Firms and the Gender Wage Gap: A Comparison of Eleven Countries

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Abstract

We document the contribution of gender-specific firm wage premiums to the gender wage gap using a harmonized research design applied to eleven matched employer-employee datasets – ten European countries and Washington State, USA. These premiums can contribute to cross-country variation in gender wage inequality if women are less likely to work at high-paying firms (sorting) or receive lower premiums than men within the same firm (pay-setting). Our key finding is that accounting for gender-specific firm wage premiums provides significant insight into cross-country variation in the gender wage gap. Combined, the sorting and pay-setting channels account for a substantial yet distinct portion of the cross-sectional gender wage gap across countries. Despite substantial differences in the relative importance of the sorting and pay-setting channels, there are similarities in the way they operate within countries. The sorting component increases markedly over the life cycle. Women receive 90% of the rents that men receive from firm productivity gains, and we observe that the pay-setting gap is systematically higher in high-wage firms.

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1. Introduction

Despite significant increases in women's labor force participation and progress in closing gender employment gaps, women continue to earn substantially less than men in most OECD countries. Research has shown that these wage differences cannot fully be explained by gender differences in skills. Instead, they reflect differences in the types of firms in which similarly skilled men and women are employed, type of tasks that they conduct in those firms as well as how they are compensated for comparable work within the same firms (Olivetti et al. 2024). This firm-level dimension of gender inequality has gained prominence as research increasingly recognizes that labor markets are imperfectly competitive and that firms have considerable discretion in setting wages, which can affect different groups of workers differently (Card et al. 2018; Kline 2024).

Thanks to the framework developed by Card et al. (2016) (hereafter CCK), the analysis of the gender wage gap in the context of imperfectly competitive labor markets has taken a leap forward. CCK extends the widely used Abowd et al. (1999) model (hereafter AKM), which decomposes wage variation into a worker-specific component and an employer-specific wage premium that captures systematic differences in firms' wage-setting practices for similarly skilled workers. By estimating these firm-specific wage premiums separately for men and women, CCK quantifies the role of firms in the gender wage gap through two distinct channels: (i) differences in the types of firms in which equally skilled men and women are employed (the *sorting* component) and (ii) within-firm wage differences between similarly skilled men and women (the *pay-setting* component).

This paper provides the first harmonized cross-country analysis of firms and their role in explaining the gender wage gap using the CCK framework. To achieve this, it makes use of a harmonized research design applied to administrative matched employer-employee data for 11 advanced economies, the United States (represented by Washington

state) and 10 European countries (Denmark, Finland, France, Germany, Hungary, Italy, the Netherlands, Norway, Portugal, and Sweden), for the period 2010–2019. For each of these countries, the data cover at least half of the population of firms and workers and often the entire population. The total sample comprises 65 million workers across 3.7 million firms. In all cases, the data include high-quality information on hourly wages. This allows the gender wage gap to be consistently measured in hourly wages and hence to systematically control for gender differences in hours worked.[1] The analysis is based on a harmonised research design that defines the sample, constructs the relevant variables and implements the econometric framework to ensure the cross-country comparability of the results. Such a harmonized cross-country analysis complements country studies by allowing for careful comparisons of the role of firms in the gender wage gap across countries that differ in the policy settings. Individual country studies are often difficult to compare due to significant differences in their research designs. Importantly, cross-country comparisons help to provide a deeper understanding of the role of firms in the gender wage gap by identifying commonalities (e.g. firms matter for the gender wage gap) and differences (e.g. the relative importance of the sorting and pay-setting channels).

To motivate the analysis of gender pay gaps in imperfectly competitive labor markets and the role of firms, we start by documenting that firm wage premiums contribute to overall wage dispersion for both men and women in all eleven countries. This highlights the importance of labor market imperfections and provides an important rationale for focusing on the role of firms in the gender wage gap. We also show that there are important differences in the role of firms in wage dispersion across countries. In Germany, Portugal, Italy, and the U.S., they account for 10% to 20% of wage dispersion, whereas

[1]The requirement of having information on hourly wages also explains why we focus on Washington State rather than the US as a whole using the LEHD. In some countries we observe only contractual hours and not realized hours.

their role is more limited elsewhere.[2] The unequal role of firms in wage dispersion across countries may also shape differences in the role of firms in gender wage gap across countries. Differences in wage premiums between firms directly contribute to the importance of the sorting channel in the gender wage gap, but may also increase the scope for differential wage-setting within firms and hence the pay-setting channel.

We then proceed by analyzing the role of firms in the gender wage gap based on the estimation of gender-specific firm wage premiums following CCK. Based on this approach, the paper provides four key findings.

First, firms significantly contribute to the gender wage gap in all eleven countries as well as differences in gender wage gaps between them. We find that firm-specific wage premiums explain about 15 to 30% of the gender wage gap. Gaps in wage premiums are correlated to overall gaps in wages across countries: countries with larger gender wage gaps also tend to have larger gender wage premium gaps. Focusing on the role of firms therefore helps to provide a better understanding of cross-country differences in gender pay gaps.

Second, we document substantial differences across and within countries in the relative importance of gaps in wage premiums between firms *(the sorting channel)* and gaps in wage premiums within firms (*the pay-setting channel*). Across countries, the pay-setting channel ranges from zero in the Netherlands and Finland to five log points in Hungary. Similarly, the sorting component varies from near zero in Denmark and Hungary to four log points in the Netherlands, Portugal and the United States and six log points in Germany.

Third, the importance of sorting increases over the life-cycle. The role of sorting increases as men move up the job ladder as they advance in their careers, while women tend to stay behind. This is consistent with findings that motherhood slows the ad-

[2]We apply bias corrections to firm and worker effects, which indicate that firm effects tend to be overstated across datasets. However, high worker mobility in most cases suggests relatively low estimation error.

vancement of women up the job ladder (Kleven et al. 2019, 2024). We find that in most countries firms requiring shorter (longer) hours pay lower (higher) premiums to both genders equally, which suggests that gender differences in compensating differentials for hours requirements are unlikely. We further find that women are disproportionately concentrated in firms with a high part-time incidence, and that these firms systematically offer lower wage premiums. These findings suggest that gender differences in firm sorting partly reflect preferences/constraints on work hours, with women trading off wages for flexibility.

Fourth, we examine the pay-setting component to understand why women receive lower wage premiums than men within the same firms. Our findings indicate that pay-setting disparities are systematically larger in high-wage firms, which is consistent with evidence suggesting that individual wage bargaining is more prevalent in these firms (Lachowska et al. 2022b). To test whether this reflects differential rent-sharing, we estimate how firm productivity gains translate into wage premiums by gender. On average, across countries, women receive only 89% of the rent-sharing benefits that men receive, with some countries showing even larger disparities. The country-level estimates range from 80% to 100%. These gender differences in rent-sharing are positively correlated with the overall pay-setting component of the gender wage premium gap.

Contribution to the literature. This paper contributes to several strands of the literature. We build on research examining the role of firms in shaping gender wage inequality (Blau 1977; Groshen 1991; Card, Cardoso and Kline 2016). Recent studies using administrative data have documented the importance of gender-specific firm wage premiums in explaining the gender wage gap (Casarico and Lattanzio 2024; Palladino et al. 2025; Boza and Reizer 2024). However, these studies typically focus on single countries and employ varying methodological approaches – including different sample selection criteria, wage

measurements, and econometric specifications – that complicate cross-country comparisons. Our study addresses this gap by providing the first systematic cross-country analysis of firm-specific gender wage premiums using a harmonized research design.[3] A key contribution of this work is to document wide disparities across countries in the role that firms play in shaping wage inequalities. Importantly, the sources of this variation –whether driven by women being less likely to work at high-paying firms (sorting) or by receiving lower premiums than men within the same firm (pay-setting) –also differ across countries.

Second, we contribute to the literature on firm-specific wage premiums, non-wage amenities, and compensating differentials as sources of wage inequality (e.g, Sorkin (2017); Morchio and Moser (2024); Lachowska et al. (2023); Audoly et al. (2024); Humlum et al. (2025)).[4] Our findings complement this strand of literature as our results suggest that variation in firm-specific work hour policies contributes to gender wage disparities, particularly through the concentration of women in firms with a high incidence of part-time work that offer lower wage premiums.

Finally, we contribute to the literature on rent-sharing and its implications for the gender wage gap. There is a long-standing literature that has established a link between rents and wages (e.g, Blanchflower et al. (1996), Kline et al. (2019)). Several papers have shown that this also matters for the gender wage gap as men and women differ in their bargaining power (e.g, Black and Strahan (2001), Biasi and Sarsons (2022), Lachowska et al. (2022b)). We document that women systematically receive a smaller share of the rent generated by firms in most countries, and that pay is consistently higher in high-wage firms.

The remainder of the paper is structured as follows: Section 2 describes the datasets

[3] For other cross-country studies on gender wage inequality, see Blau and Kahn (2003), Olivetti and Petrongolo (2016), and Penner et al. (2023).

[4] For papers focusing on nonwage job values, work flexibility, reduced hours, and shorter commutes, see Hall and Mueller (2018), Adams et al. (2025), Wasserman (2023), and Le Barbanchon et al. (2021), among others.

and sample selection criteria and presents descriptive statistics.[5] Section 3 presents our empirical framework, including the gender-specific AKM wage decomposition and the CCK methodology for separating firm wage premiums into sorting and pay-setting components. Section 4 documents our main results: first showing how firm wage premiums contribute to overall wage inequality, then quantifying their role in gender wage gaps across countries. Section 5 investigates the sorting component, examining life-cycle dynamics and the role of part-time employment. Section 6 analyzes the pay-setting component, focusing on heterogeneity across the wage distribution and differential rent-sharing by gender. Section 7 provides additional analyses and robustness checks. Section 8 concludes.

2. Harmonized Research Design

This section presents our harmonized research design for studying the role of firms in the gender wage gap across countries. Table 1 summarizes recent studies using North American and European data that apply the CCK methodology to quantify how gender differences in firm-specific wage premiums contribute to the overall gender wage gap. While these studies consistently find that firms play a role in the gender wage gap, significant methodological differences make it difficult to compare their results. The studies differ in their observation periods, sample selection criteria, whether earnings are adjusted for hours worked and which control variables are included. These methodological differences could affect estimates of the importance of firms in the gender wage gap and the relative importance of the sorting and pay-setting channels. As a result it is difficult to determine to what extent differences in the estimates across countries reflect differences in research design or differences in the factors shaping the gender

[5] We relegate a more detailed description of each country's data and institutional features to the appendix.

wage gap.[6]

Country-Specific Data Sources. We make use of a harmonized cross-country employer-employee dataset based on high-quality linked employer-employee data from the United States (Washington State), Denmark, Finland, France, Germany, Hungary, Italy, the Netherlands, Norway, Portugal, and Sweden. The selection of countries is based on the availability of comprehensive data, covering at least half the population of firms and workers, with detailed information on hours worked. The data should be sufficiently comprehensive to allow for the accurate estimation of firm-specific gender wage premiums, while detailed information on hours worked is needed to allow focusing on the gender gap in hourly wages.

Table 2 summarizes each country's dataset and its main characteristics in terms coverage and variable availability . The data primarily cover the decade 2010-2019, with the exception of the United States and Germany (2010-2014). This period was chosen to focus on the most recent full decade up to the COVID-19 crisis and to take advantage of improvements in data collection in some countries. While some countries provide data covering the entire or nearly entire population of private-sector jobs (Denmark, France, Germany, the Netherlands, Norway, Portugal), others provide very large samples covering at least half of the population.[7]

We define the firm as an employer rather than an establishment (except for Germany), and construct wages as hourly rates by dividing pre-tax labor earnings by annual hours worked. We use paid hours where available and contractual hours otherwise

[6] Bertheau et al. (2023) made a similar point about the impact of job loss across studies.

[7] In the United States, we use data from Washington State that covers most private-sector jobs. However, demographic information is only available for workers who claimed unemployment insurance, which makes up about 51% of the sample. Italy uses a sample that is representative of 50% of firms. Sweden and Finland have samples that cover at least 50 percent of private-sector workers, though workers employed in large firms are overrepresented. Hungary uses a sample of 50% of employees. To improve representativeness, we construct appropriate sample weights for Washington State, Sweden, and Finland. All baseline results presented in this paper use weighted estimates. Detailed weighting procedures and comparisons between weighted and unweighted figures are provided in Appendix D.

(as in Germany, Hungary, Italy and Sweden). Our earnings measure includes irregular payments such as overtime and bonuses in all countries. All wages are deflated using the OECD Consumer Price Index with 2015 as the base year.

Firm value-added data are available for Denmark, Finland, France, Italy, Hungary, Norway, and Sweden. The United States (Washington State) does not provide financial information on firms, while we have smaller samples for Norway (60%) and particularly Germany (2%). For Portugal, we observe only sales data rather than value-added. Throughout the paper, "productivity" refers to labor productivity, defined as value-added per person employed or, in the case of Portugal, as sales per person employed.

More detailed information about country-specific data sources, institutional contexts, and variable definitions is provided in Appendix E.1 to E.12.

2.1. Sample Selection

To ensure consistency across datasets, we apply uniform sample selection criteria. First, we focus on "prime-age workers", defined as those between the ages of 25 and 55. We restrict our analysis to workers employed in the private sector, specifically in industries where most firms are for-profit organizations. This leads us to exclude industries coded O through U in the NACE classification (education, health, culture, other services, private households with employed persons, and extraterritorial organizations). The exclusion of the public sector addresses discrepancies in its coverage across administrative sources in different countries and the classification of semi-public companies, associations, and foundations.

Second, we harmonize the time dimension by annualizing all data, regardless of the original collection frequency. For each worker, we identify their primary employer as the one from which they received the highest annual earnings, so that our final dataset contains exactly one observation per worker per year in each country. We remove

observations with hourly wages below 80% of the minimum hourly wage (or below 10% of the median hourly wage when minimum-wage information is unavailable). We also winsorize the top 0.1% of the hourly wage rate distribution within each country and year, and winsorize the bottom and top one percent of the productivity distribution.

The econometric framework used in this study, detailed in Section 3, requires the consideration of firms that employ both men and women and are linked by the mobility of workers of both sexes. In Appendices E.1 to E.12, we provide comprehensive tables summarizing three progressively restricted samples: (1) the initial analysis sample after applying our selection criteria, (2) the dual-connected sample of firms that employ both men and women and are connected through worker mobility, and (3) the dual-connected sample with available productivity data. Throughout this paper, we refer to the dual-connected set as our main analysis sample for each country.

The dual-connected set retains a very large fraction of our initial sample, ranging from 75% of person-year observations in Hungary and the US to 98% in Sweden. Figure A.1 compares the gender wage gap (measured as the difference between male and female average hourly earnings) across all three samples. With the exception of Hungary, where the gender gap increases from 10 log points in the full sample to 16 log points in the dual-connected sample, restricting to the dual-connected set yields remarkably similar gender wage gaps across countries. This consistency is reassuring, as it suggests that our subsequent analysis based on the dual-connected sample accurately represents the broader population of private-sector workers aged 25-55.

To address potential concerns about sample composition and examine whether limited mobility biases our firm effect estimates, we analyze two alternative samples. First, we include public-sector workers (these data are unavailable or only partly available for the US, Germany, Italy, Portugal, and Hungary) and workers in semi-public/not-for-profit firms to assess whether excluding these jobs affects our results. Second, we create a restricted sample of firms with at least ten movers of each gender over the observation

period. Results from these alternative samples are presented in Section 7.

2.2. Descriptive Statistics of the Main Analysis Sample

Table 3 provides descriptive statistics of the main analysis samples based on the dual-connected set for each country and gender. The datasets are substantial in size. The largest samples come from France (107.8 million person-year observations) and Germany (60.3 million person-year observations). Other countries have smaller but still sizeable samples, ranging from about 5-10 million person-year observations in countries such as Denmark and the US (Washington State) to around 20-30 million in the Netherlands and Italy. In total, our harmonized analysis sample includes about 65 million workers in 3.7 million firms. In every country, women's hourly wages are lower than men's, with the gender wage gap ranging from 9 log points (9.42%) in Sweden to 26 log points (29.7%) in Germany.

We define part-time employment consistently across countries as an employment spell where the worker works, on average, less than 30 hours per week with the primary employer. Women are much more likely to work part-time than men in all countries considered irrespective of the overall incidence of part-time work. The Netherlands has the highest incidence of part-time work and the largest gender gap in part-time work (50.6% of women against 11.6% of men), followed by Italy (41.1% against 10.4%) and Germany (31.8% against 7.1%). In contrast, Portugal and Hungary have low overall part-time rates and smaller gender differences (6.4% against 1.7% and 11.3% against 5.2%, respectively).

For an accurate estimation of firm wage premiums, worker mobility is crucial. In our samples, the average number of movers per firm exceeds 10 for both sexes across all countries.[8]

[8]Finland and Sweden have particularly high numbers of movers per firm due to their sampling designs that oversample larger firms.

Finally, we report the share of person-year observations in the dual connected-set sample belonging to firms with available productivity data. Coverage exceeds 75% of observations for both sexes in most countries. The exception is Norway, where only 59.5% of female person-year observations contain productivity data. Productivity data are not available for the United States, while Germany has a much lower coverage (around 2-4% of observations depending on gender).

3. Estimating Firm-Specific Wage Premiums and Measuring Their Contribution to Wage Inequality and Gender Gaps

This Section presents our empirical framework for analyzing how employers influence wage inequality and gender wage gaps across countries. We first describe an econometric model that disentangles the worker- and firm-specific components of wages, allowing us to quantify the contribution of firms' wage premiums to overall wage dispersion for men and women. We then extend this analysis to examine how firm-specific wage premiums contribute to the gender wage gap.

