CHAPTER 10

Government Analytics Using Human Resources and Payroll Data

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SUMMARY

This chapter presents a microdata-based approach for governments to improve their strategic human resource management and fiscal planning. Using a series of examples from Latin American countries, the authors demonstrate how basic statistics created using payroll and human resource management data can help policy makers gain insight into the current and future state of their government's wage bill. The authors argue that this constitutes an important first step toward tapping the potential of existing bodies of payroll and human resources microdata that are currently underused. This approach can help policy makers make difficult decisions by breaking down the causes of problems and putting numbers to the ways in which certain policy choices translate into longer-term consequences.

ANALYTICS IN PRACTICE

- *Data collection practices.* It is recommended that where possible, governments centralize their human resources (HR) data collection systems and render these data accessible to insights teams. If such data do not exist, even in a disparate fashion, we strongly advise governments to begin collecting, in a centralized manner, payroll and human resources management information system (HRMIS) microdata. We advise governments to make these data public where possible (anonymizing the data, naturally) to improve transparency.

- *Fiscal planning.* We advocate for better integration of HR data analysis with fiscal planning. To be able to leverage payroll and HRMIS microdata, governments must encourage civil servants from the treasury and HR department(s) to collaborate more closely. This could be achieved by allocating dedicated

portions of civil servant workload to the task of sharing and analyzing data or by creating dedicated interdepartmental roles to push forward and undertake the collection and analysis of payroll microdata for strategic human resource management (SHRM).

- *Service delivery.* By better integrating HR data and wage bill planning, policy makers can improve service delivery to citizens. For example, projections of which categories of public servants will retire or transfer across posts allow managers to identify where additional resources will be required to ensure the continuity of service provision. This logic can be extended to the integration of personnel data with the wider dataverse available to policy makers. For example, data on demographic changes among citizens allow policy makers to predict changes in service demands. The interaction of these analytics on the demand and supply sides of service delivery allows policy makers to use their resources intelligently.

- *Insulation of SHRM and fiscal planning.* Political considerations can impede the implementation of successful SHRM and fiscal planning. We recommend that governments insulate certain aspects of planning offices' work from the ebb and flow of politics. This could go hand-in-hand with our second lesson, to carve out explicit portfolios or roles dedicated to collecting and analyzing HR microdata, by ensuring that this work is undertaken by public servants reporting to an independent agency rather than to a minister.

INTRODUCTION

This chapter offers policy makers ways to use HR microdata to improve SHRM and fiscal planning. More specifically, practical examples are presented of how to use payroll and HRMIS data to strengthen wage bill projections, gain better insights into the dynamics of the public sector labor market, and strengthen evidence-based personnel policy. The approach offers ways to tap the potential of HRMIS data that are widely available but underused. The types of analysis that we propose can support public sector managers in their decision-making by rendering explicit some of the consequences of key human resource management (HRM) choices and simulating distinct scenarios.

The approach described uses administrative data related to individual employment and compensation to model the dynamics of the public sector workforce and its associated costs. By applying an analytical lens to the administrative data the public sector holds on its employees, these data become a means of better understanding the characteristics of public administration. This includes determining simple statistics, such as the ratio of pay and allowances across distinct groups of employees, the different job placements and training opportunities secured by officials across time and institutional environments, and extrapolations of core variables, such as the wage bill under current laws and regulations.

With these generally straightforward statistics—to which any government with an HRMIS should have access—significant improvements can be made to addressing potential HRM shortcomings and related fiscal issues, including strategic workforce planning, replacement rates, salary inequalities within and across government agencies, the distribution of pay-for-performance benefits, the retirement of personnel, and projections of payroll costs, among others.[1]

Data analytics based on personnel data have proliferated in recent years and enable organizations to understand analytics across the HRM cycle (Davenport 2019)—from the attractiveness of distinct positions advertised by an organization (measured by the number of applicants) to diversity and inclusion (measured by, for instance, the ethnic diversity in different ranks of an organization's hierarchy), to name just two examples. Yet, as outlined in chapter 9 of the *Handbook*, many government organizations lack an HRMIS with which to register these data. For this reason, we limit the HRMIS analysis in this chapter to personnel data that are often more readily available and registered by governments—such as age (by registering date of birth) and gender—while acknowledging that this only presents a small fraction of the HRMIS data analytics possible with more widely available data.

Common Sources of Microdata

Two key terms used throughout this chapter are the *government wage bill* and *payroll and HRMIS microdata*. Harborne, Bisca, and Dorotinsky (2017, 267n48) define the government wage bill as

> the sum of wages and salaries paid to civilian central government and the armed forces. Wages and salaries consist of all payments in cash (no other forms of payment, such as in-kind, are considered) to employees in return for services rendered, before deduction of withholding taxes and employee pension contributions. Monetary allowances (e.g., for housing or transportation) are also included in the wage bill.

Pensions, by contrast, are generally not included in the wage bill. Pensions remain, however, an important share of a government's payroll. Indeed, a recent report has found that subnational governments in Brazil have been under growing pressure from pension expenses, at times spending the same amount of money on pensions as on the wage bill (World Bank 2022). Figure 10.1 presents the percentage of the state budgetary ceiling allocated to pensions and the wage bill in Brazil. In 2019, over 20 percent of the budgetary ceiling was spent on pensions, almost the same proportion as the wage bill itself. The same type of analysis that we perform for the wage bill in this chapter could be replicated for pensions. For example, projections of pension expenses could aid governments in making strategic decisions to prepare for and potentially reduce their burden.

Payroll and HRMIS microdata are two separate data sources that we leverage in our analyses. Both capture individual-level information about employees and should be easily available to most governments. Payroll data include information pertaining to an employee's contract (job position, contract type, etc.), personal details (date of birth, national insurance number, address, etc.), salary and tax details (amount and date of payments, tax codes, etc.), and leave, holidays, and benefits. These data are generally collected by the HR or finance department that administers the salaries of public employees. For this reason, these data are automatically updated because they must reflect promotions or changes in role or leave allocations.

HRMIS data, on the other hand, can be used to enrich payroll data because they also capture information such as an employee's gender and educational qualifications or prior professional experience. However, they tend not to be updated in the same way as payroll data because they are usually taken as a

FIGURE 10.1 Wage Bill and Pensions as a Percentage of Subnational States' Budget, Brazil, 1995–2019
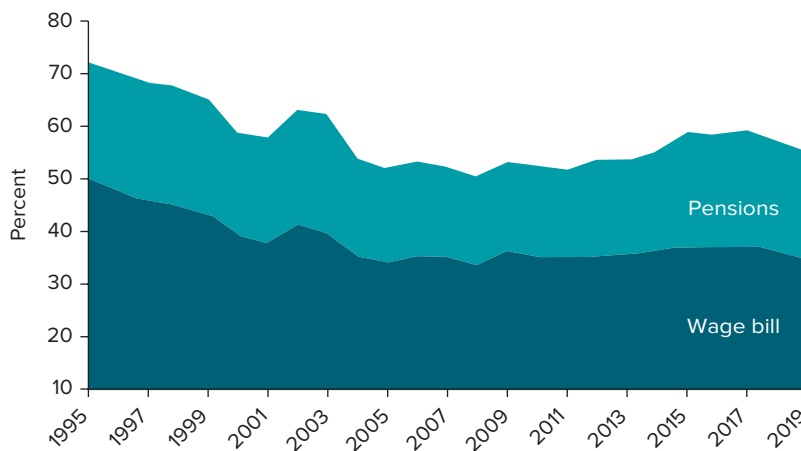
Source: World Bank 2022.

snapshot at the recruitment stage and thus capture an employee at only a single point in time (for example, if the employee earns a degree after starting a position, this will not necessarily be reflected in the HRMIS data).

When we refer to HR data more broadly, we refer to the combination of payroll and HRMIS data for active (or currently employed) civil servants.[2] While many governments have access to data collected via their HRMIS, they sometimes struggle to extract and use them to their full potential. This can be due to a number of issues, including outdated HRMIS or analytical capacity, the decentralization of HR departments (which means that central government administrators only have access to partial data), or a lack of long-term strategic HR planning. In the section "Payroll and HRMIS Microdata and Related Challenges," we offer insights into how to get these data into shape for analysis, and in the section "Descriptive Statistics," we discuss how to undertake simple and effective analyses using said data to improve SHRM.

Capitalizing on Government Microdata

We focus on SHRM and the government wage bill for a number of reasons. First, the wage bill has considerable fiscal impact because it represents a significant portion of government spending: around one-fifth of total spending, according to the International Monetary Fund (IMF) (Gupta et al. 2016, 2), or around 9–10 percent of gross domestic product (GDP) and roughly a quarter of general government expenditures, according to the World Bank (Hasnain et al. 2019, 8). Second, it is likely that across the globe, pressures on wage spending will increase in the coming years and decades because "advanced economies are facing fiscal challenges associated with aging populations while also needing to reduce high public debt levels" and because "emerging markets and low-income countries have pressures to expand public service coverage in the context of revenue and financing constraints and the need for higher public investment" (Gupta et al. 2016, 1). Thus, in order to ensure that they are able to continue to deliver essential public services when facing increasing financial constraints, governments must invest in fiscal planning and SHRM.

The approach we propose allows government organizations to better leverage their HR data and make use of evidence for decision-making. Such strategic use of HR data can also have a significant fiscal impact, helping to avoid short-termism and here-and-now pressures that may cast a long shadow over government organizations' ability to undertake their work and offer the best services to citizens under government budget constraints. A case in the Brazilian state of Alagoas offers a good example, illustrating the potential of using payroll microdata to provide empirical evidence for the pros and cons of policy decisions. Here, estimates of a decreasing pupil-per-teacher ratio helped inform the government's decision to recruit fewer teachers while maintaining the quality of the public education delivered to its citizens by opening up fiscal space to better provide other, more needed public services.

One of the major advantages of applying an analytical lens to SHRM and wage bill data is that it supports governments to improve workforce and fiscal planning jointly and in a coordinated way. These two aspects of government work should occur in tandem, but in practice, this is rarely the case. *Workforce planning* "is a core HRM process that helps to identify, develop and sustain the necessary workforce skills" and that "ensures that the organisation has the right number of people with the right skills in the right place at the right time to deliver short and long-term organisational objectives" (Huerta Melchor 2013, 7). The ultimate goal of public sector workforce planning is to optimize the number and type of staff employed and the budget of the department or government in question. By the *type* of staff, we mean their professional skill set: are they able to contribute to completing the mission of the organization they serve? Identifying the needs of an organization and the HR required to achieve its goals is the heart of strategic workforce planning (Jacobson 2009; Kiyonaga 2004; Selden 2009): "a goal of workforce planning is to identify the gap between those needs and the available labor supply for government to continue providing quality services and fulfill its mission" (Goodman, French, and Battaglio 2015, 137). *Fiscal planning*, by contrast, refers to the way in which governments use their spending and taxation to influence the economy. As such, it can be improved by developing a better understanding of when certain groups of employees are going to be hired or retire, for example, allowing for more accurate revenue forecasting, which influences the budget approved by the

government. One area that the IMF has identified as important for improving fiscal planning is precisely strengthening links between wage bill management—specifically, wage determination processes—and fiscal frameworks (Gupta et al. 2016, 2).

