

# Are Public Sector Workers in Developing Countries Overpaid?

Evidence from a New Global Data Set

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## Abstract

This paper examines the public sector wage premium using nationally representative household surveys from 91 countries. The public sector generally pays a wage premium compared to all private sector salaried employees, but the size of the premium is sensitive to the choice of the private sector comparator and varies considerably by worker characteristics. For most countries, the average premium disappears when the public sector is compared to only formal sector private employees, especially when controlling for occupation. The public sector wage premium is higher for women and low-skilled workers. In contrast, high-skilled public sector employees are most often paid the same

as their private sector counterparts or may even pay a penalty for working in the public sector. Consistent with this, the public sector premium is greater for employees with less education, those working in lower paid occupations, and those whose earnings fall in the lower part of the conditional earnings distribution. Across countries, the wage premium is only weakly associated with countries' level of development. These findings nuance the existing consensus that public sector workers tend to enjoy a significant wage premium over their private sector counterparts, and that this premium is especially large in low-income countries.

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# Are Public Sector Workers in Developing Countries Overpaid? Evidence from a New Global Data Set #

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## 1. Introduction

The incentives and abilities of the personnel employed in government bureaucracies largely determine a state's capability to effectively implement policies and efficiently achieve the desired outputs in regulation, infrastructure provision, and service delivery. Public sector wages strongly influence personnel quality and motivation, and impact the competitiveness of the overall labor market, and fiscal sustainability. Yet in developing country contexts, little is known about the characteristics of public sector workers, and of public sector wages relative to the private sector. This paper attempts to shed light on this topic, utilizing nationally representative survey data that include information on public sector employment and wages from 91 countries.

Governments face important choices regarding the size of the public sector and the compensation of its workers. If public sector workers are paid significantly less than similar workers in the private sector, the resulting difficulty in recruiting and retaining qualified workers will adversely affect the quality of publicly provided goods and services and could contribute to corruption. On the other hand, large wage premiums for public sector workers may encourage youth to queue for public sector jobs, leading to higher rates of youth unemployment. Spending more than necessary on public sector salaries may also crowd out pro-poor spending, since spending on public sector wages is generally not well-targeted to the poor. These choices are typically highly charged politically, as public sector workers are an influential, often unionized, group. Better understanding public employment and wages is therefore essential for informing policy choices and managing the likely political fallout.

This paper's main contributions are to estimate public sector earnings premiums for a much larger set of countries than has been done before, to present evidence on the heterogeneity of premiums across countries and different types of workers, and to consider the robustness of the estimates to the choice of private sector comparators. We find that the public sector generally pays a premium compared to all private sector salaried employees, even after controlling for a small set of observed worker characteristics, but that the size of the premium is sensitive to the choice of the private sector comparator and varies for different types of workers. The earnings premium falls substantially when the public sector is compared to only formal private sector employees; on average, public sector workers in fewer than half of the countries in the sample earn a statistically significant earnings premium when compared to formal private sector workers. Nor are employees likely to pay a penalty for working in the public sector; employees in only 17 percent of the countries in the sample face a statistically significant earnings penalty.

When compared with formal employees, public sector earnings premiums tend to be higher for women, and less educated workers; and higher for employees in relatively lower paid occupations compared to professionals, technical staff, and senior officials. Generally, employees at the lower end of the pay and skill distribution earn larger public sector earnings premiums, while employees at the upper end often face penalties. Cross-nationally, there is no strong association between country income levels and earnings premiums, a finding that is different from that of other studies that use a more limited set of countries. When public employees are compared with private formal sector employees, public sector earnings premiums in developing countries are comparable to those in high-income countries.

This paper adds to the large literature on public-private wage differentials. Most of the studies to date have been of high-income countries and find a significant wage premium for public sector workers (Ehrenberg and Schwartz, 1986; Gibson, 2009; Giordano et al 2015; Gregory and Borland, 1999; Moulton 1990; Christofides and Michael, 2013). The analysis confirms that the wage premium also

exists for a broad swathe of low- and middle-income countries. Existing studies also reveal heterogeneity of the wage premium across the wage distribution, with higher wage premia for lower skilled workers, a finding that is also confirmed in the data used in this study.

The few studies of wage premiums in developing country contexts find generally similar results. For example, Filmer and Lindauer (2001), and Glinskaya and Lokshin (2005) find a public sector wage premium in Indonesia and India respectively. Tansel (2005) finds public sector wage premiums for both men and women in Turkey. Panizza (2001) finds a public sector premium in Latin America, particularly for female workers. By contrast Coppola and Calvo-Gonzalez (2011) show that in Peru there is a public sector wage premium in monetary compensation which disappears and instead turns into a public sector wage penalty when bonuses and in-kind payments are included in the analysis. In their estimates of public sector earnings gaps in the Arab Republic of Egypt, Tansel, Keskin and Ozdemir (2018) address issues of unobservable differences between public sector workers using panel data and individual fixed effects. They find public sector earnings penalties for men but premiums for women. Public sector earnings premiums for women are larger for workers from the lower quantiles of the conditional wage distribution. In contrast to much of the literature, in South Africa Kwanda and Ntuli (2018) find that the public-private earnings gap starts as a penalty for public sector workers at the bottom of the distribution of earnings, increases to large earnings premiums for public workers up to the 80<sup>th</sup> percentile and then falls slightly thereafter.

The analysis in this paper is most similar to the cross-national analysis of Finan, Olken, and Pande (2015) who estimate public sector wage differentials for 32 countries and find a public sector wage premium in almost every country, which is highest in low-income countries and then falls with income per capita. This paper differs from Finan, et al (2015) by including a significantly larger number of countries, including countries from all regions and income classes, and by considering how using alternative private sector comparators affects the estimated public sector premiums.

The results inform the debate about the methodology to correctly compare public and private sector earnings. Our approach differs from the many benchmarking studies done usually by human resource consulting firms that use the “jobs approach.” The jobs approach compares pay for a sample of similar public and private sector jobs and ignores the characteristics of the workers employed in the jobs. This approach necessarily entails limiting the benchmarking to large, formal sector firms, often multinationals, that explicitly classify jobs, and tends to find large public sector wage penalties. One problem with this methodology is that the alternative employment opportunities for public sector workers in developing countries are not limited to the formal private sector and may include self-employment and informal activities which pay far less (Alderman et al., 1996, Rama and Maclsaac, 1999). A second problem is that wage premiums are inferred from a relatively small, and not necessarily representative, selection of jobs included in the study.

This study instead follows the more common “worker approach” to estimating public sector premiums, which compares the earnings of public and private sector workers reported in household surveys after controlling for observed predetermined worker characteristics. This approach, however, suffers from significant limitations, including the omission of important determinants of worker productivity such as skills and motivation that are not observed in the data. We therefore consider three alternative estimates of public sector earnings differentials that compare the wages of public sector workers first to all private employees (formal and informal), and then to only private formal employees, and finally to private formal employees in the same occupation. When comparing to all employees there is a public sector wage premium in most countries, but when comparing to private

formal sector employees the estimated wage premium is not statistically significant in the majority of countries.

There are plausible arguments both for and against limiting the comparison group to private formal employees or private sector workers in the same occupation. Unfortunately, the data used in this study are too coarse to determine which comparison group generates more credible estimates. The results, therefore, highlight the importance of further research that utilizes richer data from specific contexts to better understand the pros and cons of using different comparison groups when estimating public sector wage premia.

The paper is structured as follows. The next section describes the data sources and variables. Section 3 outlines the empirical strategy. Section 4 discusses the results, and Section 5 concludes.

## **2. Data and Descriptive Statistics**

The analysis draws on data from the World Bank's Worldwide Bureaucracy Indicators, a country-level data set containing public sector labor market indicators produced by the World Bank.<sup>1</sup> The WWBI was in turn derived from the International Income Distribution Database (I2D2), which is a set of harmonized nationally representative household surveys—both welfare and labor force surveys—from approximately 130 countries. The I2D2 data set was supplemented with the Luxembourg Income Study (LIS), which similarly harmonizes household surveys from several mostly high-income countries.<sup>2</sup>

The indicators on public employment in the data set include the share of public employment relative to total, wage, and formal sector employment; and distributions of public and private sector workers by age, gender, and academic qualifications. The wage variables capture public sector earnings premiums by gender, age, area of residence, and occupation; and the distribution of public and private sector earnings, and the public sector earnings premium across the earnings distribution. We use the country-level regional and income classifications from the World Development Indicators (WDI) database. A selected list of variables and their description is given in Annex 2.

