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The public-private sector wage gap in Lithuania: evidence from social security data

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ABSTRACT

This paper estimates high-dimensional fixed effects models using detailed administrative data to characterize the public-private wage gap in Lithuania between 2010 and 2020. We quantify that public sector employees earn, on average, 10% more than their private sector counterparts. A decomposition exercise reveals that public sector employers pay only 0.3% less to all their employees, suggesting that the existing premium is not due to organization-specific wage policies. We also document that women benefit from working in the public sector, as they have a 16% premium due to both being employed in organizations with higher premiums and having higher returns to individual-specific components compared to women in private firms. In contrast, men have higher returns to unobserved permanent heterogeneity, which are particularly high for public sector workers, but they are with employers that have lower premiums relative to men in the private sector, resulting in an observed public sector premium of 4%. Our results highlight the importance of using mobility across firms, not just across sectors, and of isolating firm-specific wage components from other sources of wage variation to properly understand the sources of pay differentials across employers with different wage-setting protocols.

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1. Introduction

Wage differentials between the public and private sectors have important implications for government spending, labor market efficiency, the allocation of talent across sectors, and the proper functioning of the public administration. It is not surprising, therefore, that the analysis of the public-private wage gap is a long-standing but still active topic among academics and of interest to public sector officials and policymakers.

Existing research has typically documented a wage premium for public sector workers relative to those in private firms (see Abdallah et al., 2023; Bargain et al., 2018; Bonaccolto-Töpfer et al., 2022; Costa, 2023; De León & Dolado, 2023; Hospido & Moral-Benito, 2016; Singleton, 2019; Vilerts, 2018, for some of the most recent work on this topic). Most of

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these studies have relied on observed characteristics and worker fixed effects to account for heterogeneity in the workforce across firms. However, except for Singleton (2019), they have overlooked the role of firms, for which there is growing evidence of their crucial role in wage dispersion (see Card et al., 2018, for a review).

Firm-specific wage components are particularly relevant in comparing public and private sector wages because public sector wage setting is heavily constrained by bureaucratic pay scales, unionization, and budgetary constraints that are not as relevant in the private sector. As a result, these policies can affect both hiring and the wages that different workers can earn in the public sector relative to the private sector. To properly understand what drives the existence of a public-private wage gap, it is therefore crucial to isolate firm-specific wages, as well as the sorting of workers across employers, from other determinants of wage variation. This allows for a more nuanced and detailed view of the sources of wage heterogeneity that contribute to wage differentials between workers employed in the public and private sectors.

In this paper, we characterize the public-private wage gap in Lithuania. To do so, we use a unique Social Security dataset that allows us to follow workers over time and across public and private sector organizations between January 2010 and December 2020. In the first step, we estimate high-dimensional fixed effects models to account for worker and firm permanent heterogeneity as well as for the differential sorting and mobility of workers across employers. With this approach, we are able to isolate firm-specific wage components from other sources of wage variation, such as workforce composition. We then use these estimates to implement a wage decomposition to analyze the contribution of each source of heterogeneity driving the raw wage gap to understand what drives the wage differential.

Our results show that between 2010 and 2020, the wages of the average public sector employee in Lithuania were about 10% higher than those in the private sector. However, if we compare only firm-specific wage components, the public-private wage gap barely survives, as the average public-sector employee works for a firm with a 0.3% lower premium than the employer of the average private-sector employee. Interestingly, the observed private-public wage gap is different for each sex: women in the public sector have 16% higher wages than female employees in private firms, while the gap is *only* 4.7% among men.

For men, we find that they are employed in public organizations that have firm-specific wage components that are 7% lower than employers where the private sector counterparts are. This is not the case for women, who instead benefit from being in the public sector by working for organizations that have pay premiums that are 4% higher relative to women in the private sector. Moreover, the levels of worker-specific wage components are higher in the public sector both for men (10% premium) and for women (5%). Thus, while for women, the firm and worker unobserved permanent heterogeneity together explain roughly 60% of the public-private sector wage gap, for men, they operate in different directions, contributing to explaining the lower pay premium.

Time-varying heterogeneity also plays a role in explaining the observed premium of public sector employees. For men, we find that the returns to the job ladder, as measured by occupation fixed effects, are almost 1% lower in the public sector than in the private sector, but women particularly benefit, as they exhibit effects that are 3.5% higher. Regarding the returns to labor market experience (age) and firm-specific experience, while both men and women in the public sector have higher returns to these

characteristics, the returns are higher for women. Looking at firm size effects, we find that men in the public sector benefit from working for larger organizations compared to men in the private sector, while for women, firm size effects reduce the public sector premium.