Strengthening Traditional Approaches

One additional application of our microdata-driven approach is to help bridge the gap between *macroanalysis* and traditional *functional reviews*, two common approaches to the analysis of the government wage bill and the distribution of work functions across the civil service, respectively. The former relies on macro-level analysis that leverages indicators such as the wage bill as a share of GDP and government employment per capita to gauge the appropriate size and cost of the civil service. By relying on macro indicators, these analyses have often led to simplistic policy prescriptions in the context of fiscal crises.

The latter strain of analysis relies on functional reviews. Using mostly legal documents, regulations, and interviews, these reviews scrutinize the goals, tasks, and resources of units inside the government to improve efficiency and effectiveness. Functional reviews thus have multiple goals but generally aim to assess how work is distributed across the civil service and to identify potential duplication of work through the functions performed by different departments. The analysis may produce results that are not integrated with an overarching strategy of reforming the civil service based on fiscal constraints.

By undertaking microdata analyses, one can complement functional reviews by not only looking at government functions but also gaining greater insight into other relevant dimensions of government organization, such as staffing and competencies. For instance, if one undertook a functional review and discovered that two departments perform similar functions, a parallel microdata-powered analysis could identify the distribution of competencies across the two departments. Perhaps one department has a natural advantage in taking full responsibility for the function because of the greater strength of its staff. Or perhaps there needs to be a redistribution of staff to more effectively distinguish the roles and activities of the two departments.

Micro-level analysis can be used to help reconcile and complement the fiscally oriented nature of macroanalysis and the flexible and detailed nature of functional reviews. This can be done through the use of simple descriptive statistics, such as the drivers of payroll growth (variation in total payroll, wages, and number of employees), the distribution of the workforce according to levels in the career ladder, and progressions and promotions over time and how much they cost, among others, and via a model-based simulation of the wage bill with the fiscal impacts of policies that improve and consolidate wage bill spending. One contribution that our chapter makes is to demonstrate some of the potential uses of and synergies between payroll and HRMIS data. By breaking down data silos, governments can start to better leverage data that are already at their disposal to gain insights into how to manage certain processes, such as adjusting the wage bill and improving fiscal planning.

In short, our chapter aims to lay out a practical, practitioner-friendly approach to the government wage bill that can improve SHRM and fiscal planning with relatively little technical expertise and data that should be accessible (with a relatively low cost of extraction) to any government with an HRMIS. This approach offers significant advantages in helping governments to use the untapped potential of lakes of payroll and HRMIS microdata and, more broadly, to use evidence in order to navigate difficult policy decisions.

STRATEGIC HUMAN RESOURCE MANAGEMENT AND FISCAL PLANNING

The public administration literature on SHRM focuses on identifying how it is used across different levels of government (Choudhury 2007; Goodman, French, and Battaglio 2015; Jacobson 2010), evaluating the effectiveness of different types of SHRM (Selden 2009; Selden and Jacobson 2007), and determining which factors influence the successful implementation of SHRM strategies (Goodman, French, and

Battaglio 2015; Pynes 2004). However, it is widely recognized that there is a paucity of empirical research on public sector SHRM (Choudhury 2007; Goodman, French, and Battaglio 2015; Reitano 2019), with much of the existing literature being normative in nature, relying on small samples, or being significantly dated. Moreover, the extant literature has a strong focus on the United States, with little to no evidence from the rest of the world.[3] Broadly, SHRM and wage bill data are underused as a source of analytics data for better understanding the characteristics and nature of public administration and public service.

One central finding of the existing literature is that many local governments do not have workforce plans in action (Jacobson 2010). In their survey of the largest US municipal governments, Goodman, French, and Battaglio (2015, 147) find that "very few local governments make use of comprehensive, formal workforce plans."[4] This is confirmed by other studies focusing on specific geographical regions, such as Jacobson (2010) and Frank and Zhao (2009). Local governments have been shown to lack the technical know-how and resources required to undertake SHRM (Choudhury 2007; Huerta Melchor 2013; Jacobson 2010). Small local governments, in particular, often lack the fiscal, professional, and technical expertise to innovate successfully (French and Folz 2004). For this reason, local governments may shy away from more complex econometric approaches to processes such as budget forecasting because they lack the know-how (Frank and Zhao 2009; Kavanagh and Williams 2016). This is precisely where our approach comes into its own. With very few, simple statistics that any public organization with an HRMIS should have access to, local and national HR departments can make a marked improvement in the use of their SHRM data.

Although the lack of capacity for SHRM seems to be most acute at the local level, it has also been documented in national governments. The Organisation for Economic Co-operation and Development (OECD) describes how its member states have "experienced problems with developing the necessary institutional capacity to engage in workforce planning both at the level of the central HRM body and the budget authority, and at the level of HR departments, professionals and front line managers" (Huerta Melchor 2013, 15). Strategic human capital management was identified by the US General Accounting Office (GAO) in 2001 as a governmentwide high-risk area because many agencies were experiencing "serious human capital challenges" and the combined effect of these challenges placed "at risk the ability of agencies to efficiently, economically, and effectively accomplish their missions, manage critical programs, and adequately serve the American people both now and in the future" (GAO 2001b). Strategic human capital management remains "high risk" to this day and is proving difficult to improve upon, with "skills gaps . . . identified in government-wide occupations in fields such as science, technology, engineering, mathematics, cybersecurity, and acquisitions" and "emerging workforce needs in the wake of the COVID-19 pandemic" (GAO 2021). For this reason, simple, timely ways to improve SHRM—such as the approach that we propose—are urgently needed.

Another important obstacle to successful SHRM and fiscal planning highlighted by the existing literature is political considerations. Successful SHRM requires support and planning from top management because data have to be systematically collected and analyzed over long periods of time. If elected figures are more interested in satisfying concerns "here and now" and are unwilling to invest in longer-term HRM and fiscal strategies, this can pose a significant challenge. This is especially true in smaller local governments, where leadership tends to be more centralized and informal and where, frequently, no separate personnel departments exist (Choudhury 2007, 265). Thus, local governments appear more susceptible to a lack of long-term planning because they are more likely to lack technical know-how or to face direct political pressures (Kong 2007; Wong 1995). It seems especially important, then, to take into consideration the nature and size of a government when examining SHRM (Reitano 2019). As Choudhury (2007, 265) notes, "the conditions of effective human resource management at the federal, state, or large urban levels often are not a good fit for smaller jurisdictions." That said, we believe that our approach can cut across different levels and sizes of government because it relies on data that should be widely available to small and large governments alike.

The extant literature has also paid significant attention to what Goodman, French, and Battaglio (2015, 147) refer to as the "perfect storm" of "human capital crisis that looms for local governments due to the number of employees who will be eligible for retirement or early retirement in the near future," which "offers significant opportunity for the use of workforce planning to help with forecasting the labor pool and fine tuning recruitment efforts." Such a storm is still brewing in many countries around the world, both at the local and

national levels. A significant number of studies explore the issue, which was becoming evident already in the early 2000s, with predictions that over 50 percent of US government senior management would retire as the baby boomer generation came to retirement age (Dychtwald, Erickson, and Morison 2004; GAO 2001a; Jacobson 2010; Kiyonaga 2004; Pynes 2009; Wilkerson 2007). Today, the issue of retirement, and the subsequent talent shortage due to a smaller pool of younger public officials available to replace retiring officials, is aggravated by significant budget constraints in the public sector. Agencies are "freezing recruitment and not replacing employees who retire. The problem is that countries continue cutting budgets without scaling back agencies' and ministries' missions, compromising the ability to serve the public" (Huerta Melchor 2013, 15). This makes SHRM all the more important because governments need to use their available resources as wisely as possible to continue to deliver essential services to the public.

Another obstacle to successful SHRM that has been identified by the existing literature is a lack of adequate data (Anderson 2004). For example, in the empirical context of Queensland, Australia, Colley and Price (2010, 203) argue that there were "inadequate workforce data to support workforce planning and thereby identify and mitigate workforce risks." Several other studies echo the finding that public organizations in many countries find it difficult to obtain an accurate picture of their workforce composition (OECD 2007; Pynes 2004; Rogers and Naeve 1989). Colley and Price (2010, 204) note that "there is general agreement in the public service HR literature that the ideal is a centralised whole-of-service database to meet the common workforce planning needs of agencies. However, establishing such databases is time-consuming and costly, which limits its appeal to an incumbent government focused on short term budget and election cycles." Again, then, we see that political short-termism can obstruct successful SHRM before one even considers the lack of technical expertise or time and capacity that HR professionals may suffer (as we saw earlier in this section). Our proposed approach speaks to this obstacle to SHRM because it requires only a few basic statistics to better leverage HR data.

In addition to the direct challenges of enacting SHRM, SHRM and fiscal planning also interact in important ways. In order to enact more effective and sustainable fiscal planning, there are numerous ways in which the management of government wages can be improved and better take fiscal concerns into consideration. For example, the IMF notes that wage bill increases have been shown to be associated with worsening fiscal balances: "rather than crowding out other items in the budget, increases in the wage bill have on average been associated with increases in other government spending and with a deterioration of the overall balance" (Gupta et al. 2016, 14). For this reason, policy makers should be especially wary of increasing the wage bill when the budget is tight. Furthermore, if SHRM is not undertaken so as to employ the right type and amount of workers, this can have a negative fiscal impact. If there is a wage premium in the public sector, this can "increase private production costs, including wage costs, as well as result in additional 'deadweight losses' associated with distortionary taxation" (15). In fact, wage penalties can also have detrimental fiscal effects because difficulty recruiting and retaining qualified workers adversely affects the quality of publicly provided goods and services and can also contribute to corruption (Hasnain et al. 2019, 8). For this reason, public sector salaries should be calibrated to those of the private sector for comparable jobs and adjusted according to broader changes in the population, society, and the economy at large (Somani 2021). Indeed, advanced economies have been found to struggle to adjust employment levels in response to demographic changes—such as the decline in school-aged children, which led to an oversupply of teachers (Gupta et al. 2016, 20)—which can lead to significant fiscal concerns that could be avoided with a more forward-thinking HRM strategy.

PAYROLL AND HRMIS MICRODATA AND RELATED CHALLENGES

Before delving into what analysis can be done with payroll and HRMIS microdata, it is important to further discuss the kind of data we are talking about and the type of variables one can extract from such data sources. We describe payroll microdata first, before turning to HRMIS microdata. Payroll microdata are

drawn from the administrative data sets that governments use to follow and register the monthly compensation of civil servants and their underlying items. They usually cover most of the government's contracts with its employees and sometimes contain demographic characteristics of civil servants and their occupational information (for example, the department or unit where the civil servant is located, the type of contract, the date of their entry in the civil service, etc.). In some contexts, sets of information are collected independently by different teams. HRMIS microdata, on the other hand, as anticipated in the introduction, are additional data, often collected by recruitment units, that can enrich payroll data with information about employees' gender, education level, and professional sector, for example. To undertake our analyses, we combine these two types of microdata.

