thus achieve response rates of 56 to 86% of the response rate of selected recent government data collection exercises.

Whereas the type of official (SECOP or SISBÉN) surveyed is prognostic of the probability of response, municipal characteristics are generally poor predictors of response behavior. Figure 4 and Table 1 show widespread geographic representation of every region of the country within each survey. Table 1 further shows that the characteristics of responding municipalities (e.g., population and municipal category) and metrics of municipal governance compiled by the DNP are very similar to those of all municipalities in Colombia. In particular, there is no evidence that Collectively, these figures suggest that the combination of phone and web surveys undertaken was successful in cultivating a high response rate that is representative of the distribution of Colombian municipalities.

³The SECOP-specific response rate falls at the 67th percentile and the SISBÉN-specific response rate falls at the 85th percentile of this distribution.

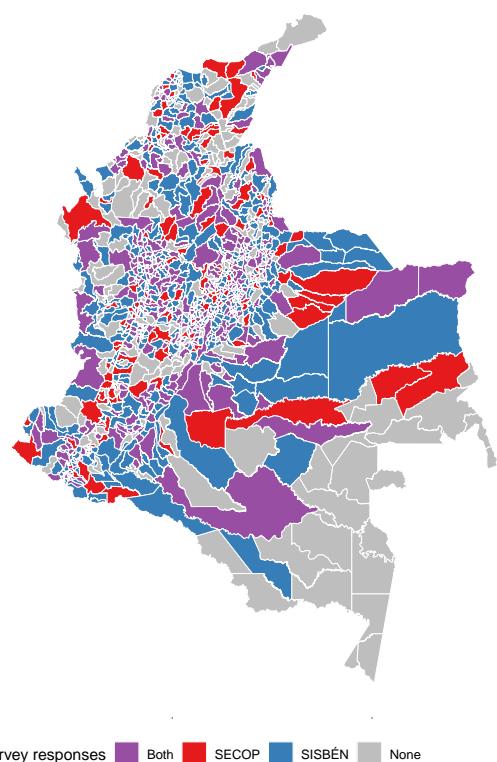


Figure 4: Geographic coverage of SECOP and SISBÉN survey samples.

Characteristic	All municipalities <i>n</i> = 1102	SECOP sample <i>n</i> = 496	SISBÉN sample <i>n</i> = 752
CENSUS			
Population	45,761 (268,039)	57,154 (384,601)	42,319 (302,808)
REGION			
Caribe	0.178 (0.383)	0.145 (0.353)	0.14 (0.347)
Centro Oriente	0.333 (0.472)	0.377 (0.485)	0.366 (0.482)
Centro Sur	0.104 (0.306)	0.089 (0.285)	0.1 (0.3)
Eje Cafetero - Antioquia	0.162 (0.368)	0.179 (0.384)	0.188 (0.391)
Pacífico	0.061 (0.239)	0.06 (0.239)	0.061 (0.24)
Llano	0.162 (0.368)	0.149 (0.357)	0.146 (0.354)
MUNICIPAL CATEGORY			
Category 1	0.025 (0.155)	0.032 (0.177)	0.021 (0.145)
Category 2	0.016 (0.127)	0.016 (0.126)	0.016 (0.126)
Category 3	0.017 (0.131)	0.018 (0.134)	0.02 (0.14)
Category 4	0.021 (0.143)	0.018 (0.134)	0.021 (0.145)
Category 5	0.035 (0.183)	0.032 (0.177)	0.039 (0.193)
Category 6	0.881 (0.323)	0.876 (0.33)	0.88 (0.325)
Special Category	0.005 (0.067)	0.006 (0.078)	0.003 (0.052)
DNP MUNICIPAL GOVERNANCE INDICES			
Municipal capacity index	50.77 (11.21)	51.89 (11.19)	51.75 (11.11)
Resource mobilization index	24.7 (17.5)	26.65 (18.02)	26.18 (18.12)
Resource execution index	67.3 (13.13)	67.97 (12.65)	67.02 (13.33)
Open government index	75.77 (26.16)	76.51 (25.49)	77.54 (25.07)
Territorial organization index	33.61 (12.13)	34.8 (12.47)	34.55 (11.82)
Public services index	48.31 (11.05)	48.49 (10.97)	48.74 (11.24)
Security and convivencia index	90.5 (6.28)	89.99 (6.47)	90.37 (6.3)

Table 1: Characteristics of Colombian municipalities and municipalities in each survey sample. The table reports means and standard deviations (in parentheses) for each municipal covariate.

The survey consisted of several modules intended to measure the characteristics and incentives of data-producing bureaucrats. First, the surveys sought to understand employees' incentives within the *alcaldía* in which they are employed. It measures whether the employee is a contractor or civil servant, as well as who the employee reports to, and their observation of penalties used against other employees. A second module, distinct to each program, measures the objectives that have been specified for the collection and reporting of data. This module echoes recent surveys of politician management practices used in Italy by Carreri (2021) and in the US by Carreri and Payson (2023). A third module measures time use following best practices established by Kalaj, Rogger, and Somani (2020). A fourth module measures contact between data producers and the respective national governments that they report data to. A final module collects data on demographic characteristics and the officials' career tenures within the *alcaldía* in which they work.