This paper connects to the existing literature in two main dimensions. We contribute to the large and still growing literature using AKM models to quantify the role of firms in explaining contemporaneous wage gaps between men and women (e.g. Card, Cardoso, & Kline, 2016; Palladino et al., 2023), natives versus immigrants (e.g. Dostie et al., 2023), unionized versus non-unionized workers (Addison et al., 2023), by race (e.g. Gerard et al., 2021), or across industries (Card, Rothstein, & Yi, 2024). We do so by quantifying an employer-based public-private sector wage differential, which, to the best of our knowledge, has only been done before in the context of the UK by Singleton (2019). We also add to the extensive literature on understanding wage differentials between the public and private sectors (e.g. Bargain et al., 2018; Bonaccolto-Töpfer et al., 2022; Costa, 2023; De León & Dolado, 2023; Hospido & Moral-Benito, 2016) by characterizing employer premiums as well as decomposing the raw gap into different wage components that capture observed and unobserved heterogeneity of workers and firms.

The rest of the paper is organized as follows. Section 2 introduces the public sector wage setting, whereas Section 3 describes the data. Section 4 presents the econometric approach. Section 5 discusses the results. Section 6 concludes.

2. Wage setting in the Lithuanian public sector

Wage determination in the Lithuanian labor market is mainly regulated by two institutions, namely the minimum wage and the Labor Code, as collective agreements are very rare. The national minimum wage, set by the Government, determines the legal minimum that employees must receive in exchange for their work. The Labor Code defines the general working conditions and regulates the components of employees' remuneration. Importantly, the Labor Code was significantly amended in 2017, establishing, among other things, that the minimum wage can be paid only to unskilled workers.

Both labor market institutions apply equally to the public and private sectors. However, while private sector organizations are only constrained by these nationwide labor regulations as to how much they can pay each of their employees, public sector institutions are subject to additional constraints. These constraints are intended to ensure the viability of public finances as well as a fair wage policy that limits inequality within firms. However, these regulations also introduce considerable heterogeneity in the compensation of public sector workers who happen to work in different organizations within the public sector.

The fixed salary of public sector employees depends on two components. On the one hand, the so-called *basic salary*, which is set each year by the Government resolution through the Law on the Basic Salary of State Politicians, Judges, State Officials, and Civil Servants of the Republic of Lithuania, determines the common salary components within the public sector. On the other hand, an organization-specific component, regulated by separate legal acts, determines the minimum and maximum level of remuneration of employees in different categories of the public sector. However, not all public sector institutions regulate the salaries of all their employees in the same way, as some units only have specific rules for the top management[1].

3. Data

3.1. Social security records

Our dataset comes from administrative records provided by the State Social Security Fund Board. The available dataset is a 25% random sample of people registered in the Social Security system at any time between 2000 and 2020[2]. The dataset has a longitudinal design that allows individuals to be tracked over time and across firms. For each sample member, we observe demographic information (e.g. sex, age, family information), and if they are employed with a contract, we have information on all work-related income subject to social security contributions paid by the employer, including base salary as well as bonuses, allowances, overtime, commissions, or severance payments. In addition, the dataset contains information on job characteristics (e.g. tenure, occupation) and firm characteristics (e.g. legal setting, industry)[3].

To define public and private sector organizations, we combine information on the legal structure of the firm as well as the 2-digit NACE2 economic activities classification identifying the Public Administration Sector. Following the legal structure of the firm, public sector organizations include budgetary institutions, public bodies, state-owned companies, and the central bank. Moreover, NACE2 code 84 identifies institutions operating in the public administration, which we also consider to be the public sector if they do not fall under the previous classification, for example, because it is not reported. The rest of the organizations are considered private-sector firms.

The labor income variable refers to *all* work-related income subject to Social Security contributions, including base salary and non-regular payments such as bonuses, allowances, overtime pay, commissions, or severance payments[4]. This is a broad measure of earnings, as it directly captures any payment made by the employer in a given month. There is an important limitation that is worth discussing. The data set does not report information on hours worked. This implies that we cannot calculate hourly wages or restrict the analysis to full-time workers. To mitigate this issue, we employ daily wages, computed as monthly income divided by days worked in the month and expressed in real terms using the 2015 consumer price index.

3.2. Analysis sample

For our analysis, we impose the following restrictions on the raw dataset. We focus on the period 2010 to 2020 because the quality of information is significantly better, and we can track workers at a monthly frequency. From this sample, we target workers aged 20 to 60 who have jobs in both private and public sectors, with full information[5]. We exclude observations where workers are employed but also receive social benefits to avoid situations where workers miss some work days, for example, due to sick leave. Moreover, we only keep observations such that the labor income in the month is at least half of the current monthly minimum wage. In this way, we aim to remove workers with low labor market attachment in that month, as well as those who work very few hours, as we do not observe hours or part-time status[6]. For each remaining job spell, we drop the last observation to exclude severance and other payments upon job termination (e.g. unused vacation). Finally, if workers have more than one job in a month, we keep the wage observation related to the longest job spell and restrict the final sample to

workers with at least two valid observations between 2010 and 2020. The resulting sample consists of 416,162 workers and 84,033 firms observed over 25,625,010 monthly observations between January 2010 and December 2020, with 32% of the workers observed at least one month in the public sector.