In table 10.1, we present an example of a hypothetical combined payroll-HRMIS microdata set with the main variables (columns) and observations (lines) needed for the type of analysis we propose in this chapter. This table represents the minimum data required to undertake the analyses we propose. Each line represents an individual and that individual's respective contract with the government, and each column points to some relevant variable for analysis, such as the unit where the civil servant is located, age, gender, date of entry in the civil service, type of contract, and so on. An individual might have more than one contract with the government: for example, a teacher with two part-time job positions. Ideally, the database should have information about the government's employees for the last 10 years so that one can retrieve variables of interest based on historical data (for example, the average number of years of service before retirement).

Ideally, governments should have the aforementioned information for all their public employees readily available, but based on our experience working with several governments from Latin America and the Caribbean (LAC) countries, we know that governments face challenges when it comes to their wage bill microdata. These challenges can be organized along two dimensions. First, governments may not be able to collect information about all their employees, potentially leading aggregate figures to be wrong or biased. This can happen if wage bill microdata collection is not centralized and the information of some units or departments is missing in the data. In table 10.1, this would be reflected in fewer observations (lines) in the data than in the actual government bureaucracy. A second dimension relates to the number of different aspects that are collected to describe the bureaucracy. In table 10.1, these are captured in the number of columns in the data set. For example, in a recent analysis undertaken in the context of a project with a LAC country, the wage bill data did not have information about when public employees started their careers in the civil service, making it difficult to determine how experience in a position, measured by years of service, was related to wage levels and, as a consequence, the total cost of hiring a new civil servant for that position. With these issues in mind, practitioners should be cautious about what the available wage bill microdata can tell them about the current situation of bureaucracy in aggregate terms and about which aspects can be explored to provide insights for governments to better manage their SHRM and fiscal planning.

In figure 10.2, we propose a simple wage bill microdata "quality ladder" to help practitioners separate good data from bad data. We organize the ladder into five levels, with the first level representing the lowest-quality microdata and the fifth level the highest-quality microdata. At level 0, there is a missed opportunity for HRMIS data analysis because the *minimum required data* are not available (see table 10.1 for reference). This is because the information on public employees is scarce, inaccurate, inconsistent, and scattered across government units or career lines, such that almost any indicator or statistic based on such data would be wrong or biased. Statistically, it is impossible to draw inferences from incomplete data, especially where there are worries that the missingness is correlated with relevant features of the underlying values of the variables in the data. To see this, you need only think of some reasons why a government agency would not report HR microdata: because they lack the capacity or manpower to do so (in this case, only agencies with greater capacity would present their data, offering a skewed vision of the performance of the government at large) or because they are not mandated to do so and thus will not spend precious resources reporting HR data (again, in this case, drawing inferences from such data would give a misleading impression of the government at large because only the agencies with reporting mandates would provide their microdata for analysis).

TABLE 10.1   Example of Payroll + Human Resources Microdata Set Showing Minimum Data Required

March 2020																					
Year	Month	Individual ID	Job ID	Date of birth	Gender	Education	Date of entry	Type of contract	Area	Job position	Weekly working hours	Career level	Date of last progression	Base salary	Allowance 1	Allowance 2	Allowance 3	Vacation	Pension contribution	Gross wage	Net wage
2020	March	100,001	1	1987-03-05	Female	Secondary	2015-01-01	Statutory	Education		20	III	2016-03-01	3,500	0	0	0	0	440	3,500	3,060
2020	March	100,001	2	1987-03-05	Female	Secondary	2010-11-10	Statutory	Health		20	IV	2013-03-01	1,000	0	100	0	0	110	1,100	990
2020	March	100,004	1	1980-06-04	Female	Superior	2008-03-02	Temporary	Safety		30	VI	2020-03-05	4,000	0	0	0	0	440	4,000	3,560
2020	March	100,005	1	1985-02-03	Female	No schooling	2009-05-03	Political appointee	Other		40	III	2020-03-31	2,500	200	0	0	0	275	2,700	2,425
March 2021																					
Year	Month	Individual ID	Job ID	Date of birth	Gender	Education	Date of entry	Type of contract	Area	Job position	Weekly working hours	Career level	Date of last progression	Base salary	Allowance 1	Allowance 2	Allowance 3	Vacation	Pension contribution	Gross wage	Net wage
2021	March	100,001	1	1987-03-05	Female	Secondary	2015-01-01	Statutory	Education		30	III	2016-03-01	3,500	0	0	0	0	440	3,500	3,060
2021	March	100,002	1	1980-06-05	Male	Primary	2010-11-10	Statutory	Health		40	IV	2013-03-01	1,000	0	100	0	0	110	1,100	990
2021	March	100,004	1	1980-06-04	Female	Superior	2008-03-02	Temporary	Safety		30	VI	2020-03-05	4,000	0	0	0	0	440	4,000	3,560
2021	March	100,005	1	1985-02-03	Female	No schooling	2009-05-03	Political appointee	Other		40	III	2020-03-31	2,500	200	0	0	0	275	2,700	2,425

Source: Original table for this publication.

At level 1, some analysis can be performed for the units or careers for which there are data available. However, for the reasons outlined above, such analyses must be applied only to the units or career lines for which data are available, and careful consideration must be given to why and how the missingness in the data is occurring. A good example of this is a situation where the wage bill data gathering is decentralized and some government units collect data while others do not. For instance, if only the education and health departments could fill table 10.1 with information about their employees, the analysis should be restricted to these units, and the government should start collecting data from other units of the government.
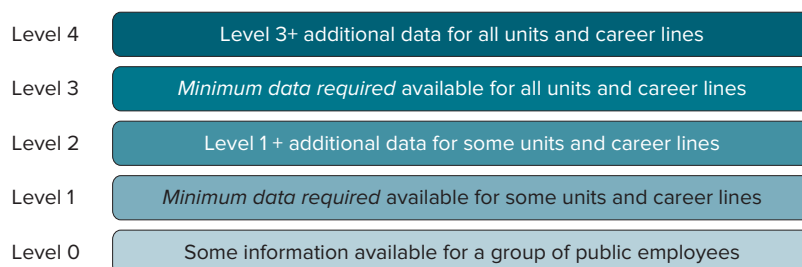
At level 2, not only is the basic information shown in table 10.1 readily available, but one is also able to connect these data with additional data sources and explore specific features of job contracts. Using the above example, this would be the case if the wage bill data for teachers could be connected to students' performance in standardized tests, allowing for the analysis of teachers' productivity in the public sector.

Level 3 illustrates a situation in which the information outlined in table 10.1 is collected for a large part of the bureaucracy in such a way that one can undertake an aggregate analysis of wage bill expenditures based on the microdata. In the section "Wage Bill Projections," we present an example of such an aggregate analysis, with a projection of the wage bill for future years based on data from the Brazilian federal government. We would like to note that levels 2 and 3 of the quality ladder can be ranked differently depending on the objectives of the analyses to be performed. For example, when analyzing the impact or value added of teachers on students' performance, having a productivity measure in the wage bill data for teachers can be especially useful. Given the fiscal nature of the analyses undertaken in this chapter, having a wage bill data set that allows the analyst to create aggregate figures is particularly important. Because of this, we have decided to rank a comprehensive data set for all civil servants without productivity measures above a data set with partial productivity measures in our quality ranking.

In level 4, one can not only undertake the analysis described in level 3 but can also merge other available data sources and connect them with the overall fiscal landscape of the government. Building on the example in level 2, one could assess both the fiscal impacts and the productivity impacts of adding a pay-for-performance scheme to teachers' compensation based on the performance of students on standardized tests.

Building an HRMIS that climbs the ladder described in figure 10.2 can be politically costly and requires sustained investment in the technical skills that underlie data management. The benefit is the improved understanding of the public sector that such an effort provides. The next section outlines the basic analytics for which such databases provide the foundation. Without the qualities outlined in figure 10.2, these analytics are undermined and can be distortionary. But with a sound foundation of quality and comprehensive data collection, these descriptives can support substantial fiscal efficiencies and improved service delivery. In the country cases described in the following section, these investments have paid off many times over.

FIGURE 10.2 Human Resources Microdata Quality Ladder

Level 4	Level 3+ additional data for all units and career lines
Level 3	*Minimum data required* available for all units and career lines
Level 2	Level 1+ additional data for some units and career lines
Level 1	*Minimum data required* available for some units and career lines
Level 0	Some information available for a group of public employees

Source: Original figure for this publication.

DESCRIPTIVE STATISTICS

In this section, we present descriptive statistics that can help policy makers gain insight into the current and future state of their government's wage bill. Along with each insight, we present examples from wage bill analyses that we undertook in different LAC countries. As mentioned before, the data required for these analyses should be available to any government that has an HRMIS. That said, we recognize that there are sometimes significant challenges to obtaining these data—especially in contexts where these data sets are not held centrally—and organizing them in order to undertake these analyses. We posit that there is great untapped potential in the payroll and HRMIS data that governments collect and propose a way to start using these data lakes, where they exist. Where they do not exist, we recommend starting to centralize HR micro-data to undertake these types of analyses.

We present our proposed descriptive statistics in three groups. The first provides a general overview of the wage bill and HRM systems to give the reader a sense of how HR practices can impact the wage bill. The second addresses how these HR microdata can be used to identify inequalities in terms of representation within the public sector. Finally, the third proposes a way to address some of these inequalities by adopting a forward-looking perspective that applies changes to fiscal policy to avoid such inequalities or inefficiencies in the future.

General Overview of the Wage Bill and HRM

We first address how HRM practices can impact the wage bill and offer some examples of the insights that can be gained by better exploiting payroll and HRMIS microdata.

Drivers of Payroll Growth

Changes in wage bill expenditures can be attributed to changes in employment levels and changes in the average wages of civil servants. A wage bill increase resulting from increased employee hiring is usually accompanied by an expansion in the coverage of public services. Wage increases do not have an immediate impact on the provision of public services, but they may have a medium- and long-term impact on the attraction, retention, and motivation of civil servants that could enhance the productivity of the public service and lead to better service provision. Figure 10.3 presents a simple way of analyzing what is driving wage bill variation. By setting the starting year as a baseline, we can see in this example from the Brazilian federal government's wage bill that most of the increase in wage bill expenditures came from increases in civil servants' compensation. In fact, between 2008 and 2017, spending on Brazilian federal executive personnel rose by 2.9 percent per year in real terms. This growth was made up of a 1.8 percent increase in average salaries and a 1.2 percent increase in the number of public servants. This kind of figure can also be applied to analyze specific sectors and career lines in the government, such as the education sector and, within that, teachers. Undertaking a sector- or career-specific analysis is also a way of providing insights with partial data, since one should be cautious when making aggregate claims from microdata if not all wage bill data are available.