We applied a variety of criteria to determine which surveys to include, to ensure sufficient sample sizes for the main variables. We excluded from the sample surveys with more than 30 percent missing observations on sector of employment (public sector or private sector), wages, or occupation. We also excluded from the analysis countries with odd data; for example, in Haiti 100 percent of the respondents claimed to be working in the private sector, implying that Haiti has no public sector, which is clearly wrong. We used the most recent acceptable survey available for each country.

The resulting data set contains surveys covering the period from 2009 to 2016, for which we have 91 countries with data on public employment and 68 countries with data on wages. These include 31 countries in Sub-Saharan Africa (SSA), 16 in Latin America and the Caribbean (LAC), 15 in Eastern Europe and Central Asia (EECA), 8 in East Asia and the Pacific (EAP), 10 in high-income Western Europe and North America, 6 in the Middle East and North Africa (MENA) and 5 in South Asia (SA). See Annex 1 for the list of countries.

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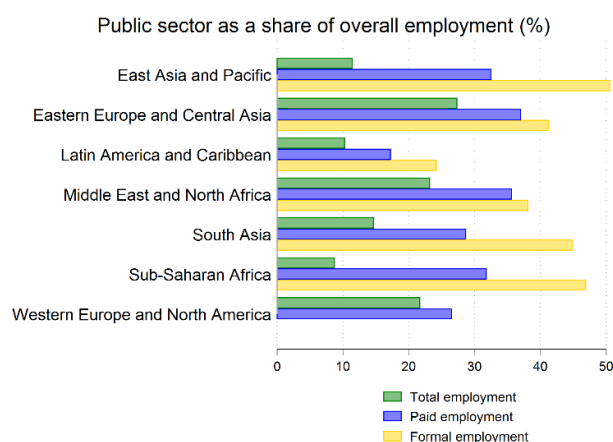
<sup>1</sup> <https://datacatalog.worldbank.org/dataset/worldwide-bureaucracy-indicators>.

<sup>2</sup> Where data exist for a country in the LIS but not in the I2D2, we use the LIS; where data exist for a country in both the LIS and I2D2, we use the I2D2.

Household surveys have their advantages and disadvantages as compared to administrative data, which are the other main potential source of information for public sector and general government employment and wages. The advantage of household surveys is that they provide a rich, consistent, and regularly updated set of variables for a variety of worker characteristics in the public and private sectors that enable robust, controlled comparisons. The disadvantage is that there may be systematic errors in individuals' responses to employment and wage questions, and many surveys do not collect information by sector or occupation to decompose the public sector into its various elements. Administrative data are potentially a more accurate and detailed measure of employment and wages in the public sector, but cannot be used to make comparisons with the private sector without resorting to other data sources, notably household surveys, that create inconsistencies. In addition, many countries do not have the administrative and information technology systems in place to regularly produce accurate data on public sector employees.

Several descriptive findings emerge from the data in the Worldwide Bureaucracy Indicators. First, the public sector is a very large employer, particularly in the wage employee and formal sector labor market. Overall, the public sector is 15 percent of total employment, 30 percent of paid (salaried) employment, and 39 percent of formal sector salaried employment.<sup>3</sup> Globally, we estimate that on average 39 percent of all employees with tertiary education work in the public sector, and in many countries this number is as high as 60 to 70 percent. Figure 1 also shows that the public sector accounts for the bulk of formal sector employment in all regions except Latin America, and Western Europe and North America. Apart from underlining the influence of public sector compensation policies on the broader labor market, this large size of the public sector highlights the importance of setting public sector compensation appropriately.

**Figure 1: Public sector is particularly large in some regions**



Source: WWBI, unweighted means across countries.

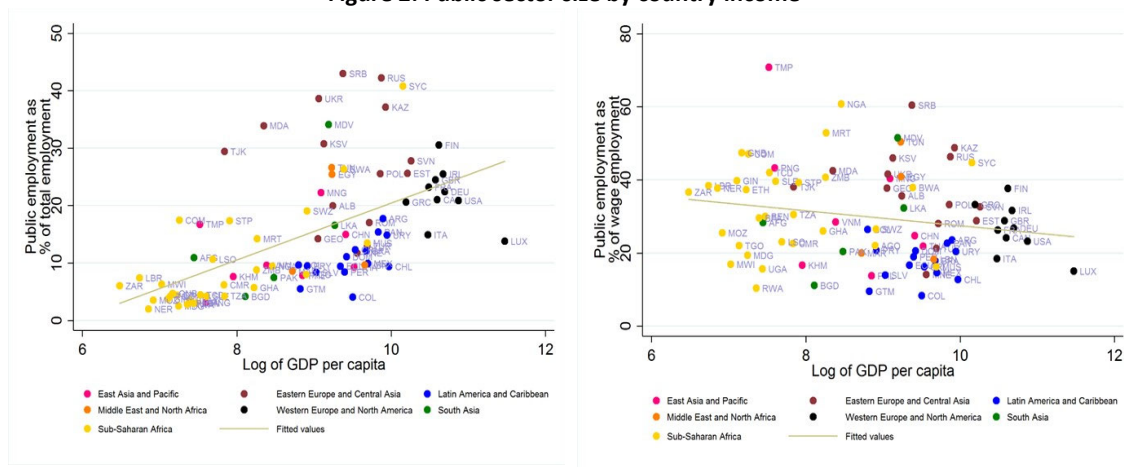
Cross-nationally, the size of the public sector as a share of total employment increases with a country's level of economic development (Figure 2, left panel). There is, however, no discernible relationship between country income levels and public sector employment as a share of salaried employment, which suggests that the public sector grows along with private formal sector wage employment (Figure 2, right panel).<sup>4</sup> There is considerable heterogeneity within these regional and income categories, revealing that countries also make choices in the numbers of their government personnel. Public sector shares of total employment range from less than 2 percent to over 40 percent, and of paid employment

<sup>3</sup> These are unweighted averages across the 91 countries in our sample. Total employed individuals are defined as those workers, aged 15 and above, who in the household surveys responded that they had a job in the prior week; wage employees are those whose basic remuneration is not directly dependent on the revenue of the unit they work for and are instead paid in wages and salaries, piece work, or in-kind, and therefore, exclude self-employed workers; and formal sector wage employees are those who also have an employment contract, have health insurance, belong to a union or who are inscribed in a pension program.

<sup>4</sup> For example, the public sector as a share of total employment is smaller in low-income SSA than in any other region, yet its share of formal sector employment is one of the largest of any region (Figure 1).

from 10 percent to 70 percent, with four- to five-fold variations in these shares at any given income level.

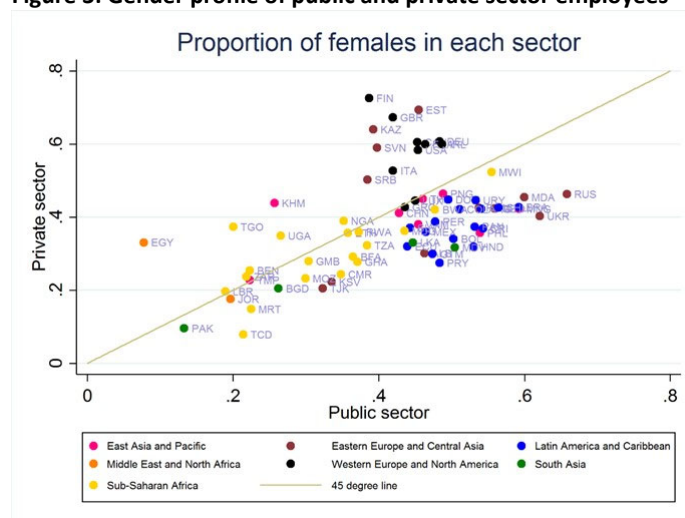
**Figure 2: Public sector size by country income**



Source: WWBI

Public sector workers are demographically quite different from their private sector counterparts—the public sector employs more women, and has older and more educated workers, than the private sector. Figures 3, 4, and 5 present the gender profile, age distribution, and educational attainment of public sector workers relative to private sector workers. In each of these figures, the 45-degree line indicates equal values for countries for the categories depicted in the two axes; and in all three figures, countries largely cluster below the 45-degree line, indicating higher shares for public sector workers for the category. The data reveal that the public sector has a higher proportion of female workers (Figure 3), older workers (Figure 4), and workers with secondary or higher education (Figure 5), respectively. These systematic differences between public and private sector workers have implications for any comparative analysis between the two labor markets, especially public-private wage differentials.