Table 1 reports basic summary statistics for public and private sector workers. The table shows that compared to the private sector, public sector employees tend to be older and more likely to be female, married, and have at least one child. In addition, these individuals have been employed at their current companies for a longer period and are more likely to hold a job classified as high-skilled based on the occupation classification. Not surprisingly, virtually all public sector employees work in the service sector, compared to less than 40% of private sector employees. Location also differs, with the public sector under-represented in Lithuania's three largest cities. Public sector organizations also tend to be bigger and, as a result, have more job switches per organization. Importantly for our econometric approach, the set of firms through which workers move, i.e. the largest connected set of firms, captures more than 97% of the observations in the estimation data, yielding a very similar sample composition. Noteworthy, on average, there is a sufficiently high number of job switches, which reduces the noise in the estimation of firm fixed effects (Andrews et al., 2012; Bonhomme et al., 2023).

In terms of earnings, the pooled data show a wage premium of about 7% (6% in the largest connected set) in favor of public sector workers. Panel A of Figure 1 shows that differences in (log) daily wages shrank between 2015 and 2018, to start diverging again afterward. In terms of earnings dispersion, the public sector exhibits a lower mass of workers earning the minimum wage but, interestingly, also a larger mass of individuals in the top half of the distribution, as shown in Panel B of Figure 1. This different shape of the distribution can be explained by the difference in occupational composition in both sectors (see Appendix C Figure C.4, Supplementary material)[7]. In the next section, we describe the econometric model we rely on to decompose the public-private sector wage gap into worker and firm permanent heterogeneity and other factors.

Table 1. Summary statistics.

	Cleaned data		Connected set	
	Public	Private	Public	Private
Women	0.785	0.435	0.786	0.434
Lithuanian	0.994	0.970	0.994	0.971
Married	0.680	0.592	0.680	0.588
Parent	0.802	0.693	0.803	0.690
Age	45.63	40.48	45.63	40.35
Wage	3.30	3.23	3.30	3.24
Tenure	8.15	4.70	8.15	4.62
High-skilled occupation	0.708	0.380	0.708	0.370
Vilnius; Kaunas; Klaipeda	0.485	0.583	0.485	0.584
Service sector	0.995	0.376	0.995	0.374
Firm size	53.03	12.40	55.80	13.56
Job switchers	12.87	6.35	13.58	7.16
No. workers	111,764	344,132	111,308	334,041
No. firms	6,380	77,653	6,037	68,643
No. observations	6,639,339	18,985,671	6,615,349	18,419,709

Notes: Wages refer to (log) daily earnings expressed in real terms using the 2015 Consumer Price Index. Tenure is expressed in years. Vilnius, Kaunas, and Klaipeda are the three largest cities in Lithuania.

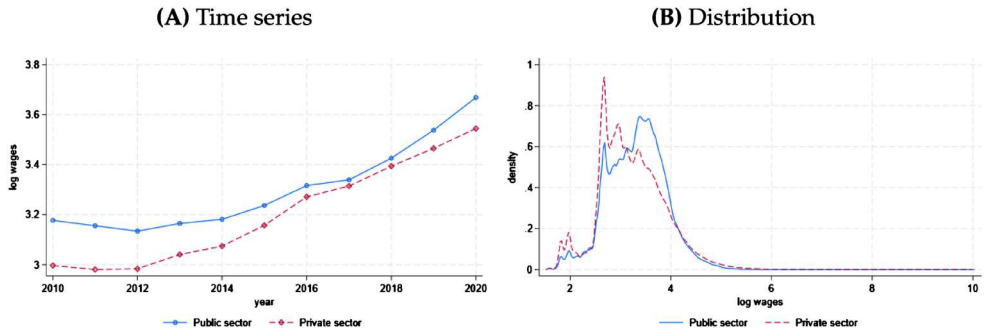

Figure 1. Wages by sector. (A) Time series (B) Distribution. Source: Social Security records and own calculations.

Notes: Panel A shows (log) real daily earnings for the public and private sectors over time. Panel B plots the distribution of (log) real daily earnings, net of time effects, for public and private sector organizations.

4. Econometric approach

4.1. Model and decomposition

4.1.1. Wage regression

To estimate employer wage premiums, we adopt an AKM specification (Abowd et al., 1999), which assumes that the firm- and worker-specific components are additively separable functions of (log) wage as follows

$$y_{it} = \eta_i + \psi_{j(i,t)} + \theta_{o(i,t)} + X_{it}\Omega + \epsilon_{it} \tag{1}$$

where y_{it} is the log daily earnings of worker i in month t. η_i represents time-invariant wage-specific components of the worker, such as ability. $\psi_{j(i,t)}$ is the fixed effect of firm j in which worker i is employed in period t to capture persistent wage differences across firms that are enjoyed by *all* workers in a given firm, i.e. employer wage premiums or pay policies. $\theta_{o(i,t)}$ represents 2-digit ISCO code occupation fixed effects to capture occupational heterogeneity between the private and public sectors. X_{it} are time-varying covariates, including quadratic polynomials in age, tenure, and firm size, as well as year and month-fixed effects[8]. ϵ_{it} is the error term that reflects purely transitory wage fluctuations.