Breakdown of the Wage Bill by Sector

Breaking down the change in overall wage bill expenditures into changes in the number of civil servants and in average wages can also lend itself to understanding how civil servants and wage bill expenditures are distributed among priority areas. Extending the analysis to the sector level can shed light on the needs and targets of the government in areas such as education, health, and security. For example, in the case of the Brazilian state of Rio Grande do Norte (see figure 10.4), 86 percent of civil servants are distributed in
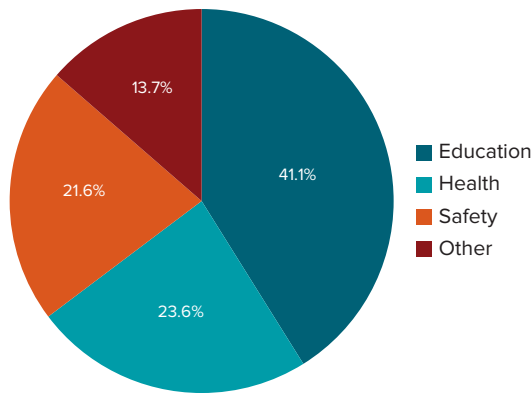
FIGURE 10.3   Drivers of Wage Bill Variation, Brazilian Federal Government, 2008–18
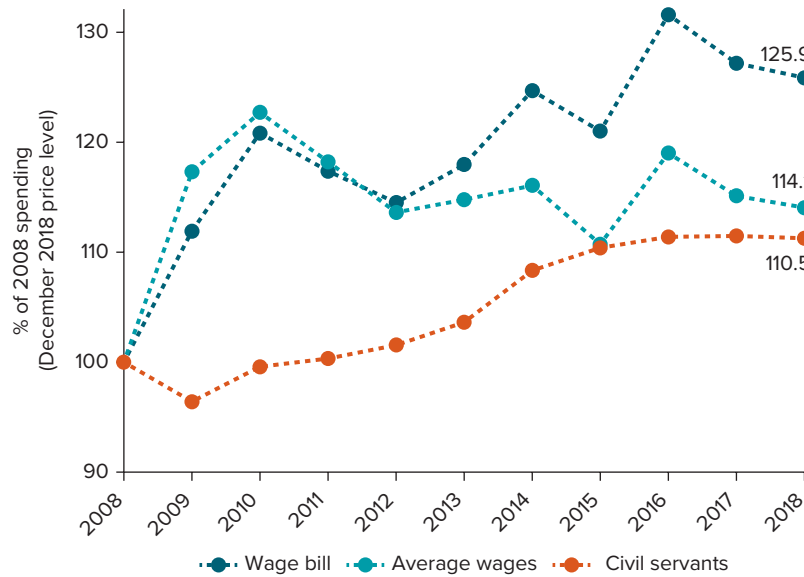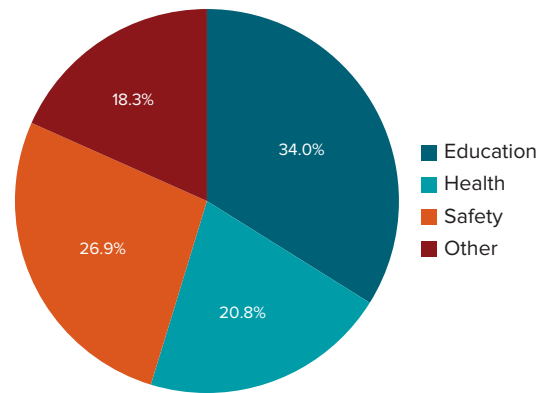

Source: World Bank 2019.

FIGURE 10.4   Wage Bill Breakdown, by Sector, Brazilian State of Rio Grande do Norte, 2018

Source: Original figure for this publication.

priority areas, while the wage bill expenditures for these same sectors amount to 82 percent of the total wage bill spending. In particular, the education sector employs 41 percent of the public servants and accounts for 34 percent of the total wage bill.

Distribution of Civil Servants by Career-Ladder Level

Progressions and promotions along career ladders are a common path for governments to connect higher labor productivity to wage increases. Based on this link between productivity and wages, we can expect that a longer tenure in the civil service reflects a knowledge gain that should equip employees with better tools

FIGURE 10.5 Distribution of Civil Servants, by Career-Ladder Level, Brazilian Federal Government, 2018
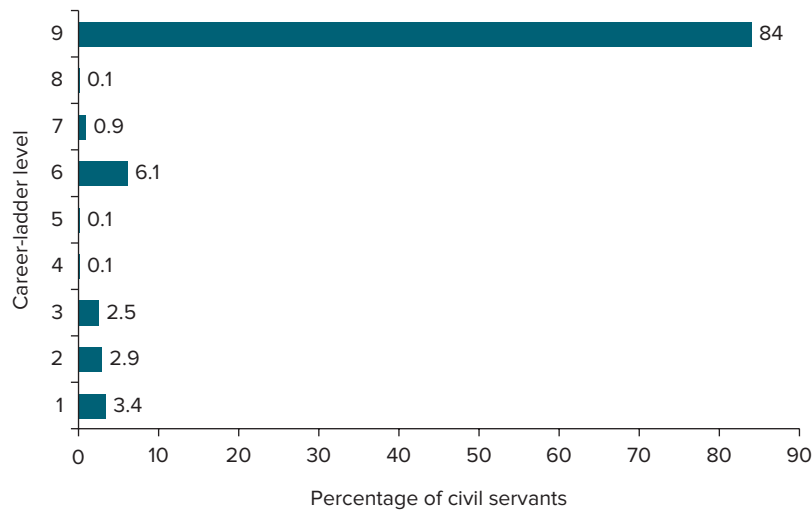
Source: Original figure for this publication.
Note: The figure shows the career-ladder levels for the Tax Auditor career track in the Brazilian federal government.

with which to deliver public services. By analyzing how civil servants are distributed along career-ladder levels, policy makers can assess whether the ladder structure of civil service careers reflects increases in productivity. Ideally, we should expect to see a smooth distribution of civil servants across the different levels. In figure 10.5, we use as an example the career of tax auditors in the Brazilian federal government. We can see that more than 80 percent of public employees are in the final step of their careers, which suggests that there may be margin for improving the design of the career structure and the requirements for progression or promotion to better reflect labor productivity gains.

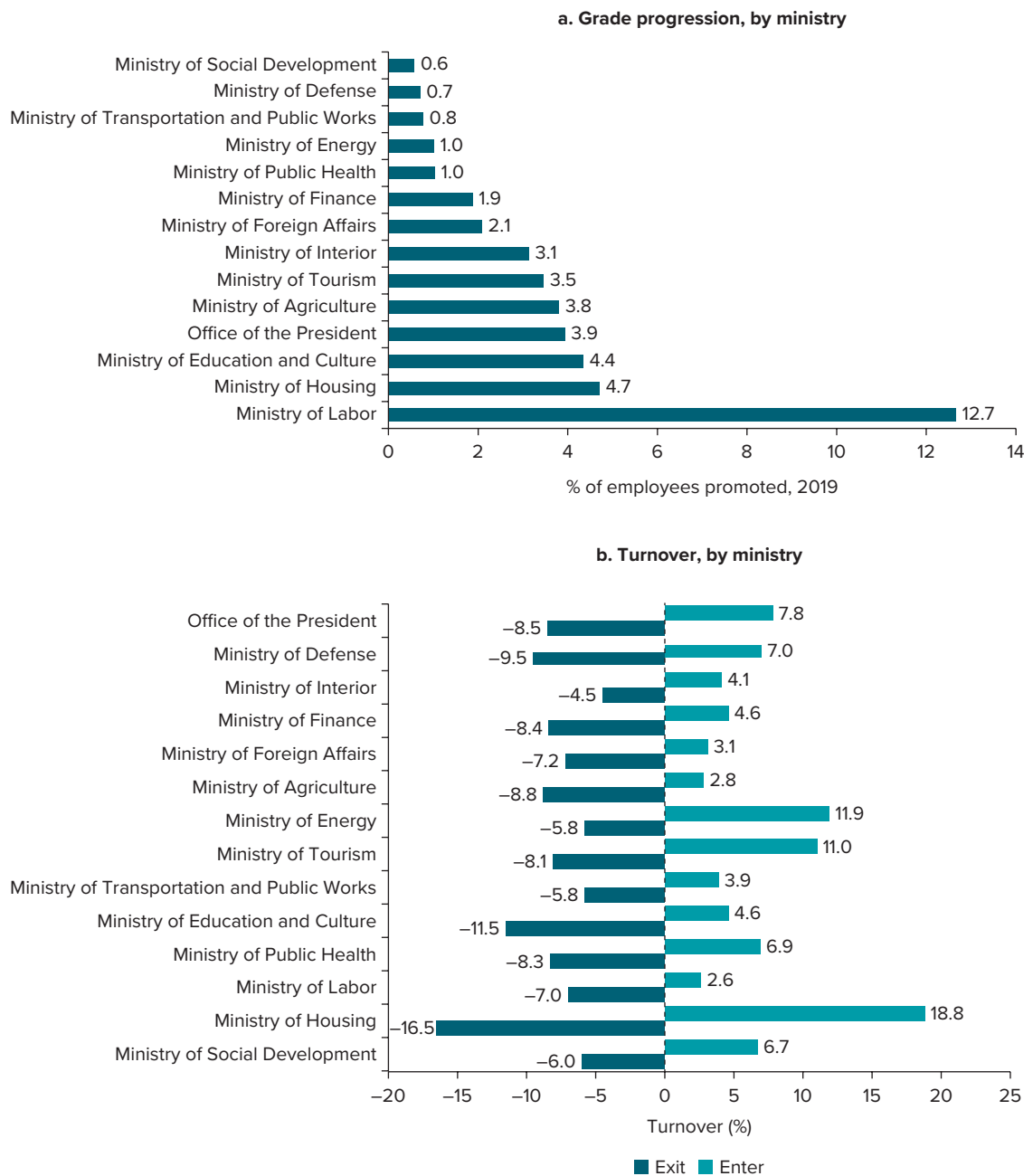### Strict Progression Rules and High Turnover of Civil Servants

On the other hand, situations where the rules for career progression and promotion are too strict may lead to difficulty retaining public employees, along with their acquired knowledge and expertise. To illustrate such a situation, we can examine the case of Uruguay's central administration, where civil servants are assigned to one scale (*escalafón*) and ministry. As movement across ministries and scales is rare and can only take place with special authorization, grade progression is the only career path available for civil servants. As a result, this limited room for vertical promotions may end up hindering productivity and motivation, as well as increasing turnover. In figure 10.6, we can see the share of employees who were promoted in 2019 (figure 10.6, panel a), and the turnover of employees (figure 10.6, panel b) by ministry in Uruguay's central administration. Less than 5 percent of employees were promoted to a higher grade in almost all ministries, while 7 percent of employees entered the central administration in 2019, and 6 percent exited that same year. In some ministries, the exit rate was even higher than the entry rate. This high turnover can be interpreted as a sign of the challenges in retaining civil servants. It also represents a hidden cost for the government due to the loss of expertise and the cost of training new staff.