3.1. A Gender-Specific AKM Model

We estimate the AKM two-way fixed effects model separately for men and women as in CCK in each country:

$$\ln w_{it} = \alpha_i + \psi^{G(i)}_{J(i,t)} + X'_{it}\beta^{G(i)} + r_{(it)} \tag{1}$$

where $\ln w_{it}$ denotes the log hourly wage of worker i in firm $j \in \{1, ..., J\}$ in year t. α_i captures the worker fixed effect – the portable, time-invariant component of worker productivity valued equally across employers. $\psi^{G(i)}_{J(i,t)}$ represents the *gender-specific* firm fixed wage effect, reflecting the wage premiums systematically associated with a par-

ticular employer j for gender G. $X_{it}^{'}$ contains observable time-varying characteristics, including a third-order polynomial in age and year effects. To identify age, time, and worker fixed effects separately, we follow CCK in restricting the age-wage profile to be flat at 40. $r_{(it)}$ denotes the error term.[9] Firm wage effects can be interpreted as reflecting between-firm wage premiums arising from differences in firm wage policies rather than differences in workforce composition (Card et al. 2018). Because we allow firm wage effects to differ for men and women by estimating equation (1) separately by G, we can interpret $\hat{\psi}_{J(i,t)}^{G(i)}$ as systematic differences in a firm's wage policy toward men and women.

Our methodology relies on several assumptions that have been tested and validated across dataset.[10] A key challenge in estimating firm fixed effects is limited mobility bias, which arises when relatively few workers move between firms during the observation period. Limited mobility leads to an upward bias in the estimated variance of firm effects but does not bias first-order moments of firm effects under AKM assumptions (Bonhomme et al. 2023). Limited mobility bias therefore is not a concern for our analysis of the gender wage premium gap in Section 3.3, which relies on differences in mean firm effects between men and women rather than their variances.[11] However, limited mobility bias is relevant for our variance decomposition analysis in Section 3.2, where we examine how much of the country-specific total wage variation is attributable to

[9] Our specification differs from Card et al. (2016) in that we take a more parsimonious approach to the covariates vector X. While Card et al. include interactions between year dummies, education levels, and age terms, we omit these education interactions because education data are unavailable for France, Hungary, and Italy. In Section 7, we show that including education interactions for countries with available data yields results similar results to our main specification.

[10] We make three key assumptions in our wage equation framework. First, we assume log-additive worker and firm fixed effects with no complementarities between firm and worker types, meaning wage premiums apply equally to all workers regardless of individual characteristics. Second, we require conditional random mobility where workers' job transitions are uncorrelated with unobserved match-specific wage components. Third, we employ a static framework excluding lagged employment effects, assuming previous employers don't influence current wage premiums. Recent empirical work by Bonhomme et al. (2019), Card et al. (2013), and Di Addario et al. (2023) provides support for these assumptions.

[11] Nevertheless, we show that our results remain fairly consistent when we restrict the sample to firms with at least ten movers of each gender during the observation period (Section 7).

firm-specific wage premiums. To address this concern, we implement the leave-one-out correction approach proposed by Kline et al. (2020) when computationally feasible, and the alternative correction method developed by Babet et al. (2025) when it is not.

3.2. Measuring Firm Contributions to Wage Inequality

Before analyzing gender-specific differences in firm wage premiums, we first assess the overall importance of firms in generating wage inequality within each country and across genders. To quantify the effect of firms on wages, we conduct the following decomposition of equation (1) separately for men and women:[12]

$$\text{var}(\ln w_{it}) = \text{var}(\alpha_i) + \text{var}(\psi_{J(i,t)}) + 2\text{cov}(\psi_{J(i,t)}, \alpha_i) + \text{var}(r_{it}) \tag{2}$$

Firms' influence on the variance of wages for men and women is measured through the ratio of the variance of firm effects to the variance of wages: $\frac{\text{var}(\psi_J)}{\text{var}(\ln w_{it})}$.

3.3. Measuring Firm Contributions to Gender Wage Gaps

Beyond examining how firms contribute to overall wage inequality for men and women separately, we are primarily interested in understanding how firm-specific wage policies contribute to the gender wage gap. We define the gender wage premium gap as the difference in average firm wage effects between men and women: $E[\psi_j^M] - E[\psi_j^F]$.

To understand the channels through which firm wage premiums contribute to gender wage inequality, we further decompose the gender wage premium gap using a Kitagawa-Oaxaca-Blinder approach (Kitagawa 1955; Oaxaca 1973; Blinder 1973; Card et al. 2016):

$$E[\psi_j^M] - E[\psi_j^F] = \underbrace{E[\psi_j^M - \psi_j^F|M]}_{\text{Pay-setting}} + \underbrace{E[\psi_j^F|M] - E[\psi_j^F|F]}_{\text{Sorting}} \tag{3}$$

[12] For simplicity, we omit the covariances between fixed effects and the vector X'.

This decomposition separates the gender wage premium gap into two economically distinct components. The first component on the right-hand side is the *pay-setting* component, which measures the extent to which women receive lower wage premiums than men at the same employers. This captures within-firm gender gaps in wage premiums for similar workers, which may reflect differences in bargaining power (Babcock and Laschever 2009), including as a result of employer monopsony power (Manning 2021). The second component on the right-hand side is the *sorting* component, which measures the extent to which women are employed in firms that offer lower wage premiums to all workers. This component captures gender gaps in wage premiums between firms due to differences in access to high-premium employers for similar workers by gender.[13]

3.3.1. Normalization of Gender-Specific Firm Wage Premiums

To allow comparisons between firm fixed effects estimated separately for men and women, a normalization is required. Since firm effects are only identified up to a constant within each gender group, we need to establish a common reference point for meaningful cross-gender comparisons. The goal is to identify "low-surplus" firms and set their gender-specific firm fixed effects to zero, assuming that these firms pay, on average, zero wage premiums to both genders (Card et al. 2016, 2018). One approach to identifying "low-surplus" firms uses value-added data and relies on the economic intuition that low-productivity firms have limited resources to share with workers beyond their reservation wage. Card et al. (2016) show that this intuition manifests itself empirically as a nonlinear relationship between firm productivity and wage premiums, a pattern that can be exploited to identify a set of low-surplus firms.

Figure A2 illustrates the relationship between firm productivity and firm wage pre-

[13]The decomposition in equation (3) uses the distribution of jobs held by men as the reference. While this choice is conventional in the literature, it is ultimately arbitrary. As a robustness check, we also estimate the decomposition using the distribution of jobs held by women as the reference. The decomposition using women's jobs is given by $E[\psi^M] - E[\psi^F] = E[\psi^M - \psi^F|F] + E[\psi^M|M] - E[\psi^M|F]$. We report the results using this alternative reference in Section 7.

miums across the countries for which we have value-added data. The figure shows mean estimated firm wage premiums from the AKM model for men and women, averaged across firms within 100 percentile bins of productivity (measured as mean log value added per worker).[14] Gender-specific wage premiums and productivity are rescaled to improve readability. Firm effects are rescaled to have a mean of zero below the vertical normalization threshold, which marks the point in value-added per worker where firm effects begin to rise.[15] Across all countries, we observe a consistent hockey-stick pattern: firm fixed effects remain flat at low productivity levels and start increasing beyond a certain threshold. The normalization procedure sets male and female wage premiums to zero on average for all firms below this threshold, effectively defining these low-surplus firms as the reference group for measuring gender-specific wage premiums. It is important to note that only the pay-setting component is affected by the normalization procedure, while the sorting component remains invariant.

Value-added (or sales) information is not available in the United States (Washington State) and is limited to a very small subset of firms (about 2-4% of observations) in Germany. An alternative approach in the literature uses industry information to identify low-surplus firms, typically focusing on the food and accommodation sector as a reference point. Following this approach, we normalize the firm effects by setting the average firm wage premiums in the country-specific lowest-surplus sector[16] to zero for both

[14] For Portugal, sales data are used instead of value added due to data availability constraints.

[15] To formally identify the normalization threshold for each country, we follow CCK and estimate a bivariate regression model:

$$\begin{aligned} \hat{\psi}^{M}_{J(i,t)} &= \pi^{M}_{0} + \pi^{M} \max\{0, S^{o}_{J(i,t)} - \tau\} + \nu^{M}_{J(i,t)} \\ \hat{\psi}^{F}_{J(i,t)} &= \pi^{F}_{0} + \pi^{F} \max\{0, S^{o}_{J(i,t)} - \tau\} + \nu^{F}_{J(i,t)} \end{aligned} \tag{4}$$

where $S^{o}_{J(i,t)}$ is log labor productivity. We estimate this system for a range of potential τ values and select the threshold τ that minimizes the mean squared error of both equations. The vertical lines in Figure A2 represent these country-specific estimated thresholds.

[16] We identify the lowest-surplus sector by selecting the industry that (i) has the lowest firm effects for both men and women, and (ii) employs at least 1 percent of the workers in the dual-connected sample. This ensures that we use a sector with sufficient representation while still capturing firms with minimal wage premiums.

men and women. This method is less rigorous than the productivity-based approach and makes stronger assumptions, essentially assuming that the entire gender wage gap in the reference sector is due to gender differences in worker fixed effects. However, it has the advantage of being applicable to all countries, including the United States, and does not require restricting the analysis to the subset of firms with productivity data.

When we compare the results of this industry-based normalization with our productivity-based normalization using the same sample of firms, we find inconsistent patterns across countries. As a general rule, we privilege the results based on the productivity-based normalization. Given the lack of robustness using the industry-based normalization and the absence of productivity information for the United States, we do not report pay-setting estimates for the United States in our baseline analysis. For Germany, we have more confidence in the robustness of our estimates because the pay-setting component estimated using the industry normalization is consistent with the results of the productivity normalization in the limited productivity sample.[17] For Norway, we face a different challenge: the coverage of productivity data is relatively low (only 59.5% of female person-year observations), and the sorting component, which is invariant to normalization, differs substantially between the dual-connected set and the subset with productivity information, in contrast to other countries. While the industry-based normalization in the full dual-connected set yields inconsistent results with the productivity-based normalization for Norway (contrary to Germany), we therefore also exclude Norway's pay-setting estimates from our baseline analysis.

We provide more details about normalization robustness and sample sensitivity in Section 7.

[17] It is also consistent with a third normalization procedure based on the bottom quintile of predicted firm quality.

4. Contribution of Firm Wage Premiums to Wage Inequality and Gender Gaps Across Countries

This section presents our empirical findings on how firms affect both overall wage inequality and the gender wage gap across countries. First, we quantify the importance of firm-specific wage premiums in explaining wage dispersion for men and women separately. We then examine how these firm-specific wage premiums contribute to the gender wage gap by measuring both the extent to which women receive lower wage premiums than men within the same firms and the extent to which women are employed in firms that offer lower wage premiums to all workers.

4.1. Firm Wage Premiums and Overall Wage Inequality

Figure 1 presents variance decompositions from equation (2) separately by gender in each country. We apply the Kline et al. (2020) correction to adjust for limited mobility bias.[18]

Our results reveal significant cross-country variation in the contribution of firm wage premiums to wage dispersion. While firm wage premiums contribute positively to wage inequality for both men and women everywhere, their importance varies considerably across countries. It is largest in Germany and Hungary , where firm wage premiums account for 20% of the wage variance for men and slightly less for women (18% in Germany, 15 per cent in Hungary). In the middle range, we find Italy (11-12%), the Netherlands (8-12%), Portugal (11-13%) and the US (10-13%), where firm effects explain at least 10% of the variation in hourly wages for at least one gender group. In other countries, the effect is more modest, ranging from 5% to 10%: France and Denmark

[18] For Denmark, Hungary and France, we use the alternative method of Babet et al. (2025) to implement the bias-correction. For these three countries, either the Kline et al. (2020) correction was not computationally feasible or the MATLAB package could not be implemented in the country-specific data access servers.

(6-7%), Norway (5-6%), Finland (4-5%), and Sweden (3-4%).[19,20,21]

The systematic differences we observe – both in the magnitude of firm effects and in their relative importance for men versus women – raise two critical questions: (i) to what extent do firm-specific wage policies contribute to the gender wage gap across countries? (ii) are gender differences in the importance of firm-specific wage policies correlated with gender differences in the observed pay gap? Having established that firms play a significant role in overall wage inequality, we now turn to examine how firm-specific wage premiums specifically contribute to the gender wage gap across countries.

4.2. Firm-Specific Wage Premiums and the Gender Wage Gap

Figure 2A plots the gender wage gap (y-axis), the difference between male and female average log hourly wages, against the gender wage premium gap (x-axis), which reflects the combined effect of sorting and pay-setting components. To illustrate the explanatory power of the gender wage premium gap, the figure includes diagonal reference lines representing scenarios where it accounts for 10% and 40% of the overall gender wage gap. As discussed in Section 3.3.1, the United States (Washington State) and Norway are excluded from this panel due to normalization issues that affect estimates of the pay-setting component.

The comparison shows that focusing on firm-specific wage premiums helps to

[19]The Finnish and Swedish samples oversample workers in large firms, likely reducing the share of variance explained by firm effects.

[20]We compare the corrected and uncorrected variance decompositions in Figure A10. As expected, the reduction in the importance of firm effects is most pronounced in datasets with a random sample of workers (e.g., Italy) or in panel datasets with less than six years of data (e.g., Germany). However, the high degree of worker mobility in most of our datasets suggests that firm effects are estimated with relatively little error in the main sample.

[21]In Appendix B, we report the results from two additional exercises. First, we present a variance decomposition using a restricted sample of individuals with annualized earnings above a certain threshold, as described in Bonhomme et al. (2023). Second, we assess the relative importance of the firm and worker components in explaining gender-based wage inequality across countries following Kline (2024).

explain cross-country differences in gender wage gaps. Countries with larger gender wage premium gaps tend to exhibit larger overall gender wage gaps, suggesting that firm-specific wage policies play an important role in shaping gender wage inequality.

Firm-specific wage premiums explain between 15% and 32% of the gender wage gap across countries. In Sweden, Norway, France, Finland, the Netherlands, Portugal and Italy, these premiums account for 15-20% of the gap. In Germany and Hungary, firm-specific wage premiums account for 30% and 32% respectively . These patterns suggest that while firm-specific wage policies play a positive role in the gender wage gap, their magnitude varies considerably across institutional and labor market contexts.

The cross-country variation in the sorting and pay-setting channels, shown in Figure 2B, is even more pronounced. The figure decomposes the gender wage premium gap into sorting and pay-setting components, revealing fundamentally different patterns across countries. In Hungary and Denmark, the gender wage premium gap is mainly driven by differences in within-firm pay-setting, with women receiving lower premiums than men at the same employer. In the Netherlands, Germany, Portugal and Finland, on the other hand, sorting is the dominant mechanism, as women are strongly concentrated in firms that offer lower wage premiums.

5. Understanding the Sorting Component of the Gender Wage Premium Gap

Section 4.2 established that firm-specific wage premiums significantly contribute to the gender wage gap across countries, with variation in the relative importance of sorting and pay-setting channels. Having documented these cross-country differences, we now turn to explore heterogeneities within countries and assess whether common patterns emerge across different labor markets. This section focuses on understanding the sorting component, while Section 6 will examine the pay-setting component.

5.1. The Dynamics of Gender Gaps Across the Life Cycle

We begin by examining how changes in the gender wage gap correlate with changes in its firm component as age increases. Figure 3 illustrates this relationship by plotting the difference in the gender wage gap between older workers (ages 50-55) and younger workers (ages 25-29) against corresponding differences in the gender wage premium gap and its pay-setting and sorting components.

Panel A shows a strong positive correlation between the life-cycle increase in gender-specific firm wage premium gaps (x-axis) and the widening of the overall gender wage gap (y-axis). For example, Germany, Portugal, and Italy show substantial increases in both measures, with the gender wage gap expanding by approximately 20–30 log points between younger and older workers, matched by a 4–8 log point increase in the gender wage premium gap. Panel B shows that the correlation between age-related increases in the sorting component and the gender wage gap is also strong. The country-specific points in Panel B closely align with those in Panel A, indicating that nearly all of the age-related expansion in firm wage premium gaps is explained by the sorting component. Indeed, Panel C shows that there is essentially no relationship between age-related changes in the pay-setting component and changes in the gender wage gap. Most countries show minimal variation in the pay-setting component across age groups: points are clustered near zero on the x-axis, despite substantial increases in the overall gender wage gap on the y-axis.

Taken together, these patterns provide evidence that the widening gender wage gap over the life cycle is to an important extent related to changes in the sorting component. Women are less likely to progress in the career by moving to higher-wage firms.[22]

[22]While we cannot fully disentangle cohort effects from age effects within cohorts, research by Arellano-Bover et al. (2024) indicates that cohort effects significantly influenced gender wage gap dynamics in the US, Italy, and two other countries up to the mid-1990s, but have played a diminished role in the past two decades. Additionally, Casarico and Lattanzio (2024) find that similar age-specific patterns in sorting persist even when comparing different cohorts at the same age in Italy.

This suggests that constraints on job mobility – potentially related to motherhood and family responsibilities – play an important role in shaping gender wage disparities over the life cycle (Kleven et al. 2024). In the next subsection, we investigate a potential mechanism behind the differential sorting of equally productive workers by gender over their careers.

5.2. Compensating Differentials and the Role of Part-Time Employment

A growing body of literature (Goldin 2015) suggests that part of the gender wage gap arises due to compensating differentials for long work hours. If some firms offer compensation packages that combine high wages with long hours and such packages are less attractive to women than to men, especially as they take on more family responsibilities, compensating differentials can contribute to the sorting component of the gap in firm wage premiums.