4.1.2. Employer-based pay differential

From Equation (1), the employed-based public-private sector wage gap can be calculated based on the difference between the average of firm fixed effects in the public and private sector, as follows

$$\hat{\Psi} = E\left[\hat{\phi}_{J(it)} \mid J \in \text{Public}\right] - E\left[\hat{\phi}_{J(it)} \mid J \notin \text{Public}\right] \tag{2}$$

where $\hat{\Psi}$ simply represents the difference in wage premiums enjoyed by *all* workers in the public sector relative to those enjoyed by *all* workers in the private sector. In other words, $\hat{\Psi}$ is the wage differential between the public and private sectors once observed and unobserved (worker) heterogeneity and differential sorting of workers to firms are taken into account. Thus, this comparison of firm fixed effects will reflect productivity

differences across organizations, heterogeneous rent-sharing protocols, or other firm-specific factors that are ultimately factored into company wages and are shared by all their workers (Card et al., 2018).

4.1.3. Gelbach's decomposition

To decompose the contribution of worker heterogeneity, employer wage premiums, as well as time-varying components to the observed public-private wage gap, we rely on the decomposition proposed by Gelbach (2016). This decomposition, which is based on the omitted variable bias formula, has the advantage of unambiguously quantifying the share of the gap that is due to the set of variables included in Equation (1) that represents our *full* model. Formally, consider as the *base* model a simple linear regression including a dummy for public sector employees (and month-year dummies), such that $\tilde{\beta}$ is the coefficient attached to the public sector indicator and measures the *raw* gap between workers in public and private sector organizations, net of time effects. Following Gelbach (2016), one can prove by the Frisch-Waugh-Lovell theorem that[9].

$$\tilde{\beta} = \hat{\delta}_{\eta} + \hat{\delta}_{\phi} + \hat{\delta}_{\Omega}$$

where $\hat{\delta}_{x}$ are simply the coefficients from the projection of each of the estimated effects of the variables in the full model, worker fixed effects ($\hat{\eta}$), firm fixed effects ($\hat{\phi}$), and groups of time-varying characteristics predicted effects ($X\hat{\Omega}$) onto the public sector dummy.

4.2. AKM identifying assumptions

Before turning into the results, we evaluate the two main identifying assumptions for the validity of the estimates of worker and firm fixed effects from the AKM model[10].

4.2.1. Exogenous mobility

Firm fixed effects are unbiased if worker mobility between employers is exogenous or uncorrelated with the time-varying components of the residual in Equation (1). Formally, this would mean that strict exogeneity holds, i.e. $E[\epsilon_{it} \mid \eta_i, \psi_{j(i,t)}, X_{it}] = 0$. In this context, If the model is correctly specified, workers who move from low-wage employers to high-wage employers should experience a wage increase and vice versa. Conversely, if workers experience wage increases regardless of the type of job change, this would suggest the existence of job match effects, as workers take advantage of favorable specific job opportunities. To assess this assumption, we follow the widely used in the related literature (Card et al., 2018) to document how job mobility relates to employer changes and wage gains. Specifically, we focus on workers who change jobs in a given quarter but have held the previous job for at least 6 months prior to the job change and hold the new job for at least another 6 months. For this group of workers, we classify their jobs according to the average wage in the firm, calculated as total payroll divided by total employment on December 31 of each year, and track their wages over time before and after the job change. Figure 2 shows that workers who move up to better-paying employers show sizable wage gains, while those who fall down the ladder experience losses. Moreover, these movements are almost symmetric when looking at the private sector, while for public firms, there seem to be slight differences with respect to some