Distribution of Pay-for-Performance Allowances

Pay-for-performance is a useful tool to stimulate productivity in the civil service. In theory, it rewards high-performing public employees and inspires low performers to perform better. However, there is much debate regarding the extent to which performance pay succeeds in improving civil service performance

FIGURE 10.6   Grade Progressions and Turnover, Uruguay Central Government, 2019

a. Grade progression, by ministry

Ministry	% of employees promoted, 2019
Ministry of Social Development	0.6
Ministry of Defense	0.7
Ministry of Transportation and Public Works	0.8
Ministry of Energy	1.0
Ministry of Public Health	1.0
Ministry of Finance	1.9
Ministry of Foreign Affairs	2.1
Ministry of Interior	3.1
Ministry of Tourism	3.5
Ministry of Agriculture	3.8
Office of the President	3.9
Ministry of Education and Culture	4.4
Ministry of Housing	4.7
Ministry of Labor	12.7

b. Turnover, by ministry

Ministry	Exit	Enter
Office of the President	−8.5	7.8
Ministry of Defense	−9.5	7.0
Ministry of Interior	−4.5	4.1
Ministry of Finance	−8.4	4.6
Ministry of Foreign Affairs	−7.2	3.1
Ministry of Agriculture	−8.8	2.8
Ministry of Energy	−5.8	11.9
Ministry of Tourism	−8.1	11.0
Ministry of Transportation and Public Works	−5.8	3.9
Ministry of Education and Culture	−11.5	4.6
Ministry of Public Health	−8.3	6.9
Ministry of Labor	−7.0	2.6
Ministry of Housing	−16.5	18.8
Ministry of Social Development	−6.0	6.7

Turnover (%)

■ Exit ■ Enter

Source: World Bank 2021, based on data from the Contaduría General de la Nación, Government of Uruguay, 2019.
Note: In panel b, the year of entry of an employee is the first year when her/his ID appears on the list of employees related to a specific job category.

(cf. Hasnain, Manning, and Pierskalla 2014). We posit that our approach can help policy makers under-stand whether pay-for-performance is working in the context in which they work. For example, one prob-lem arises when *all* employees receive performance payment. In figure 10.7, using data from the Brazilian federal government, we display on the *x* axis all careers (each vertical line represents a specific career track) and on the *y* axis the percentage of each profession that received a performance bonus. We show that in 2017, at least 90 percent of employees received performance-related payment in 164 of the 187 careers that offered such schemes. This could indicate that the pay-for-performance scheme in question is not successful in differentiating between good and bad performers.

FIGURE 10.7   Distribution of Pay-for-Performance Allowances, Brazilian Federal Government, 2017
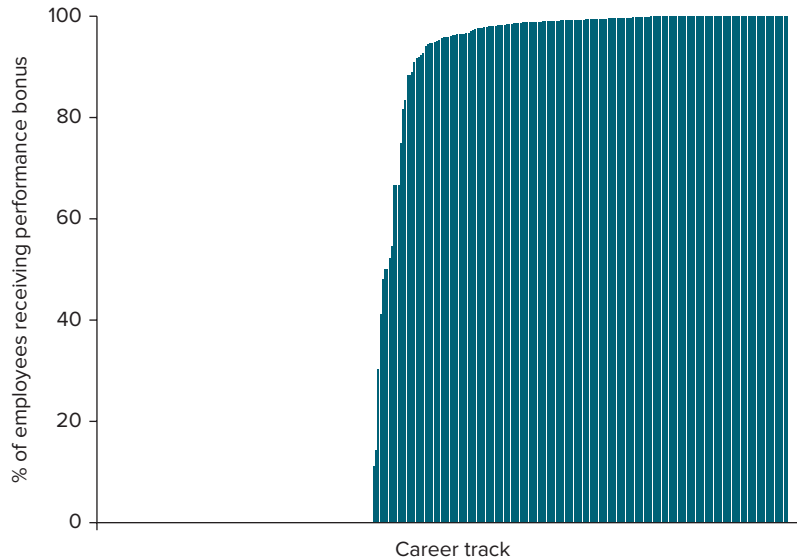
Source: Original figure for this publication.
Note: The *x* axis shows all career tracks in the Brazilian federal civil service, ranked by the *y*-axis variable.

Inequality in the Public Sector Wage Bill

Having given a general overview of key features of the public service, we turn to the use of HRMIS data to understanding inequalities in the public service. Such inequalities may come in different forms and have correspondingly different impacts on the efficiency or other qualities of the state.
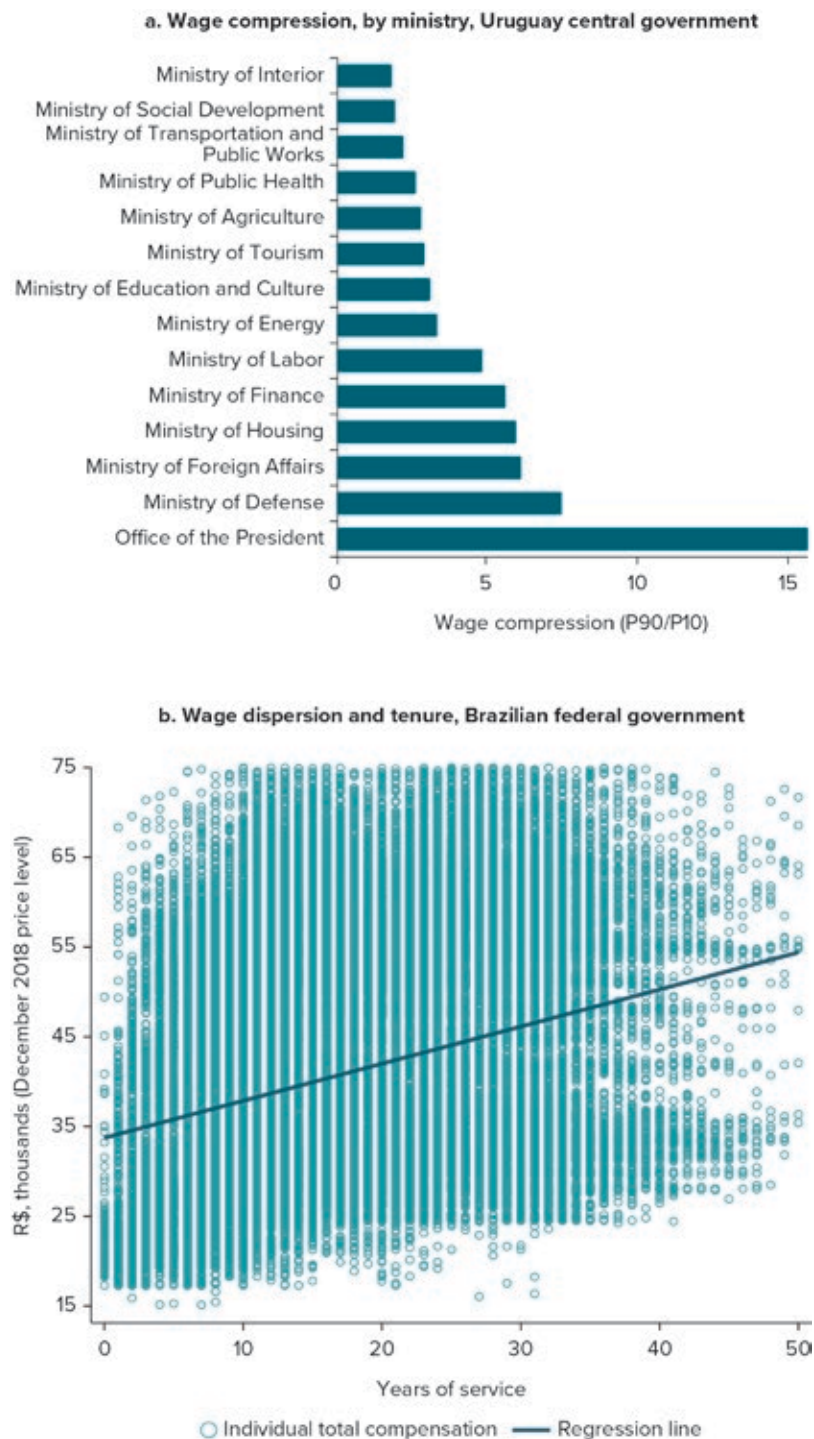
Representativeness

Many governments strive to recruit officials in a way that ensures the administration as a whole is broadly representative of the population it serves: for example, by having personnel from across the country's regions in rough proportion with the distribution of the population across those regions. Normatively, such considerations are important, given that in a democratic setting, bureaucracies should represent the populations they serve. Moreover, it has been empirically demonstrated that more representative bureaucracies—dependent on the policy domain—can affect important phenomena such as citizens' trust in the government and willingness to cooperate with the state (see, for example, Riccucci, Van Ryzin, and Lavena 2014; Theobald and Haider-Markel 2009; Van Ryzin, Riccucci, and Li 2017). Though there may be good reason for this principle not to hold strictly, HRMIS data allow the degree of representativeness of the administration to be accurately articulated and to act as the foundation of an evidence-based debate on the matter.

Pay Inequity

Inequality in payments in the public sector can reflect underlying differences in responsibilities or can be a sign that inconsistent compensation rules are being applied. For example, we expect the government to reward managers and high-performing employees with better compensation than entry-level civil servants, but we do not expect it to award significantly different levels of compensation to employees with the same attributes, jobs, and tenure, following the generally observed principle of equal pay for equal jobs. In the case of the Brazilian federal government tax auditors (see figure 10.8b), we can see that there is huge wage dispersion for similar workers. Gross pay can vary fivefold for workers with similar levels of experience, which is largely a result of nonperformance-related payments and is not related to base salary.

FIGURE 10.8   Measuring Pay Inequity in the Uruguayan and Brazilian Governments

a. Wage compression, by ministry, Uruguay central government

Wage compression (P90/P10)

b. Wage dispersion and tenure, Brazilian federal government

R$, thousands (December 2018 price level)

Years of service

○ Individual total compensation ── Regression line

Source: Panel a: World Bank 2021, based on data from the Contaduría General de la Nación, Government of Uruguay, February 2020. Panel b: Original figure for this publication.

Related to this is the need for governments to devise pay schedules that incentivize officials to keep exerting effort to rise up the career ladder while also being aware that equity in pay is a key issue for some officials' motivation. To measure inequality due to differences in responsibilities and career level, we can analyze the pay scale compression of the government's units.[5] Higher wage compression (a smaller wage gap between management level and entry level) is associated with greater difficulty in motivating personnel

to progress through the public service because increased responsibility is not adequately compensated. For example, in the case of Uruguay (see figure 10.8a), wage compression in the central administration is low by international standards but varies greatly across ministries. Having low wage compression by international standards is good for equity, but the implications for civil servants' productivity and motivation are unclear. Low pay compression can generate positive attitudes across civil servants if responsibilities are also spread accordingly across the civil service, but it might also indicate that the salary structure is not sufficiently able to incentivize and reward workers' efforts or reward workers who have additional responsibilities.

Pay Inequity Based on Increasing Wage Components

A good compensation system should allow the government to select high-quality candidates and offer incentives to align each public servant's interests with those of society. Desirable characteristics of a payment system include the ability to link wage gains with skills and performance and the transparency of the wage components. Having a large number of salary components can hinder transparency and generate inequalities. For example, in the case of Uruguay's central administration, there are 297 different salary components, of which 53 are "basic" and 244 are "personal."[6] Each entity has some discretion to define the compensation its employees receive, thereby reducing transparency and potentially creating payment inequalities. From figure 10.9, we can see that this discretion is reflected in the distribution of personal payments (figure 10.9, panel b), which, unlike the distribution of basic payments (figure 10.9, panel a), follows a nonstandard distribution. The nonstandard distribution of personal payments suggests both a lack of transparency and an unequal pay structure, based on the increase of payment line items.

Wage Inequality by Gender

Gender equality is a key indicator of progress toward making the public sector workforce more diverse, representative, and innovative, and better able to provide public services that reflect citizens' needs. According to the OECD (2019), women are overrepresented in the public sector workforce of OECD countries.