Our empirical strategy approaches this question from two complementary angles. We start by implementing the methodology proposed by Lachowska et al. (2023), which uses a two-way fixed effects model to separately identify employer and worker contributions to variation in hours worked. This model allows us to interpret firm effects as policies on hours and worker effects as reflecting individual preferences. We estimate the model separately by gender and then regress firm wage effects on firm hour effects to recover gender-specific elasticities of firm wage policies with respect to firm hour policies.[23] Figure 4 shows the elasticity of firm wage premiums with respect to firm-specific hour policies, estimated separately by gender and restricted to countries where

[23]We estimate the elasticity of firm wage premiums with respect to firm hour policies using firm-level regressions. Let ψ_j^g denote the AKM firm effect on wages and ϕ_j^g the firm effect on hours for gender $g \in \{m, f\}$. We estimate:

$$\psi_j^g = \beta_g \hat{\phi_j^g} + \eta_j^g. \tag{5}$$

To correct for measurement error, we use a split-sample IV strategy and instrument ϕ_j^g with ϕ_j^{-g}, the hours policy estimated for the opposite gender.

data on paid hours are available (and not solely contractual hours). Across most of these countries, we find a positive relationship between firm hours and firm wage premiums: firms that require longer paid hours tend to offer higher wages. The magnitude of the elasticity varies across institutional contexts, but the underlying economic mechanism is broadly similar: hours policies matter for wage setting. Importantly, we do not find systematic differences in the elasticity across genders. The association between firm hours and wages is similar for both men and women, indicating that women are compensated similarly to men for working longer hours within firms. This suggests that the hours-wage relationship primarily influences gender wage gaps through sorting mechanisms.

We provide direct evidence of this sorting mechanism by analyzing the relationship among firms' incidence of short hours, their gender composition and their wage-setting policies. Figure 5 focuses on the role of part-time employment. In the top panel, firms are grouped into country-specific terciles based on the share of women in their workforce, and we plot the average share of male part-time workers for firms in the bottom tercile (low share of women, blue circles) and top tercile (high share of women, red triangles). We find that women are disproportionately employed in firms with high part-time incidence in all countries. The bottom panel sorts firms into country-specific terciles based on their within-firm share of male part-timers and shows the corresponding average firm wage premium[24] for firms in the bottom tercile (low part-time intensity, blue circles) and top tercile (high part-time intensity, red triangles). A consistent negative relationship emerges across all countries except Germany: firms with high part-time intensity systematically offer lower wage premiums than those with low part-time intensity. Firms in the top tercile of part-time intensity offer, on average, wage premiums that are about 9 log points lower than those in the bottom quartile. It is not just that women are more likely to work part-time, but also that women are more likely to work

[24]The firm wage premium is computed as the weighted average of gender-specific wage premiums.

in firms where part-time work is more widespread, and the within-firm prevalence of part-time work is associated with lower firm-specific wage premiums.

These findings reveal that compensating differentials for longer hours exist and operate similarly for both men and women within firms. The sorting component of the gender wage premium gap partly reflect women's systematic concentration in firms offering shorter hours and lower wage premiums.[25]

6. Understanding the Pay-Setting Component of the Gender Wage Premium Gap

6.1. Heterogeneity by Firm Wage Premium Level

Lachowska et al. (2022a) find that wage bargaining is more common among high-wage workers in high-wage firms, while wage posting (where wages are offered without negotiation) predominates in low-wage markets. Motivated by this evidence, we examine whether the pay-setting component varies systematically with the level of firm wage premiums. We classify firms as high- or low-wage based on the weighted average of gender-specific wage premiums, with high-wage firms being those above the median of this measure and low-wage firms being those below it.

Figure 6 shows the difference in the pay-setting component between high- and low-wage firms.[26] The results reveal a clear pattern: in all countries except Germany, the pay-setting component is substantially larger in high-wage firms compared to low-wage firms. This heterogeneity suggests that the mechanisms underlying differences in pay

[25]Given the substantial cross-country variation in the sorting component, this Section raises the question of whether countries differ primarily in the allocation of workers across different types of firms or in the underlying dispersion of firm wage premiums. We explore this relationship and decompose their relative importance in Appendix C.

[26]We analyze differences in the pay-setting component rather than levels because differences are invariant to the normalization choice, allowing us to include results for the United States and Norway despite the normalization challenges discussed in Section 3.3.1

setting are not uniform across the firm wage premium distribution. The larger within-firm gender gaps in high-wage firms could arise from two related yet distinct channels: differences in wage setting, with a larger role for individual bargaining, and differences in the availability of firm-specific rents to be shared. In the next subsection, we directly investigate this rent-sharing channel.

6.2. Equal Rent-Sharing of Firm Wage Premiums Across Countries?

Having established that pay-setting differences are more pronounced in high-wage firms, a natural question is whether these differences are related to how firms share productivity gains with workers. Card et al. (2018) show that more productive firms tend to pay higher wages and that firm wage premiums can be partially explained by rent-sharing, in which workers capture some of the firm-specific surplus. In a monopsonistic labor market, if women's labor supply is less responsive (i.e., more inelastic) than men's, we would expect the gender gap in firm wage premiums to be larger in high-wage, high-productivity firms because women have fewer outside options and hence a weaker bargaining position.

To test this mechanism, we estimate gender-specific rent-sharing equations:

$$\psi^{M}_{J(i,t)} = \pi^{M}_{0} + \pi^{M} S^{*}_{J(i,t)} + \nu^{M}_{J(i,t)}$$
$$\psi^{F}_{J(i,t)} = \pi^{F}_{0} + \pi^{F} S^{*}_{J(i,t)} + \nu^{F}_{J(i,t)}$$

where $\psi^{G}_{J(i,t)}$ represents the gender-specific firm wage premium and $S^{*}_{J(i,t)}$ is the net surplus.[27] We focus on two key measures: (1) the relative rent-sharing parameter ($\gamma_1 = \pi^F/\pi^M$), which captures the share of male rent-sharing received by women, and (2) the percentage point difference in pass-through ($\delta_1 = \pi^M - \pi^F$), which measures the

[27] Defined as $S^{*}_{J(i,t)} = \max\{0, S^{o}_{J(i,t)} - \tau\}$ where $S^{*}_{J(i,t)}$ is the firm level value-added (sales in Portugal) per worker and τ is the country-specific threshold estimated in Equation 4

direct contribution to the pay-setting component and is more relevant for assessing its relevance in explaining cross-country differences in the gender wage gap.[28]

Figure A5 shows the estimated pass-through of net firm surplus to wage premiums by gender. Figure 7, panel A presents estimates of the relative rent-sharing parameter γ_1 across countries. The average ratio across countries is 0.89, indicating that on average, women receive 89% of the rent-sharing benefits that men receive. This result suggests that even within the same firm, women capture a smaller share of productivity rents. The Netherlands comes closest to parity with a ratio close to 1, where we cannot reject equal rent sharing between men and women. Panel B of Figure 7 shows the direct contribution of differential rent-sharing to the pay-setting component. In Hungary, where the pay-setting component is the largest, the firm-level premium gap increases by 0.3 percentage points when firm productivity increases by 10%. In contrast, in the Netherlands, where the pay-setting component is nearly zero, there is virtually no change in the premium gap as firm productivity increases. These findings suggest that differences in surplus-driven rents help explain variations in the pay-setting component and its role in the overall gender wage gap across countries.

7. Additional Analyses and Robustness

7.1. Public Sector and the Sorting Component

Thus far, the analysis has focused exclusively on private-sector jobs because public-sector jobs are not observed in the United States, the Netherlands, Italy, and Portugal and only a subset of public-sector jobs are observed in Germany. However, it is well-documented that women are more likely than men to work in the public sector or in

[28] We estimate the relative rent-sharing parameter γ_1 via IV using firm productivity as an instrument: $\psi^F_{J(i,t)} = \gamma_0 + \gamma_1 \hat{\psi}^M_{J(i,t)} + e_{J(i,t)}$. For the direct contribution parameter δ_1, we regress the within-firm gender gap in premiums directly on firm productivity: $\psi^M_{J(i,t)} - \psi^F_{J(i,t)} = \delta_0 + \delta_1 S^*_{J(i,t)} + e_{J(i,t)}$. All regressions are estimated at the firm level and weighted by male person-year observations.

non-profit organizations (NPOs) that operate for collective, public, or social benefit. Therefore, given this gender difference in sector choice, it is important to examine how including public-sector and nonprofit jobs affects the contribution of firm-specific wage premiums to the gender wage gap. Figure 8 contrasts the sorting component of our baseline sample, which includes only private-sector jobs, with the results obtained when all jobs are included.[29] The results show a clear and consistent pattern: the sorting component increases in all countries except Norway when public-sector and nonprofit jobs are included. This increase is substantial. In Finland, France, Hungary, and Denmark, the sorting component ranges from close to zero to two log points in the private-sector sample, but increases to between two and five log points when all jobs are considered. These findings suggest that studies focusing exclusively on private-sector jobs likely underestimate the true extent of gender-based sorting across types of firms.

7.2. Country-Industry Evidence of Firm-Driven Gender Wage Gaps

One of the paper's central findings is the strong correlation between the observed gender wage gap and the gender wage premium gap across countries. The fact that firms systematically contribute to gender wage variation has important policy implications. In this section, we reinforce this conclusion by examining variation within a country-industry dataset, which we created by aggregating individual-level information from our administrative datasets to the country-industry level. This approach enables us to determine the extent to which firm-driven inequalities contribute to cross-industry variation in gender wage gaps while controlling for country- and industry-specific factors. Figure 9 illustrates the robust relationship between gender wage gaps and gender wage premium gaps at the country-industry level. The figure presents binned scatter plots where country-industry observations are grouped into ventiles based on

[29] We focus on the sorting component because, in the public sector, our preferred normalization based on productivity data is not feasible, which makes obtaining reliable estimates of the pay-setting component difficult for this extended sample.

their gender wage premium gap, with each point weighted by the industry's employment share.[30] The left panel shows the relationship when controlling only for country fixed effects. The right panel shows the relationship when accounting for both country and industry fixed effects. The within-country R^2 is remarkably high in both specifications, ranging from 0.39 to 0.45. This indicates that firm-specific wage premiums account for a substantial portion of the within-country variation in gender wage gaps across industries. The strengthening of the relationship when industry fixed effects are added suggests that the link between firm premiums and gender wage gaps represents a fundamental structural relationship rather than being driven by particular institutional arrangements or factors. This country-industry evidence strongly supports our main finding that firm-specific wage policies are a key driver of gender wage inequality across labor markets.

7.3. Robustness Checks

Alternative Decomposition. Figure A6 presents the results of an alternative CCK decomposition. In our main decomposition, we estimate the pay-setting effect by comparing firm effects for men and women across the distribution of jobs held by men. We measure the sorting effect by comparing the average firm effects for women across jobs held by men versus women. In the alternative decomposition, the pay-setting effect is estimated using the distribution of jobs held by women. The sorting effect is calculated by comparing average male wage premiums across jobs held by men versus women. The relative importance of the sorting and pay-setting components within countries remains consistent, though Denmark is a notable exception, where the sorting component becomes more prominent in the alternative specification. The cross-country ranking of components is also well-preserved, though the Netherlands shifts from having a relatively high sorting component to having average sorting while showing an

[30] We omit country-industry cells representing less than 0.5% of total employment within a country.

above-average pay-setting component.

Alternative normalization.

Different sample cuts and econometric specifications. In most countries, the data covers a ten-year panel of the entire private-sector workforce. However, in some cases, the data include only a 50% random sample of workers. In the United States and Germany, we use a five-year panel. One concern is that low worker mobility could lead to greater sampling errors in firm effect estimates, especially for firms with few job transitions. Figure A8 presents the sorting and pay-setting effects for a restricted sample of workers employed in firms with at least ten gender-specific movers over the study period. This restriction ensures that firm effects are estimated from a substantial number of worker transitions, thereby reducing potential measurement error. However, it is important to note that this creates a highly selected sample that may not be representative of the broader firm population. Furthermore, depending on their overall firm size structure, the composition of this high-mobility sample likely varies across countries. Panel A shows that the sorting component generally remains stable when restricted to high-mobility firms, with most countries maintaining their relative positions. However, Hungary is an exception, as the sorting component increases from 0.4 to 2.3 log points. Panel B reveals more variation in the pay-setting component. While most countries have similar estimates to the baseline, Hungary, Denmark, Italy, and Portugal display significant reductions.

Another potential concern is the limited set of observable worker characteristics included in our main specification, which accounts only for year effects and third-order polynomials in age.[31] Figure A9 presents the sorting and pay-setting effects estimated

[31]Actual labor market experience is not available in our datasets, either because employment history cannot be reconstructed or because the data only report point-in-time employment measures (e.g., payroll status in October). Moreover, employment gaps are generally non-random. Card et al. (2018) provide a detailed discussion of this issue.

using a gender-specific AKM model with and without additional controls for worker characteristics. Specifically, we introduce four educational attainment categories (less than high school, high school or vocational training, some college, and master's degree or above) interacted with age. We also perform the same analysis incorporating broad occupational groups, following Casarico and Lattanzio (2024). In both cases, the results remain nearly identical, suggesting that our findings are robust to the inclusion of additional worker controls.

8. Conclusion

This paper provides the first harmonized cross-country analysis of firm-specific wage premiums and their contribution to the gender wage gap. Using administrative employer-employee matched data from eleven developed economies covering 65 million workers across 3.7 million firms, we establish that firms play a crucial role in explaining both the level and cross-country variation in gender wage gaps. Firm-specific wage premiums account for 15-32% of the gender wage gap, and countries with larger overall gender gaps consistently show larger gaps in firm premiums. The decomposition into sorting and pay-setting channels shows significant cross-country variation.

Despite this heterogeneity, robust patterns emerge across all countries. The sorting component intensifies over the life cycle. Women's concentration in firms with high part-time incidence partly explains this sorting, as these firms offer systematically lower wage premiums. For the pay-setting component, we find that disparities are concentrated in high-wage firms where women receive only 89% of the rent-sharing benefits that men receive from firm productivity gains.

Taken together, our findings underscore the unequal role that firms play in shaping gender wage inequality. While traditional explanations such as human capital differences and occupational segregation remain relevant, firm-specific wage premiums

emerge as a crucial factor in explaining persistent gender pay gaps. Our results suggest that policies aimed at reducing gender wage disparities should consider not only differences in bargaining power and wage-setting practices within firms but also the broader structural forces that shape gendered sorting across the firm wage distribution. Our findings highlight the need for future research on the mechanisms underlying firm-specific wage premiums, the role of labor market institutions in mitigating gender disparities, and the broader implications of firm pay policies for gender inequality.

References

Abowd, John, Francis Kramarz, and David Margolis, "High Wage Workers and High Wage Firms," *Econometrica*, 1999, *67* (2), 251–333.

Adams, Abi, Mathias Fjællegaard Jensen, and Barbara Petrongolo, "The Contribution of Employee-Led and Employer-Led Work Flexibility to the Motherhood Wage Gap," 2025.

Addario, Sabrina Di, Patrick Kline, Raffaele Saggio, and Mikkel Sølvsten, "It ain't where you're from, it's where you're at: hiring origins, firm heterogeneity, and wages," *Journal of Econometrics*, 2023, *233* (2), 340–374.

Arellano-Bover, Jaime, Nicola Bianchi, Salvatore Lattanzio, and Matteo Paradisi, "One Cohort at a Time: A New Perspective on the Declining Gender Pay Gap," *NBER Working Paper 32612*, June 2024.

Audoly, Richard, Manudeep Bhuller, and Tore Adam Reiremo, "The pay and non-pay content of job ads," *arXiv preprint arXiv:2407.13204*, 2024.

Babcock, Linda and Sara Laschever, "Women don't ask: Negotiation and the gender divide," in "Women Don't Ask," Princeton University Press, 2009.

Babet, Damien, Olivier Godechot, and Marco G. Palladino, "In the Land of AKM: Explaining the Dynamics of Wage Inequality in France," *Banque de France Working Paper N° 987*, 2025.

Barbanchon, Thomas Le, Roland Rathelot, and Alexandra Roulet, "Gender differences in job search: Trading off commute against wage," *The Quarterly Journal of Economics*, 2021, *136* (1), 381–426.

Bertheau, Antoine, Edoardo Acabbi, Cristina Barcelo, Andreas Gulyas, Stefano Lombardi, and Raffaele Saggio, "The Unequal Consequences of Job Loss Across Countries," *American Economic Review: Insights*, 2023, *5* (3).

Biasi, Barbara and Heather Sarsons, "Flexible wages, bargaining, and the gender gap," *The Quarterly Journal of Economics*, 2022, *137* (1), 215–266.

Black, Sandra E and Philip E Strahan, "The division of spoils: rent-sharing and discrimination in a regulated industry," *American Economic Review*, 2001, *91* (4), 814–831.

Blanchflower, David G., Andrew J. Oswald, and Peter Sanfey, "Wages, profits and rent-sharing," *Quarterly Journal of Economics*, 1996, *111* (1), 227–251.

Blau, Francine D, "Equal pay in the office," *(No Title)*, 1977.

___ **and Lawrence M Kahn**, "Understanding international differences in the gender pay gap," *Journal of Labor economics*, 2003, *21* (1), 106–144.

Blinder, Alan S, "Wage discrimination: reduced form and structural estimates," *Journal of Human resources*, 1973, pp. 436–455.

Bonhomme, Stéphane, Kerstin Holzheu, Thibaut Lamadon, Elena Manresa, Magne Mogstad, and Bradley Setzler, "How Much Should We Trust Estimates of Firm Effects and Worker Sorting?," *Journal of Labor Economics*, 2023, *41* (2), 291–322.

___ **, Thibaut Lamadon, and Elena Manresa**, "A distributional framework for matched employer employee data," *Econometrica*, 2019, *87* (3), 699–739.

Boza, István and Balázs Reizer, "The Role of Flexible Wage Components in Gender Wage Difference," Technical Report, IZA Discussion Papers 2024.