**Figure 3: Gender profile of public and private sector employees**

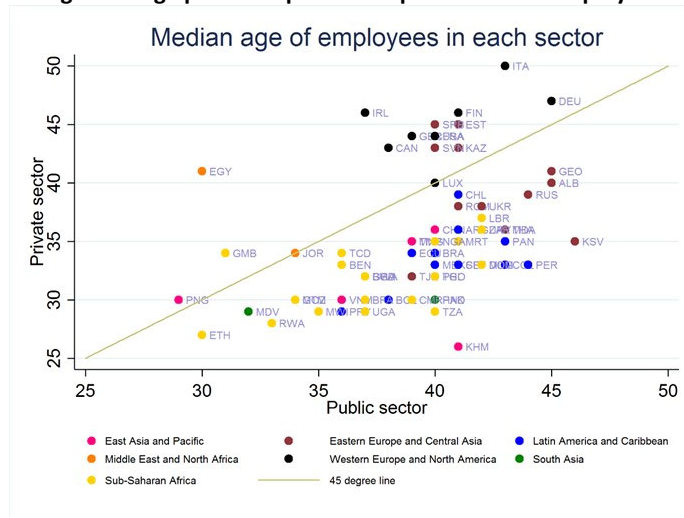


Note: The 45 degree line depicts equal values on the two axes

Source: WWBI

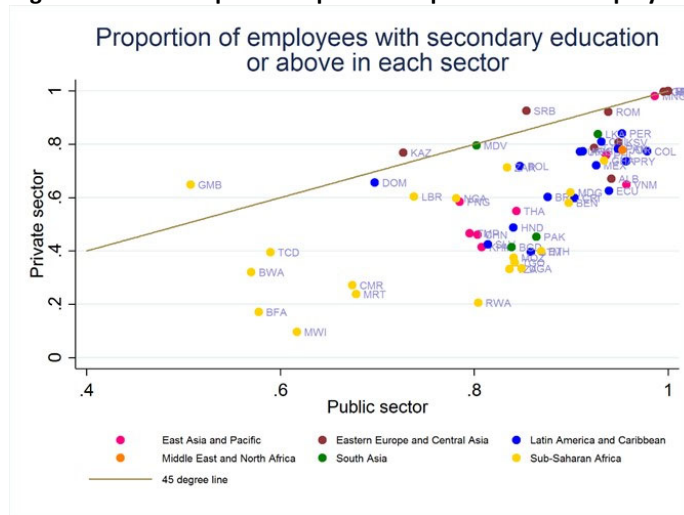


**Figure 4: Age profile of public and private sector employees**



Note: The 45 degree line depicts equal values on the two axes  
Source: WWBI

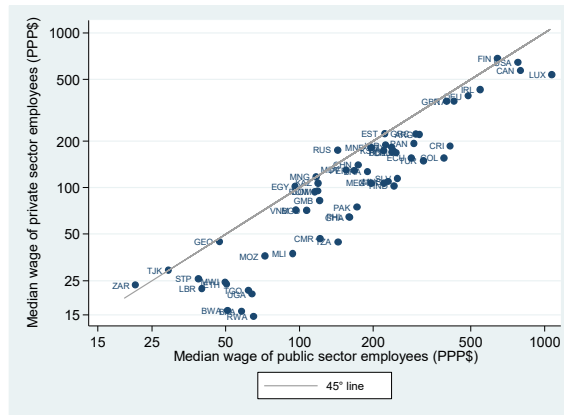
**Figure 5: Academic profile of public and private sector employees**



Note: The 45 degree line depicts equal values on the two axes  
Source: WWBI

A third notable descriptive finding is that public sector workers tend to earn higher wages than private sector workers. A simple comparison of average public and private sector wages shows that the public sector has a significant raw earnings premium (Figure 6). Median public sector weekly wages are higher than median private sector weekly wages for almost all countries in the sample. On average, the public sector earnings premium is 50 percent in low- and middle-income countries and declines to 20-25 percent in the richer countries. The wage data in the harmonized household surveys do not include bonuses and other payments paid to employees, which likely underestimates the public sector premiums given the generally higher proportion of pay given in the form of allowances in the public sector. The data also do not include in-kind payments, which also leads to underestimates of the public sector premium based on total compensation. In addition, the reported earnings do not include the value of other non-wage benefits such as health insurance, pensions, sick days and vacations.

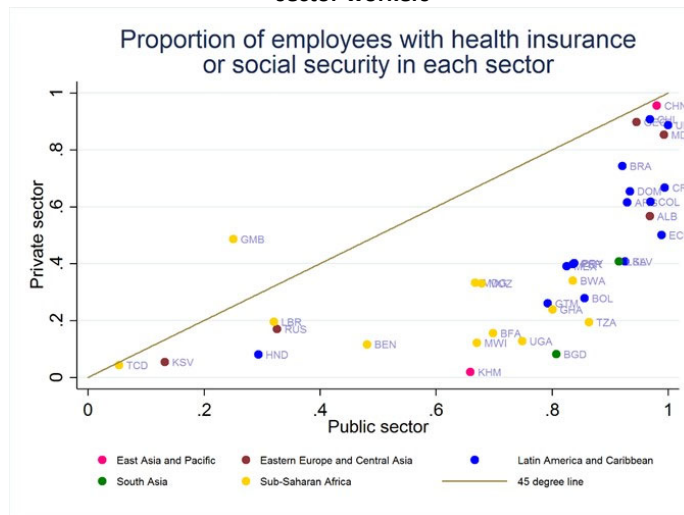
**Figure 6: Median weekly wages in the public and private sectors**



Note: The 45 degree line depicts equal values on the two axes  
Source: WWBI

The public sector also offers many more of these non-wage benefits to workers than the private sector. As Figure 7 below shows, a higher proportion of public sector workers have either health insurance or social security, the two most important and widely provided benefits, than private sector workers in all countries in the sample. Therefore, ignoring the value of non-wage benefits tends to understate the raw earnings premium compared to all private sector workers. Combined with the public sector earnings premiums, the data suggest significantly higher average total compensation in the public sector compared to the private sector.

**Figure 7: Health insurance or social security of private and public sector workers**



Note: The 45 degree line depicts equal values on the two axes  
Source: WWBI

These simple wage differentials should be interpreted with caution given the significant differences in worker characteristics of the two sectors. Higher wages of public sector workers could be due to their higher average age and educational attainment. A more meaningful measure is public sector wage premiums controlling for some of these observable features. We turn to these next.

### 3. Empirical Strategy

To control for observed worker characteristics that would affect wages, we estimate a standard Mincerian wage regression with a dummy variable indicating whether the worker is employed in the public sector or private sector.<sup>5</sup> The basic specification is:

$$\log w_i = \alpha + \beta \cdot PUBLIC_i + X_i \cdot \gamma + \epsilon_i$$

Where  $\beta$  is the adjusted public-private earnings difference;  $\log w_i$  is log(weekly wages in local currency) of employee  $i$ ;  $PUBLIC_i$  is a dummy=1 if wage employee works in public sector; and  $X_i$  is a vector of standard controls including age, age squared, level of education (four levels in the I2D2 and three in the LIS), location (urban/rural), and sex. We estimate the equation separately for each country using OLS. The estimated standard errors are robust to heteroscedasticity but are not adjusted for clustered survey design.<sup>6</sup> The data used include only salaried employees with a positive wage. We estimate additional specifications that restrict the private sector to formal wage employees only, other specifications that interact  $PUBLIC_i$  with gender, education, and occupation, and finally a specification that uses quantile regression to estimate the premium at different points in the conditional earnings distribution.

