

Human resource management as a tool to control corruption: Evidence from Mexican municipal governments

Fernando Nieto-Morales¹  | Viridiana Ríos²

¹El Colegio de México, Mexico City, Mexico

²Harvard University, Cambridge, Massachusetts, USA

Correspondence

Fernando Nieto-Morales, Camino al Ajusco 20, 14110 Tlalpan, Mexico City, Mexico.
Email: fnieto@colmex.mx

Abstract

Principal-agent models of corruption control that emphasize rules, incentives, and sanctions as prime antecedents of corruption often stop short when evaluating how these general principles translate into concrete Human Resource Management (HRM) policies. Following a call to develop research about how day-to-day public management operations change incentives to be corrupt, we use data of 5.22 million USD audited to 545 local Mexican governments over 3 years to test the correlation between the misappropriation of public funds and specific HRM functions. Our results suggest that HRM is a critical, underseen factor in understanding the risk of corruption. In line with previous findings, we show that having merit-based recruitment can prevent corruption. However, we also find that having performance and departmental evaluations and a less unequal structure of remunerations may also help local governments effectively avoid the misappropriation of public money.

1 | INTRODUCTION

Control of corruption is a metric for the adequacy of governments worldwide and an issue that lies at the center of public administration as a professional field (Perry 2015). However, important aspects such as how human resource management (HRM) influences corruption prevalence have not been sufficiently studied (Sondang Silitonga et al. 2019; Meyer-Sahling & Mikkelsen, 2016). Analyses that tackle this aspect resort to Agency Theory and Control of Corruption Theory (Kiltgaard 1988; Shapiro 2005) and thus emphasize the role played by incentives, monitoring, and sanctions. However, studies often fail to test how concrete implementation of these principles, either independently or in combination, could influence corruption within public organizations.

We build on the idea that HRM could be an essential tool to curb corruption. We use microdata of registries and administrative census data to explore this relationship in municipal governments. The notion that HRM could be a relevant antecedent of corruption is not new. Several studies have shown a connection between the management of people and ethical behavior in organizations. For example, when HRM practices include moral reminders to reduce corruption, unethical behavior could drop (Shu et al. 2012). In addition, public employees' compliance with regulation could be affected by managerial cues, such as exposure to dishonest behavior (Hoeben et al. 2016), the degree of focus on monetary rewards (Gino & Mogilner 2014), intra-organizational competition (Rigdon & D'Esterre 2015), and entitlement (Sah 2017). Studies have also shown that challenging performance goals and time pressure may influence compliance (Belle & Cantarelli 2017). Other studies have pointed to the importance of monitoring (Rixom & Mishra 2014; Welsh & Ordóñez 2014), whistle-blowing protection (Near & Miceli 1985), and wage management and discretion (Kwon 2012) as tools to control corruption (Belle & Cantarelli 2017).

In response to recent calls to find new ways to study corruption as a public management issue (Sondang Silitonga et al. 2019; Meyer-Sahling & Mikkelsen, 2016; Oliveros & Schuster 2018; Perry 2015), this study provides evidence on how public HRM may reduce the likelihood of corruption. We contribute to the literature in three ways. First, we side with an emerging literature that posits that the best way to understand state capacity is to rely on administrative measures, not (only) surveys (Holt & Manning 2014). Most studies on corruption still rely on perceptual or experience-based surveys (Meyer-Sahling & Mikkelsen 2016). However, elite concerns influence these measures and are biased in favor of grand corruption. Our study explores corruption using administrative data sources. Although there are some efforts (Bersch et al. 2017; Cullen 2012; Rose & Peiffer 2015; Sundström 2016), this form of research remains limited due to the lack of reliable, comparable information.

Second, we focus on studying the role that rules and practices within the different phases of the HRM cycle could play in controlling corruption. According to principal-agent models of corruption, incentives and regulations are the prime determinants of higher compliance levels. We use public HRM policies as a translation of principal-agent models and, therefore, an angle to analyze corruption at the organizational and management level. Specifically, we study how specific HRM policies are related to the prevalence of budget misappropriation among Mexican municipal governments with comparable economic and institutional traits, including a similar structural risk for corruption (Cantu 2014; Langbein & Sanabria 2013).

Finally, our analysis focuses on differences in public management at the sub-national level rather than cross-national comparisons. Arguably, many national public administrations worldwide have improved over the last decades regarding control of corruption (Meyer-Sahling & Mikkelsen 2016; Santiso 2015). However, it remains unclear whether the same can be said of subnational governments, particularly in places with weak institutions (Charron et al. 2016; Nicholls-Nixon et al. 2011). Thus, our study provides an opportunity to examine how internal differences combine to influence corruption outcomes within these governments (cf. Belle & Cantarelli 2017).

Following the recommendations of other scholars (Rose-Ackerman & Palifka, 2016; Lasthuizen et al. 2011; Johnston 2005), we focus on analyzing a single type of measurable corruption: the misappropriation of public funds. We define it as *the displacement and potential embezzlement of public funds placed in trust or allocated to municipal governments*. We focus on misappropriation because it allows us to study unethical behavior by tracing public records that depend not on subjective evaluations but factual, public, and independent records. Furthermore, studying misappropriation enables us to examine concrete organizational practices related to “cultures of corruption” and administrative incapacity.

This study was made possible due to the existence of two fine-grained datasets. First, we collected data on misappropriations from audits to municipal governments in Mexico from 2014 to 2016. These audits trace the use of 5.22 million USD (99,163,380 MXN) and identify misuse of 426,873 USD in the period (about 8%). This is one of the

most extensive auditing-based studies to date in Mexico. Before, Olken (2007), Ferraz and Finan (2011), and Bobonis et al. (2016) used auditing processes to study corruption in Indonesia, Brazil, and some other cases. Second, we paired these data with the results of a multi-year census of local management variables conducted biannually since 2011. To the best of our knowledge, this is the first time these datasets are analyzed to understand corruption at the subnational level.