Card, David, Ana Rute Cardoso, and Patrick Kline, "Bargaining, sorting, and the gender wage gap: Quantifying the impact of firms on the relative pay of women," *Quarterly Journal of Economics*, 2016, *131* (2), 633–686.

___ , ___ **, Jörg Heining, and Patrick Kline**, "Firms and Labor Market Inequality: Evidence and Some Theory," *Journal of Labor Economics*, 2018, *36* (S1), S13–S70.

___ **, Jörg Heining, and Patrick Kline**, "Workplace Heterogeneity and the Rise of West German Wage Inequality," *Quarterly journal of economics*, 2013, *128* (3), 967–1015.

Casarico, Alessandra and Salvatore Lattanzio, "What firms do: Gender inequality in linked employer-employee data," *Journal of Labor Economics*, 2024, *42* (2), 000–000.

Goldin, Claudia, "Hours Flexibility and the Gender Gap in Pay," *Center for American Progress*, 2015.

Groshen, Erica L., "The Structure of the Female/Male Wage Differential: Is It Who You Are, What You Do, or Where You Work?," *Journal of Human Resources*, 1991, *26* (3), 457–472.

Hall, Robert E and Andreas I Mueller, "Wage dispersion and search behavior: The importance of nonwage job values," *Journal of Political Economy*, 2018, *126* (4), 1594–1637.

Humlum, Anders, Mette Rasmussen, and Evan K Rose, "Firm Premia and Match Effects in Pay vs. Amenities," *NBER Working Paper 33884*, 2025.

Kitagawa, Evelyn M, "Components of a difference between two rates," *Journal of the american statistical association*, 1955, *50* (272), 1168–1194.

Kleven, Henrik, Camille Landais, and Gabriel Leite-Mariante, "The child penalty atlas," *Review of Economic Studies*, 2024, p. rdae104.

___ , ___ **, and Jakob Egholt Søgaard**, "Children and gender inequality: Evidence from Denmark," *American Economic Journal: Applied Economics*, 2019, *11* (4), 181–209.

Kline, Patrick, "Firm wage effects," *Handbook of Labor Economics*, 2024, *5*, 115–181.

___ **, Neviana Petkova, Heidi Williams, and Owen Zidar**, "Who profits from patents? rent-sharing at innovative firms," *The quarterly journal of economics*, 2019, *134* (3), 1343–1404.

___ **, Raffaele Saggio, and Mikkel Sølvsten**, "Leave-out estimation of variance components," *Econometrica*, 2020.

Lachowska, Marta, Alexandre Mas, Raffaele Saggio, and Stephen A Woodbury, "Do firm effects drift? Evidence from Washington administrative data," *Journal of Econometrics*, 2022.

___ , ___ , ___ **, and** ___ , "Wage posting or wage bargaining? a test using dual jobholders," *Journal of Labor Economics*, 2022, *40* (S1), S469–S493.

___ , ___ , ___ **, and** ___ , "Work hours mismatch," Technical Report, National Bureau of Economic Research 2023.

Manning, Alan, "Monopsony in Labor Markets: A Review," *ILR Review*, 2021, *74* (1), 3–26.

Morchio, Iacopo and Christian Moser, "The gender pay gap: Micro sources and macro consequences," 2024.

Oaxaca, Ronald, "Male-female wage differentials in urban labor markets," *International economic review*, 1973, pp. 693–709.

Olivetti, Claudia and Barbara Petrongolo, "The evolution of gender gaps in industrialized countries," *Annual review of Economics*, 2016, *8*, 405–434.

___ **, Jessica Pan, and Barbara Petrongolo**, "The evolution of gender in the labor market," in "Handbook of Labor Economics," Vol. 5, Elsevier, 2024, pp. 619–677.

Palladino, Marco G., Alexandra Roulet, and Mark Stabile, "Narrowing industry wage premiums and the decline in the gender wage gap," *Labour Economics*, 2025, *94*, 102693.

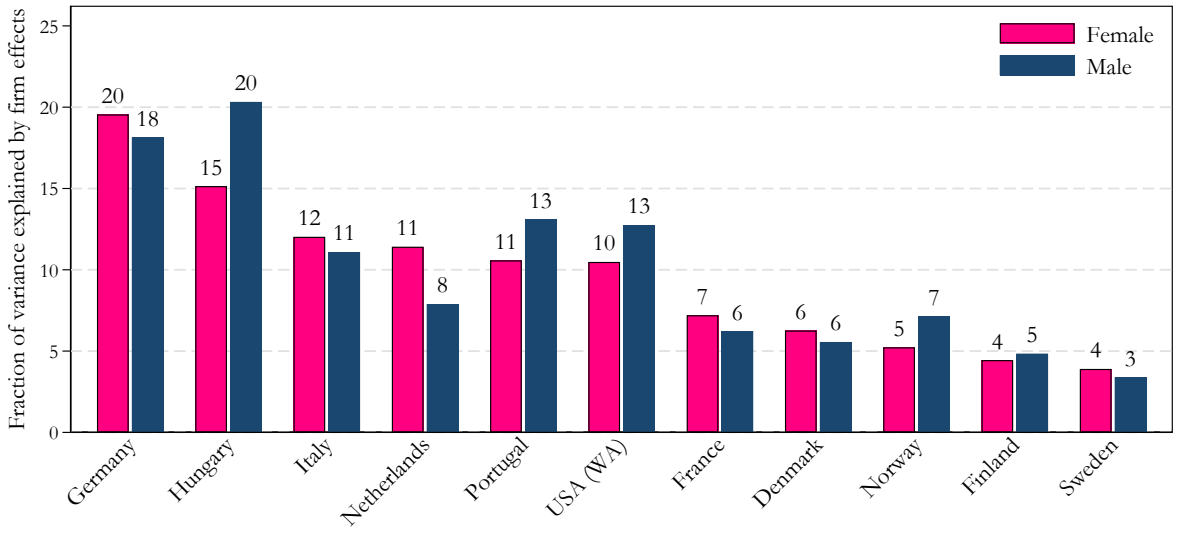
Penner, Andrew M, Trond Petersen, Are Skeie Hermansen, Anthony Rainey, István Boza, Marta M Elvira, Olivier Godechot, Martin Hällsten, Lasse Folke Henriksen, Feng Hou et al., "Within-job gender pay inequality in 15 countries," *Nature human behaviour*, 2023, *7* (2), 184–189.

Sorkin, Isaac, "The role of firms in gender earnings inequality: Evidence from the United States," *American Economic Review, Papers and Proceedings*, 2017, *107* (5), 384–387.

Wasserman, Melanie, "Hours constraints, occupational choice, and gender: Evidence from medical residents," *The Review of Economic Studies*, 2023, *90* (3), 1535–1568.

Figures

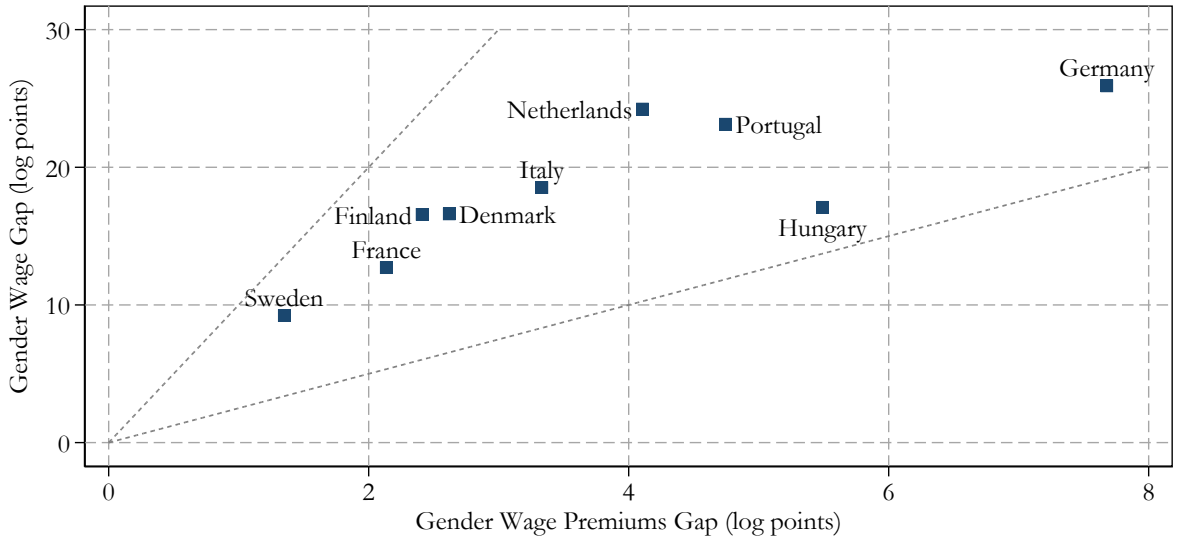
FIGURE 1. The Role of Firms in Wage Inequality Across Countries



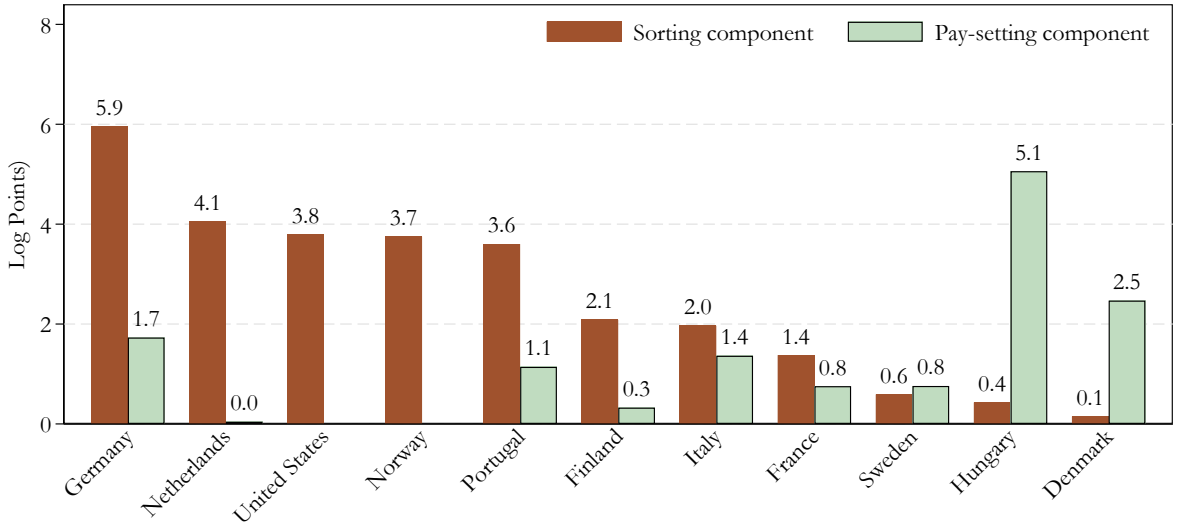
Notes: The figure shows the variance share due to firm wage premiums. We estimate firm wage premiums by estimating equation (1) separately by gender for each country. Variance components are biased-corrected using either the Kline, Saggio and Sølvsten (2020) or Babet, Godechot and Palladino (2025). We compute a bias correction by leaving entire worker-firm matches out (i.e., spell level). See the Appendix for comparing the relative magnitude of the person and firm effects, not-biased corrected variance shares, and variance shares on a different sample restriction. The samples in Sweden and Finland oversample large firms. See the text for details.

FIGURE 2. The Role of Firms in Gender Wage Inequality Across Countries

A. Relationship Between the Gender Wage and Wage Premium Gap



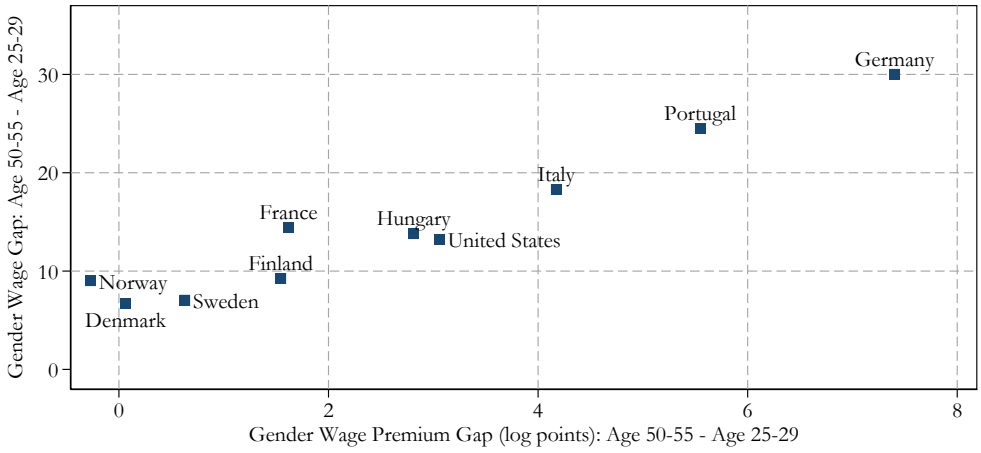
B. Decomposing the Gender Wage Premium Gap: Sorting vs Pay-setting



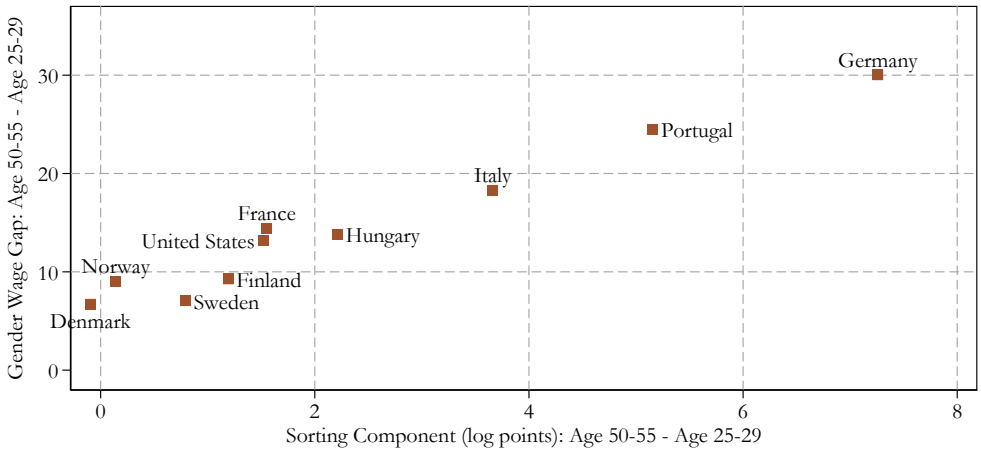
Notes: In Panel A, the y-axis shows the unconditional gender hourly wage gap in log points for private sector workers aged 25-55 in our analysis sample. The x-axis displays the gender gap in firm wage premiums, calculated as the sum of sorting and pay-setting components. The diagonal lines represent scenarios where firm wage premiums account for 10% and 40% of the total gender wage gap. In Panel B, we decompose the gender wage premium gap into sorting and pay-setting components following Equation 3. For most countries (Denmark, Finland, France, Hungary, Italy, Portugal, and Sweden), we use the dual-connected sample with productivity information, normalizing firm effects using value-added per worker (sales data for Portugal). For Germany, the United States, and Norway, we use the full dual-connected sample. For Germany, firm effects are normalized using the lowest-surplus industry approach, while for the United States and Norway, we show only the sorting component (which is invariant to normalization) due to issues discussed in Section 3.3.1. The samples in Finland, the United States, and Sweden are re-weighted based on worker characteristics to account for their sampling designs.

FIGURE 3. Gender Wage Gap and Its Component Over the Life Cycle Across Countries

A. Firm-Specific Wage Premium Gap (Sorting and Pay-setting)



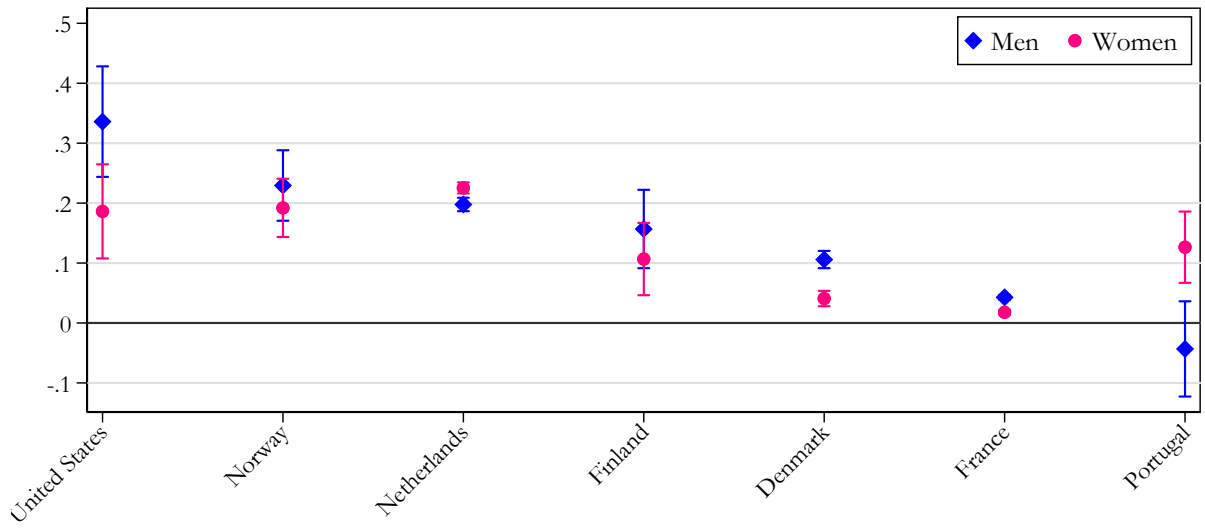
B. Sorting Component



C. Pay-setting Component

Notes: Panel A on the y-scale reports the difference between gender hourly wage gap for workers aged 50-55 minus workers aged 25-29. Panel A on the x-scale reports the difference between the firm-specific wage premiums gap for the same age group. Panel B reports the sorting component, while Panel C reports the pay-setting component of the total firm-specific wage premium gap.