We chose this simple specification in part because there is a limited variety of variables available in the I2D2 and LIS databases that are consistently defined across countries. For a similar reason there is no variable in the I2D2 database that can reasonably be used as an instrumental variable, which limits the ability to properly control for selection or endogeneity. As noted above, the earnings variable is also limited to self-reported wages, and does not include bonuses, allowances, and in-kind payments, which can be significant in the public sector. The data set has information on the presence of some work benefits, such as health insurance and social security, but these are not monetized and cannot be added to wages to provide an estimate of total compensation.

As discussed above, we follow the bulk of the literature in taking a “workers approach” to estimating wage premia, which differs from the many benchmarking studies that use the “jobs approach” (Bales and Rama, 2001; Gittleman and Pierce, 2011). The jobs approach is potentially problematic, as it assumes that the relevant private sector comparators are workers in large, formal sector firms. Using nationally representative household surveys rather than administrative data on jobs offers more flexibility, by allowing results to be compared across a variety of control groups. The standard approach includes all private sector employees in the control group, irrespective of the jobs where they are employed. Because the data in this case also include information on formality and occupation, the standard workers approach can be supplemented by limiting the control group to similar formal

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<sup>5</sup> The two main empirical approaches in the literature are the Mincerian wage regression with a dummy variable indicating whether the worker is employed in the public sector or private sector; and the Oaxaca-Blinder decomposition which does not assume that the returns to education, gender, age and other observable worker characteristics are the same in the public and private sectors. The latter method decomposes the wage differential into a part that can be explained as resulting from worker endowments, and an unexplained part presumably due to economic rents that the public sector enjoys. The two approaches in general give similar results (Gittleman and Pierce, 2011), so we use the dummy variable method as it is simpler to present. To allow the public sector earnings differential to vary between individuals we estimate Mincer-style wage gaps by gender, age, occupation, skill level and other characteristics.

<sup>6</sup> Standard errors are not adjusted for clustering due to the lack of a primary sampling unit identifier in many of the surveys.

employees, or employees in similar occupations. Including job-related characteristics to define the control group makes the estimates conceptually similar to the jobs approach.

In this paper, we first compare the earnings of public sector workers with the earnings of all salaried employees. We then estimate public sector earnings premiums by comparing public sector employees with private formal employees, and also further divide workers by occupation. In this way we examine the sensitivity of the estimated wage premium to including job-related controls.

#### 4. Results and Discussion

The main findings are that the public sector generally pays a wage premium, even after controlling for observable worker characteristics, but that the size of the premium varies considerably across countries, is sensitive to the private sector comparator, and is heterogeneous across demographic and job characteristics.

Figure 8 plots the earnings premium (estimated  $\beta$  values) against each country's 2015 per capita GDP (measured in PPP terms). The left panel (8a) shows the premium when the public sector is compared to all private sector salaried employees; 68 percent of countries in our data set have a statistically significant premium,<sup>7</sup> but there is considerable heterogeneity in the size of the premium across countries, varying from a penalty of 40 percent to a premium of 60 percent. Public sector workers face a statistically significant penalty in fewer than 20 percent of the countries in our sample. Overall, and consistent with the previous literature, the public sector premium is larger in developing countries than in the high-income countries. Still, the relationship between income per capita and the public sector earnings premium does not fall consistently with income per capita; the highest premiums tend to be in middle-income countries. Premiums tend to be highest in Latin America and consistently lowest in Eastern Europe and Central Asia.<sup>8</sup>

The right panel of Figure 8 (8b) shows the premium when public sector workers are compared to private formal sector workers only. Note that we only separate the private formal and informal sectors for developing countries because the LIS does not have the necessary information to identify formal employees, and because informal employment in high-income countries is likely to be small. When we compare the public sector to private formal sector employees, the public sector premium falls for almost all countries, and disappears in many countries—fewer than half (46 percent) of the countries in our sample have a statistically significant public sector earnings premium—but again there is considerable heterogeneity in the size of the premium. Overall, public sector workers face a statistically significant earnings penalty in 17 percent of the countries in the sample, while in 37 percent of the countries the earnings gap between public and private formal sector workers is not significantly different from zero.<sup>9</sup> Further, when we compare public sector earnings to private formal sector employees only there is no correlation between GDP per capita and public sector earnings differences,

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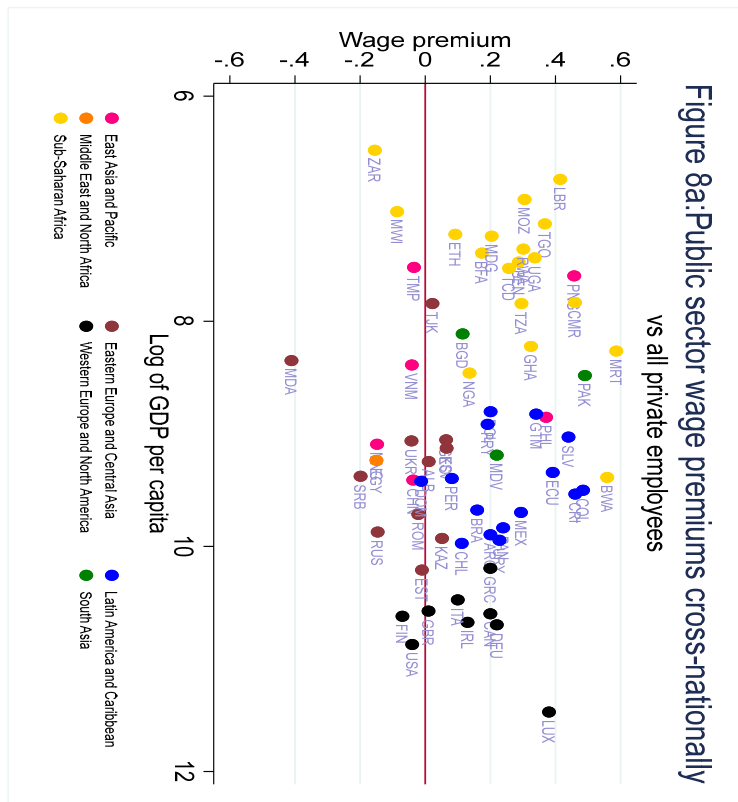
<sup>7</sup> Unless otherwise noted, in this paper “statistically significant” indicates that the public sector earnings premium or penalty is significantly different from zero at the 5% significance level.

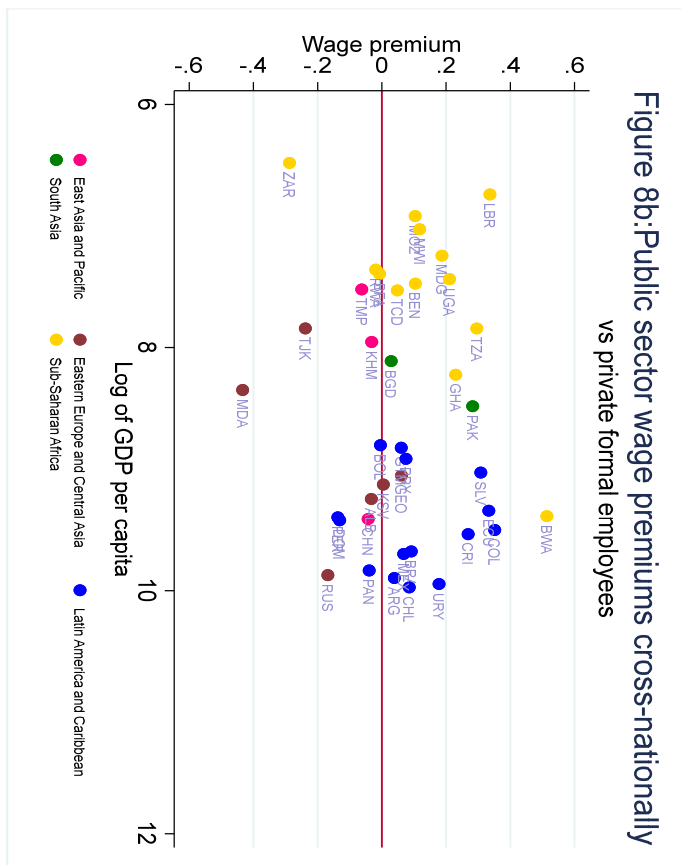
<sup>8</sup> Public sector workers face an earnings penalty in several Eastern European and Central Asian countries such as the Russian Federation, Serbia, Romania and Tajikistan. In most other EECA countries the difference between public and private earnings is not statistically significant. Lausev (2014) reports public sector earnings penalties in Eastern European countries during their transition to market economies, although these penalties disappeared as transitions continued.