Multilevel analysis of the data shows that merit-based recruitment and the implementation of personnel and departmental evaluations correlate with less corruption. We found no significant effects of employment protection and the probability of employee dismissal. However, we do see some evidence that an unequal wage structure could lead to increased corruption. These results show that attention to specific management policies can aid local public administrations interested in preventing corruption. That is, results stress the relevance of focusing on HRM to control corruption, particularly in developing countries.

2 | CORRUPTION CONTROL AS AN HRM ISSUE

A professionalized and impartial public bureaucracy may help reduce corruption (Rothstein & Teorell, 2008). Famously, Evans and Rauch (1999) showed a correlation between “Weberian” administrative structures and economic performance. Professional bureaucracies based on meritocratic recruitment, impartial rules, and long-term careers increase organizational conformity and predictability and create disincentives to corrupt behavior, promoting trust and economic growth. However, there is still much to unpack about how specific organizational practices and policies impact corruption (Meyer-Sahling & Mikkelsen, 2016). The functions of recruitment, promotion, evaluation, and dismissal and the structure of remunerations could play an essential role in this regard. Nevertheless, their net effect has not been studied chiefly out of the difficulties of finding data with sufficient granularity and comparability. In addition, most available datasets (e.g., QoG Expert Survey) rely on experts' assessments rather than factual administrative data.

In any case, this is an area that deserves more attention as evidence suggests that management and organizational practices could indeed influence the decision to be corrupt (Belle & Cantarelli 2017; Bing et al. 2012). For instance, Moore & Gino (2013) showed that organizational factors could exacerbate socio-psychological processes that facilitate moral neglect, moral justification, and immoral action. Also, Ashford and Anand (2003) have explained how organizational mechanisms can promote rationalization and the normalization of corruption. Even minor changes in organizational processes could have a significant effect. For example, studies have shown that when individuals are required to sign their documents before reporting their activities, the probability of honest reporting increases (Shu et al. 2012; see also, Cohn et al. 2014).

Organizational policies could also help temper social influences that correlate with corruption. Because of exposition to dishonesty, illegal conduct may become more acceptable (Hoeben et al. 2016). Nevertheless, if internal policies shift attention away from monetary rewards, individuals may behave more ethically by cheating less (Gino & Mogilner, 2014; Rigdon & D'Esterre 2015). In organizations that create a sense of entitlement and invulnerability, crossing ethical boundaries has been proven to be more common (Sah 2017). Studies have shown that corruption tends to be more prevalent among individuals subject to challenging performance goals and time pressure, mainly low-risk persons (Belle & Cantarelli 2017).

To study the role that HRM policies and practices may have on corruption, we build on Meyer-Sahling & Mikkelsen (2016) and Berman (2015) and their four critical civil service management functions: (a) recruitment, (b) control and evaluation, (c) employee protection and dismissal, and (d) remuneration. These functions roughly cover all critical parts of the HRM cycle: staffing, appraisal, development, and exit. In what follows, we derive hypotheses for each function, and next, we gather evidence of which practices may influence the capacity of public bureaucracies to limit corruption most effectively.

2.1 | Recruitment

Scholars have shown that adopting recruitment through examinations lowered corruption in different cases, from Latin American (Oliveros & Schuster 2018) to post-communist countries (Charron et al. 2016; Meyer-Sahling & Mikkelsen 2016). This relation seems to happen because of different reasons. First, merit-based recruitment reduces adverse selection as it signals that capacity and performance are key variables that determine success. As Adverse Selection Theory predicts, public servants who are corrupt or incompetent may be deterred from applying to a position. As a result, the pool of public servants becomes a subset of the total population less prone to corruption.

Second, merit-based recruitment promotes disincentives to misbehave by changing the logic of access to public employment. As a result, accepting bribes or embezzling public funds might become more difficult (Bersch et al. 2017; Heywood & Meyer-Sahling 2013). This happens because bureaucrats' positions in meritocratic systems do not depend on loyalty to politicians but credentials and measurable performance. In this environment, bureaucrats could have a lot to lose by engaging in corruption.

Finally, merit-based recruitment could help develop a public administration that adheres to professional standards of integrity (Neshkova & Kostadinova 2012). Merit-based recruitment increases bureaucratic expertise (Haveric et al. 2018) and encourages government officials to more candidly voice their opinions (Cooper 2018). When merit determines the career of professional bureaucrats, collusion for taking bribes is less likely because it becomes a collective action problem (Dahlström et al. 2012). Merit-based recruitment helps create stronger ties and esprit de corps among bureaucrats, reinforcing adherence to (un)codified rules of behavior. As a result, some research has shown that the behavior of different bureaucrats tends to become similar, creating a virtuous cycle in which peers monitor the behavior of others, thus reducing the chances of misconduct (Dahlström et al. 2012). In light of the previous, our first hypothesis (H1) states: *Merit-based recruitment of personnel correlates with lower misappropriation.*

2.2 | Control and evaluation

As with other illicit behaviors, corruption decreases when the probability of detection is higher (Becker 1968). When day-to-day management operations include internal controls in the form of monitoring and personnel and organizational evaluations, a reduction in corruption may be observed due to the increased risk of punishment and highlighted awareness of weaknesses.