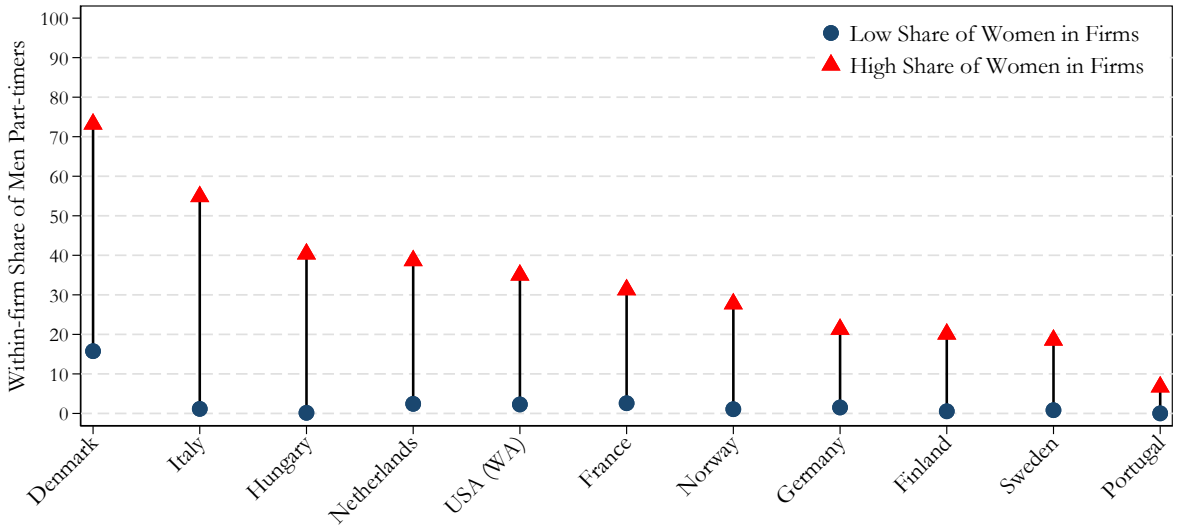
FIGURE 4. Elasticity of Firm Wage Premiums with Respect to Firm Hour Policies



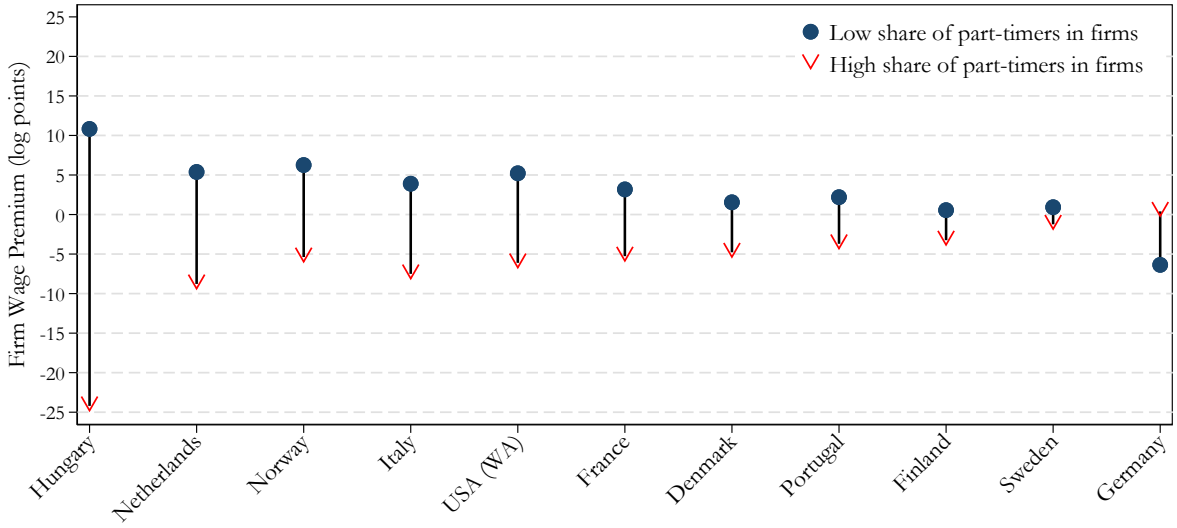
Notes: The figure plots the elasticity of firm wage premiums with respect to firm hour policies, estimated separately by gender. Each point represents the coefficient β_g from a firm-level regression as in Equation 5. Vertical bars indicate 95% confidence intervals with standard errors clustered at the firm level. The analysis is restricted to countries where paid hours are available.

FIGURE 5. Part Time Jobs and Firm Wage Premiums

A. Part-time Jobs and Women Employment

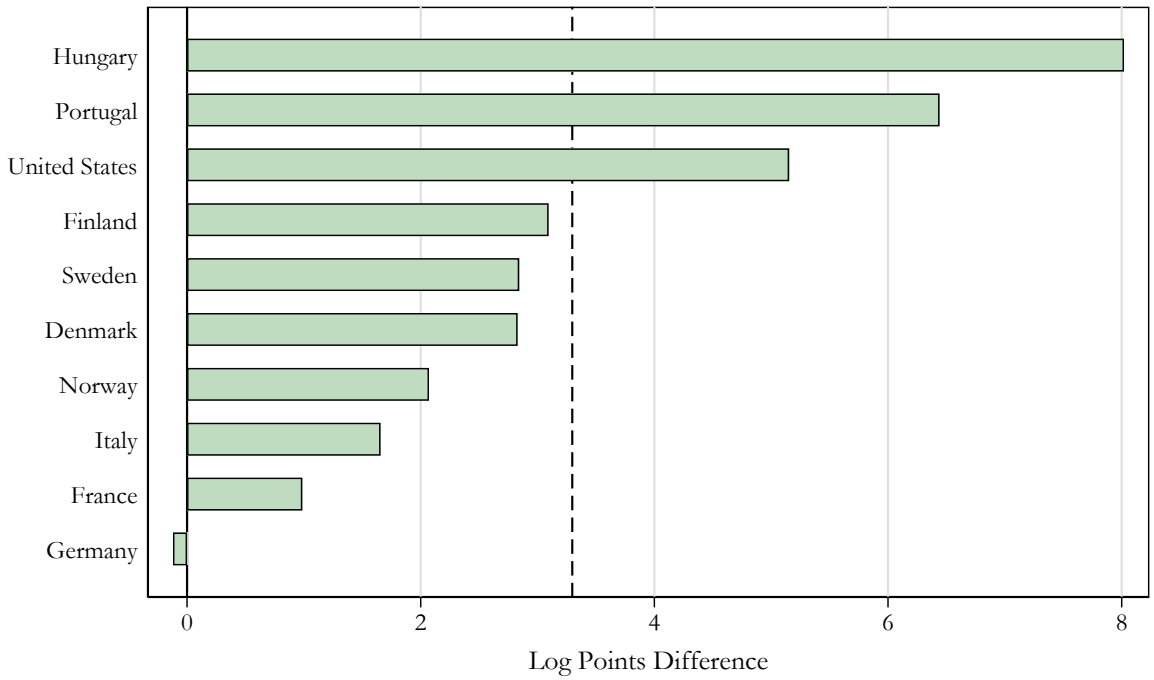


B. Part-time Jobs and Firm Wage Premiums



Notes: Panel A plots the share of part-time workers (men and women) for the lowest and highest terciles based on the share of women in their workforce. Women are disproportionately employed in firms with high part-time incidence in all countries. As shown in the Appendix, this pattern is not driven by the gender composition of part-timers within those firms. Panel B shows the average firm wage premium, with firms sorted into the lowest and highest terciles based on their share of part-time workers.

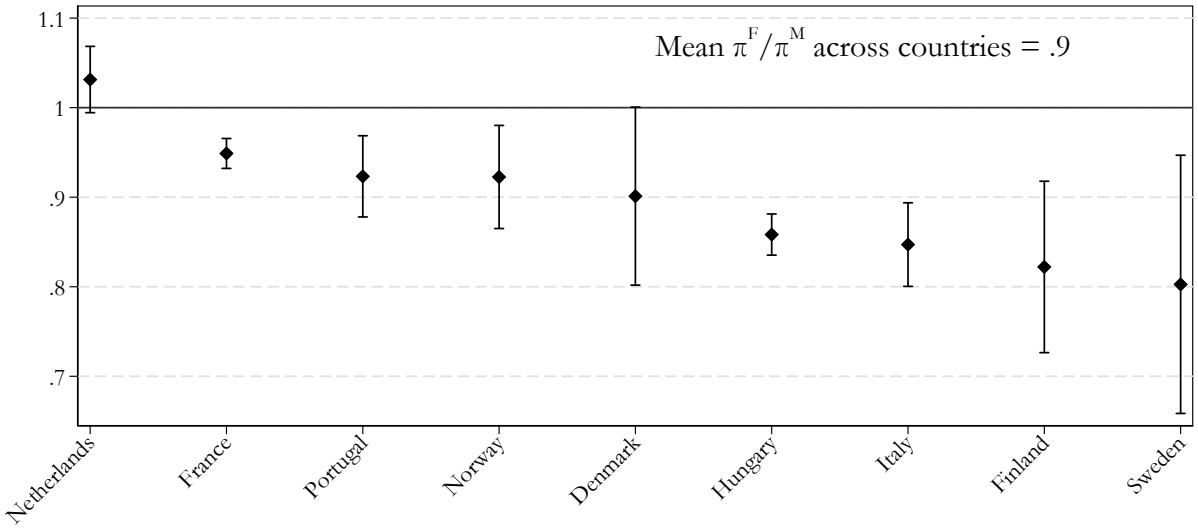
FIGURE 6. Pay-Setting Component – Difference between High-wage and Low-wage Firms



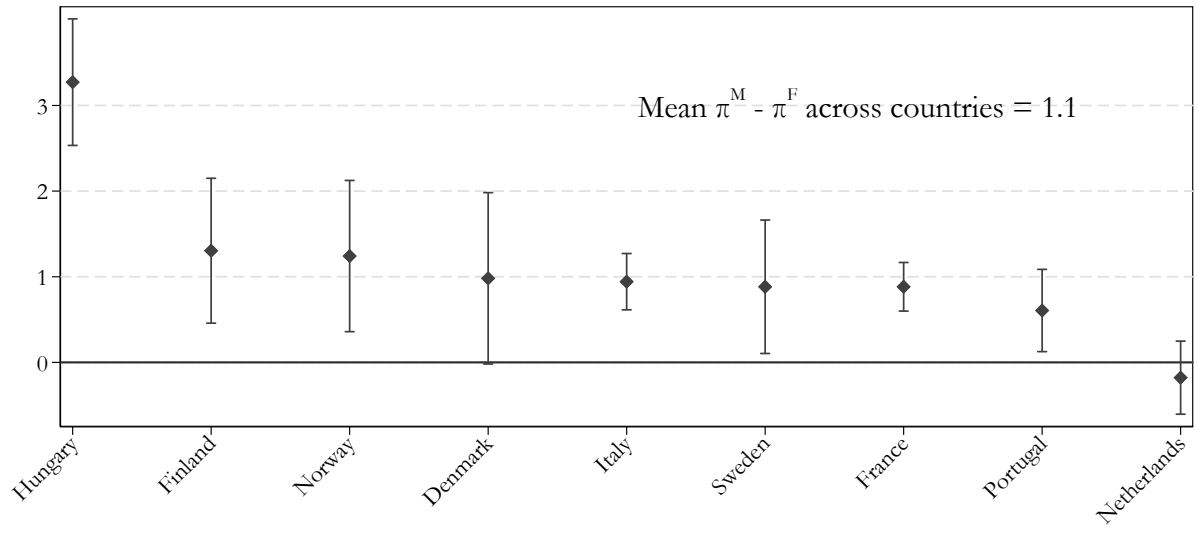
Notes: The figure shows the difference in the pay-setting component between high-wage and low-wage firms across countries. High-wage firms are defined as those above the median of the weighted average of gender-specific wage premiums, while low-wage firms are those below the median. The vertical dashed line represents the average difference across all countries.

FIGURE 7. Rent Sharing of Firm Wage Premium Across Countries

A. The Share of Male Rent-Sharing Captured by Women (%)

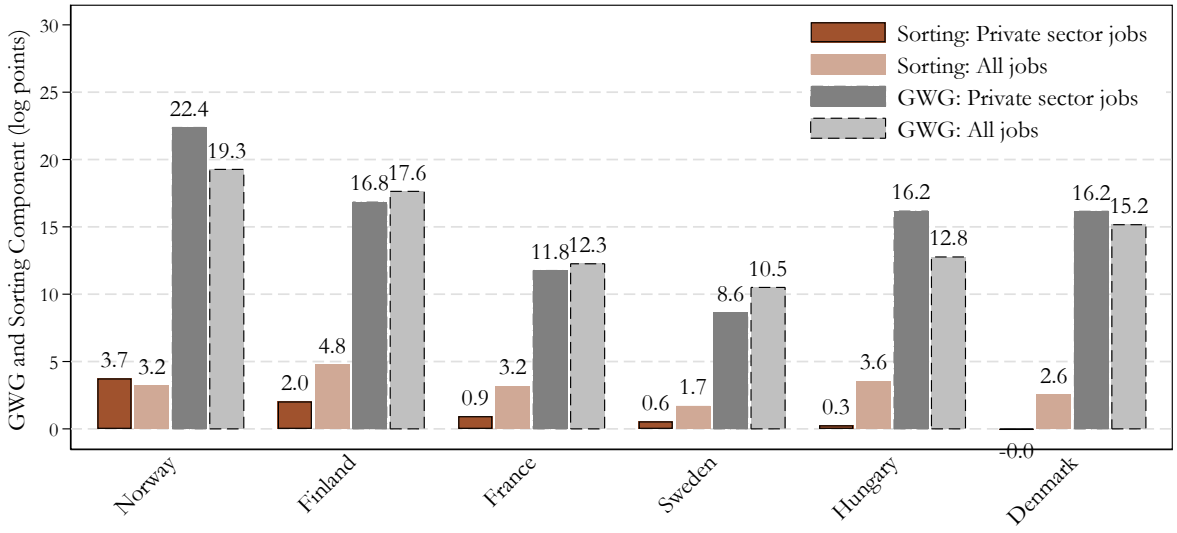


B. Direct Contribution to the Pay-Setting Component (ppt)



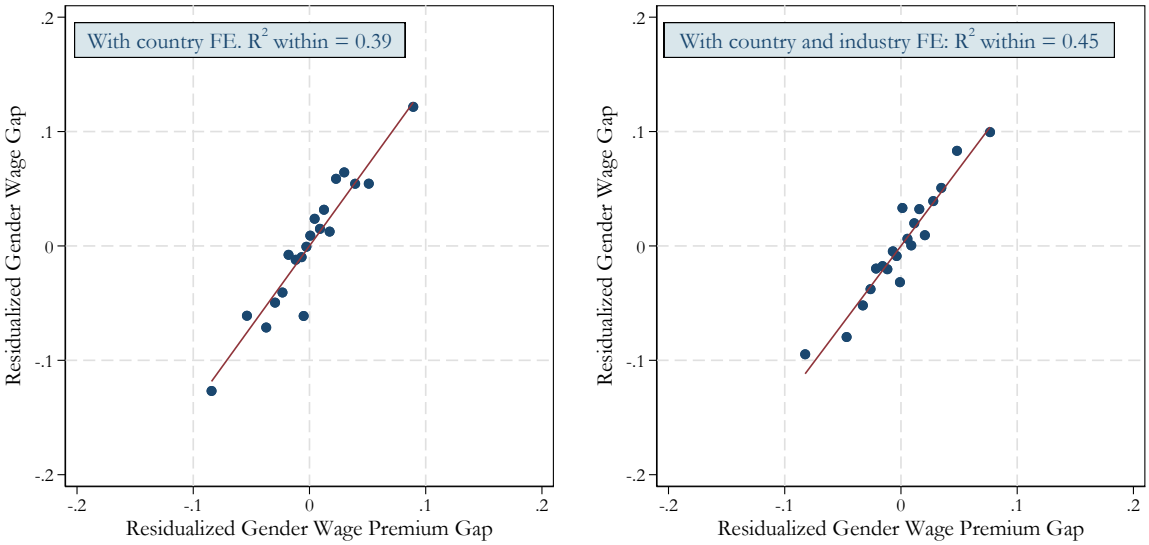
Notes: Panel A reports the elasticity of firm-level productivity to male and female wage premiums. The male and female models include a constant and are estimated at the firm level (weighted at the person-year level). Panel A reports the elasticity of firm-level productivity to female wage premiums on the elasticity of firm-level productivity to female wage premiums. This ratio measures whether the rent-sharing is similar for males and females. Small firms are underrepresented in the samples for Finland and Sweden.

FIGURE 8. Gender Wage Gap and Sorting in Private Sector Jobs versus All Jobs



Notes: This figure compares the sorting component of the gender wage premium gap and the gender wage gap between private-sector jobs only (the baseline sample) and all jobs (including the public sector and non-profit organizations) across countries. Countries are ordered from left to right based on the magnitude of their private-sector sorting component, from highest to lowest. Only countries with information on the public sector are included.

FIGURE 9. Correlation of Gender Wage Wage and Gender Wage Premium



Notes: Binned scatter plots at the country-industry level using NACE Rev. 2 industry categories. Each point represents a ventile of country-industry observations ranked by their gender wage premium gap. The left panel shows the relationship between residualized gender wage gaps and gender wage premium gaps after controlling for country fixed effects. The right panel shows the same relationship after controlling for both country and industry fixed effects, where industry controls consist of 10 broad sector dummies. Country-industry cells representing less than 0.5% of total employment within each country are excluded from the analysis. The sample includes 486 country-industry observations, with the number of industries varying from 40 to 47 across the 11 countries. All observations are weighted by the industry's employment share within each country.