<sup>9</sup> Because the estimated standard error does not account for clustering within primary sampling units, this figure underestimates the share of countries for which the wage premium and penalty are not statistically significant.

and public sector premiums are no longer higher in developing economies than in high-income countries.

Figure 8: Public sector wage premiums cross-nationally





These findings underscore the importance of the choice of the private sector comparator. There are plausible arguments both for and against limiting the control group to formal private sector employees.<sup>10</sup> One benefit of limiting the control group to formal sector employees is that it will reduce the bias due to unobserved characteristics, such as motivation or skills, that may systematically differ between public sector and private informal sector employees. An additional benefit is that it will better estimate the total compensation premium of the public sector as both public and private formal sector workers are likely to receive similar non-wage benefits such as social security and other worker protections, while workers in the informal sector do not generally receive these benefits.

On the other hand, limiting the control group to formal sector employees has drawbacks as well. First, it may “overcontrol” by excluding the possibility that informal wage employment is a viable alternative to public employment. This would underestimate the public sector wage premium by failing to consider the informal sector, which offers below-average wages, as a potential counterfactual to public sector employment. In addition, limiting the control group to formal sector employees makes the resulting wage premium and penalty representative of only formal workers. This may be appropriate if the intent is to estimate the premiums enjoyed by public sector workers, for example to examine issues related to public sector retention. But to the extent the estimated public sector wage premium intends to capture the penalty faced by informal workers in the private sector, limiting the control

<sup>10</sup> Limiting the control group is an alternative to adding a formal sector dummy as a control variable in the model. Because no informal sector workers are employed in the public sector, the public sector dummy does not vary within the set of informal workers. Therefore, when controlling for formality, the data are only informative about wage premia for formal workers. Limiting the sample to formal sector employees is preferable to adding a formal dummy as a control, however, because it gives a more conservative estimate of the standard error.

group could also underestimate the wage premium. This is because the public sector wage premium appears to be smallest for the types of workers overrepresented in formal employment, such as better educated workers. Further analysis, based on richer panel data containing information on worker characteristics, skills, and work transitions, is needed to better assess the relative magnitude of these biases and evaluate whether excluding informal sector workers from the control group improves or worsens the accuracy of the estimated wage premia.

Where public sector workers come from, and where they go if they leave, could shed light on the appropriate private sector comparator. A few studies have used panel data to examine transitions between public and private sector jobs, such as tracer studies of separated public sector workers. These studies suggest that for many workers, particularly unskilled workers, the relevant alternative employment includes informal self-employment and informal sector salaried employment, while the appropriate comparison for skilled workers may be the private formal sector or (formal) self-employed professionals (Alderman et al., 1996, Rama and MacIsaac, 1999, Girsberger and Meango, 2017, Yassin and Langot, 2017). Girsberger and Meango (2017) present data on transitions between the public, private formal and private informal sectors from West Africa. Most less-educated workers who leave jobs in the public sector go to the informal sector, and once in the informal sector very few transition into a private formal sector job or back to the public sector. On the other hand, more-educated public sector workers who leave the public sector tend to go to self-employment or formal salaried employment. For all workers, the biggest source of transitions into the public sector is from unemployment. Yassin and Langot (2017), which presents transition probabilities for Egypt, also find that most workers who enter the public sector come from unemployment. For workers with a tertiary education, a significant proportion of public sector workers also come from formal self-employment, most likely as professionals. For more educated workers public sector employment is very stable—over 98% of those with a tertiary education in the public sector were in the public sector 3 years before. On the other hand, there is much less stability in the public sector for less educated workers.

In summary, the transition data from developing countries suggest that since less-skilled public sector employees who leave the public sector tend to go to the informal sector, their appropriate comparison includes informal sector employment. On the other hand, since workers with a tertiary education do not tend to move into the informal sector when they lose their jobs, but often move back and forth between the private formal sector and the public sector, the appropriate comparison for them is the private formal sector. In the discussion below we focus on developing countries and present evidence for both comparators (all private employees and only private formal employees).

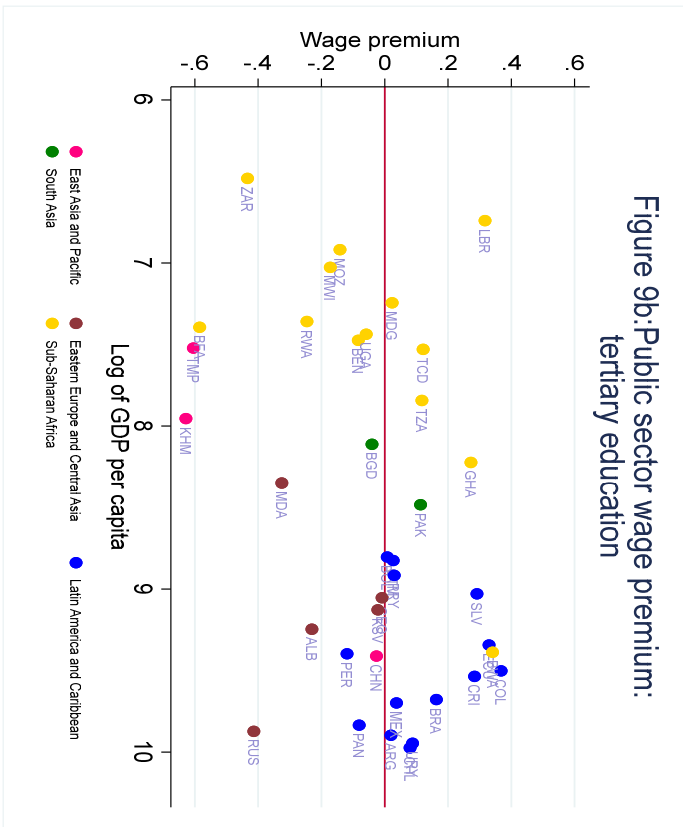
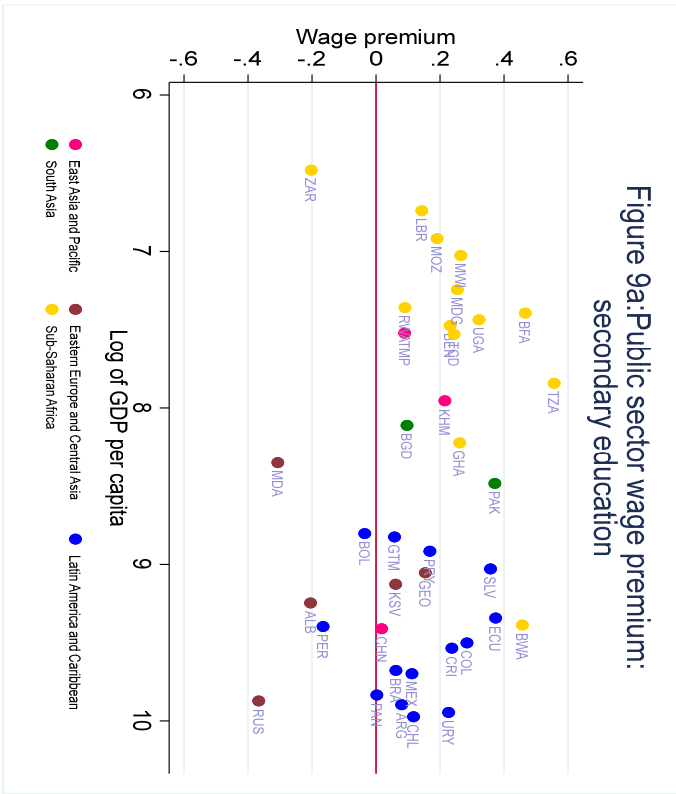
These patterns of public sector employment transitions also suggest that the estimates of public sector earnings differentials should differentiate between less-skilled and more-skilled workers. When we estimate earnings differentials by education level and compare to private formal employees, we find that the relationship between education level and the public sector earnings premium is not monotonic. The average premium across countries is 7.8 percent for employees with a primary education, 11.6 percent for employees with a secondary education, while employees with a post-secondary education pay an average penalty of 3.4 percent. Figure 9 shows that for most countries, public earnings premiums are higher for employees with secondary education than for workers with post-secondary education. Compared to private formal sector workers, secondary school graduates working in the public sector earn statistically significant premiums in 54 percent of countries (and penalties in only 10 percent), while employees with post-secondary education earn statistically significant premiums in only 24 percent of countries. In most countries (56 percent) the earnings for

public sector workers with post-secondary education are not statistically different from their private formal sector counterparts.