Top-down monitoring tools like audits, reviews, and evaluations are among the most effective anti-corruption tools (Gans-Morse et al. 2018). Observational studies from Argentina (Di Tella & Franceschelli 2011) to Pakistan (Davis 2004) show that when management can oversee the actions of public servants, this induces ethical behavior. In Indonesia, for example, village road projects have been proven to be less corrupt when they are audited (Olken 2006). In Georgia, the capacity to monitor public bureaucracies relates to the success of anti-corruption reforms (Schueth 2012). Overall, corruption is considerably lower in municipalities with spending monitoring before and during elections (Bobonis et al. 2016). Experimental evidence has also confirmed the importance of monitoring and evaluation in reducing corruption (Rosenbaum et al. 2014). A randomized policy experiment implemented in Brazil concluded that temporarily increasing annual monitoring risk by about 20 percent reduces the proportion of tampered procurement processes by 15 percent (Zamboni & Litschig 2018). A meta-analysis of 19 independent experiments showed a negative effect of monitoring on individuals' unethical behavior (Belle & Cantarelli 2017; Dai et al. 2017).

An interpretation of the mechanism through which monitoring may have effects in bureaucrats is through its psychological impact. Monitoring encourages self-awareness, thus making it impossible for a public servant to engage in corruption without updating her self-concept (Welsh & Ordoñez, 2014; Mazar et al. 2008). Sometimes

unethical behavior results from people's limited attention to ethical considerations (Pittarello et al. 2015). Therefore, our second hypothesis (H2) states that: *Existence of internal control and evaluations correlates with lower misappropriation.*

2.3 | Employment protection and stability

Employment protection and job stability could also reduce incentives to corrupt behavior because public servants are less motivated to take risky short-term corrupt gains (Becker & Stigler 1974; Meyer-Sahling & Mikkelsen 2016). The expected punishment for being corrupt is more prominent when the job is more likely to lead to a long-term stable income than a temporary one. Furthermore, tenure facilitates long-term socialization into a public service ethos that, in turn, may reduce corruption (Dahlström et al. 2012). Stronger employment protections and lower probability of dismissal make public servants more prone to follow the rules of ethical behavior posed by their institution (Evans & Rauch 1999). Tenure may also liberate public servants from the pressure of greedy elected officials that may want to force them to be corrupt (Neshkova & Kostadinova 2012). Clientelism and patronage are particularly prone to emerge when politicians can personalize public administration (Oliveros 2016).

However, evidence concerning job protection and corruption remains quite mixed (Oliveros & Schuster 2018). Mainly because the opposite behavior could also be true, that is, a tenured public servant might participate in corrupt deals even against the will of an honorable elected official, precisely because tenure could “shield” corrupt officials from dismissal. In any case, most available evidence supports the idea that protections such as tenure could lead to less corruption. The third hypothesis (H3) states: *Employment protection and a lower probability of arbitrary dismissal correlate with lower misappropriation.*

2.4 | Remuneration

Evidence also points to the significance of wages and remuneration practices. Corruption emerges when salaries are below a basic living wage (Anders 2010; Borcan et al. 2014; Reeves 2013). Meager wages for civil servants or sudden declines in salaries tend to be related to more extensive corruption (Dal Bó et al. 2013; Gans-Morse et al. 2018). There is also evidence that intra-organizational inequality and high pay compression ratios may also pave the way towards corruption because remuneration unfairness diminishes intra-organizational trust and commitment among public servants. As Rothstein & Uslaner (2005) have shown, lack of trust increases the propensity of individuals to rely on illegal solutions, like corruption, to solve their problems. Bureaucracies are less effective at combating corruption when levels of trust and conformity are low (Bjørnskov 2011). As a result, higher levels of income inequality could enable a higher degree of unethical behavior (Ariely & Uslaner 2017; Podobnik et al. 2015).

Inequality in compensation could also lead to self-justification. As social cognitive research shows, individuals may find ways to minimize their responsibility for unethical behavior (Mazar et al. 2008). If individuals think that the difference in bureaucratic wages is not justifiable or fair, the probability of corrupt behaviors may increase (Jost et al. 2004). This effect may be enhanced because individuals that belong to superior echelons are likely to be less aware of corruption because of their feeling of entitlement to greater power and a desire to maintain dominance (Gingerich ; Rosenblatt 2012). In other words, intra-organizational inequality may create a justification to extract rents through corrupt behavior. Thus, the fourth and final hypothesis (H4) states: *An unequal structure of remunerations correlates with higher misappropriation.*

3 | EMPIRICAL STUDY

3.1 | A bit of context

Mexico has 2469 municipal governments that share three important institutional features (Merino 2007). First, local councils (ayuntamientos) presided by a mayor govern municipalities. Second, although formally autonomous, municipalities must abide by state and federal legislation. This is particularly important in municipal finances, and the organization of public administrations since municipal governments must comply with federal and state regulations to receive funding. Finally, municipal administrations share a joint responsibility to provide essential public services and infrastructure such as lighting, sewer, water services, market and slaughterhouse administration, paving, and policing independently of their size or population.

Municipal governments typically have a three-year term, and there was no reelection until 2018. Local councils and mayors are elected by direct vote. Municipal public administration organizes according to state legislation and municipal regulations issued by the local council. As a consequence, there is much variation in the day-to-day functioning of municipal administrations. According to census data (2015), Mexican municipal governments have around 286 public employees (although the figure ranges from two public employees in small towns to >15,000 in large cities). The most common departments/functions of municipal administrations are public safety and police (16%), urban services (15%), and public works (8%).

3.2 | Misappropriation

Corruption is an umbrella concept that refers to a series of activities that are not necessarily correlated (Johnston 2005). Thus, we constrain our study to a single type of event: the misappropriation of public funds. We focus on this for three reasons. First, misappropriation reduces the capacity of a local government to deliver services. When public money that was supposed to go to education or social services goes misappropriated, the performance of government agencies is likely to weaken.