Tables

TABLE 1. Review of Research Designs and Estimates

Paper	Country	Wage Type	Period	GWG	WPG (GWG %)	Sorting (GWG %)	Pay Setting (GWG %)
Li et al. (2023)	Canada	Annual	2001–15	26.8	6.1 (22.8)	2.9 (10.8)	3.2 (11.9)
Sorkin (2017)	USA	Annual	2000–08	33.5	—	9.3 (27.7)	—
Card et al. (2016)	Portugal	Hourly	2002–09	23.4	4.9 (21.2)	4.7 (19.9)	.3 (1.2)
Casarico and Lattanzio (2024)	Italy	Weekly	1995–15	20.4	6.9 (33.8)	4.2 (20.5)	2.7 (13.3)
Palladino et al. (2025)	France	Hourly	2014–19	12.8	2.0 (15.8)	1.1 (8.7)	.9 (7.1)
Bruns (2019)	W. Germany	Daily	2001–08	24.7	6.4 (25.9)	6.3 (25.4)	.1 (0.3)
Gallen et al. (2019)	Denmark	Hourly	2000–09	20.8	—	3.3 (15.8)	—
Masso et al. (2022)	Estonia	Monthly	2006–17	27.1	10.9 (40.1)	7.7 (28.5)	3.1 (11.6)
Boza and Reizer (2024)	Hungary	Hourly	2003–16	23.6	9.8 (41.5)	4.4 (18.6)	5.4 (22.9)

Notes: This table reviews studies examining gender wage gaps and firm-specific wage premiums across North America and Europe. The Gender Wage Gap (GWG) represents the unconditional gender wage gap measured in log. The sorting component measures how gender differences in firm allocation affect the wage gap, while the CCK pay-setting component captures within-firm gender pay differences. The Wage Premium Gap (WPG) represents the total effect by combining sorting and pay-setting components. Wage measurements vary across studies and include annual earnings (total yearly), hourly wages (per hour worked), weekly earnings, daily wages, and monthly earnings. Studies differ in their methodological approaches, including their choice of analysis unit (firm versus establishment level), selection of control variables, and methods for normalizing firm effects. These methodological variations should be considered when comparing results across studies.

TABLE 2. Characteristics of Data Sources by Country

Characteristic	USA	DNK	FIN	FRA	DEU	ITA	HUN	NLD	NOR	PRT	SWE
Time span and population											
Year coverage	2010–14	2010–19	2010–19	2010–19	2010–14	2010–19	2010–17	2010–19	2010–19	2010–19	2010–18
Reference month	No	No	Yes	No	No	No	Yes	No	No	Yes	Yes
Private sector jobs (%)	51	100	50	100	100	50	50	100	100	100	50
Public sector jobs	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Employee Information											
Hourly wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hours information	P	P	P	P	C	C	C	P	P	P	P
Education	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Occupation	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Employer Information											
Labor productivity	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes

Notes: P = Payroll-based hours; C = Contractual hours. The reference period spans 2010–2019 for most countries, with the USA being an exception (2001–2014). While most countries have comprehensive job coverage of private sector jobs, Sweden, Finland, Italy, and Hungary cover approximately 50% of jobs. Reference month indicates whether the data represents a specific month snapshot (Yes) or contains information about all employment spells throughout the year (No). Hourly wage measures are available across all countries and include irregular payments (overtime and bonuses). Hours are measured as paid hours including overtime, except in Hungary and Italy where contractual hours are used. The hourly wage measure in these countries reflects the base wage rate excluding overtime. Labor productivity is measured as value added per person employed for Denmark, Finland, France, Italy, Hungary, Norway, and Sweden. USA does not provide productivity data. In Germany, productivity data is available for about 3 percent of person-year observations. For Portugal, productivity is calculated using sales per person employed instead of value added. In the USA (Washington state), workers are observed if they have claimed unemployment insurance at least once during the sample period. In Sweden, the sample overrepresents workers employed in large firms.

TABLE 3. Summary Statistics

		Log Hourly Wage	Age	Part-time (%)	Separation (%)	Firm Size	Movers per Firm	Obs with VA (%)	Person/Yr Obs	N of workers	N of firms
USA	Male	3.00 (0.54)	39.46	11.56	30.85	120	19	NA	1.06	350.47	17.25
	Female	2.80 (0.53)	39.79	18.00	32.82	125	11	NA	0.61	207.15	17.25
DEU	Male	3.05 (0.57)	40.81	7.09	19.96	45	26	3.86	38.59	10438.87	426.20
	Female	2.79 (0.54)	40.66	31.81	22.95	45	14	2.10	21.75	6336.21	426.20
DNK	Male	3.44 (0.41)	40.59	25.92	27.66	36	41	82.61	4.58	930.03	59.26
	Female	3.27 (0.35)	40.35	32.01	26.75	40	23	79.80	2.70	567.42	59.26
FIN	Male	3.04 (0.36)	40.17	4.40	22.42	140	100	93.19	2.58	526.47	9.04
	Female	2.87 (0.34)	40.28	15.24	25.99	138	65	86.84	1.63	361.12	9.04
FRA	Male	2.90 (0.46)	39.38	12.68	27.79	42	54	92.58	65.62	14849.45	548.85
	Female	2.79 (0.43)	38.94	29.60	29.56	43	33	88.14	42.17	10549.49	548.85
HUN	Male	6.84 (0.64)	38.85	5.24	26.56	44	24	90.11	2.90	640.06	56.91
	Female	6.67 (0.57)	39.52	11.33	28.65	46	18	90.23	2.26	522.59	56.91
ITA	Male	2.67 (0.45)	40.71	10.35	22.03	25	33	87.53	24.49	4050.51	376.27
	Female	2.49 (0.40)	40.02	41.09	24.29	26	23	85.09	15.83	2712.56	376.27
NLD	Male	3.05 (0.51)	39.95	11.59	24.79	62	61	82.19	19.32	3306.77	176.87
	Female	2.82 (0.44)	39.21	50.59	27.33	67	37	76.48	11.47	2180.42	176.87
NOR	Male	3.25 (0.46)	39.84	8.47	21.94	45	53	84.63	6.56	1130.21	62.71
	Female	3.03 (0.46)	40.01	26.62	23.85	51	33	59.66	5.01	961.04	62.71
PRT	Male	1.96 (0.58)	39.34	1.73	23.62	33	33	99.51	7.53	1483.40	92.98
	Female	1.73 (0.53)	38.93	6.37	25.20	34	24	99.37	5.69	1146.84	92.98
SWE	Male	3.11 (0.35)	40.59	5.72	23.18	304	169	88.63	3.93	904.82	6.53
	Female	3.03 (0.32)	40.05	22.13	27.51	307	95	83.37	2.19	547.84	6.53

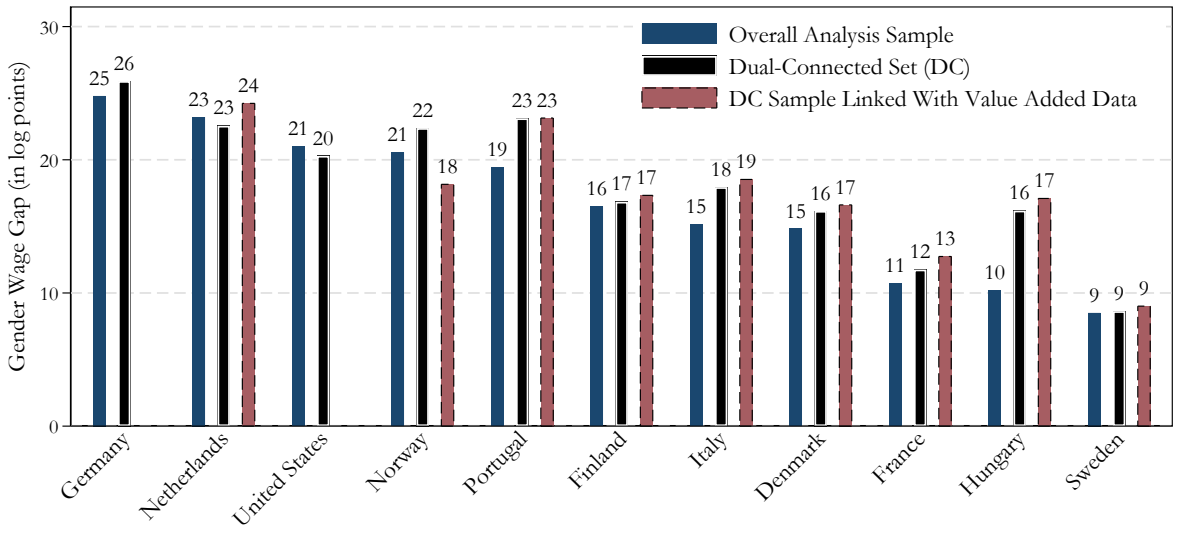
Notes: The table presents summary statistics of the dual-connected set samples across countries for private sector jobs only. Workers are classified as part-time if they work less than 30 hours per week. The separation rate shows the percentage of workers who leave their firms between consecutive years. Mean firm size represents the raw count of employees per firm without weighting by workforce size. The last three columns are scaled: person-year observations are in millions, while the number of workers and firms are in thousands.

Appendix

A. Additional Figures and Tables

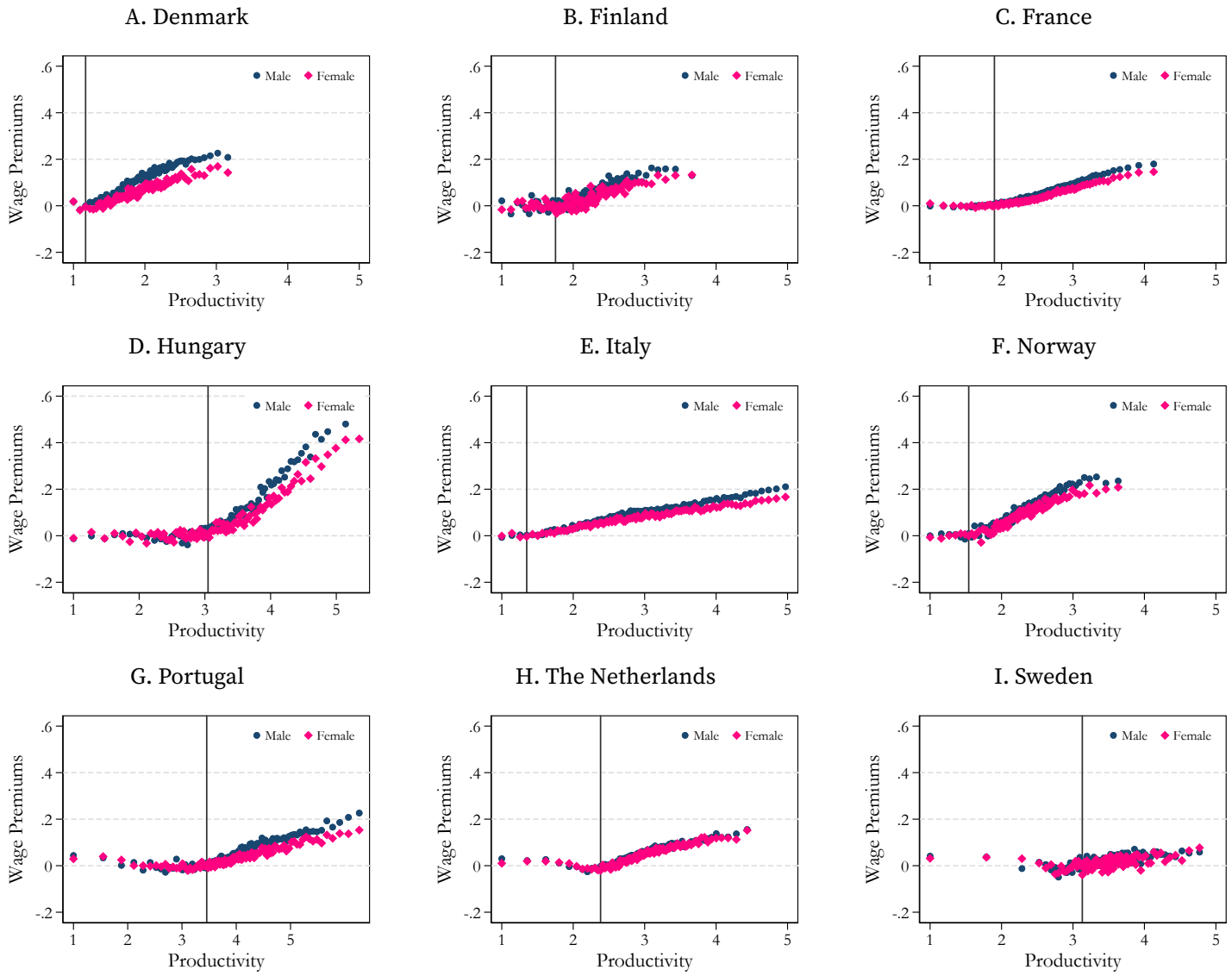
A.1. Figures

FIGURE A.1. The Gender Wage Gap Across Countries
Unconditional Gender Wage Gap For Various Samples



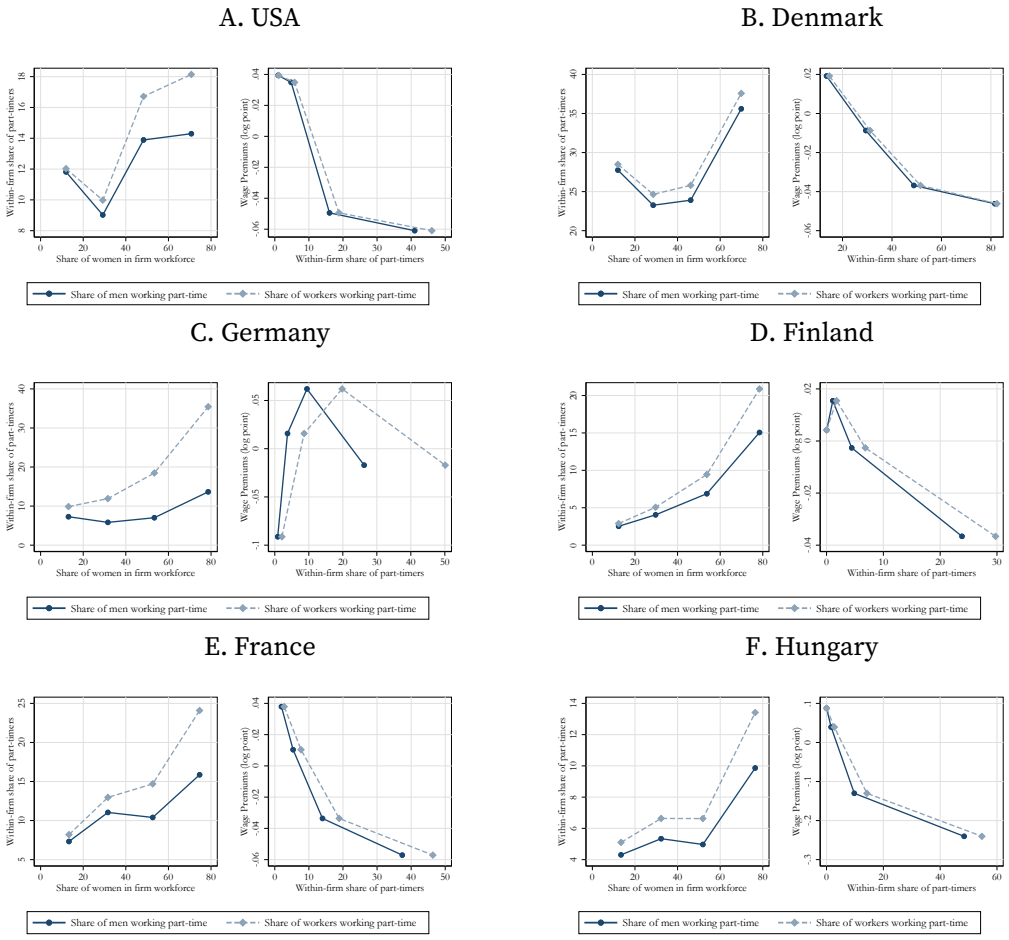
Notes: Overall analysis sample includes paid workers aged 25-55 employed in the private sector. Wages are measured in real (2015 = 100) euros per hour. The gender wage gap is calculated across country-person-year observations. See the text for the definition of connected and dual-connected sets.