We argued above that the appropriate comparison for less skilled public sector employees includes both private formal and private informal employees. When the comparison is to all private sector employees, primary school graduates and secondary school graduates earn significant public sector earnings premiums in 46 percent of countries and 73 percent of countries respectively (and fewer than 10 percent pay significant penalties), strengthening the conclusion that less-educated employees are more likely to earn premiums than those with post-secondary education.



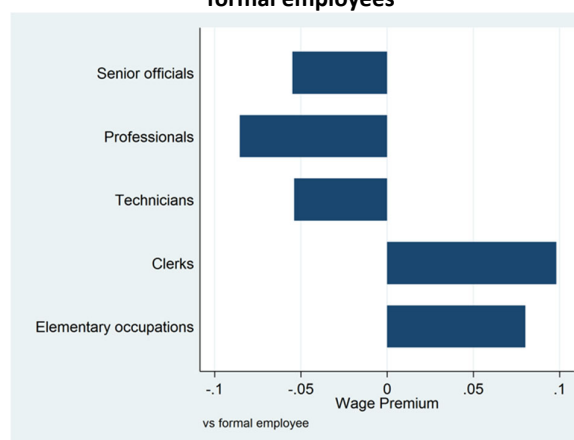
Figure 9: Public sector wage premiums (vs. private formal employees), by education levels



The above analysis implicitly assumes that workers with the same personal characteristics should be paid the same wage irrespective of the job they do, and therefore a public sector wage premium represents an economic rent (Moulton 1990). However, it is possible the public sector has a different distribution of jobs—larger proportions of workers in managerial, professional, and clerical occupations, and fewer in sales and laborer occupations—and that these jobs require additional responsibilities that are not accounted for in premium estimates that only control for workers’ observable characteristics. To account for the possibility that the public sector wage premium compensates for the additional requirements necessary for these occupations, we consider a hybrid of the worker and jobs approach and estimate the wage premium for the main occupational categories, while also controlling for worker observable characteristics, so that similar workers in similar jobs are compared in the two sectors.<sup>11</sup>

When we control for both individual characteristics and differences between occupations, public sector workers receive neither a statistically significant premium nor pay a penalty in most countries in the sample. That is, in more than 50 percent of countries and occupations in our sample, public and private formal sector earnings are not significantly different, although there is quite a bit of heterogeneity between occupations. The public sector is more likely to pay earnings premiums for clerks and workers in elementary occupations, but penalties for senior officials, professionals, and technicians

**Figure 10: Premiums by occupation; public vs. private formal employees**



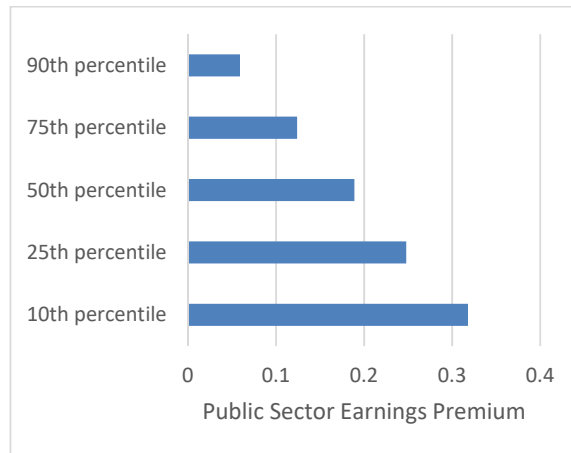
Source: WWBI, unweighted means across countries

(Figure 10). For example, when compared to private formal sector employees, professionals face a statistically significant public sector earnings penalty in 34 percent of countries in our sample (and a premium in 20 percent), while workers in elementary occupations earn a significant public sector earnings premium in 36 percent of countries (and pay a penalty in 15).

<sup>11</sup> Our data set only has information on these main occupational categories and we cannot further disaggregate into the three-digit occupations within these categories. The following occupational categories which have relatively few public sector workers are not shown in Figure 10: agriculture, service and market sales workers, craft workers, and machine operators. In addition, armed services are not included as there are few private sector workers in this occupation.

Quantile regressions can be used to estimate the public sector earnings premium and penalty at different points in the conditional earnings distribution (Angrist and Pischke, 2009). The conditional earnings distribution will be related to, but not be exactly the same as, the unconditional (actual) earnings distribution. If, for example, only one explanatory variable were included such as education, -then the conditional earnings distribution would be the distribution of actual wages for each level of education, so that someone in the 90<sup>th</sup> quantile and 5 years of education would earn more than 90% of all workers with 5 years of education (and so on for all education levels and quantiles). Angrist, Chernozhukov, and Fernandez-Val (2006) show that in the context of earnings regression estimates, “quantile regression coefficients can be used directly to describe “residual inequality,” i.e. the spread in the wage distribution conditional on the variables included in the quantile regression model” (p.540). Beginning with Juhn, Murphy and Pierce (1993), many labor economists have interpreted the residual inequality in earnings regressions as the inequality of earnings due to unobserved skills.

**Figure 11: Premiums by position in the conditional earnings distribution of all employees**



Source: WWBI, unweighted means across countries

Figure 11 presents the average across countries of the earnings premium from the bottom (10<sup>th</sup> percentile) of the distribution to the top (90<sup>th</sup> percentile) of the distribution. Figure 11 shows that public sector earnings premiums are largest at the bottom of the conditional earnings distribution, falling from 32 percent for workers at the 10<sup>th</sup> percentile to 6 percent for workers at the 90<sup>th</sup> percentile. Once again, this suggests that low-skilled employees are more likely to earn a public-sector premium than are high-skilled employees.

To summarize, after allowing earnings to compensate for the characteristics of individual workers and the characteristics of different occupations, on average across all workers public sector workers earn neither a premium nor penalty in most developing countries in our sample, although there are important differences by occupation and skill level. Low-skilled public sector workers, whose alternative employment opportunities are likely to include informal sector employment, are most likely to be overpaid in the public sector; while many highly skilled workers face a public sector wage penalty. In terms of overall compensation though, it is likely that the premium for public sector workers is higher than our estimates given that the public sector offers more benefits than the private sector, and these results do not factor in the significant non-pecuniary features of employment, such as job security, that are also likely to further tilt compensation in favor of the public sector.

These findings underline the importance of nuanced public sector wage policies. Many governments regularly enact across-the-board wage increases for their workers that have relatively high fiscal costs and are inefficient as they exacerbate the public sector wage premium for low-skilled workers and may be insufficient to reduce the public sector wage penalty for high-skilled workers.