Moreover, when public funds used to construct and enhance public infrastructure disappear, the probable result is roads, sewage, or public spaces with poor quality. We focus on misappropriation because of its direct substitution effects with public spending. Second, misappropriation could signal institutional or organizational weaknesses within local governments that enable other forms of corruption, such as embezzlement or the illegal funneling of public funds into political campaigns. Finally, studying misappropriation allows us to depart from studies based on perception measures. To date, most studies rely on subjective measures such as surveys asking individuals whether they perceive a government to be corrupt (UNODC 2018). This is problematic because press coverage and information availability tend to influence perception-based measures, among other factors.

To avoid these problems, we rely on a measure of misappropriation extracted from public audits by an independent comptroller agency. According to Gans-Morse et al. (2018), the most critical tool capable of identifying corruption acts is upper monitoring in the form of Federal Auditing Institutions (FAIs).

Our response variable (*misappropriation*) comes from data from the Mexican FAI: Auditoría Superior de la Federación (ASF), which publicly reports the results of audits of municipal spending. ASF is a congressional institution that every year selects a sample of audited municipalities. On average, ASF audits 258 municipalities every year. Sampling results from the size of budgets, recent changes in budget size, non-recent audits, results from previous audits, media interest, and specific requests by Congress or civil society organizations. Thus, in the Mexican system, audited municipalities share a similar risk for corruption.

Consequently, the results of this study relate to an estimation of how HRM may limit corruption within governments that may already tend to higher prevalence or vulnerability to corruption. Studying corrupt-prone environments is increasingly interesting for academics and policymakers as studies have shown that many places “have

remained stuck in a high-corruption equilibrium” (Corbacho et al. 2016; Klačnja et al. 2018). Another advantage of using these data is that cases are already comparable but retain enough variability to make substantial comparisons regarding organizational and managerial characteristics.

We use a dataset of 1312 audits to municipal governments across Mexico between 2014 and 2016 (34.1% from 2014, 33.2% from 2015, and 32.7% from 2016). Although audits include information on several domains, for this study, we focus on the amount of money found to be misappropriated (as a proportion of the total audited), the (mis-managed) fund, and the year of audit.

In total, audits correspond to 545 different municipalities. The Fund for Municipal Social Infrastructure (FAIS), the Fund of Contributions for Strengthening of Municipalities and the Territorial Demarcations of the Federal District (FORTAMUNDF), and the Fund of Subsidies for Municipalities that Perform Public Safety Functions (FASP-FORTASEG) represent more than 87% of audits included in the sample. These are the most sizeable federal funds entrusted to municipal authorities in Mexico during the studied period (Merino 2007; Porras Sanchez, 2016). Other audited funds include the Fund for Sports Infrastructure, the Fund for Paving, Sports Spaces, Public Lighting and Rehabilitation of Educational Infrastructure, and the Cultural Fund.

Mean misappropriation in all funds was 321 USD, within a range from 0 to 26,300 USD. In about 40% of audits, ASF reported some degree of misappropriation. However, only 1% misappropriation amounted to 5300 USD or more. Still, a given municipal government could have misappropriated funds in only one audit, several or none. In our statistical analysis, we used a normalized score of misappropriation as a proportion of the total audited. As seen in Figure 1, there is considerable variation in this variable across municipalities (panel a) and the 31 Mexican states (panel b). According to Bliese's (2000) interpretation of intraclass correlation coefficients (ICC), about 57% of the observed variance in misappropriation in the sampled audits can be attributed to municipal differences, whereas only 9% is due to state differences. In both cases, ICC scores (0.77 and 0.81, respectively) indicate that we can reliably differentiate between municipalities and state group mean values of our standardized measurement of misappropriation.

3.3 | Municipal HRM policies

We gathered data on HRM policies of municipal governments and control variables from databases of the National Statistics Institute of Mexico (INEGI). Data on HRM come from two waves of the National Municipal and Local Government Census (2013 and 2015). Although the phrasing of some of the modules in the Census has changed over time, the relevant measurements for this study remained largely unaltered before 2017. Control variables regarding local contextual characteristics for 2014–2016 come from the National Census and public databases of INEGI, CONEVAL (National Council for Social Policy Evaluation), and local electoral authorities.

We used eight variables to capture HRM differences across municipal governments and to evaluate hypotheses. First, we identified whether a municipal government had a civil service based on meritocratic recruitment to measure merit-based recruitment. Specifically, we measured whether the hiring of public employees included formal examinations (*meritocratic recruitment*). Only about 27% of sampled municipalities had meritocratic, examination-based hiring in the studied period.

Second, three dummies measure internal control and evaluations. The first one (*performance evaluation*) indicates whether a government implemented annual performance evaluations of its personnel during the period. The second one (*organizational evaluation*) indicates whether a municipal government had a bureaucratic or departmental evaluation and modernization program. Finally, *Internal comptroller* indicates whether a municipality had a comptroller office independent from state and federal auditing institutions. Although most municipal governments have some form of internal comptroller (81%), the use of performance and organizational evaluations is far more limited (only 33% and 35% of municipalities, respectively).