FIGURE A2. Firm Wage Premiums versus Productivity Across Countries



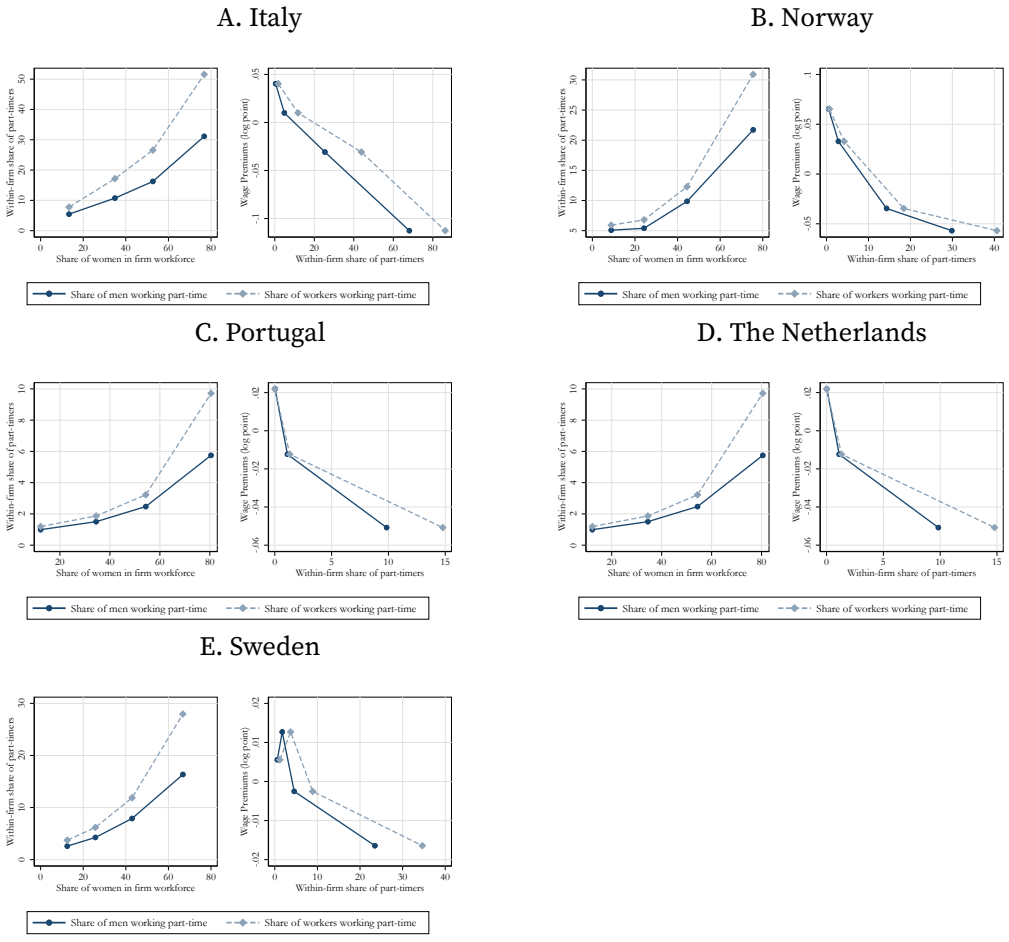
Notes: The figures represent the relationship between gender-specific firm wage premiums effects (arbitrary normalization) and firm-level productivity. Specifically, the points shown represent mean estimated firm wage premiums from the AKM models for men and women averaged across firms with 100 percentile bins of productivity (measured as mean log value-added per worker). The vertical line marks a threshold in value-added per worker used to normalize firm effects. Sales instead of value-added is used in Portugal. For each country, firm effects and productivity are rescaled.

FIGURE A3. Relationship Between Firm-specific Wage Premiums and Part-time Jobs



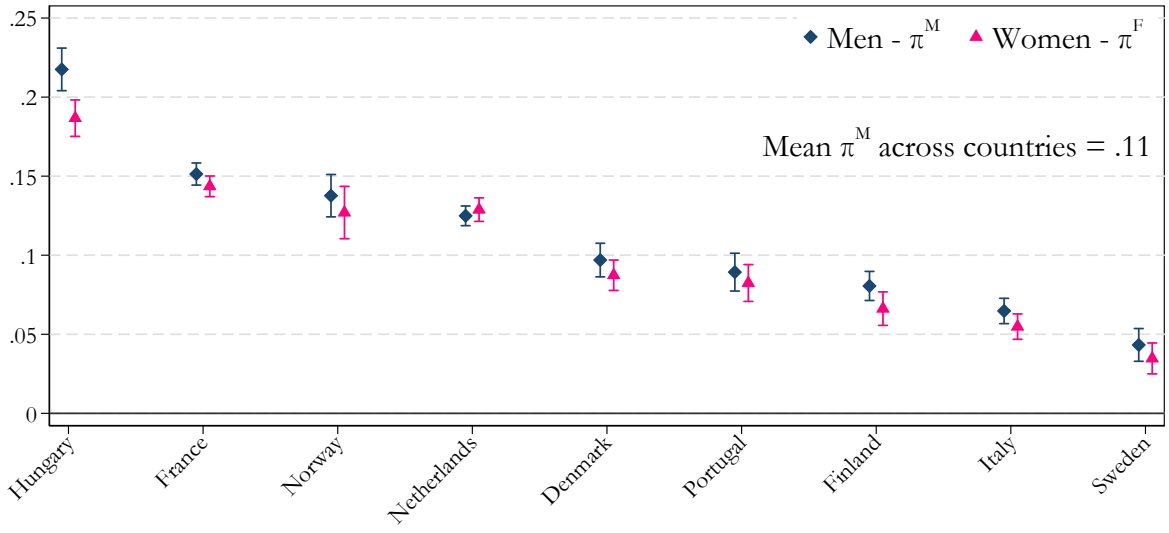
Notes: The figures plots the relationship between the firm wage premiums and the firm's share of part-timers.

FIGURE A4. Relationship Between Firm-specific Wage Premiums and Part-time Jobs



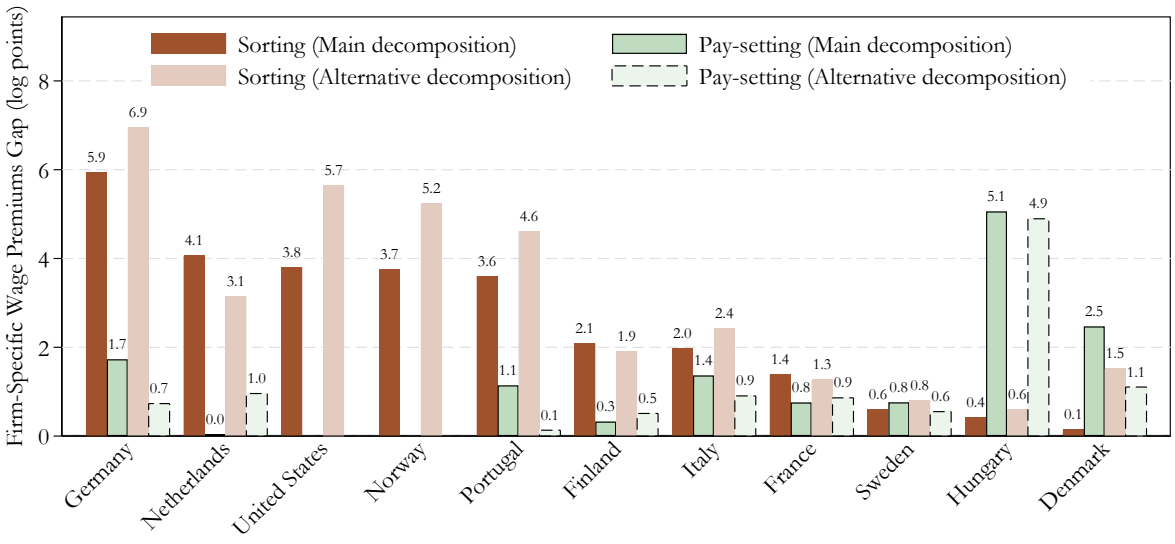
Notes: The figures plots the relationship between the firm wage premiums and the firm's share of part-timers.

FIGURE A5. The Productivity Pass-Through to Wage Premiums



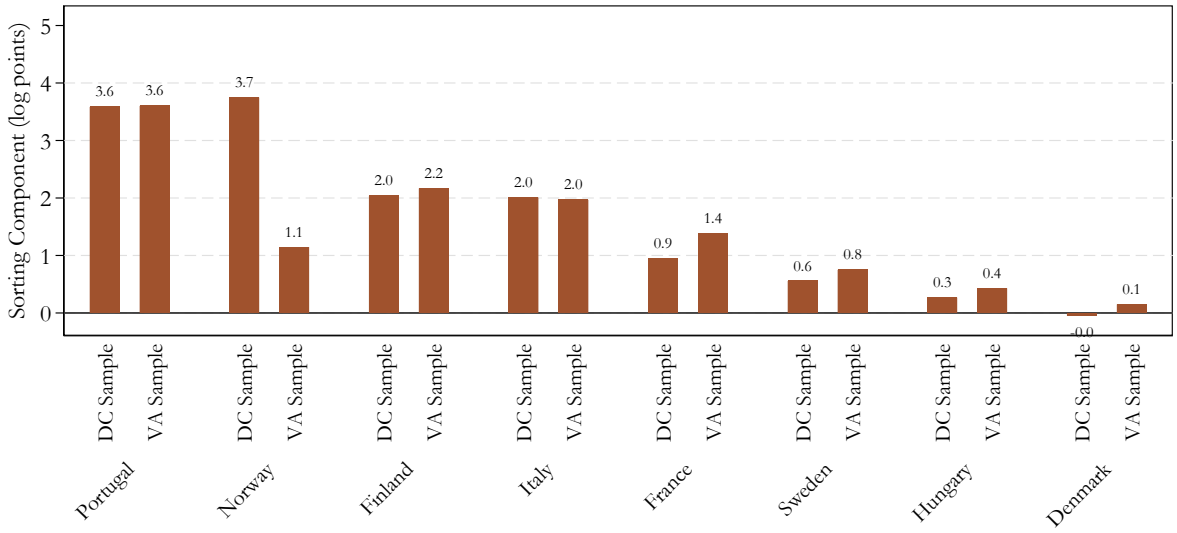
Notes: Panel A reports the elasticity of firm-level productivity to male and female wage premiums. The male and female models include a constant and are estimated at the firm level (weighted at the person-year level).

FIGURE A6. Gender Wage Premium Gap: Alternative Decomposition



Notes: The figure reports the alternative decomposition of the sorting and pay-setting components. The pay- setting effect is calculated using the distribution of jobs held by women, and the sorting effect is calculated by comparing the average value of the male wage premiums across jobs held by men versus women. Countries are ordered from left to right based on the magnitude of the baseline sorting component, from highest to lowest.

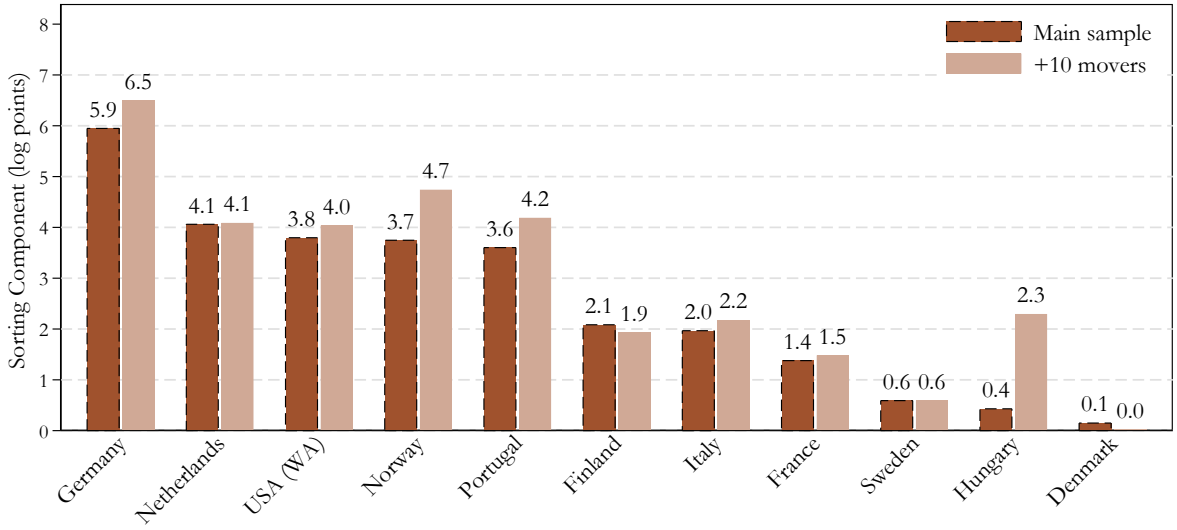
FIGURE A7. Sorting Component for the Sample With and Without Productivity



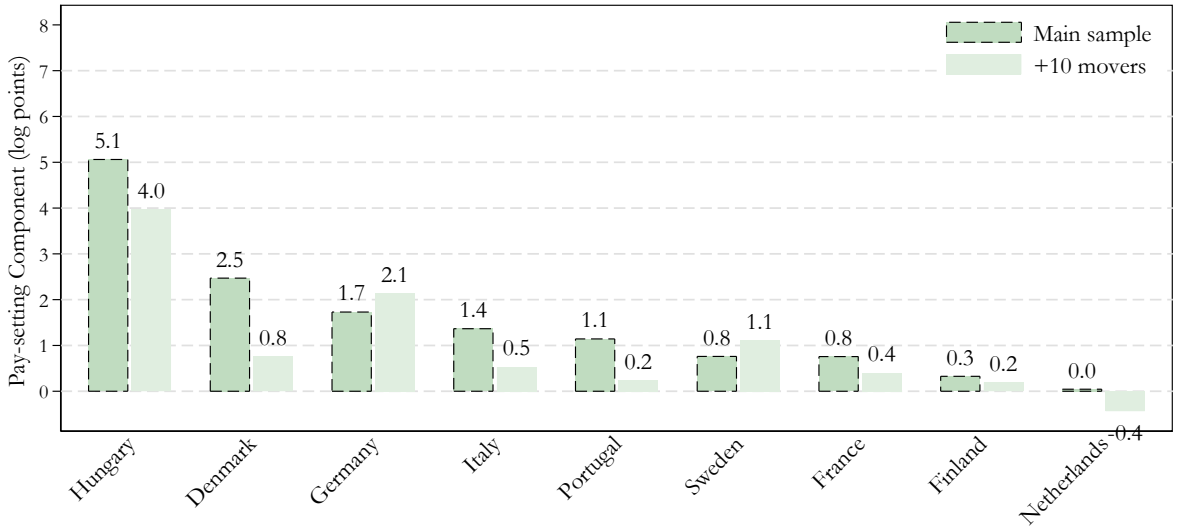
Notes: This figure compares the sorting component of the CCK decomposition for samples with and without productivity data.

FIGURE A8. The Role of Firms in Gender Wage Inequality Across Countries: At Least 10 Movers by Gender Sample

A. Sorting Component

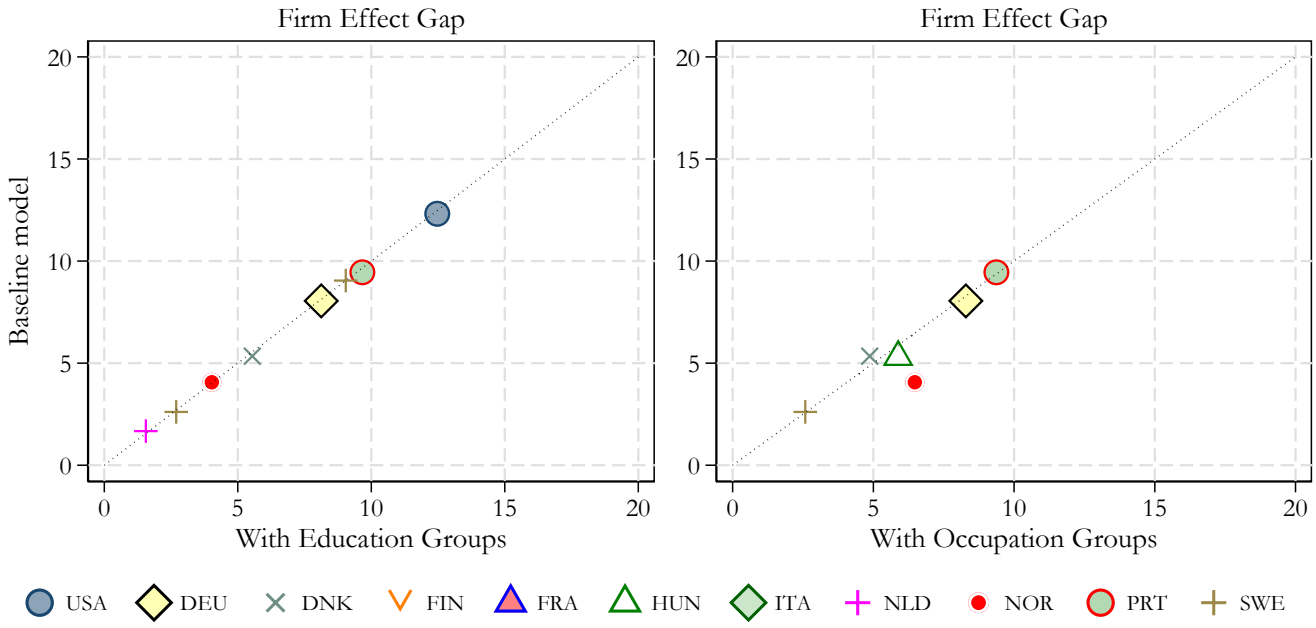


B. Pay-setting Component



Notes: The two figures decompose the gender wage premium gap into sorting and pay-setting components following Equation 3.

FIGURE A9. Gender Wage Premiums Gap: Model specification



Notes: The figure reports the firm wage premium gap using education groups and occupation groups in the AKM model.