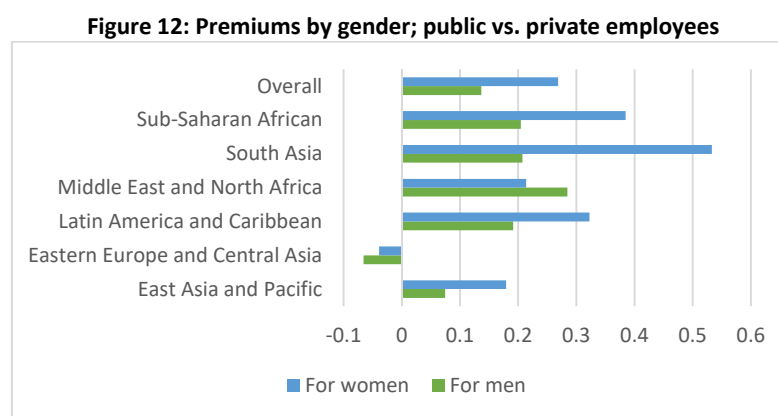
In almost all the countries in our sample, the public sector pays a higher wage premium to women compared to men (Figure 12). On average across all countries, women receive a wage premium of 27 percent, as compared to 14 percent for men, and the premium is higher in all regions of the world but MENA. The reasons for these gender differences could be due to both employment and wage factors. Women could be disproportionately represented in public sector occupations, such as teaching and nursing, which have a higher wage premium. Wage discrimination against women may also be lower in the public sector given that salary scales are determined by regulations and may leave less discretion for managers to differentiate pay based on gender for similar occupations and workers. The higher public sector earnings premium for women could help to explain why women are more likely to find work in the public sector than men, especially if the reason is that women face discrimination in the private sector but not in the public sector.<sup>12</sup> These relative gender differences are an important area for further research.

## 5. Conclusion

There is a rich literature on public-private wage premiums that focuses largely on high-income countries. Our paper adds to this literature by exploring this topic for a larger set of countries, particularly developing countries, than has been done in the past. In doing

so, we reinforce some findings in the literature, while also obtaining more surprising results. As in other studies, we find that the public sector pays a wage premium. However, this premium disappears in most developing countries when public sector workers are compared to private sector formal workers. In that case, the premium is higher for women, lower skilled employees, and employees with lower unexplained wages. These patterns suggest that the public sector premium for public sector workers may be smaller in magnitude than the private sector penalty for private sector workers, who tend to be less well-educated and have lower-paid jobs than their public sector counterparts. Furthermore, there is no significant relationship between country income levels and the size of the wage premium, either compared to all wage employees or only formal sector wage employees.

The paper points to several questions for future research. First, what is the appropriate private sector comparator given the heterogeneity in premiums across employee characteristics? Administrative data sets that identify transitions between public and private sector employment, or panel household surveys with rich information on workers' skills, can be potentially valuable sources of data to explore this issue. The appropriate comparator may also differ for different types of workers. Second, what are the determinants of the cross-country heterogeneity in the size of the wage premiums given that country income levels are not a major factor? The literature emphasizes the strength of public sector employee unions, but there are no studies to our knowledge that explore the role of unions in a large sample of countries. Other possible explanations could be the strength of political business cycles, the



Source: WWBI, unweighted means across countries

<sup>12</sup> In Turkey, Tansel (2005) finds public sector wage premiums for women are higher because men earn more than women in the private formal sector, while men and women are paid essentially the same in the public sector.

role of populist political parties, the ability of the government to raise funds to pay workers (i.e., taxes), and the market power of the government in specific sectors and occupations. Finally, is there any relationship between wage premiums and the experience and competence of public servants, government policy formulation and policy implementation capacity, corruption and the quality of public service provision? Given significant wage premiums in some countries, and concomitantly high fiscal costs of public sector workers, do these relatively high wages incentivize better public sector performance and lead to higher government productivity?

## References

- Angrist, J., V. Chernozhukov, and I. Fernandez-Val (2006), "Quantile Regression under Misspecification, with an Application to the U.S. Wage Structure," *Econometrica*, 74(2): 539-563
- Angrist, J. and J-S Pischke, (2009), *Mostly Harmless Econometrics: An Empiricists Companion*, Princeton University Press, Princeton,
- Bales, S. and M. Rama (2001). "Are Public Sector Workers Underpaid? Appropriate Comparators in a Developing Country", *Policy Research Working Paper 2747* (Washington DC: The World Bank).
- Christophides, L. and M. Michael (2013), "Exploring the public-private sector wage gap in European countries," *IZA Journal of European Labor Studies* 2(15): <https://doi.org/10.1186/2193-9012-2-15>
- Coppola, A. and O. Calvo-Gonzalez (2011). "Higher Wages, Lower Pay: Public vs. Private Sector Compensation in Peru", *Policy Research Working Paper 5858* (Washington DC: The World Bank)
- Ehrenberg, R. G. and Schwarz, J. L. (1986). Public sector labor markets. In O. Ashenfelter and R. Layard (eds.), *Handbook of Labor Economics*, (pp. 1219—67). Amsterdam: North-Holland.
- Filmer, D., and D. Lindauer (2001). "Does Indonesia Have a 'Low Pay' Civil Service?", *Bulletin of Indonesian Economic Studies*, 37 (2): 189-205
- Finan, F. B. Olken, and R. Pande (2015). "The Personnel Economics of the State", *National Bureau of Economic Research Working Paper 21825*
- Gibson, J. (2009), "The Public Sector Pay Premium, Compensating Differentials and Unions: Propensity Score Matching Evidence from Australia, Canada, Great Britain and the United States", *Economics Bulletin*, 29(3): 2325–32.
- Ginsberger, E. M. and R. Meango (2017), "The Puzzle of Educated Unemployment in West Africa," paper presented at the IZA Workshop on Labor and Development, Bonn, October.
- Giordano, R. (2015), M. Pereira, D. Depalo, B. Eugène, E. Papapetrou, J. Perez, L. Reiss, and M. Roter (2015). "The Public Sector Pay Gap in a Selection of Euro Area Countries in the Pre-crisis Period." *Review of Public Economics* 214 (3): 11-34
- Gittleman, M. and B. Pierce (2011). "Compensation for State and Local Government Workers", *Journal of Economic Perspectives* 26 (1): 217: 242
- Glinskaya, E. and M. Lokshin (2005). "Wage differentials between the public and private sector in India", *Policy Research Working Paper 3574* (Washington DC: The World Bank)
- Gregory, R. and Borland, J. (1999), "Recent Development in Public Sector Labor Markets" in *Handbook of Labor Economics*, edited by O. Ashenfelter and D. Layard. Amsterdam, North Holland.
- Juhn, C., K. Murphy and B. Pierce (1993) "Wage Inequality and the Rise in Returns to Skill," *Journal of Political Economy* 101 (3): 410-442.
- Kwenda, P. and M. Ntuli (2018), "A detailed decomposition analysis of the public-private sector wage gap in South Africa," *Development South Africa*, 35(6): <https://doi.org/10.1080/0376835X.2018.1499501>

- Lausev, J. (2014), "What has 20 years of public-private pay gap literature told us? Eastern European transitioning vs. developed economies," *Journal of Economic Surveys*, 8(3): 516-550.
- Moulton, B. (1990). "A Reexamination of the Federal- Private Wage Differential in the United States", *Journal of Labor Economics* 8 (2): 270-293
- Panizza, U. (2001), "Public Sector Wages and Bureaucratic Quality: Evidence from Latin America", *Economía*, 2(1): 97–139.
- Tansel, A. (2005) "Public-Private Employment Choice, Wage Differentials, and Gender in Turkey," *Economic Development and Cultural Change* 53(2): 453-477,
- Tansel, A., H. L. Keskin, H. I., and Z. A. Ozdemir (2018), "Public versus private sector wage gap in Egypt: Evidence from Quantile Regression on panel data," IZA Discussion Paper 11895 (October).
- Yassin S. and F. Langot (2017), "Informality, Public Employment and Employment Protection in Developing Countries," IZA Discussion Paper 11014, September.

## Annex 1: Countries in the data Set

Our main source of data is the World Bank's Worldwide Bureaucracy Indicators (WWBI) which can be downloaded from <https://datacatalog.worldbank.org/dataset/worldwide-bureaucracy-indicators>. The latest version of WWBI covers 115 countries from 2000-2016. We restrict our sample to 2009-2016, which covers 91 countries for which we have public employment information and 68 countries with data on wages. For each country, we use the most recent year of data for the analysis. The tables below list the countries with their latest available year of data.