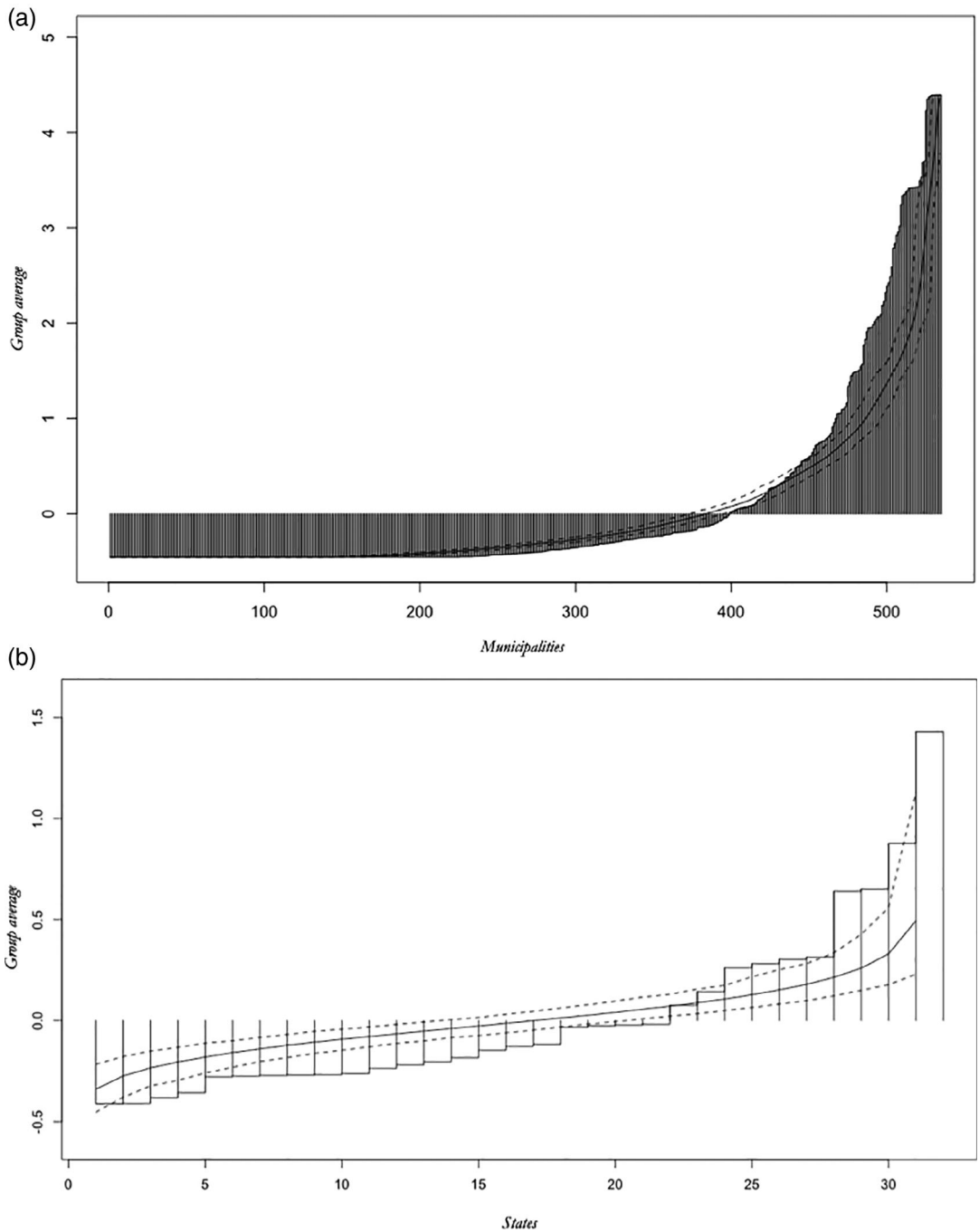


FIGURE 1 Group average scores and 95% CI of misappropriation (normalized) across municipalities (a) and states (b)

Third, we measured employment protection and the probability of arbitrary dismissal with two variables. The first is the share of unionized personnel, which has stronger protections against dismissal and discretionary severance. The second variable indicates the proportion of political appointments in the payroll. Although most political

appointments are at the upper (managerial) echelons, they can also be dismissed easier. Mexican municipalities typically exhibit high turnover rates, especially at the top of the hierarchy (Porras Sanchez 2016).

Finally, to capture the structure of remunerations, we computed two variables. *Pay decompression* measures the distance between the highest and the lowest-earning official as the number of payroll levels. There are seven levels possible, ranging from level 0 (0–1000 MXN monthly salary) to level 6 (>50,000 MXN monthly salary). Lower values in this variable indicate a more narrow differentiation of salary ranks among public employees and, thus, higher pay compression. *Salary inequality* is the Gini coefficient of the municipal payroll. It is a measurement of the distribution and concentration of income among employees of a given municipality.

3.4 | Control variables

In addition, we included in our analyses several variables to control for the probability of corruption at the municipal level: proportion of women in the municipal payroll, municipal population (in log scale), municipal socioeconomic marginalization index score, economic growth (seasonally adjusted), as well as percentages of the population that are migrant, catholic or indigenous. We also incorporated two dummies to indicate whether an audit happened during the electoral year or the year before an election. All explanatory and control variables are summarized in Table 1.

TABLE 1 Descriptive statistics

Variable	Mean	SD	Minimum	Maximum
Misappropriation (dep.)	0.00	1.00	−0.45	4.39
Fund ^a	1.78	1.09	1	4
Year ^b	1.99	0.82	1	3
Merit-based recruitment	0.27	−	0	1
Performance evaluation	0.33	−	0	1
Organizational evaluation	0.35	−	0	1
Internal comptroller	0.81	−	0	1
% Unionized	0.27	0.23	0	1
% Political appointments	0.53	0.32	0	1
Payroll decompression	3.51	1.81	0	6
Salary inequality	0.12	0.08	0	0.44
Electoral year	0.28	−	0	1
Year before election	0.37	−	0	1
% Women	31.5	0.08	0	66.61
Pop (log)	11.58	1.35	7.03	14.39
Marginalization	−0.43	1.21	−2.21	5.14
Growth	0.03	0.03	−0.07	0.13
% Migrants	12.80	12.57	0	67.69
% Catholics	71.45	13.02	16.00	100.00
% Indigenous	14.07	24.07	0	93.49

^aFAIS = 1 (60.06%), FORTAMUNDF = 2 (14.71%), FASP-FORTASEG = 3 (12.65%), Other = 4 (12.58%).

^b2014 = 1 (34.15%), 2015 = 2 (33.15%), 2016 = 3 (32.70%).