3.2 Administrative Data

This project focuses on mapping survey data measuring local bureaucrats' incentives to the administrative data that they produce. I use only disaggregated publicly accessible data outputs downloaded from the national government's open data portal.⁴ The SECOP data consist of all contracts from 2007 through 2023 from the SECOP-I and SECOP-II databases. Because I only observe the surveyed bureaucrats cross-sectionally in mid-2022, I do not look at contracts signed after January 1, 2023. The SISBÉN data consist of a repeated cross-section of 126 to 11,072 randomly sampled, anonymized household surveys per municipality. While it is not possible to track any individual household through the panel, I rely on properties of the random sampling to evaluate variation in reports in the aggregate.

My goal is to isolate variation in the production and reporting of data by local bureaucrats. In an ideal world, I would compare these observed data outputs to a measure of "ground truth." Unfortunately, there does not exist such a measure.⁵ Whereas an independent/external audit is a

⁴<https://www.datos.gov.co/>

⁵With identified SISBÉN data, it may be possible to cross-reference household or individual-

Attribute	Contracts data SECOP-I	Contracts data SECOP-II	Means-testing surveys SISBÉN-IV
PANEL A: RAW DATA			
Cross-section Time	Contract 2007-2022	Contract or process 2015-2022	Household or individual Annual from 2021-2023
PANEL B: PROCESSED DATA			
Unit of analysis	Municipality-month	Municipality-month	Municipality-year
Years analyzed	2016-2022	2016-2022	2021, 2022, (2023)
Municipalities	1102	1102	1102
Surveyed municipalities	497	497	754

Table 2: Raw administrative data and aggregate units of analysis.

feasible way to validate some types of publicly accessible data (Garbiras-Díaz and Slough, 2022), this type of measurement is cost-prohibitive for the contracts data and impossible in the case of anonymized means-testing surveys. As such, the analysis on this paper relies on features of aggregate data. Table 2 describes the aggregation of contract data to the municipality-month level and the aggregation of the means-testing survey data to the municipality-year level.

The measures constructed from the administrative data seek to measure three dimensions of bureaucratic reporting behavior in the aggregate: effort, selective reporting, and the quality or accuracy of data outputs. The specific measures and comparisons cannot be harmonized across the two programs due to the different data structures reported in Table 2.

3.3 Contrasts, Outcomes, and Estimation

The empirical strategies used to measure reporting behavior vary with the structure of the administrative data outcomes in Table 2. The ideal measurement of reporting behavior would compare “ground truth” with reported data. Unfortunately, generating independent measures of contracts or plausible welfare beneficiaries is prohibitively expensive, both for the national government and for independent researchers. In the absence of a measure of ground truth, then, I seek to isolate changes in reporting behavior from changes over time in reported data. I delineate outcomes that level observations with other administrative databases, as DNP purports to do with SISBEN-IV. These alternate data are not public and cover only a subset of items on the survey.

measure *effort* of a bureaucrat from outcomes that measures of the *data outputs* they report.

3.3.1 SECOP Contract Data

The principal (common) unit in the SECOP-I and SECOP-II administrative data is the individual contract. I analyze the subset of contracts reported by *alcaldías* in municipalities for which there are survey responses from the bureaucrat responsible for inputting SECOP data. I aggregate contracts to the municipality-month level on the basis of the start date of each contract. The principal variation that I leverage relies on the tenure of mayors (local government principals) and bureaucrats (local government agents). Specifically, I look at how the data change as a function of when mayors and bureaucrats change within each local government.

Outcomes of interest: I focus on five outcome measures; summary statistics are presented in Table XX. Three outcomes measure features of the contracts entered in SECOP-I: (i) the number of contracts; (ii) the number of non-competitive contracts; and (iii) the (logged) total value of contracts in municipality m and month t . Isolating variation in the contracts entered from variation in the use of contracts is difficult for these outcomes. For regulatory bodies, non-competitive contracts may trigger higher scrutiny, meaning that there may be stronger incentives to manipulate this feature of contracts. While outcomes (i) and (ii) are highly correlated at this level of aggregation ($\rho = 0.82$), there does exist meaningful variation in the ratio of non-competitive contracts to all contracts (see Figure XX).

The remaining outcomes are more direct measures of bureaucratic reporting behavior. First, I measure the average length of the description of each contract (in words). While these descriptions are generally concise, they are produced for SECOP and thus provide a direct measure of effort related to inputting information. These descriptions are employed by users of SECOP including the central government. Second, I measure the timing of the transition to SECOP-II. This is a different platform that requires substantially more detailed information. I code each month in which a municipality has entered SECOP-I as a “1;” else, this variable takes the value “0.”