### Public and private sector employment data: 91 countries in the sample

Year	Number of countries	
2009	8	Botswana, Morocco, Maldives, Nigeria, Papua New Guinea, Poland, Russian Federation, Eswatini
2010	13	Canada, Cameroon, France, Guinea-Bissau, Ireland, Kazakhstan, Lesotho, Romania, Serbia, São Tomé and Príncipe, Timor-Leste, Turkey, Vietnam,
2011	11	Afghanistan, Benin, Chad, Guatemala, Lebanon, Mauritius, Mongolia, Montenegro, Thailand, Togo, Tunisia
2012	15	Albania; Cambodia; Congo, Dem. Rep.; Costa Rica; Egypt, Arab Rep.; Ghana; Guinea; Madagascar; Mexico; Moldova; Mozambique; Panama; Paraguay; Slovenia; Uganda
2013	19	Chile, China, Comoros, Dominican Republic, Estonia, Ethiopia, Finland, Georgia, Germany, Greece, Luxembourg, Malawi, Rwanda, Seychelles, Sri Lanka, Tajikistan, Ukraine, United Kingdom, United States
2014	19	Angola, Argentina, Bolivia, Brazil, Burkina Faso, Colombia, Ecuador, El Salvador, Italy, Kosovo, Liberia, Mauritania, Niger, Pakistan, Peru, Philippines, Sierra Leone, Tanzania, Uruguay
2015	4	Bangladesh, Djibouti, The Gambia, Zambia
2016	2	Honduras, Jordan

Region	Number of countries
East Asia & Pacific	8
Eastern Europe & Central Asia	15
Latin America & Caribbean	16
Middle East & North Africa	6
Western Europe and North America	10
South Asia	5
Sub-Saharan Africa	31

### Public and private sector wage data: 68 countries in the sample

Year	Number of countries	
2009	5	Botswana, Maldives, Nigeria, Papua New Guinea, Russian Federation
2010	8	Canada, Cameroon, Ireland, Kazakhstan, Romania, Serbia, Timor-Leste, Vietnam
2011	6	Benin, Guatemala, Mongolia, Chad, Thailand, Togo
2012	13	Albania; Cambodia; Congo, Dem. Rep.; Costa Rica; Egypt, Arab Rep.; Ghana; Madagascar; Mexico; Moldova; Mozambique; Panama; Paraguay; Uganda



2013	16	Chile, China, Dominican Republic, Estonia, Ethiopia, Finland, Georgia, Germany, Greece, Luxembourg, Malawi, Rwanda, Tajikistan, Ukraine, United Kingdom, United States
2014	16	Argentina, Bolivia, Brazil, Burkina Faso, Colombia, Ecuador, El Salvador, Italy, Kosovo, Liberia, Mauritania, Pakistan, Peru, Philippines, Tanzania, Uruguay
2015	2	Bangladesh, The Gambia
2016	2	Honduras, Jordan

Region	Number of countries
East Asia & Pacific	8
Eastern Europe & Central Asia	11
Latin America & Caribbean	16
Middle East & North Africa	2
Western Europe and North America	9
South Asia	3
Sub-Saharan Africa	19

41 countries have both wage and formal employment information:

Year	Number of countries	
2009	2	Botswana, Russian Federation
2010	1	Timor-Leste
2011	3	Benin, Guatemala, Chad
2012	12	Albania; Cambodia; Congo, Dem. Rep.; Costa Rica; Ghana; Madagascar; Mexico; Moldova; Mozambique; Panama; Paraguay; Uganda
2013	7	Chile, China, Dominican Republic, Georgia, Malawi, Rwanda, Tajikistan,
2014	13	Argentina, Bolivia, Brazil, Burkina Faso, Colombia, Ecuador, El Salvador, Kosovo, Liberia, Pakistan, Peru, Tanzania, Uruguay
2015	2	Bangladesh, The Gambia
2016	1	Honduras

Region	Number of countries
East Asia & Pacific	3
Eastern Europe & Central Asia	6
Latin America & Caribbean	16
Middle East & North Africa	0
Western Europe and North America	0
South Asia	2
Sub-Saharan Africa	14

## Annex 2: Description of variables

Variable	Description
<i>Main Country-level variables</i>	
<i>Sector of employment: Public or private</i>	<p>Variable is constructed for all persons administered this module in each questionnaire. Classifies the main job's sector of activity of any individual with a job (labor status=employed) and is missing otherwise.</p> <p>Public sector includes general government and state-owned enterprises. State owned includes para-statal firms and all others in which the government has control (participation over 50%). Private sector is that part of the economy which is both run for private profit and is not controlled by the state.</p> <p>Information is mainly missing for people below working age, unemployed and for people out of the labor force. Other missing values are allowed.</p>
<p><i>Labor status:</i></p> <ul style="list-style-type: none"> <li>• Employed</li> <li>• Unemployed</li> <li>• Not-in-labor force</li> </ul>	<p>Variable is constructed for all persons administered the labor module in each survey. The lower age cutoff (and perhaps upper age cutoff) at which information is collected will vary from country to country.</p> <p>All persons are considered active in the labor force if they presently have a job (formal or informal, i.e. are employed) or do not have a job but are actively seeking work (i.e. unemployed).</p> <p>Employment and unemployment definitions are taken from the survey itself.</p>
<p><i>Employment status</i></p> <ul style="list-style-type: none"> <li>• Paid Employee</li> <li>• Non-Paid Employee</li> <li>• Employer</li> <li>• Self-employed</li> <li>• Other, workers not classifiable by status</li> </ul>	<p>Variable is constructed for those who are working (labor status=employed). Definitions taken from the International Labor Organization's Classification of Status in Employment with some revisions to take into account the data available. Classifies the main job employment status of any individual with a job (<i>labor status=employed</i>).</p> <p><b>Paid employee</b> includes anyone whose basic remuneration is not directly dependent on the revenue of the unit they work for, typically remunerated by wages and salaries but may be paid for piece work or in-kind. The 'continuous' criteria used in the ILO definition is not used here as data are often absent and due to country specificity.</p> <p><b>Non-paid employee</b> includes contributing family workers are those workers who hold a self-employment job in a market-oriented establishment operated by a related person living in the same households who cannot be regarded as a partner because of their degree of commitment to the operation of the establishment, in terms of working time or other factors, is not at a level comparable to that of the head of the establishment.</p> <p><b>Employer</b> is a business owner (whether alone or in partnership) with employees. If the only people working in the business are the owner and 'contributing family workers, the person is not considered an employer (as has no employees) and is, instead classified as own account.</p> <p><b>Own account or self-employment</b> includes jobs are those where remuneration is directly dependent from the goods and service produced (where home consumption is considered to be part of the profits) and have not engaged any permanent employees to work for them on a continuous basis during the reference period.</p> <p>Members of producers' cooperatives are workers who hold a self-employment job in a cooperative producing goods and services in which each member takes part on an equal footing with other members in determining the organization of production, sales and/or other work of the establishment, the investments and the distribution of the proceeds of the establishment amongst the members.</p> <p><b>Other, workers not classifiable by status</b> include those for whom insufficient relevant information is available and/or who cannot be included in any of the preceding categories.</p>
<i>Wages</i>	<p>Public and private monthly wages in the surveys are for the respondent's main job (job to which the person dedicated the bulk of their time in the week preceding the survey) as a paid employee. The data includes all wage and salaried employees, so that the estimates are the public sector earnings premium relative to private wage and salaried employees. Wages reported for different units of time in different surveys were harmonized to the monthly wage equivalent. The analysis excludes self-employed workers as many do not report any wages, and if wages are reported they may not be comparable to the reported wages of employees.</p>

<i>Private formal sector employee</i>	are those who also have an employment contract, have health insurance, belong to a union or who are inscribed in a pension program
<i>Contract</i>	indicates if a person has a signed (formal) contract, regardless of duration. This variable is constructed only if there is an explicit question about contracts in the survey.
<i>Health insurance</i>	Classifies health insurance status of any individual with a job. Constructed only if there is an explicit question about health security in the survey.
<i>Social security</i>	Classifies the social security status of any individual with a job. Constructed only if there is an explicit question about pension or social security.
<i>Union membership</i>	Classifies the union membership status of any individual with a job. Constructed only if there is an explicit question about trade unions in the survey.

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