3.5 | Bivariate correlations and method

As shown in Table 2, we find that HRM policies correlate. First, there is a strong correlation between meritocratic recruitment and the use of personnel performance evaluations, suggesting that Mexican municipalities tend to implement these policies in tandem. Second, as expected, our two remuneration measurements are correlated. In particular, lower payroll compression positively correlates with higher salary inequality. This implies that we should treat these variables independently. Third, there are moderate correlations among employment protection variables (% unionized and % political appointments) and other HRM variables. Thus, having a higher proportion of unionized public employees (with stronger dismissal protections) relates to fewer political appointees, less payroll compression, the use of performance evaluations, and the existence of an internal comptroller.

Overall, bivariate correlations suggest that HRM policies appear, in the case of Mexican municipalities, in “typical bundles” (e.g., meritocratic recruitment and performance evaluation, or a broader and unequal payroll). However, given the structure of correlations, it also appears that municipal governments retain considerable variation in the actual implementation of different HRM policies.

We performed multilevel regression analyses from $N = 1312$ audits in the 545 municipalities in the dataset to investigate our hypotheses. We use this type of analysis because data have a hierarchic structure: audits (level 1, $N = 1312$) are nested in municipalities (level 2, $N = 545$), which in turn are nested in states (level 3, $N = 31$). In multilevel analysis, residual variance is partitioned into different components (or levels). This is useful because higher-level residuals (municipal and state effects) capture (un)observed characteristics that could affect misappropriation. In other words, accounting for both municipal and state (un)observed effects could be informative because, as pointed out before, Mexican municipal governments must comply with state regulations, which in some cases include rules for organizing municipal administrations. Therefore, we studied data with and without random effects at two and three levels as described below (Table 3).

4 | RESULTS

Multilevel analyses show that, as expected, different HRM characteristics and policies correlate with the misappropriation of public funds in Mexican municipalities. First, the baseline model (Model 1) demonstrates that multilevel analysis is adequate for these data. Specifically, the difference between the -2 log-likelihood value for Model 1 with random intercept and a more straightforward linear model with no mixed-effects (357.86) is significant.

TABLE 2 Bivariate correlations (municipal HRM characteristics and policies)

Variable	9.	8.	7.	6.	5.	4.	3.	2.
1. Misappropriation (dep.)	-0.01	-0.10*	0.03	-0.09*	-0.09*	-0.10*	-0.16*	-0.17*
2. Merit-based recruitment	0.10*	0.21*	-0.18*	0.22*	0.15*	0.15*	0.76*	-
3. Performance evaluation	0.13*	0.26*	-0.21*	0.23*	0.19*	0.16*	-	
4. Organizational evaluation	0.11*	0.12*	-0.03	0.09*	0.20*	-		
5. Internal comptroller	0.22*	0.29*	-0.10*	0.22*	-			
6. % Unionized	0.12*	0.29*	-0.61*	-				
7. % Political appointments	-0.05	-0.16*	-					
8. Payroll decompression	0.74*	-						
9. Salary inequality	-							

Note: Sig. code: * $p < 0.05$.

TABLE 3 Multilevel regression analysis on misappropriation

	Model 1		Model 2		Model 3	
	β	SE	β	SE	β	SE
Municipal HRM						
Merit-based recruitment			-0.10	0.10	-0.18*	0.10
Internal control and evaluations						
Performance evaluation			-0.22**	0.10	-0.23**	0.09
Organizational evaluation			-0.07	0.06	-0.10*	0.06
Internal comptroller			-0.04	0.08	-0.07	0.08
Employment protection and probability of dismissal						
% Unionized			-0.08	0.19	0.09	0.19
% Political appointments			-0.13	0.12	-0.02	0.12
Unequal structure of remunerations						
Payroll decompression			-0.07**	0.03	-0.08***	0.03
Salary inequality (centered)			1.18**	0.59	2.19***	0.59
Controls						
% Women in government			-1.69***	0.40	-0.73*	0.41
Electoral year			0.51***	0.07	0.42***	0.07
Year before election			0.17***	0.06	0.13**	0.06
Pop (log)			-0.03	0.03	-0.06	0.04
Marginalization			0.10*	0.05	0.05	0.06
Growth			-1.46	1.06	-1.07	1.10
% Migrants			0.003	0.003	0.005	0.004
% Catholics			-0.001	0.003	0.006	0.004
% Indigenous			-0.004	0.002	-0.005**	0.002
Constant	0.02	0.07	1.08**	0.47	0.77	0.57
Audit characteristics						
Fund^a						
FORTAMUNDF			-0.08	0.06	-0.08	0.06
FASP-FORTASEG			-0.02	0.06	-0.01	0.06
Other			0.16**	0.07	0.13**	0.06
Year^b						
2015			0.04	0.06	0.07	0.05
2016			0.19***	0.06	0.19***	0.06
Variance						
		SD		SD		SD
State	0.09	0.30	-	-	0.11	0.33
Municipality	0.64	0.79	0.62	0.78	0.59	0.77
Audit	0.41	0.64	0.38	0.62	0.34	0.58
R^2 (fixed and random)			0.66		0.71	
Log-likelihood	-1636.48		-1634.43		-1596.28	

Note: Sig. codes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

^aReference: FAIS.

^bReference: 2014.