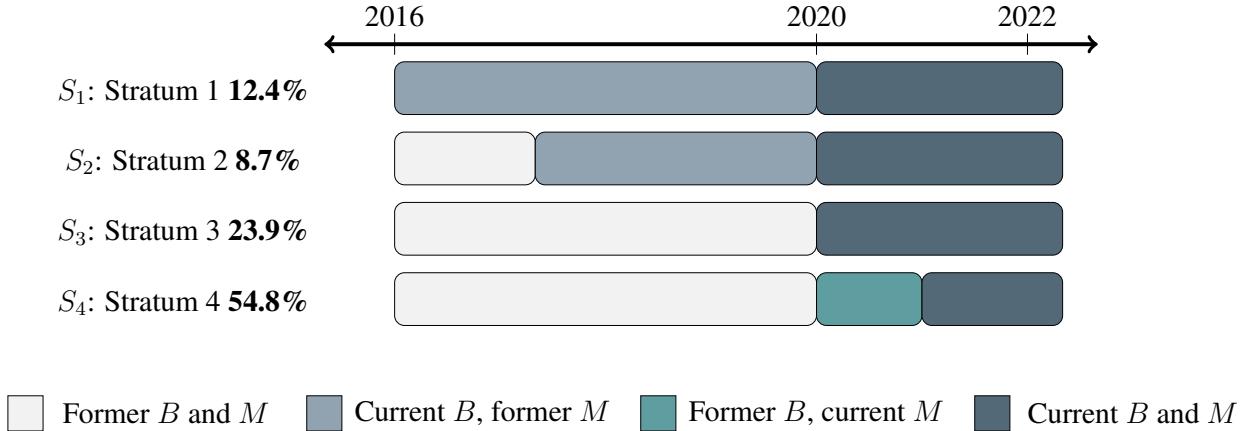


Figure 5: Bureaucratic (B) tenure relative to mayoral (M) tenure for SISBÉN bureaucrats. Bureaucratic tenure is reported in $N = 492$ municipalities. The sets S_1 , S_2 , S_3 , and S_4 include the municipalities in each stratum.

Contrasts: Because mayoral elections occur simultaneously every four years and mayors cannot serve consecutive terms, there is a change in the mayor in all municipalities on January 1, 2020. In contrast, the bureaucrats vary in their tenure in their position from one month to 29 years (at the time of the survey). Within the SECOP data entered between 2016 and 2022, this yields four configurations of mayor-bureaucrat tenure combinations, as depicted in Figure 5. I refer to these as “strata” of municipalities, and denote by S_1 , S_2 , S_3 , and S_4 the set of municipalities in each stratum. Note that in Strata 2 and 4, bureaucratic turnover could occur at any point before (stratum 2) or after (stratum 4) the change in mayor. Bureaucratic turnover could occur because an individual leaves employment in the *alcaldía* or because they are rotated to another job within the *alcaldía*. Shorter-tenured bureaucrats are disproportionately contractors:

Figure 5 implies several comparisons of interest. First, we may be interested in the effect of change in data outputs holding fixed the mayor, by comparing data entered before and after the bureaucrat’s appointment, e.g., by comparing “current bureaucrat, former mayor” to “former bureaucrat and mayor” periods in Stratum 2 or “current bureaucrat and mayor” to “former bureaucrat, current mayor” in Stratum 4. We may also be interested in the effect of a simultaneous shock to the identity of both bureaucrats, i.e., “current bureaucrat and mayor” vs. “former bureaucrat and

“mayor” in Stratum 3. It is useful to consider these strata when interpreting the output difference-in-difference or first-difference methods.

The comparison of “current” to “former” bureaucrats and mayors permits for assessment of whether personnel within local governments shape data outputs (and, where relevant, underlying features of contracts). However, the interpretation of this comparison depends crucially on how current and former actors differ. Because we do not observe the identity or characteristics of the former bureaucrat (at the least), it is not clear *ex-ante* whether changes in personnel should generate a shift in the mean of the outcomes of interest. As a consequence, I also develop a strategy for examining changes in the variance of these outcomes as a function of these personnel shifts.

Estimation The structure of the politician and bureaucrat tenure data in Figure 5 suggests different potential comparisons of interest in different strata. Substantively, there are three comparisons of interest: (i) the effect of a mayor holding constant the bureaucrat; (ii) the effect of a simultaneous change in mayor and bureaucrat; and (iii) the effect of a new bureaucrat holding fixed the mayor. Strata 1 and 2 facilitate comparison (i); Strata 3 facilitates comparison (ii); and Strata 4 facilitates comparison (iii).⁶ In principle, the quantity that I seek to estimate is the average treatment effect on the treated (ATT) of each treatment on the above outcomes of interest. The strength of the research designs used to estimate these estimands varies across the comparisons of interest. I estimate the following equations using OLS, clustering standard errors at the level of the municipality.

$$Y_{mtc} = \beta_M \text{Current mayor}_t + \boldsymbol{\lambda}_m + \boldsymbol{\gamma}_c + \epsilon_{mt} \quad \text{for } m \in S_1 \cup S_2, \text{Cur. bureau}_{mt} = 1. \quad (1)$$

$$Y_{mtc} = \beta_{MB} \text{Current mayor}_t + \boldsymbol{\lambda}_m + \boldsymbol{\gamma}_c + \epsilon_{mt} \quad \text{for } m \in S_3. \quad (2)$$

$$Y_{mtc} = \beta_B \text{Current bureaucrat}_{mt} + \boldsymbol{\lambda}_m + \boldsymbol{\gamma}_t + \epsilon_{mt} \quad \text{for } m \in S_4, \text{Current mayor}_t = 1. \quad (3)$$

⁶One could also make comparison (iii) using Strata 2, but the sample is constrained to 43 municipalities given substantial turnover in bureaucrats.