However, this is not true across the globe; in fact, the Worldwide Bureaucracy Indicators show that public sector gender equity is correlated with country income (Mukhtarova, Baig, and Hasnain 2021). Part of the issue lies in providing similar levels of compensation for women and men where some systems discriminate against women. In some cases, the wage gap can discourage women from entering the civil service or applying for higher positions in an organization. In this sense, identifying potential gender wage gaps in the public sector is important to fostering the diversity of public employees. In figure 10.10, we analyze the gender wage gap in Uruguay's public sector workforce. The results suggest that overall, after controlling for working hours, age, type of contract, grade, tenure, and occupation, there is not a statistically significant gender wage gap, but this varies across ministries.
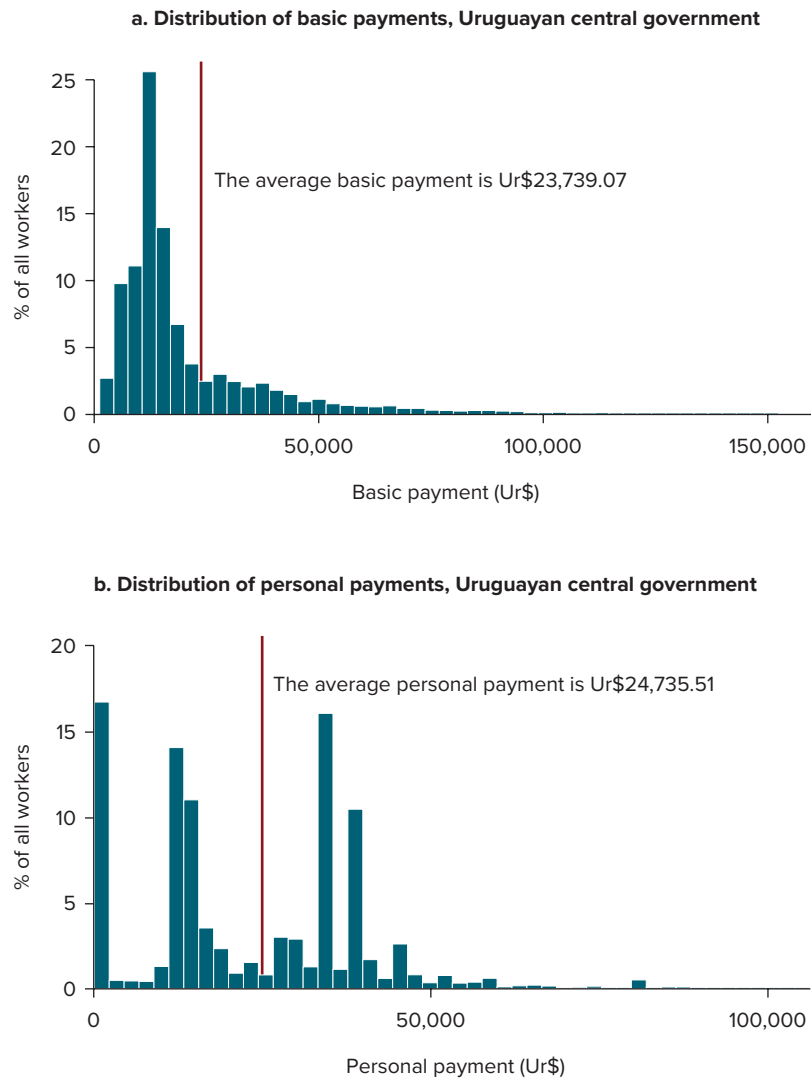
While there are many other margins of potential inequality in the service, and between the public service and the rest of society, these examples showcase the power of government microdata in identifying the extent and distribution of inequities across public administrations.

Fiscal Analysis

Having considered what the wage bill is, how HRM can affect it, and how HR practices can affect the character and equity of the bureaucracy, we now turn our attention to how such practices can affect the fiscal health of a polity.

Setting compensation schemes, including initial wages and wage increases related to progressions and promotions, is a key tool to attract, retain, and motivate civil servants. But it can also be a cause of long-term fiscal imbalance because public sector employees usually work for more than 15 years.[7] For example, careers with high starting salaries may attract qualified candidates, but when combined with slow or small wage increases related to progressions, this can lead to demotivated public employees. In such a situation, a reform

**FIGURE 10.9 Inequity of Pay in Wage Components, Uruguay, 2019**

a. Distribution of basic payments, Uruguayan central government

The average basic payment is Ur$23,739.07

b. Distribution of personal payments, Uruguayan central government

The average personal payment is Ur$24,735.51

Source: World Bank 2021, based on data from the Contaduría General de la Nación, Government of Uruguay, February 2020.

that kept starting salary levels high and increased the additional pay related to progressions and promotions might cause the wage bill to be fiscally unsustainable. By understanding the fiscal impact of current career compensation schemes and potential reforms, policy makers can better manage the public sector's HR in the long term. In figure 10.11, we present examples of how these compensation features can be visualized. In the case of the Brazilian state of Mato Grosso (figure 10.11, panel b), we find that for some of the careers, the first three progressions more than double public employees' salaries.

Besides starting salaries and wage increases, another important piece of information for policy makers implementing strategic workforce planning is when public officials retire. Getting a clearer picture of when public employees retire is of critical importance for strategic workforce planning and fiscal planning. One needs to understand who will retire and when in order to plan successfully for incoming cohorts of civil servants, both in terms of their numbers and the competencies they will need. When large numbers of public servants are all due to retire at the same time, this can offer a window of opportunity for policy reform. For example, in the case of the Brazilian federal administration, the World Bank projected, using 2017 data, that 22 percent of public servants would have retired by 2022 and that 40 percent would have retired by 2030 (see figure 10.12). This situation presented an opportunity for administrative reform to restructure career systems

FIGURE 10.10   Gender Gap, by Ministry, Government of Uruguay, 2010–20
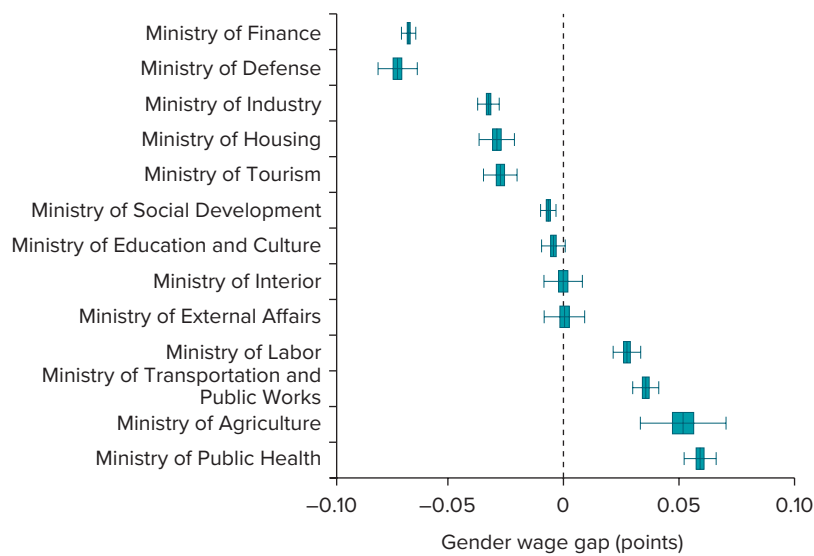
Source: World Bank 2021, based on data from the Contaduría General de la Nación, Government of Uruguay, 2010–20.
Note: The graph shows regression coefficients and 95 percent confidence intervals for the interaction between the female dummy and for the ministry fixed effect. Each point represents the average salary difference with respect to the Ministry of Public Health, after controlling for workers' characteristics.

and rationalize the number of existing civil servants in order to better plan, both in terms of the workforce and in fiscal terms. The use of HR microdata to undertake this analysis helped to inform the debate about civil service reform.[8]
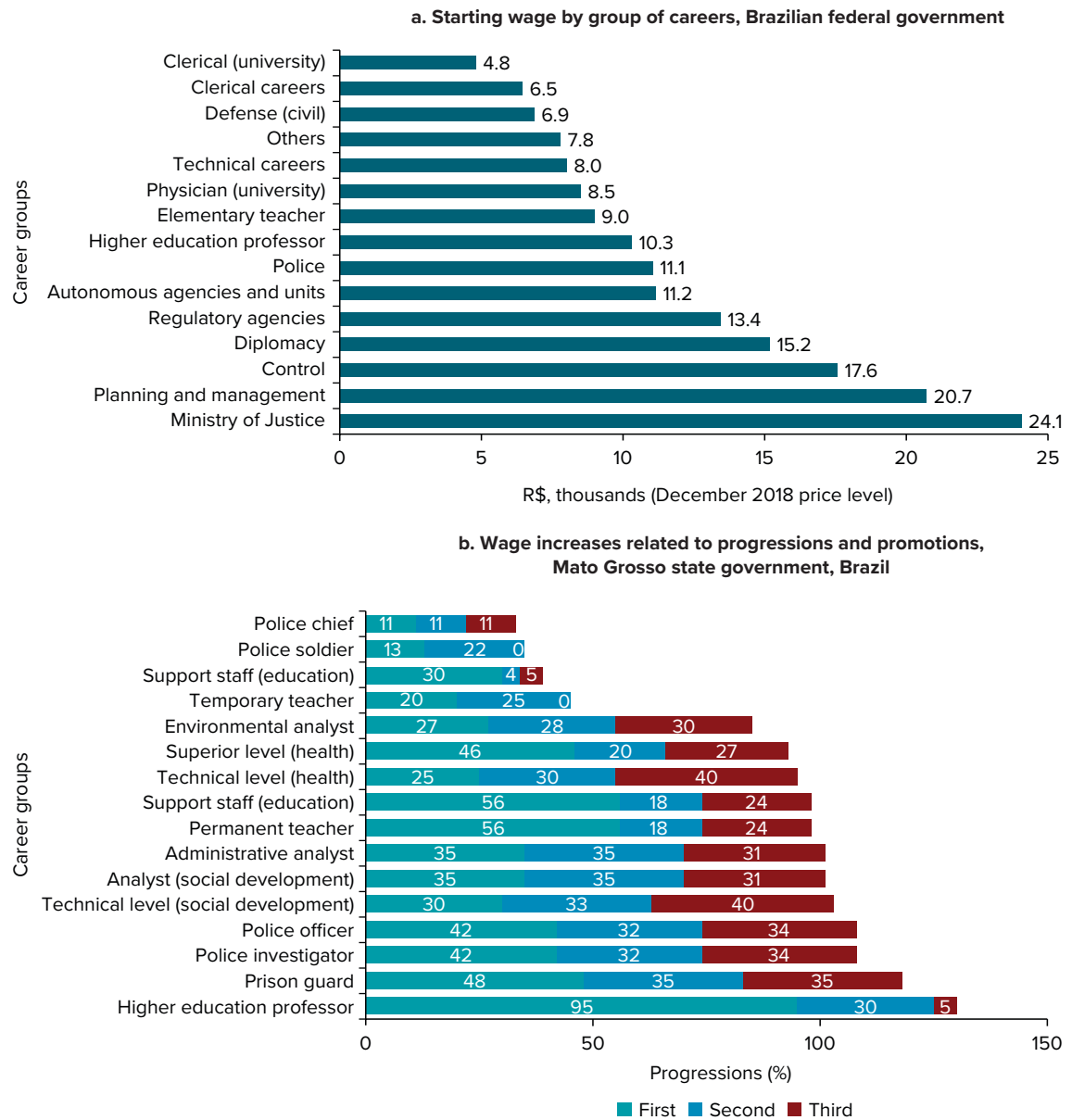
WAGE BILL PROJECTIONS

In this section, we present an HR-microdata-based model on the basis of the building blocks presented so far. With information about initial wages, wage increases related to career progressions, and expected dates of retirement, policy makers can project the expected fiscal impact of civil service reforms, the design of new careers, and fiscal consolidation policies. Using counterfactual scenarios can also help governments promote diversity and reduce inequalities in the civil service, fostering policies and services that better reflect citizens' needs.