When we allowed random variation across municipalities and included audit characteristics (Model 2), municipal HRM predictors, and control variables, the model accounts for ~66% of the observed variance in the response variable (cf. Nakagawa & Schielzeth 2013). This model found that merit-based recruitment does not significantly affect misappropriation, although it has the hypothesized negative effect (i.e., municipalities that hire using public examinations tend to misappropriate less). We found that having regular personnel performance evaluations has a negative and significant effect on the dependent. This is evidence that supports Hypothesis 2, in that performance evaluations correlate with lower misappropriation in the data. Having an internal comptroller or a program of organizational evaluation does not yield statistically significant effects in this model. We found no significant effects for the proportion of unionized personnel or political appointments in the two-level model. However, and in line with Hypothesis 4, we found that more significant income inequality (measured as the Gini coefficient of the municipal payroll) has a positive and significant effect on misappropriation. However, the CI for the corresponding beta in the regression model crosses zero. A lower payroll compression negatively affects the response variable or, put differently, municipalities with more payroll levels tend to exhibit less misappropriation in the audited funds.

Regarding audit characteristics, we found a positive effect of “Other” types of funds. Hence, it is more likely to find misappropriated money in smaller and more discretionary funds than larger but more regulated federal funds like FAIS or FORTAMUNDF. This makes sense to the extent that smaller and less regulated funds provide more discretion opportunities.

Finally, municipal controls show few significant effects. However, two are particularly noteworthy. First, municipal governments that hire more women also tend to be less corrupt. This result seems to echo research that shows gender effects on the probability of corruption (e.g., Wängnerud, 2012). Second, the dummies for electoral year and year before a local election correlate positively and significantly with misappropriation. These results, in particular, are significant because we believe they indicate that we are not merely observing administrative inefficiency. Moreover, given that clientelism and patronage remain pervasive in local elections in Mexico (Morris 2009), it is more likely that public funds go missing during electoral years, and thus this seems a strong indication that the dependent is capturing corruption.

If we account for random variance at level 3 (states) in the model (Model 3), overall model fit improves, as compared to the model with only two levels (-2 log-likelihood difference = 76.3, $p < 0.001$), and explained variance in the outcome variable increases to about 71%. However, given that we do not have specific hypotheses at level 3, we did not include fixed effects at the state level and only focused on the effects of municipal predictors. Nevertheless, this model does account for random variations that may arise from different state environments. Hypothesis 1 established that merit-based recruitment correlates with lower corruption. We found supporting evidence in Model 3: There is a negative and significant effect on misappropriation of having a civil service with exam-based recruitment. We also found evidence in support of Hypothesis 2. Specifically, there are negative effects of performance evaluation of personnel and having organizational evaluations. In addition, the effect of evaluations seems to be more consistent than recruitment and indicates that municipalities that put in place regular monitoring and appraisal mechanisms could deter misappropriation. As in Model 2, the internal comptroller office does not yield a statistically significant effect. Also, as before, we did not detect significant effects for the proportion of unionized personnel or political appointments in the three-level model. We found evidence of a positive effect on misappropriation of salary inequality and a negative effect of low payroll compression. Finally, most of the effects of audit characteristics and municipal control variables remain as before, including a negative effect of hiring more women and a positive effect of electoral and pre-electoral years.

Given the structure of correlations among HRM variables (see above), we also report alternative specifications of the three-level model (Table 4). On the one hand, we found that the effect of meritocratic recruitment and performance evaluations will hold even when either one is omitted (Models 4 and 5). This confirms the idea that these two policies come as a bundle in the case of Mexican municipalities. On the other hand, the effect of payroll compression disappears when salary inequality is not included (Model 7), indicating that salary compression in itself might not be a sufficient condition related to misappropriation.

TABLE 4 Multilevel regression analysis on misappropriation (three-level model specifications)

	Model 4		Model 5		Model 6		Model 7	
	β	SE	β	SE	β	SE	β	SE
Municipal HRM								
Merit-based recruitment	-0.32***	0.07	-	-	-	-	-	-
Internal control and evaluations								
Performance evaluation	-	-	-0.34***	0.07	-0.35***	0.07	-0.34***	0.07
Organizational evaluation	-0.09*	0.05	-0.10*	0.05	-0.09*	0.06	-0.09	0.06
Internal comptroller	-0.08	0.08	-0.06	0.08	-0.06	0.08	-0.05	0.08
Employment protection and probability of dismissal								
% Unionized	0.14	0.19	0.04	0.19	0.002	0.19	-0.02	0.19
% Political appointments	-0.005	0.12	-0.02	0.12	-0.03	0.12	-0.02	0.12
Unequal structure of remunerations								
Payroll decompression	-0.08***	0.03	-0.08***	0.03	-	-	-0.001	0.02
Salary inequality (centered)	2.12***	0.59	2.28***	0.59	1.14***	0.41	-	-
Controls								
% Women in government	-0.72*	0.41	-0.76*	0.41	-0.75*	0.41	-0.74*	0.41
Electoral year	0.43***	0.07	0.42***	0.07	0.44***	0.07	0.44***	0.07
Year before election	0.14**	0.06	0.13**	0.06	0.14**	0.06	0.15***	0.06
Pop (log)	-0.07*	0.04	-0.07	0.04	-0.09**	0.04	-0.07	0.04
Marginalization	0.06	0.06	0.05	0.06	0.06	0.06	0.05	0.06
Growth	-1.07	1.10	-1.06	1.10	-1.07	1.10	-0.91	1.12
% Migrants	0.005	0.004	0.005	0.004	0.005	0.004	0.004	0.004
% Catholics	0.006	0.004	0.006	0.004	0.006	0.004	0.005	0.004
% Indigenous	-0.005**	0.002	-0.005**	0.002	-0.005*	0.002	-0.004*	0.002
Constant	0.89	0.57	0.83	0.57	0.82	0.57	0.60	0.57
Audit characteristics								
Fund^a								
FORTAMUNDF	-0.08	0.06	-0.08	0.06	-0.09	0.06	-0.09	0.06
FASP-FORTASEG	-0.02	0.06	-0.02	0.06	-0.02	0.06	-0.01	0.06
Other	0.13**	0.07	0.13**	0.07	0.13**	0.07	0.15**	0.07
Year^b								
2015	0.07	0.05	0.07	0.06	0.06	0.05	0.09*	0.05
2016	0.19***	0.06	0.19***	0.06	0.17***	0.06	0.20***	0.06
Variance								
		SD		SD		SD		SD
State	0.11	0.32	0.11	0.33	0.11	0.33	0.09	0.31
Municipality	0.59	0.77	0.59	0.77	0.59	0.77	0.59	0.77
Audit	0.34	0.59	0.34	0.59	0.34	0.59	0.37	0.61
R ² (fixed and random)	0.69		0.71		0.70		0.68	
Log likelihood	-1597.46		-1596.40		-1597.49		-1657.91	

Note: Sig. codes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

^aReference: FAIS.