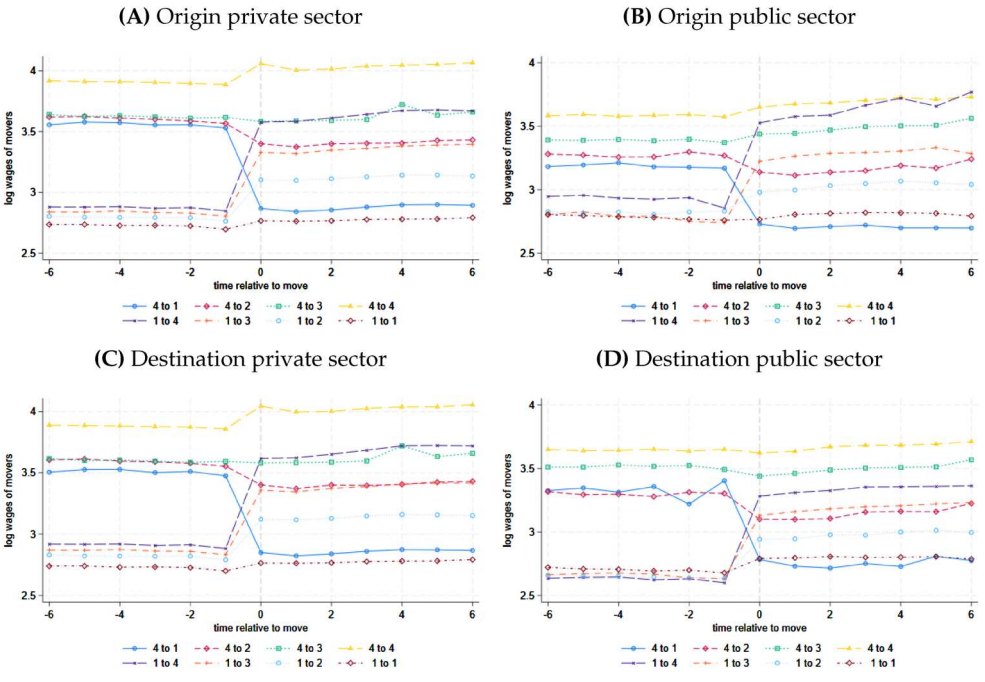

Figure 2. Average wages of switchers by quartile of firm average wages. (A) Origin private sector (B) Origin public sector (C) Destination private sector (D) Destination public sector. Source: Social Security records and own calculations.

Notes: The figure shows the average wages of switchers by quartile of firm average wages (total wage bill divided by total employment by December 31st each year) by origin and destination firms before the movement. Wages are net of year and age effects. The vertical line represents the month when the new job starts.

movements. Still, they do not seem stark enough to suggest a critical violation of the exogeneity assumption.

4.2.2. Additive separability

The second assumption relates to the additive separability of the firm and worker effects. If the assumption fails to hold, one should observe systematic differences in the residuals within the pairs defined by the worker and firm fixed effects cells. To assess whether additive separability, in Figure 3, we group workers and firms into 10 cells based on the estimated effects from Equation (1), then we plot the average residuals across those 100 pairs separately for the private and public sector. The figure reveals that there are some differences between the private and public sectors in the sign of the residuals within cells. This might suggest differences in the wage determination process between the public and private sectors. Note that the assumption should hold in the full sample, since we are pooling private and public sectors. Thus, the opposite signs might be partially reflecting the split sample we are doing. However, in general, the magnitude of the errors is small, especially when compared to the wage gains from mobility described in Figure 2, suggesting that there are no large deviations from the assumption of additive separability even if public and private sectors are not having the exact same wage determination process. For example, even in the most worrisome situation, the cell formed by the

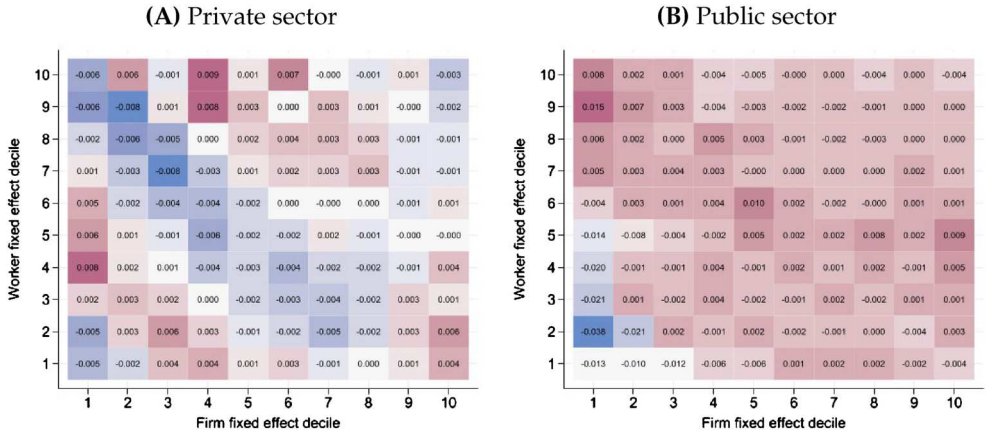

Figure 3. Additive separability assumption. (A) Private sector (B) Public sector. Source: Social Security records and own calculations.

Notes: The figure plots the average residuals from Equation (1) by deciles of worker and firm fixed effects. The deciles of worker and firm fixed effects distributions refer to the full sample. The residuals are then plotted by deciles separately for the public and private sectors.

second decile of worker fixed effects and the first decile of firm fixed effects in the public sector shows the largest average residual of −0.038. Examining workers whose employer before moving was in the public sector (Panel B) and moving from the 1st to the 2nd quantile of the employer wage distribution shows wage gains between 0.10, so the residual represents at most 38% of the wage gain.