It is important to note that (3) takes the form of a standard two-way fixed-effects model with municipality and month fixed effects. In (1) and (2), I use calendar month (c) fixed effects as opposed to time fixed effects, given that all mayors take office in the same month. These fixed effects account for the high seasonality in patterns of contracting in the Colombian public sector, but do not account for secular trends in the outcomes of interest.

To measure the possibility that changes in personnel change the variance of the outcome measures, I measure outcomes in terms of deviations from pre-period municipality, calendar month (e.g., January) averages. Specifically, for each outcome, I estimate \bar{Y}_{mc}^{Pre} , where the “Pre” superscript denotes that these averages are evaluated for the four years from 2016-2019. I re-estimate (2) and (3) substituting $|Y_{mtc} - \bar{Y}_{mc}^{Pre}|$ as the (left hand side) outcome of interest. The result measures how a change in mayor and bureaucrat (in (2)) or bureaucrat (in (3)) changes an outcome (in either direction) relative to pre-treatment averages.

Some clarifications are necessary about inference on β_{MB} and β_M using these measures. In principle, we should expect (artifactual) increases in the outcome $|Y_{mtc} - \bar{Y}_{mc}^{Pre}|$ since measures of Y_{mtc} after the 2016-2019 period do not feature into the measure of \bar{Y}_{mc}^{Pre} . If changes in personnel increase deviations in these outcomes, our estimates of β_{MB} and β_B will be exaggerated in magnitude. To measure the extent of this exaggeration and guard against Type-I errors, I conduct two ancillary exercises.

Recall that our estimates of the treatment effect of a simultaneous change in mayor and bureaucrat in S_3 rely on a comparison of 2016-2019 with 2020-2021 because mayoral elections are coterminous. I conduct a parallel analysis by comparing a 2016-2017 pre-period to a 2018-2019 placebo period and then compare a 2018-2019 pre-period to a 2020-2021 post-treatment period. I estimate the differences between effects in the placebo and true treatment periods in an effort to estimate the magnitude of artifactual increases in $|Y_{mtc} - \bar{Y}_{mc}^{Pre}|$. This strategy is clearly imperfect, but, in light of data constraints, it provides a baseline for comparison.

For the municipalities in S_4 (and thus (3)), I use a permutation-based approach to guard against

Type-I errors due to artifactual discrepancies. Specifically, I permute the start dates (and thus the “ $\text{Current Bureaucrat}_{mt}$ ” treatment indicator) many times. These permutations ensure that the distribution of start dates is the same but their assignment across municipalities varies. For each permutation, p , I estimate β_B^p following (3). I then assess where the estimated β_B ranks relative to the set of permutations. To assess the degree to which a new bureaucrat increases deviations from existing data entry practices net of artifactual changes, I measure the difference between the observed β_B and the mean of the analogous permutation estimates, $\overline{\beta_B^p}$.

3.3.2 SISBÉN Registry Data

The SISBÉN data exhibits less granular temporal variation. However, the output of the survey: a classification of households into categories based on wealth or vulnerability facilitates comparisons of classifications of households in a municipality from one year to the next. These classifications are made on the basis of a survey of assets. While individual items are available for the random sample of households, I focus on the ultimate classification in this version of the manuscript. The ultimate classifications have nontrivial economic consequences for households, and by extension, municipalities.

Contrasts: I focus on two characteristics of bureaucratic employment: bureaucratic tenure and status as a civil servant/contractor. Because I observe a cross section of SISBÉN IV data each year starting in 2021, it is not feasible to examine how data inputs respond to bureaucratic turnover before the 2022 survey was conducted. I compare bureaucrats who had served as SISBÉN administrators prior to mayoral turnover on January 1, 2020 (40.1%) to those who were appointed by the current mayor (in the current term) (59.9%). The idea here is that bureaucrats who precede the mayor have greater insulation from pressures from above. This is echoed in the data on the contracts employed: 49.8% of bureaucrats hired during the current mayor’s term were contractors whereas only 11.0% of bureaucrats hired before the current mayor’s term were contractors.

The primary source of variation that I exploit is the comparison of bureaucrats that precede

the mayor to those that were hired (or assigned) to oversee SISBÉN by the mayor. Within this variation, I also consider the variation in contract type. To ensure that expectations are coded in the same direction (toward more control by the politician), I look at the difference in data produced by “short tenured” bureaucrats (those hired after January 1, 2020) versus “long tenured” bureaucrats (those hired before January 1, 2020). I also examine data produced by “contractors” vs. “civil servants.”

Outcomes: The outcomes of interest are changes in the classification of households within a municipality. These measures are constructed from the random sample of households reported expansion factors. The data are stratified on residence in the municipal center (*cabecera*) versus outside the municipal center. I maintain this stratification in the analysis because registration of both types of households entail different levels of effort by bureaucrats: travel costs are greater for citizens residing outside municipal centers.

Figure 6 shows how outcomes are constructed from the SISBÉN data in one municipality. There are 30 ranked classifications of household precarity. These 30 classifications then comprise four broader categories: extreme poverty, moderate poverty, vulnerability, and neither poor nor vulnerable. When calculating the *distribution* of households across categories, I calculate the share of households in the SISBÉN data that are in a given classification or poorer.⁷ More precisely, in the data, I observe H_{mzt}^c , a count of households in category c in zone z (municipal center or outside municipal center) of municipality m at time t . From this data, I evaluate $F_{mzt}(H_{mzt}^C)$, or the cumulative mass function of registered households in municipality m and zone z at time t .