Payroll and HRMIS microdata represent an important tool for the analysis of HR and fiscal policies. They can help policy makers lay out the trade-offs among competing policy objectives. For example, in the Brazilian state of Maranhão, the government sought to understand the fiscal impacts of wage increases for teachers along with increased recruitment of police personnel. By representing graphically the relevant statistics and comparing, first, the decreasing trend of the pupil-per-teacher ratio and its effect on the demand for new teachers and, second, levels of violence in the state when compared with its peers and the ratio of policemen per inhabitant, decision-makers obtained a more realistic picture of the available employment policies. In this section, we use some of the figures from the previous section to lay out the building blocks of a policy-oriented model for projecting wage bill expenditures. This model can help policy makers make difficult choices more transparent by showing the real costs and benefits of potential civil service reforms.

In practice, this is how we make the projections. First, we set up the HR microdata in a structure similar to the one described in the section "Payroll and HRMIS Microdata and Related Challenges"

FIGURE 10.11 Career Types and Wages, by Career Group, Brazil

a. Starting wage by group of careers, Brazilian federal government

Career group	R$, thousands (December 2018 price level)
Clerical (university)	4.8
Clerical careers	6.5
Defense (civil)	6.9
Others	7.8
Technical careers	8.0
Physician (university)	8.5
Elementary teacher	9.0
Higher education professor	10.3
Police	11.1
Autonomous agencies and units	11.2
Regulatory agencies	13.4
Diplomacy	15.2
Control	17.6
Planning and management	20.7
Ministry of Justice	24.1

b. Wage increases related to progressions and promotions, Mato Grosso state government, Brazil

Career group	First	Second	Third
Police chief	11	11	11
Police soldier	13	22	0
Support staff (education)	30	4	5
Temporary teacher	20	25	0
Environmental analyst	27	28	30
Superior level (health)	46	20	27
Technical level (health)	25	30	40
Support staff (education)	56	18	24
Permanent teacher	56	18	24
Administrative analyst	35	35	31
Analyst (social development)	35	35	31
Technical level (social development)	30	33	40
Police officer	42	32	34
Police investigator	42	32	34
Prison guard	48	35	35
Higher education professor	95	30	5

Progressions (%)

■ First ■ Second ■ Third

Source: Original figure for this publication.

and reported in table 10.1. Ideally, the database should contain payroll and HR information for the last 10 years. If monthly data are not available, it is possible to use a representative month of the year.[9] The wage bill data from previous years are then used to estimate some of the parameters of the model, and the most recent month or year data are used as a starting point for the projections.

Second, with the microdata set up, we group civil servants according to similarities in job position or common legal framework. The inputs of the government's HR managers are critical to this first part of the model because the number of groups set should both reflect the bulk of civil service careers and allow for more fine-grained policy options. In this sense, there is no "magic number" of groups; the number is based on context. In practice, we tend to cluster civil servants in a range of 5–20 groups.

FIGURE 10.12   Retirement Projections, Brazilian Federal Government, 2019–54
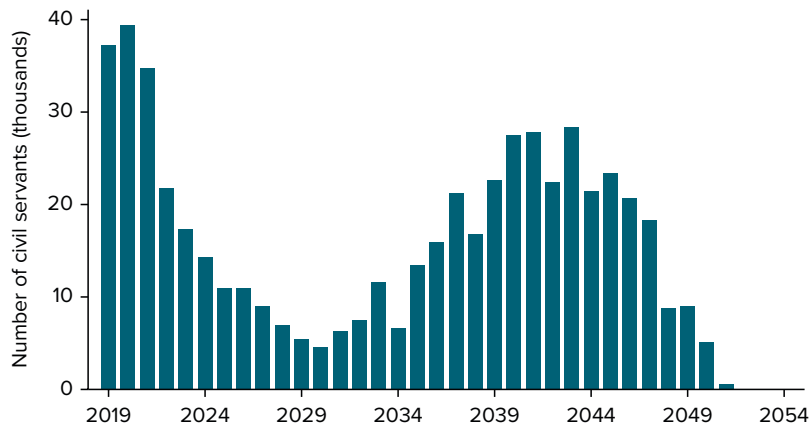
Source: Original figure for this publication based on Brazilian government data from 2008–18.

For example, in the case of some Brazilian states, we defined seven main groups: teachers, military police, investigative police, physicians, education support staff, health support staff, and others. These groups were defined to reflect the main public services Brazilian states are responsible for: public security, secondary education, and mid- to high-complexity health care. In another example, for the Brazilian federal government, we defined 15 career groups, which included university professors because Brazilian public universities are mostly federal.

Third, after setting the clusters of careers, we estimate some basic parameters for these groups using the microdata from previous years: the number of retirees by year for the following years, average tenure when retiring, initial wages, years between progressions or promotions, real increases in salaries related to progression or promotion legislation, real increases in salaries not related to progression or promotion legislation, and the attrition rate, which is the ratio of new hires to leavers. Some of these parameters were shown in the previous section. For example, figure 10.12 shows estimates for the number of retirees by year for the Brazilian federal government with data from 2008 to 2018.

Fourth, we use the most recent month of the wage bill database and our estimated parameters to track the career path of current employees until their retirement and of the new civil servants who will replace retiring civil servants. Because of the fiscal nature of the model, the wage bill estimates tend to be less accurate for long-term projections. Based on experiences with LAC governments, we recommend using at most a 10-year span for projections. Using the estimated parameters, we come up with a baseline projection: the trajectory of wage bill expenditures assuming "business as usual," as extrapolated from the data on past years. In other words, we project the expected wage bill spending if we assume the same wage increases as in past years, the same expected tenure before retirement, and the same replacement rate of new civil servants per retiring employee.

Finally, after making a baseline projection of the wage bill, we are able to simulate reforms that implement changes to the estimated parameters. For example, if the government wants to analyze the fiscal impacts of a reform that increases the recruitment of teachers, we simply change the rate of replacement of the career group of teachers. In another example, if the government wants to consolidate wage bill expenditures by freezing wages for the next two years, we change the parameter for salary increases that are not related to progressions or promotions. The list of potential policy scenarios includes hiring freezes or targeted pay increases for specific classes of employees. The model is meant to be flexible to adapt to the government's needs so policy makers can test different reform options and hypotheses.

## Example from the Brazilian Federal Government

To exemplify the use of the model, in this section, we present wage bill projections for the Brazilian federal government for the period 2019–30, which were undertaken using HR microdata from 2008 to 2018. For example, figures 10.11, panel a and 10.12 in the previous section are graphical representations of the starting wages and the number of retirees by year, respectively. Figure 10.13 presents the baseline projection of the wage bill, and figure 10.14 provides a decomposition of the wage bill projection across current and new employees. Brazil is something of an outlier among LAC countries in that it has very high-quality administrative data, making it a good example of the more advanced types of analyses one can undertake with HR microdata once a comprehensive, centralized data collection system has been put in place.

FIGURE 10.13 Baseline Wage Bill Projection, Brazilian Federal Government, 2008–30
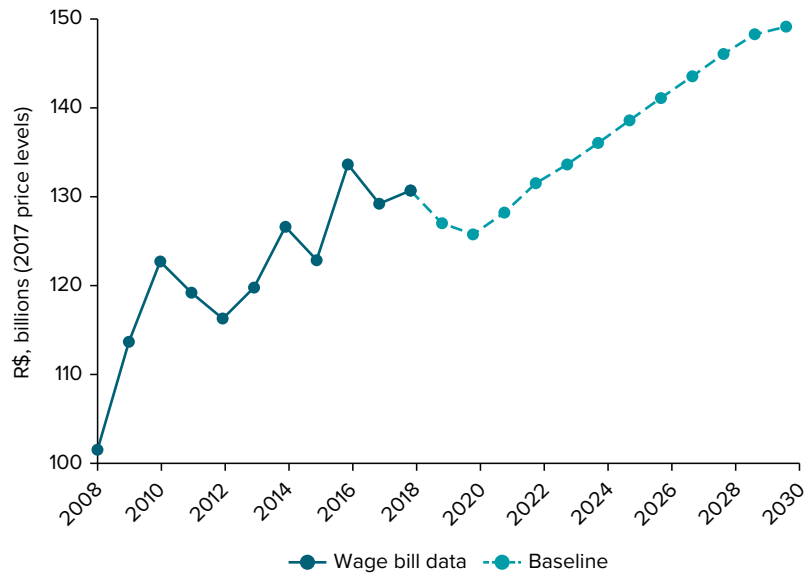
Source: Original figure for this publication based on Brazilian government data from 2008–18.

FIGURE 10.14 Decomposition of Wage Bill Projection between Current and New Employees, Brazilian Federal Government, 2018–30
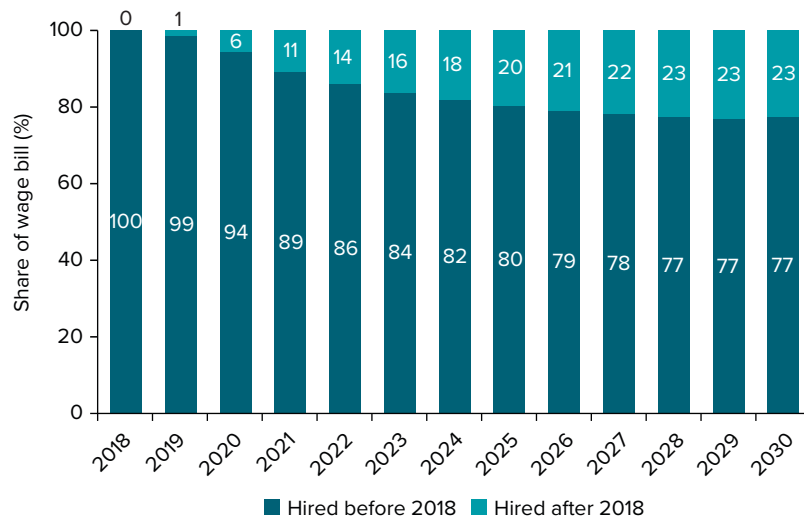
Source: Original figure for this publication based on Brazilian government data from 2008–18.