5. Workers and firms in the public-private sector gap

5.1. The wage gap across models

Table 2 presents estimates of the public-private wage gap for the average Lithuanian worker and by sex. The first row indicates that once month and year effects are removed, public sector employees earn almost 10% higher wages compared to workers in private firms. The existence of the premium is consistent with most of the

Table 2. Public-private sector wage differential, 2010–2020.

	Pooled	Men	Women
1. Raw gap	0.0988	0.0469	0.1613
	(0.0022)	(0.0050)	(0.0027)
2. Movers approach	0.0789	−0.0053	0.1215
	(0.0049)	(0.0093)	(0.0055)
3. AKM approach	−0.0036	−0.0692	0.0397
	(0.0012)	(0.0033)	(0.0015)
Observations	25,625,010	11,608,645	12,942,145

Notes: Raw gap in row 1 refers to a linear regression of the (log) real daily earnings on the public sector dummy, including only month and year fixed effects as controls. Movers approach in row 2 estimates a panel data model where the (log) real monthly wages are projected onto the public sector dummy along with worker and occupation fixed effects plus quadratic polynomials in age, tenure, firm size, as well as month and year fixed effects. AKM approach in row 3 estimates the model in Equation (1) that accounts for firm, worker, and occupation fixed effects plus quadratic polynomials in age deviations from 40, tenure, firm size, as well as month and year fixed effects. The gap in row 3 is calculated as $E[\hat{\phi}_{J(it)} \mid J \in \text{Public}] - E[\hat{\phi}_{J(it)} \mid J \notin \text{Public}]$. Standard errors are clustered at the worker level in parentheses.

existing evidence for several advanced economies (see Abdallah et al., 2023 for a collection of findings in the literature), where the average documented gap is 10%, but there is a wide range of heterogeneity, from a penalty for public sector workers in Estonia, Denmark, or Sweden of around 12% to premiums as high as 20% in Luxembourg or Ireland. However, our estimates are about 2 to 5 percentage points lower than previous estimates for Lithuania based on survey data for the period 2004–2012 (Campos et al., 2017; Christofides & Michael, 2013)[11]. We also measure the raw wage gap for men and women separately and document a premium of 4.7% and 16%, respectively. These results are consistent with existing evidence that this premium is particularly salient for women (e.g. Bonaccolto-Töpfer et al., 2022; Campos et al., 2017; Christofides et al., 2013; Hospido & Moral-Benito, 2016).

In the second row, we quantify the wage gap following a common approach in the literature, i.e. using worker-fixed effects along with other time-varying characteristics such as occupation, age, tenure, and firm size, in addition to time effects as controls. In this model, the public-private sector wage differential is solely identified by workers moving into and out of the public sector and, hence, allows to keep worker (unobserved) permanent heterogeneity constant. The results indicate that while these characteristics matter, they do not seem to play a critical role in explaining the raw gap for the average worker, as the premium only reduces to 8%. However, when we estimate the model separately for men and women, we find that for men, the gap disappears completely, while for women, the estimated gap is 75% of the raw gap. This reduction in the public sector premium is consistent with existing studies that emphasize the importance of accounting for selection (e.g. Bonaccolto-Töpfer et al., 2022; Costa, 2023; Hospido & Moral-Benito, 2016).

The movers' approach overlooks the role of firms in the wage gap because it does not take into account firms' wage policies or the sorting of workers across employers. Thus, the third row presents estimates from the AKM model described in Equation (1). We find that once the firm-specific wage components, i.e. the wage premium enjoyed by all workers in a given firm, are isolated from other sources of wage dispersion, such as observed and unobserved worker heterogeneity as well as differential sorting across employers, public sector organizations pay only slightly lower wages (0.3% lower wage premiums) than private firms. When we estimate the model separately for women and men, i.e. firm fixed effects are gender specific as in Singleton (2019), we document that male public sector employees work for lower-paying companies compared to their private sector counterparts, and the opposite is true for women. While these sex differences are consistent with a similar study for the UK by Singleton (2019), the results for Lithuania contrast with those for the UK, as we find that men are penalized by being in the public sector, while in the UK there is no premium or penalty. Interestingly, our results are quantitatively similar for women.

To put the average employer-based wage differential between the private and public sectors into context, we construct a weighted gap for the average worker using the gender-specific effects reported by Singleton (2019). This exercise yields a small premium in favor of the public sector of 0.037, indicating slightly higher firm-specific wages in the UK public sector compared to Lithuania. However, this small difference, positive or negative, in organizational wage policies between the public and private sectors does not imply an absence of a public sector wage gap. Rather, workforce heterogeneity

and differences in the returns to such heterogeneity are likely more relevant. Importantly, if public sector wages are set inefficiently –such as uniform wage-setting practices that ignore economic conditions; this would still be loaded into the firm-specific wage components. Examining the distribution of firm fixed effects reveals that public sector organizations exhibit a less dispersed distribution of wage policies and appear to be particularly underrepresented at the top (see Figure 4). These distributional differences would then be reflected in the average employer-based wage gap between the public and private sectors.