Several observations are immediately obvious from Figure 6: a higher share of households is classified as poor in each year after the rollout of SISBEN IV in 2021. In the example municipality—the municipality with the median shift of residents into poverty from 2021 to 2022—the share of residents classified as “in poverty” increases from 50.0% in 2021 to 65.7% in 2023 (in the *cabecera*) and 57.7% to 82.2% (non-*cabecera*).

⁷This coding is analogous to the cumulative mass function.

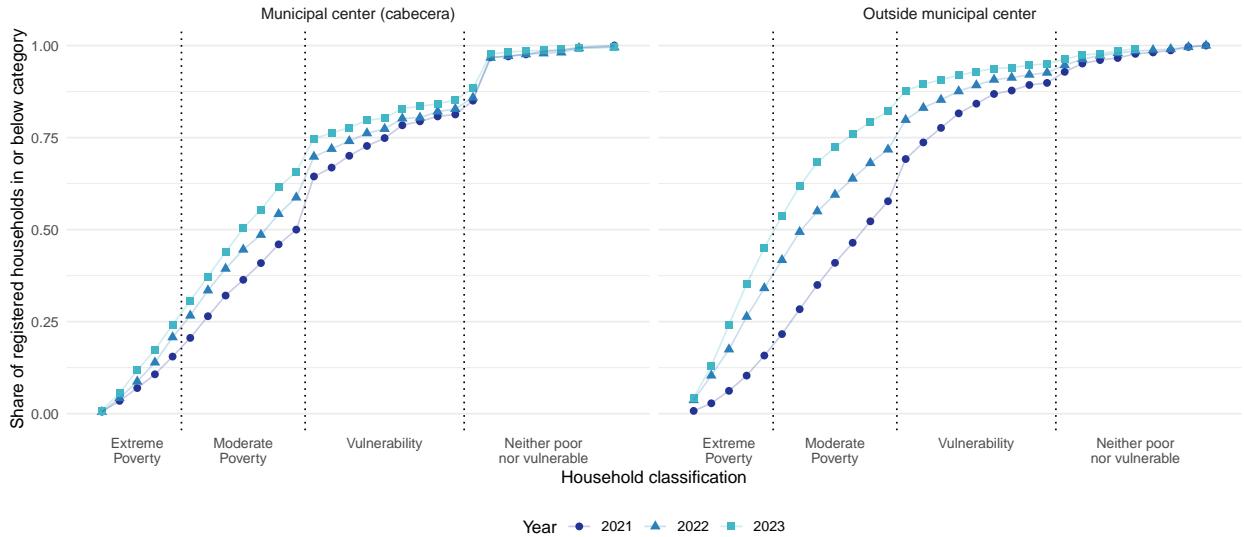


Figure 6: Visualization of the change in the classification of households in the municipality (Falan, Tolima) with the median change in the share of households in extreme or moderate poverty between 2021 and 2022.

These shifts are systematic: we observe first-order stochastic dominance of the classifications in 2021 relative to 2022 in 39.3% (*cabecera*) and 74.9% (non-*cabecera*) of municipalities.⁸ These shifts generate a higher share of beneficiary households: for example, only households in extreme or moderate poverty qualify for *Más Familias en Acción*, the largest conditional cash transfer. It is important to note that Colombia's economy grew quickly in these years registering growth rates of 11% and 7.2% in 2021 and 2022, respectively, so these shifts toward greater poverty do not obviously stem solely from macroeconomic conditions.

The shares of households in each category could shift through the exit of households from new surveys of registered households, the entrance of new households, or the exit of households from the registry (e.g., due to migration). During this period, SISBÉN rolls expanded substantially, including 8.5 million households in 2021, 10.4 million households in 2022, and 12.1 million households in 2023. At the municipal level, rolls in 98.1% of municipalities grew from 2021 to

⁸The classification from 2022 first-order stochastically dominates the classification from 2023 in 30.4% (*cabecera*) and 51.1% (non-*cabecera*) of municipalities.

2022 and 95.3% of municipalities between 2022 and 2023. Given this general expansion registered households, I consider two further outcome measures. First, I code an indicator for whether a given category (extreme poverty, moderate poverty, vulnerable, and neither poor nor vulnerable) has reduced the number of registrants from year t to year $t + 1$. For this indicator to take the value “1,” at least one household must be resurveyed in municipality m or re-register in a different municipality *and* fewer “replacement” households (in a given category) were added to SISBÉN in the intervening year. Second, I code a measure of the total change in enrollment as a share of the number of households in each zone of a municipality in the 2018 Colombian census, P_{mz} . This measure, in year t , is given by $\sum_c H_{mzt}^c / P_{mz}$.