^bReference: 2014.

Overall, these results show that while merit-based recruitment does correlate negatively with corruption (as discussed, e.g., by Dahlström et al. 2012), other HRM policies are also significantly related to less misappropriation. In particular, performance evaluations and organizational and departmental evaluations aimed at improving bureaucratic performance and processes of the municipal administration could be deterrents of corruption.

Furthermore, having a more significant proportion of unionized personnel (and therefore with greater job security and stability) does not seem to correlate with less corruption in our data. Nor having more political appointees (who can be dismissed at any time in the Mexican system). These two results suggest that job stability and the probability of dismissal, by themselves, do not necessarily limit this form of corruption, or at least they have a limited effect when controlling by other HRM variables such as meritocratic recruitment and the structure of remuneration. Regarding this last point, our analysis offers evidence that greater inequality in the payroll of a local government (i.e., a concentration of higher salaries in fewer officers) does correlate with a higher probability of misappropriation. Thus, results suggest that concrete features of the remuneration management system and specifically the unequal concentration of intra-organizational benefits in some people could affect the overall probability of corruption.

5 | DISCUSSION AND CONCLUSION

Recent analyses of corruption have implied that the principal-agent approach is outdated and that collective action is needed to understand better how corruption happens (Rothstein 2011; Prasad et al., 2019). However, our findings seem to show that the principal-agent approach may still have some value. Thus, we need a deeper understanding of corruption at the micro-level and its relation to administrative practices and structures. Indeed, evidence shows that, even in developed countries, corruption control has been far from accomplished (Cheol & Mikesell 2014; Perry et al. 2014; Svava 2014; Teachout 2014), and that developing nations have been capable of reducing corruption in some local governments but not in others (Langbein & Sanabria 2013). Studying HRM differences could result in more practical knowledge that allows us to understand better when public employees and governments hold more ethical behavior.

Based on contributions by Meyer-Sahling and Mikkelsen (2016) and Berman (2015), the present study posed that HRM policies can be a central correlate of corruption control at the organizational level. The core idea is that HRM practices can provide rules and incentives that might deter corruption and other forms of misconduct in public organizations. Accordingly, we studied four core HRM functions (recruitment, control and evaluation, employee protection and dismissal, and remuneration) and looked into which ones are related to the capacity of a municipal bureaucracy to limit corruption. We conclude that meritocratic recruitment, performance, and organizational evaluations, and less unequal wage structures seem related to a lower probability of missing public funds. Thus, local governments could prevent or reduce misappropriation by adopting HRM policies like exam-based hiring and routine personnel and departmental evaluations. Importantly, these policies might be more effective than establishing (often expensive) internal comptrollers and profuse regulations.

Three potential limitations of our study need to be acknowledged. First, we conducted our study in Mexico, which begs the question of generalizability. Experience-based measures of corruption tend to classify Mexico as a country with more corruption than average. While in Latin America, 21% of individuals have given a bribe to public officials, in Mexico, 34% had done so (GCB, 2017). This is also higher than the worldwide average (27%) (GCB, 2017). Mexico also exhibits substantial variation in corruption levels at the subnational level, with the most corrupt state (Mexico City) being 1.2 times more prone to bribery than the least one (Guanajuato) (ENCIG 2017). In our dataset, differences between municipalities are also substantial. While some municipalities misappropriated 100% of the audited budget, others spent all the money following the rules.

Though Mexican municipal governments share traits of some Continental and Latin American cases, they differ from highly decentralized Anglo-Saxon models. A further comparative investigation is needed to disentangle regional

variations and the effects of different legal and administrative traditions. Future studies could also build on a multi-level design to study variation across local governments of different countries. However, in this case, future research will likely face the challenge of comparable and reliable microdata on misappropriation and HRM policies.

Second, this study focuses on misappropriation. However, other forms of corruption could be related to different HRM policies and practices. For instance, influence peddling or conflict of interest can relate to more political appointees in the municipal administration. Identifying and studying the connections between HRM policies and different forms of corruption constitutes an exciting and promising research avenue.

Third, since we wanted to study the overall effect of HRM variables, we used relatively coarse-grained measurements in some cases (e.g., the existence of exam-based recruitment). This was also the consequence of data availability. Admittedly, much variation could exist among concrete policy implementation in a specific domain. For instance, merit-based recruitment could resort to different types of examinations, or performance evaluations could be implemented in varied ways. Future studies could analyze further observed variations and their effect on corruption.

Notwithstanding these limitations, this study does offer new evidence that differences in HRM policies correlate with the likelihood of corruption in local governments. It also yields evidence that some policies could be more effective in preventing corruption, such as exam-based recruitment, regular performance and organizational evaluations, and payroll management. These results constitute important lessons that confirm previous literature findings and further our understating of the organizational and managerial antecedents of corruption among subnational public administrations.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in www.asf.gob.mx and <https://inegi.org.mx/>. All data were derived from public sources and publicly available administrative records.

ORCID

Fernando Nieto-Morales  <https://orcid.org/0000-0003-4130-2745>

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