5.2. Decomposition of the observed wage gap

To better understand the contribution of worker- and firm-side heterogeneity in explaining the wage gap, Table 3 reports the results of Gelbach's decomposition.

For the average worker, the decomposition shows that half of the observed wage gap of 10% in favor of public sector workers is explained by the fact that these workers have higher individual-specific wage components or, in AKM words (Abowd et al., 1999), there are more high-wage workers in the public sector[12]. The results also point to high-paying occupations being more common in the public sector; these higher occupation returns are likely to emerge from middle-top occupations as professionals are overrepresented in the public sector compared to the private sector (see Figure C.4, Supplementary material). In addition, we find that the returns to age (labor market experience) and tenure (firm-specific experience) appear to be higher among public employers. Finally, as already suggested by the wage gap obtained from comparing employer wage premiums, the results indicate that firm-specific wage components contribute negatively to the observed public sector premium. However, the contribution is small compared to the components (i.e. only 3% in absolute value). This suggests that firm-specific wage components explain little of the observed public sector wage premium in Lithuania, which is consistent with (Singleton, 2019) findings for the United Kingdom. Notably, the uncovered contribution is also smaller compared to the extent to which firms explain other gaps in the literature. For example, firm fixed effects explain 20% of the immigrant-native wage gap in Canada (Dostie et al., 2023), two-thirds of the union premium in Portugal (Addison et al., 2023), or 5-6% of the racial wage gap in Brazil (Gerard et al., 2021).

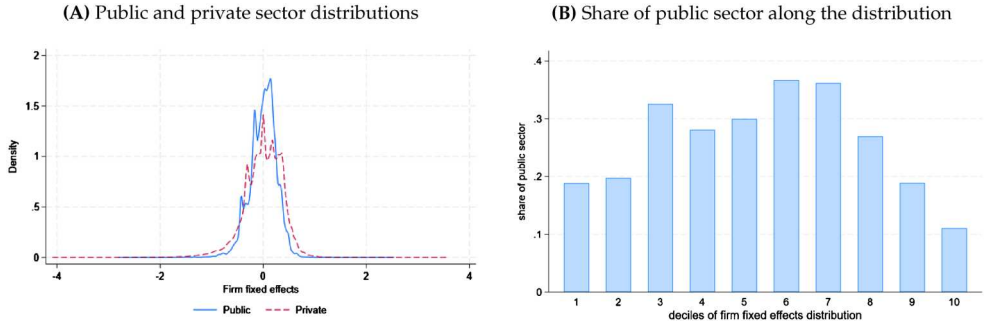

Figure 4. Distribution of firm fixed effects. (A) Public and private sector distributions (B) Share of public sector along the distribution. Source: Social Security records and own calculations.

Notes: Panel A shows the distribution of firm fixed effects estimated from (1). Panel B shows the share of the public sector in each decile of the firm's fixed effects distribution.

Table 3. Gelbach decomposition of the public-private sector wage gap.

	Pooled	Men	Women
Raw gap	0.0988	0.0469	0.1613
	(0.0022)	(0.0050)	(0.0027)
lDecomposition			
Firm fixed effects	−0.0023	−0.0696	0.0420
	(0.0012)	(0.0033)	(0.0015)
Worker fixed effects	0.0518	0.0953	0.0504
	(0.0019)	(0.0046)	(0.0022)
Occupation fixed effects	0.0102	−0.0087	0.0353
	(0.0004)	(0.0008)	(0.0006)
Age effects	0.0222	0.0157	0.0240
	(0.0003)	(0.0005)	(0.0003)
Tenure effects	0.0107	0.0028	0.0167
	(0.0001)	(0.0003)	(0.0001)
Firm size effects	0.0061	0.0115	−0.0071
	(0.0003)	(0.0004)	(0.0004)

Notes: Raw gap in row 1 refers to a linear regression of the (log) real daily earnings on the public sector dummy, including only month and year fixed effects as controls. The decomposition refers to the contribution of each covariate to the full model in Equation (1) to the raw gap. Standard errors are clustered at the worker level in parentheses.

As discussed earlier, men and women appear to reap different wage benefits from working in the public sector relative to the private sector. The decomposition exercise allows us to quantify the contribution of each covariate in the model to the observed differences in the public-private wage gap for men and women separately.

For men, the decomposition shows that skill returns, as measured by worker fixed effects, play a fundamental role in explaining the public sector wage premium, as they are almost 10% higher for public sector employees. In the opposite direction, the contribution of firm fixed effects is 7% lower for the public sector average. These firm-specific wage components, which can be interpreted as productivity differences or rent sharing, may indicate that men tend to sort into lower-paying, less productive firms when working in the public sector or that they are able to extract less rent from the employer because of the more rigid wage setting in public institutions. The contribution of other wage components is much weaker in relative terms, with returns to the job ladder, as reflected by the occupation fixed effects, contributing negatively, while the effects of age, tenure, and firm size are positive, suggesting higher returns to these characteristics for men in the public sector.