Estimation The focus of the analysis of the SISBÉN data is the change in the number of households in a given classification from year t to year $t + 1$. I estimate specifications of the following forms:

$$Y_{mz,t}^{(c)} - Y_{mz,t-1}^{(c)} = \gamma_B \text{Short tenure}_m + \gamma_C \text{Contractor}_m + \boldsymbol{\kappa} \mathbf{X}_m + \epsilon_{mz} \quad (4)$$

These specifications examines changes in reporting behavior over time. Ideally, this specification estimates the average marginal effect of a short-tenured bureaucrat and/or a contractor. (In additional specifications that include either Short tenure_m or Contractor_m (but not both), we would seek to estimate the average treatment effect of each feature of public employment.) For the estimators γ_B or γ_C to be unbiased estimators of *causal* effects, it must be the case that, conditional on municipal covariates X_m , assignment to Short tenure_m and Contractor_m are conditionally independent of potential outcomes.⁹ The differencing on the left-hand size of (4) improves the plausibility of this assumption by differencing out time-invariant municipal characteristics that feed into the data reported in any given year (e.g., the population or extent of poverty in a municipality). However, it is possible that reports could be changing at different rates as a function of characteristics of

⁹For, for employment condition $Z_m \in \{0, 1\}$, conditional ignorability of assignment to Z_m requires that $Y_{mz,t}^{(c)}(Z_m) - Y_{mz,t-1}^{(c)}(Z_m) \perp Z_m | \mathbf{X}_m$.

bureaucrats or municipalities. To this end, the covariates included in the matrix \mathbf{X}_m include other attributes of bureaucrats (gender and age bins); municipal characteristics (administrative category, population quintile bins, and department fixed effects); and measures of political competition in mayoral elections (competitiveness and share of protest/invalid votes). I also report the sensitivity of estimates of γ_B and γ_C to violations of conditional ignorability [hazlett].

4 Results

4.1 Characterizing local bureaucrats' incentives

Before examining the relationship between bureaucratic incentives and data outputs, I use the survey data to establish several stylized facts about these incentives. First, it is worthwhile to consider the degree to which the characteristics of employment covary within the same local government *alcaldía*. For example, are there municipalities that use contractors to different rates? Do mayors vary in the degree to which they delegate oversight to civil servants? Table 3 examines the correlation between common measures within municipalities for which both bureaucrats were surveyed ($n = 358$). Columns (2)-(3) report means on each survey measure for each type of bureaucrat. Relative to SISBÉN bureaucrats, SECOP bureaucrats are more likely to be contractors, less likely to be supervised by a civil servant, less likely to have goals set by their supervisor, less likely to have communication with central government, and yet perceive more frequent oversight and less freedom. These differences between subsamples of bureaucrats are also clear in the subsample of survey responses for which both bureaucrats in a municipality were surveyed (columns (4)-(5)).

These survey measures are very weakly correlated across data collection processes within local governments. The strongest correlation—employment as a contractor—is only $\rho = 0.15$. Given the overall rate of contractors in Table 3, this implies that having a contractor for one position predicts a 14 to 16 percentage point increase in the probability that the other position is filled by a contractor. The other correlations are all very weak $\rho \in [-0.06, 0.06]$. This suggests that features of bureaucratic oversight within *alcaldía* and by the central government exhibit substantially more

Variable	FULL SURVEY SAMPLE		BOTH SURVEYS COMPLETE		Within municipality Correlation (ρ)
	SECOP	SISBÉN	SECOP	SISBÉN	
Short-tenured (appointed since 2020)	0.67	0.55	0.70	0.56	-0.06
Contractor	0.55	0.34	0.55	0.34	0.15
Mayor supervises	0.39	0.37	0.39	0.39	0.05
Civil servant supervises	0.74	0.90	0.72	0.91	0.06
Supervisor sets goals	0.45	0.70	0.45	0.69	0.03
Oversight frequency (0-5 scale)	3.69	3.13	3.63	3.17	0.06
Perceived freedom (1-5 scale)	3.22	3.67	3.21	3.74	-0.06
Any communication with central government	0.23	0.51	0.22	0.51	0.04

Table 3: Measures of bureaucrat incentives within the *alcaldía*. All variables are binary unless otherwise noted.

variation by position (and data collection process) than by individual mayor or municipality.

Second, mayors have some degree control over the staffing of municipal governments through the hiring of contractors and new civil servants or through the reassignment of civil servants to different jobs. But they can additionally adopt different management practices for bureaucrats. Because mayors make both decisions, our focus on the length of employment and on contractors versus civil servants could covary with other management practices. Figure 7 looks at how these management practices covary within type of bureaucrat/dataset. It is unsurprising that contractors are more likely to be short-tenured than civil servants (and vice versa). The differences in other management practices are more subtle. Among both types of bureaucrats, contractors are more likely than civil servants to report that they are supervised by a civil servant, that their supervisors set goals, and that they experience higher levels of oversight. Nevertheless, they perceive similar levels of freedom to make decisions. Relative to long-tenured bureaucrats, short-tenured bureaucrats are more likely to say their supervisor sets explicit goals and, for SISBÉN bureaucrats, that they are overseen with a higher frequency.