After projecting a baseline scenario for wage bill expenditures in the coming decade, we are able to compare it to different policy scenarios. To better organize reform options, we can separate them into pay-related and employment-related reforms. In the context of Brazil, the federal government's main objective was to simulate reforms that could lead to fiscal savings. We presented nine policy options, two of them related to employment reforms and the other seven related to pay policies. Based on these specific policies, we projected the following scenarios, each with a set of pay-related and employment-related policies:

- Scenario A: Replacement of 100 percent of retiring employees and no real salary increases for 10 years.

- Scenario B: Replacement of 90 percent of retiring employees and no nominal salary increases for the first three years.

- Scenario C: Replacement of 80 percent of retiring employees and no nominal salary increases for the first three years, and after that, no real salary increases for the next seven years.

Figure 10.15 provides a graphical presentation of the baseline projection along with the three outlined reform scenarios. In scenario A, a policy of no real wage increases is implemented starting in 2019. Since the *y* axis measures wage bill expenditures in real prices for 2017, the policy of correcting salaries only for inflation leads to an almost steady line in the chart. Scenarios B and C implement tighter policies, with a nominal freeze in salaries for the first three years starting in 2019, along with fewer hires of new employees to replace retiring civil servants. The bulk of the difference in savings between scenarios B and C comes from the years after 2022, in which scenario B returns to the baseline wage bill expenditures, while in scenario C, salaries are corrected for inflation.

To put these different scenarios in perspective and compare their effectiveness in providing fiscal savings, we show in figure 10.16 the fiscal savings accumulated throughout the years in each reform scenario. In 2018, wage bill expenditures in the Brazilian federal civil service amounted to a total of R$131 billion. The projections of the model used in this analysis indicate that in 2026, scenario A saves approximately 12 percent of the 2018 wage bill expenditures, scenario B saves 19 percent, and scenario C saves 24 percent. Besides these differences in total savings, in scenarios B and C, the government achieves larger savings in the short term while compensating with smaller savings after a few years, whereas, in scenario A, the total savings are spread out over the years.
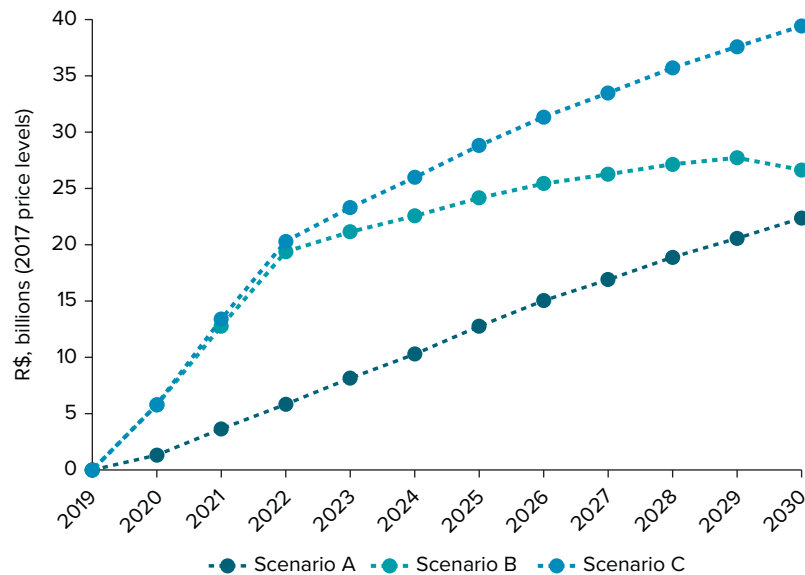
FIGURE 10.15   Wage Bill Projection and Policy Scenarios, Brazil, 2008–30
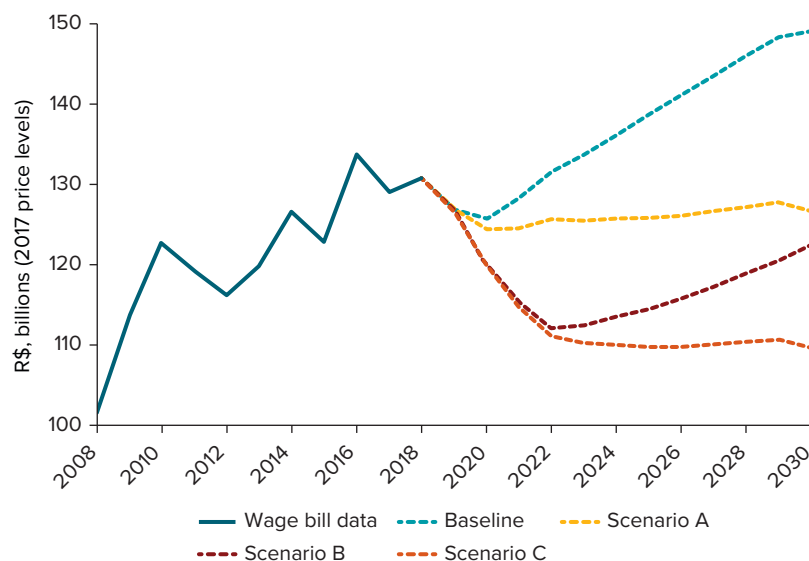
Source: Original figure for this publication.

FIGURE 10.16 Cumulative Fiscal Savings from Policy Scenarios, Brazil, 2019–30

Source: Original figure for this publication based on Brazilian government data from 2019.

Experimenting with combinations of policies before implementation to understand their fiscal impact has the potential to save a significant proportion of a government's wage bill. Similarly, such extrapolations can be extended to the descriptive analysis outlined in previous sections so governments can better understand how personnel policy reform will impact the character of the public service. With enough good-quality data, governments can leverage their SHRM and wage bill data for evidence-based planning of their fiscal expenditures and personnel dynamics into the future.

CONCLUSION

We have presented a microdata-based approach for governments to improve their SHRM and develop realistic civil service compensation and employment strategies. We have also demonstrated how such strategies can allow policy makers to make better fiscal choices. We have used a series of examples from LAC countries to demonstrate how the use of relatively basic payroll and HRMIS statistics can help policy makers gain insight into the current and future state of their government's wage bill. We posit that this constitutes an important first step toward tapping the potential of existing bodies of payroll and HRMIS microdata that are currently underused. We believe that our approach can help policy makers make difficult decisions by breaking down the causes of problems and putting numbers to the ways in which certain policy choices will translate into longer-term consequences. On the basis of our experience using HR microdata for such analyses, we have a series of practical recommendations to make.

The first recommendation pertains to the collection of the data required to undertake the analyses we propose. Although, in theory, any government with an HRMIS should have access to these data, we know from our experience working with governments that extracting and cleaning these data can be a difficult task. As such, we recommend that where possible, governments centralize their HR data collection systems and render these data accessible to insights teams. If such data do not exist, even in a disparate fashion, we strongly advise governments to begin collecting, in a centralized manner, payroll and HRMIS microdata. If governments are able

to break down existing inter- and intradepartmental data silos and embed data analytics into their institutional culture, they stand to gain a much clearer idea of—among many other phenomena—the composition of their workforce, how to use their workforce more effectively, and how to plan, budget, and staff for future challenges. This is a central recommendation from our experience working with these microdata. As we laid out above, the quality and coverage of the data at one's disposal affect the usefulness of the analyses one can undertake and, consequently, the power of the insights one can gain.

The second recommendation is that the analysis of HR data be better integrated with fiscal planning. Our approach can both complement and help to bridge functional reviews and macroanalyses and, for this reason, can reconcile the fiscally oriented nature of macroanalyses with the detail of functional reviews. For this to be effective, however, governments must encourage civil servants from the treasury and HR department(s) to collaborate more closely. This could be achieved by allocating dedicated portions of civil servant workload (from both the treasury and the HR department) to the task of sharing and analyzing data in collaboration, or by creating dedicated interdepartmental roles to push forward and undertake the collection and analysis of HR microdata for SHRM. By better integrating HR data and wage bill planning, policy makers can also improve the services that are delivered to citizens. In the example we mentioned in the introduction, policy makers in Alagoas incorporated demographic changes into their projections of how many teachers to hire (given the falling pupil-per-teacher ratio caused by lower fertility rates) and were thereby able to identify an area in which they could achieve substantial savings and better target their HR strategy to hire different categories of civil servants that were not oversupplied. In this way, the state was able to provide better-quality services to its citizens by hiring civil servants in areas where greater personnel were needed, rather than in the education sector, where there was an excess of teachers.

The third recommendation relates to how political considerations can impede the implementation of successful SHRM and fiscal planning. We recommend that governments, in addition to centralizing HR data collection systems, seek to insulate certain aspects of planning offices' work from the ebb and flow of politics. This could go hand-in-hand with our second recommendation, to carve out explicit portfolios or roles dedicated to collecting and analyzing HR microdata, by ensuring that this work is undertaken by public servants reporting to an independent agency rather than to a minister.

All three recommendations pertain to how governments can better institutionalize SHRM and improve their analytical capabilities with data that should be relatively easy to collect and use. By developing a culture of centralizing and sharing such data—always anonymized, stored, and shared with full respect for employees' privacy and rights—governments can improve their ability to identify and resolve issues pertaining to the workforce and fiscal planning alike, as we have laid out. Moreover, such analyses are simple to undertake, meaning that governments can leverage these data through existing staff with even minimal data literacy, without hiring a significant number of data specialists. We hope we have illustrated the benefits of combining HRMIS and payroll data to inform SHRM and fiscal planning and that we have inspired practitioners to exploit these data's potential for more and better evidence-based policy making.

NOTES

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1. The IMF, in fact, estimates that over 130 countries report comprehensive government finance statistics and that, on average, countries have about 25 years of data at their disposal (Gupta et al. 2016, 11).
2. Some governments also gather and record data on pensioners and survivors. Having this additional data can be useful, especially to improve the government's understanding of retirees' profiles and the overall fiscal impact of pensions. Given that this subject opens a whole set of new analyses, however, we do not comprehensively discuss the use of pension data in this chapter.

3. The studies that exist are limited analyses looking at very specific issues, often from the health care sector, with the notable exception of Colley and Price (2010), who examine the case of the Queensland public service.
4. Of the HRM professionals they surveyed, 47 percent reported engaging in little or no work-force planning for their municipalities, and only 11 percent reported that their municipalities had a centralized, formal workforce plan (Goodman, French, and Battaglio 2015, 148).
5. Wage compression is generally defined as the ratio between high earners and low earners in a specific organization. In this chapter, we define wage compression as the ratio between the 90th percentile and the 10th percentile of the wage distribution of the organization.
6. The salary structure in the public administration consists of multiple salary components, grouped into "basic" and "personal" components. Basic payments are determined based on the specific position (*plaza*), which represents the set of tasks, responsibilities, and working conditions associated with each civil servant, including *sueldos al grado* and *compensaciones al cargo*. All civil servants also receive personal payments, which are specific to each individual employee.
7. For example, a Brazilian federal government employee works for an average of 30 years before retiring.
8. See "Banco Mundial aponta urgˆencia de uma reforma administrativa," *Valor Econômico,* October 10, 2019, https://valor .globo.com/brasil/noticia/2019/10/10/banco-mundial-aponta-urgencia-de-uma-reforma-administrativa.ghtml.
9. The "representative month" should allow for the extrapolation of monthly wage bill expenditures and the number of civil servants for the whole year.

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