For women, the picture is different. First, the contribution of the worker and firm fixed effects is in the same direction, suggesting that women benefit from being in the public sector due to higher returns to individual skills as well as being in better-paying firms. Second, returns to occupational position also contribute positively to the public sector wage premium, with a magnitude comparable to that of the worker and firm fixed effects. This large (and positive) contribution relative to men may reflect more fragile glass ceilings due to organizational policies in the public sector[13]. The contribution of age and tenure effects is also substantial and favors women in the public sector, which again may be related to wage-setting policies that automatically index wages to each employee after long absences from the workplace, such as parental leave. The firm size effect is negative for female public sector employees. However, the magnitude of the effect is much smaller than that of the other variables.

6. Conclusions

This paper estimates high-dimensional fixed effects models to account for the role of worker- and firm-side heterogeneity in wage variation and characterize its contribution to the public-private sector wage gap in Lithuania between 2010 and 2020.

We document that, unconditionally, workers employed in the public sector have 10% higher wages compared to those in private firms, and the gap is still about 8% when accounting for worker heterogeneity. However, once we account for firm-specific wage components, the results indicate that the public sector pays, on average, 0.3% lower premiums compared to private firms, suggesting that most of the gap is due to workforce heterogeneity rather than differences in pay policies. However, there is considerable heterogeneity between men and women: male public sector employees work for organizations that pay 7% lower premiums than their private sector counterparts, while women benefit from being in the public sector by having firm-specific wage components that are almost 4% higher than those of women in the private sector.

Taken together, the results highlight the need to isolate firm-specific wage components from other sources of wage heterogeneity to properly understand wage differentials between workers employed by organizations with institutionalized wage-setting protocols and those working in firms where wages are market-driven. Importantly, understanding how pay policies are related to the provision of non-pecuniary job amenities, such as greater job security, is an interesting area for future research. Similarly, given the existing cross-country evidence on the role of firms in explaining the gender pay gap (Palladino et al., 2023), the differences found between men and women open up an interesting avenue for future research to investigate how workplace policies pursued by the public sector can contribute to reducing gender gaps.

Notes

1. Appendix A, Supplementary material provides a detailed explanation of the wage setting protocols of each public sector institution in Lithuania.
2. This includes employees, the self-employed, as well as recipients of government transfers.
3. Appendix B, Supplementary material defines key classifications related to industry, occupation, and location.
4. Given the change in Social Security contributions in 2019, we recalculate income before the 2019 reform by multiplying it by the official re-scaling factor of 1.289.
5. In practice, we discard job spells with missing information on occupation category, sector of activity, location, or firm type.
6. This restriction is particularly important in our context, as aggregate data from Statistics Lithuanian show that there are noticeable differences in paid hours worked per month between the private and public sectors, as shown in Figures C.1 and C.2 in Appendix C, Supplementary material.
7. In the Appendix C Figures C.6 and C.7, Supplementary material we show the same figures separately for men and women.
8. Because cohort effects are nested within the person effects, it is not possible to uniquely identify the age, time, and person effects separately. To address this identification issue, we impose a flat age profile at age 40, use a third-degree polynomial expressed in deviations from that value, and omit the linear term from the estimating equation as in Card et al. (2018).

Figure C.8 in Appendix C, Supplementary material suggests that this assumption holds in our context. However, the identification approach does not drive the results; see Table C.1, Supplementary material for alternative approaches.

9. See Cardoso et al. (2016) for details on how the Gelbach strategy can be implemented in settings where the omitted variables are fixed effects and the coefficient of interest refers to a variable that is subsumed in one of the fixed effects.
10. For more evidence evaluating the AKM model in Lithuania for different periods, see Garcia-Louzao and Ruggieri (2023).
11. Using the 2015 Labor Force Survey for Latvia, Vilerts (2018) estimates a small premium for public employees that reverts to a penalty once individual characteristics and selection effects are taken into account.
12. This might reflect the fact that public sector employees tend to be more educated, thus partly reflecting differences in educational attainment and its returns. For example, Campos et al. (2017) documents that the public-private wage gap for tertiary graduates is higher in Lithuania than in other Western economies, both overall and at the unexplained level, and argues that it partly reflects the equilibrium outcome of labor shortages.
13. Consistent with this, Christofides et al. (2013) using survey data for 2007, found that the public sector in Lithuania is associated with lower gender wage gaps.
14. For instance, teachers can obtain different qualification levels through attestation and coefficients will depend on those qualifications.
15. Board members were not allowed to get any payment for their job until 2015. Since then, the compensation of board members cannot exceed 1/5 of the manager's monthly salary.
16. For some years, the minimum wage was used instead of the basic salary, also affecting the level of coefficients set by the Government given the level differences between the basic salary and the minimum wage.

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No potential conflict of interest was reported by the author(s).

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