Theoretically, these descriptive findings may cut in different directions. Observations of more explicit directives from supervisors and more frequent monitoring suggest that in addition to control over their selection, contractors and short-tenured bureaucrats may be more sensitive to the goals of the mayor than they would be if they were civil servants or long-tenured. Nevertheless, they are more likely to be overseen by a higher-level bureaucrat, which may also weaken the

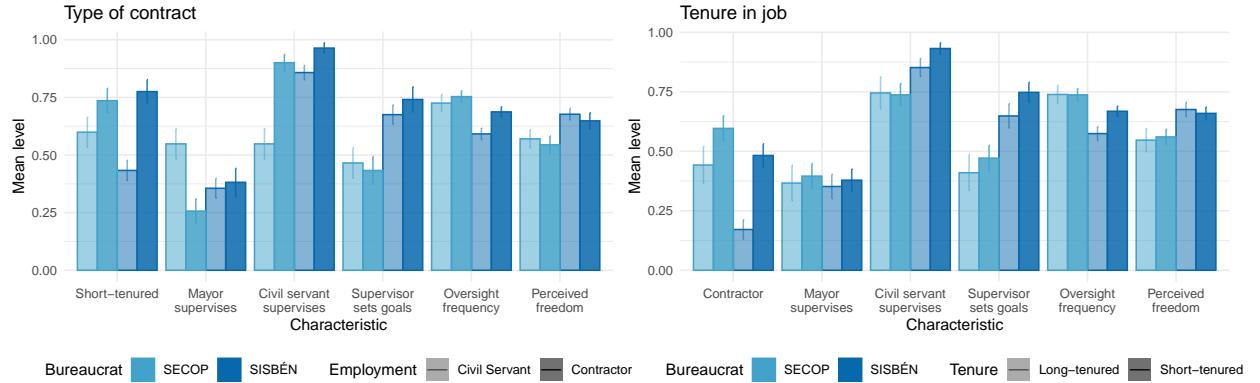


Figure 7: Rates of other personnel selection and management practices reported by civil servants vs. contractors (left) and long- and short-tenured bureaucrats (right). Note that the oversight frequency and perceived freedom measures are rescaled to a 0 to 1 scale for comparability. 95% confidence intervals are constructed on heteroskedasticity-robust standard errors.

mayor's ability to control the bureaucrat. In sum, measures of bureaucratic contracting and tenures are bundled treatments. The original survey data here shed some light on attributes of the bundle.

Finally, consider the predictors of communication between local bureaucrats and central government bureaucrats. Per Table 3, 23% of SECOP and 51% of SISBÉN bureaucrats report any contact with the central government in the past week. Examining within program, which bureaucrats report this communication? Given the covariates at hand, our ability to predict this communication is extremely weak. I use a random forest classifier to predict this communication. Predictors include characteristics of municipalities (distance from Bogotá and departmental capitals, population, category), the political environment (from the 2018 mayoral election), and respondents, the area under the receiver operator curve (AUC) is only 0.56 for SECOP and 0.52 for SISBÉN (see XX). Because this measure comes from a time use survey, is consistent with the idea that contact with the national government is fairly stochastic in any given week. Nevertheless, the higher mean for SISBÉN suggests that these interactions are more likely for some bureaucrats/data collection processes than others.

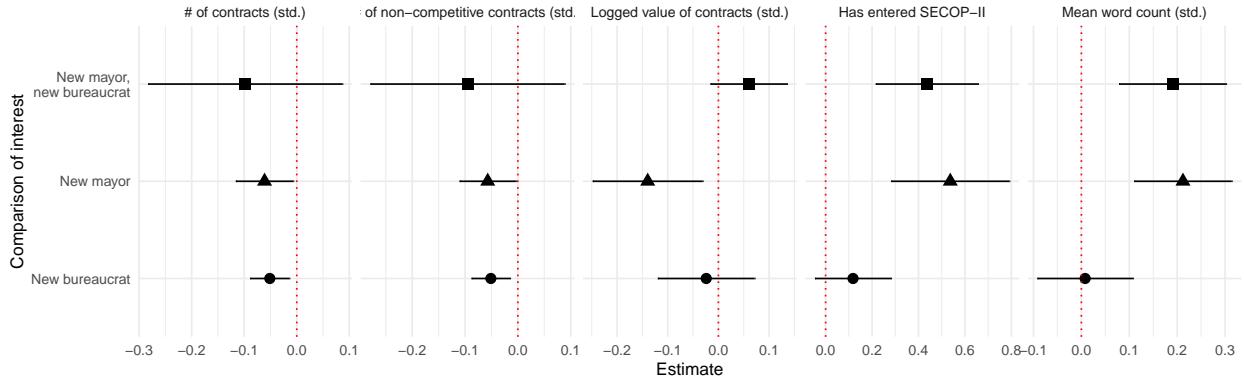
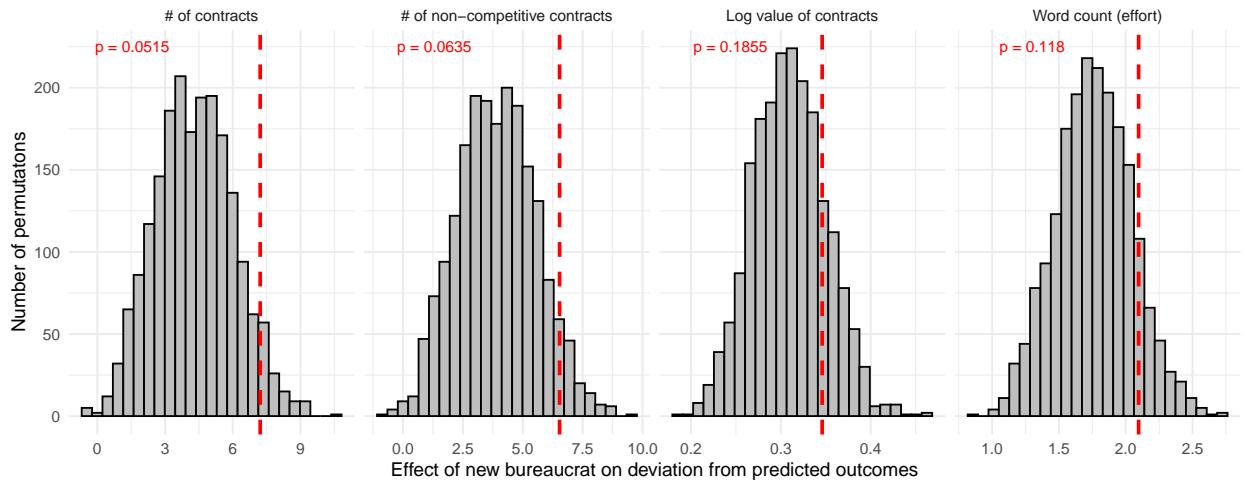


Figure 8: Estimates of the effects of changes in municipal personnel on contracts data in SECOP-I. 95% confidence intervals constructed on standard errors that are clustered at the municipal level.



4.2 SECOP Contracting Data

Turning to the contracting data, I examine the extent to which variation in which bureaucrats' tenures yield changes in reported data. Figure 8 plots estimates of β_{MB} (top estimate), β_M (middle estimate), and β_B (bottom estimate in each row).

4.3 SISBÉN Enrollment Data

5 Discussion

6 Conclusion

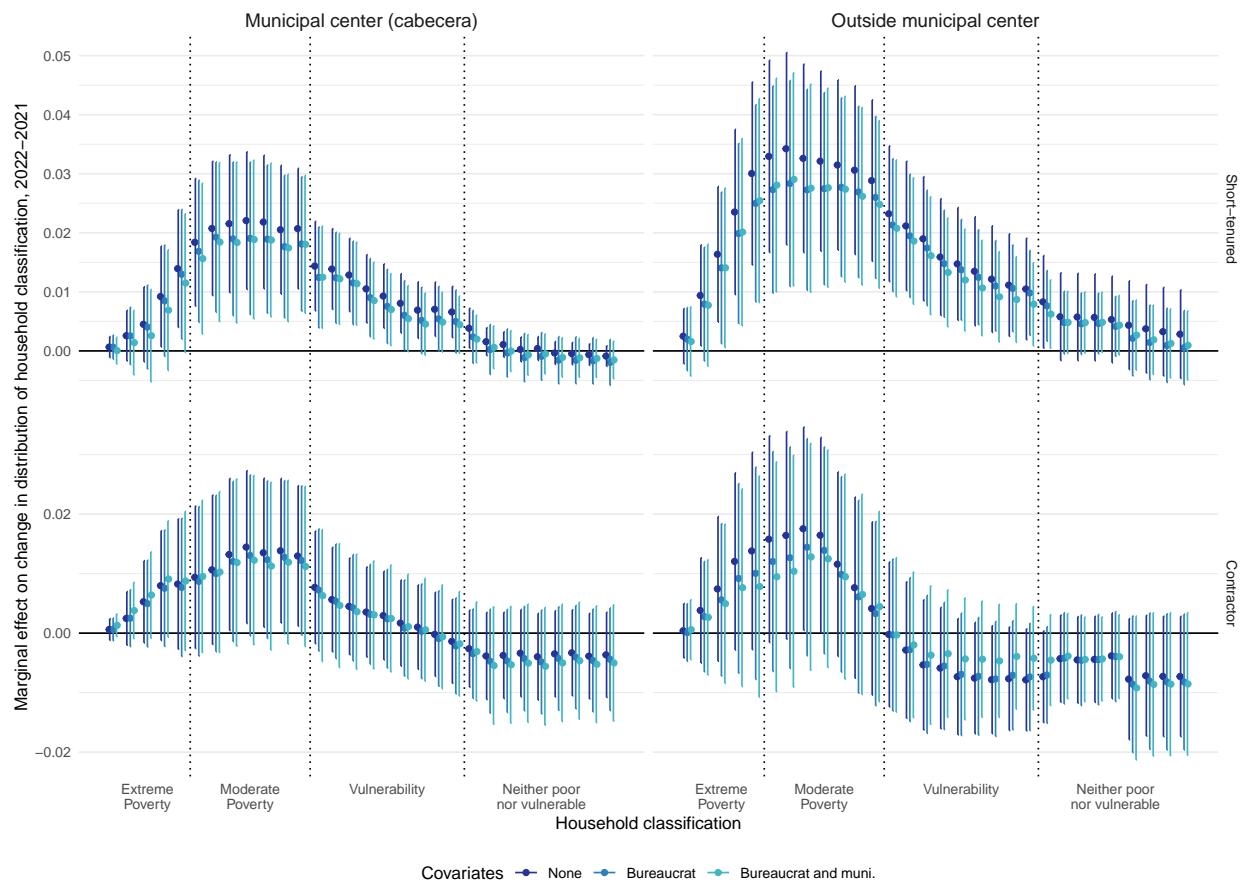


Figure 9

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