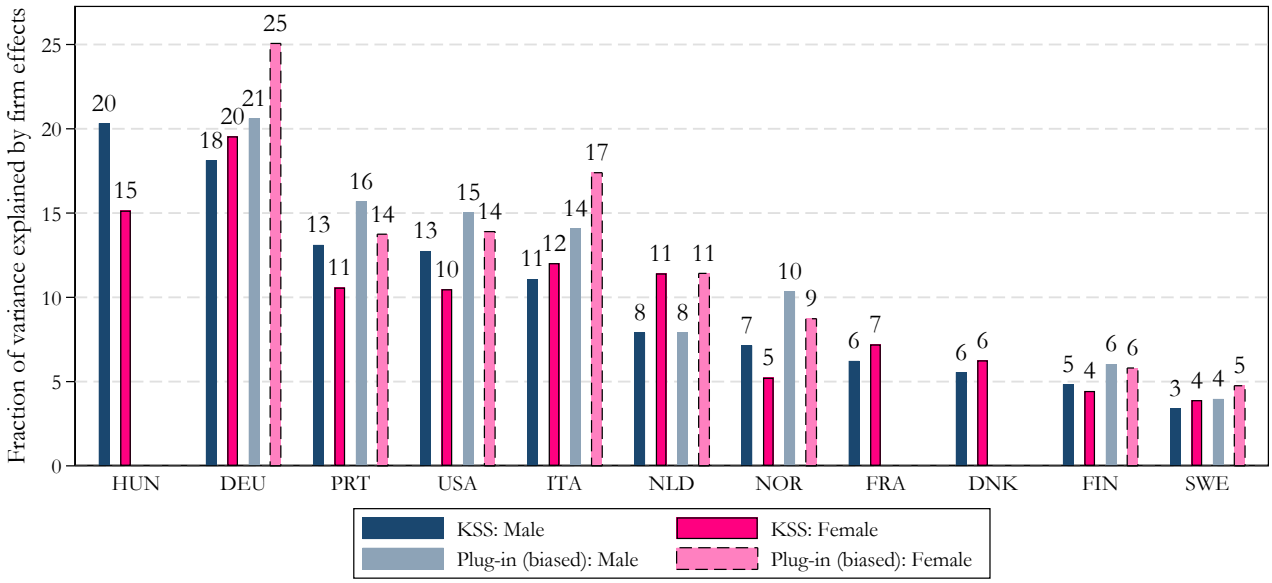
B. Further Analysis of the Contribution of Firm Wage Premiums to Wage Inequality

How do our findings in Section 4.1 compare to existing cross-country evidence on the role of firm effects? To our knowledge, the most comparable study is Bonhomme et al. (2023), which examines firm wage effects across five countries (Austria, Italy, Norway, Sweden, and the U.S.). A direct comparison, however, is challenging, as their analysis is based on annual earnings rather than hourly wages and includes only individuals earning above an annualized minimum wage threshold. To facilitate comparison, Panel B of Figure A10 presents the bias-corrected variance decomposition for both our main sample and a restricted sample that includes only individuals with annualized earnings above a certain threshold—specifically, at least 32.5% of mean annual earnings, as in their study. Firm wage effects are generally higher in our main sample than in the alternative sample with the annual earnings threshold. For example, in Germany, firm wage effects account for 18-20% of total variance in our main sample but drop to 15-16% when using the alternative sample.

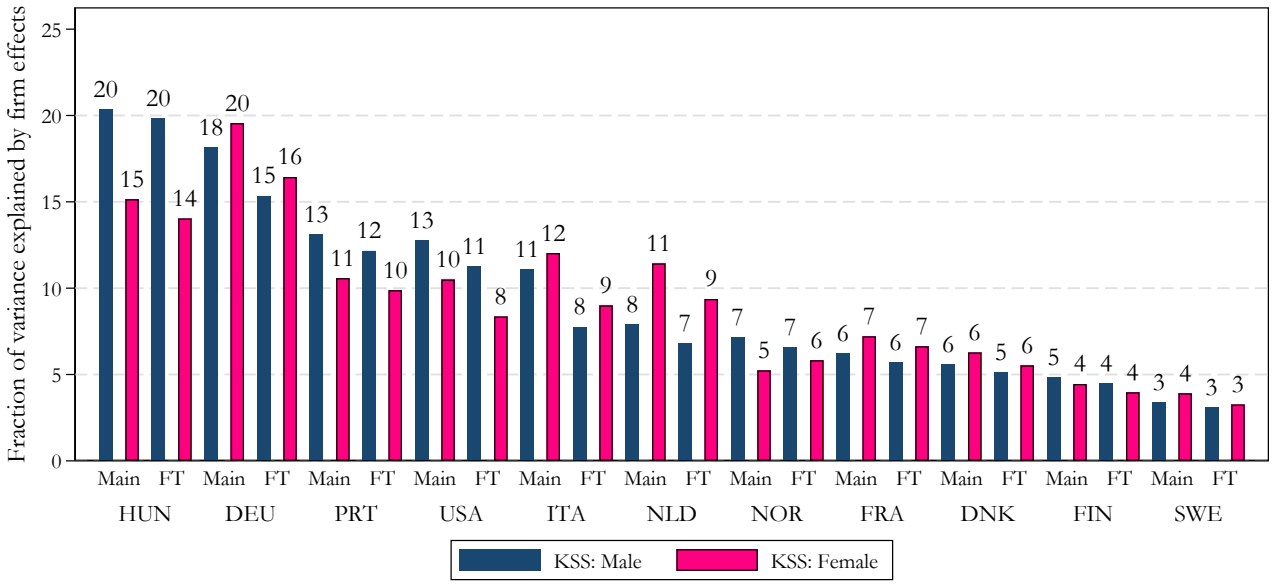
Additionally, we assess the relative importance of firm and worker components in explaining wage inequality by gender across countries. Following Kline (2024), Figure A11 reports the standard deviation of bias-corrected worker and firm effects, which can be directly interpreted in log points. The 45-degree line represents the expected relationship if worker and firm components were equally important in explaining overall wage inequality across gender and country. Most of our estimates fall well below the 45-degree line, indicating that worker effects play a larger role in wage dispersion than firm effects in the countries we study. That said, firm effects are still substantial, with a standard deviation ranging from 0.10 to 0.20. This variation is consistent with findings from Gerard et al. (2021), who report standard deviations between 0.3 and 0.7 across race and gender. Panel B of Figure A11 compares uncorrected and corrected firm wage effects. To assess the impact of limited mobility bias, the plot includes two reference lines: a dotted gray line, representing firm effects estimated without upward bias, and a solid gray line, assuming the uncorrected firm effects overestimate the standard deviation by 20 percent. Across all countries, our estimates fall between these two lines. The importance of bias correction and sample selection criteria highlights the necessity of harmonized sample construction for meaningful cross-country comparisons. Overall, our analysis confirms that firm wage effects contribute to wage inequality for both males and females, though their magnitude varies considerably across countries.

FIGURE A10. Additional Results on Firm Wage Effect Variance Shares

A. Main Sample



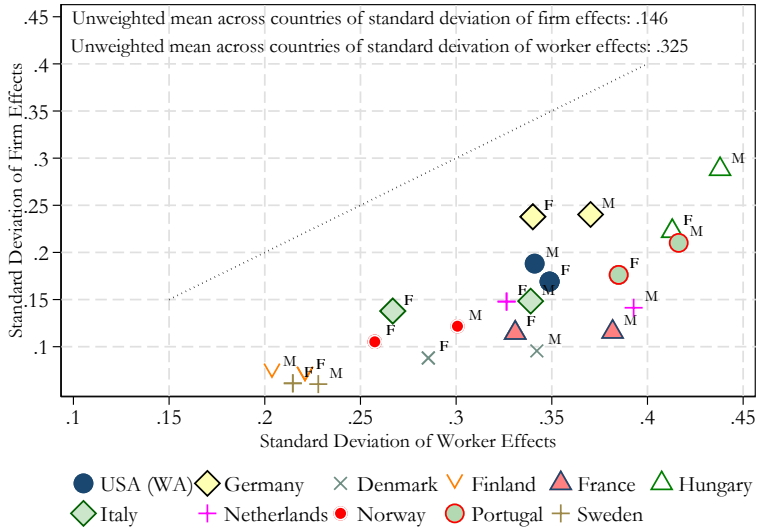
B. Sample With An Higher Threshold on Annual Earnings



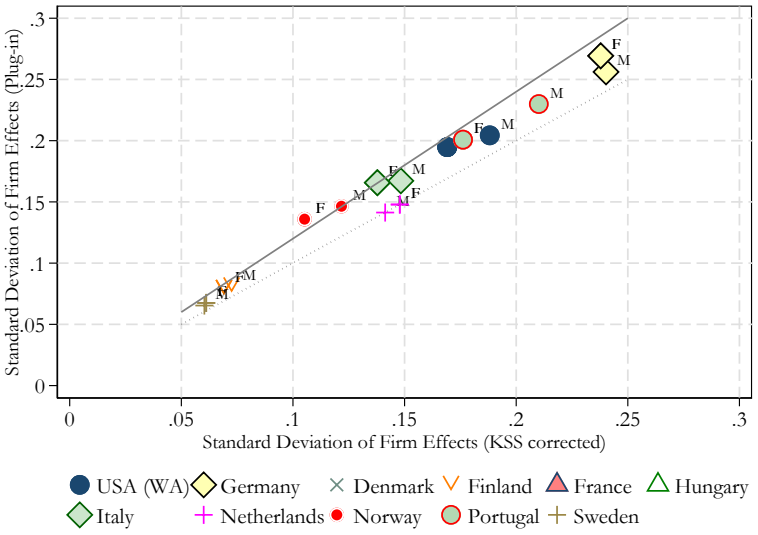
Notes: Figure shows the variance share due to firm wage premiums. We estimate firm wage premiums by estimating equation (1) separately for each country. Variance components are biased-corrected using the Kline, Saggio and Sølvsten (2020) correction. We compute a bias correction by leaving the entire worker-firm matches out. Panel A. We plot the plugin (biased) variance share on the same leave one out sample in light blue and light pink. Panel B. We plot the biased-corrected variance shares for the main sample and an alternative sample that we label "Full-time". The latter sample is restricted to person-year observations where the total annual earnings is greater than 32.5% of the mean of the annualized earnings (as in Bonhomme, Holzheu, Lamadon, Manresa, Mogstad and Setzler (2023)).

FIGURE A11. Standard Deviation of Worker and Firm Effects

A. Worker and Firm Wage Effects



B. Firm Effects: Corrected vs Uncorrected



Notes: Panel A. Bias corrected standard deviations of person and firm effects using the Kline, Saggio and Sølvsten (2020) correction (except for France, where another method is used; see text for details). The dotted gray line gives what one should expect if worker and firm components are equally important and scale with the overall level of hourly wage inequality in an economy. We compute a bias correction by leaving entire worker-firm matches out (i.e., spell level). Panel B. Compare firm effects corrected and uncorrected in the same leave-out sample. The gray dotted line represents a scenario where the uncorrected and corrected firm effects are similar. The gray solid line represents a scenario where the uncorrected standard deviation of firm wage effects would be 20% larger than the corrected standard deviation.

C. Explaining Variation in the Sorting Component: Gender Allocation or Wage Premiums Dispersion?

As documented in Section 4.2, the sorting component ranges widely, from close to zero in Denmark to six log points in Germany. We explore the extent to which these differences arise from two channels: (1) differences in the allocation of men and women across firms' wage premiums (i.e., gender segregation across firms) and (2) differences in the dispersion of firms' wage premiums (i.e., the difference in premiums offered by high- and low-wage firms).[32] Since greater dispersion in firm wage premiums creates stronger incentives for sorting into different types of firms, these channels are likely interconnected. Figure A12 illustrates visually these two channels. Panel A plots the difference between the share of women and men employed in each quintile of the firm wage premium distribution.[33] In countries like Norway and Germany, women are overrepresented in low-paying firms and underrepresented in high-paying firms, with a gap of more than 12 and 8 percentage points in the top quintile respectively. By contrast, Denmark shows almost no gender imbalance across quintiles, consistent with its near-zero sorting component. Panel B shows the average firm wage premium by quintile. Dispersion is especially large in countries like Germany and Hungary, where the gap between the bottom and top quintiles exceeds 80 log points, compared to only 20 log points in Finland and Sweden.

To quantify the relative importance of these channels, we implement a percentile-based decomposition. We first divide firms into 100 percentiles based on their wage premiums (Ψ^F), assuming no differential sorting of males and females within percentiles. For each percentile p, we compute the share of female and male employed in that percentile relative to total female and male employment (S^F and S^M) and average

[32] Throughout this section, we consistently use female wage premiums in accordance with the baseline decomposition in Equation 3

[33] For each quintile i, we compute $(F_i/F - M_i/M) \times 100$, where F and M denote total female and male employment, respectively.

wage premiums. Each country c's deviation from a benchmark can then be written as:

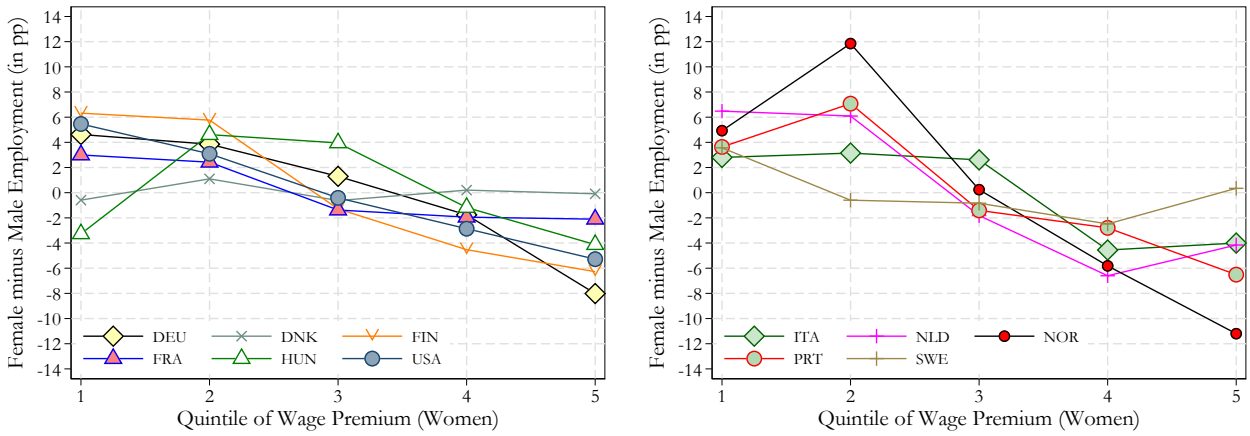
$$\underbrace{\sum_{p=1}^{100} S_{p,c} \cdot \Psi^F_{p,c} - \sum_{p=1}^{100} S_{p,\mathrm{b}} \cdot \Psi^F_{p,\mathrm{b}}}_{\text{Total Difference}} = \underbrace{\sum_{p=1}^{100} (S_{p,c} - S_{p,\mathrm{b}}) \cdot \Psi^F_{p,\mathrm{b}}}_{\text{Allocation}} + \underbrace{\sum_{p=1}^{100} (\Psi^F_{p,c} - \Psi^F_{p,\mathrm{b}}) \cdot S_{p,c}}_{\text{Dispersion}} \tag{A.1}$$

where $S_p = S^M_p - S^F_p$. As is common in Kitagawa-Oaxaca-Blinder decompositions an alternative formulation is possible, using different base periods for each component. In this case, since there is no prior as to which would work best *a priori*, we compute both versions and use their average as our baseline estimate. Figure A13 shows the results of decomposing the sorting component of the gender wage premium gap into two channels. Panel A uses Denmark — the country with the lowest observed sorting component — as the benchmark. For each country, we decompose the difference in the sorting component relative to Denmark into the gender allocation component and the dispersion component. Then, we sum the absolute value of each component across countries to measure their relative importance. Using Denmark as the benchmark, the gender allocation channel accounts for 79% of the total absolute variation, while dispersion explains the remaining 21%. Panel B repeats the decomposition, but uses the average sorting component across countries as the benchmark instead of Denmark. In this case, the dispersion component plays a larger role, accounting for 39% of the variation. This shift is expected because Denmark does not have the flattest firm wage premium distribution in the sample. Thus, comparing other countries to Denmark minimizes the role of dispersion by construction. Nevertheless, even under this more neutral benchmark, the gender allocation channel remains the dominant factor, explaining 61% of the absolute cross-country variation.

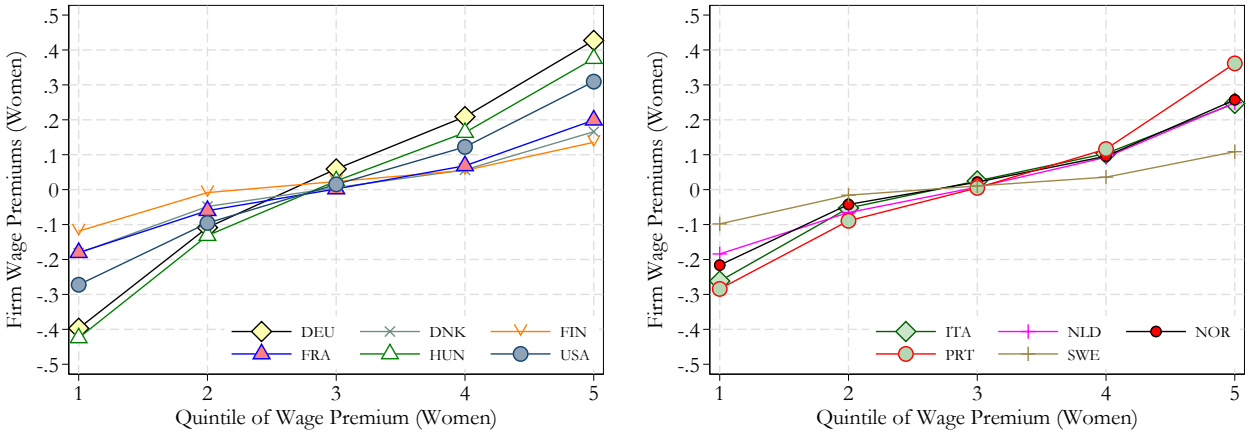
Together, these results suggest that cross-country differences in the sorting component are primarily driven by the segregation of men and women across different types of firms. However, the difference in how much high-paying firms pay relative to low-paying ones can amplify the effect of gender segregation. In countries with more dispersed firm wage premiums, similar levels of gender segregation result in significantly larger contributions to the gender wage gap from the sorting component.

FIGURE A12. Gender Allocation and Firm Wage Premium Dispersion

A. Gender Allocation Across Deciles of Firm Wage Premium



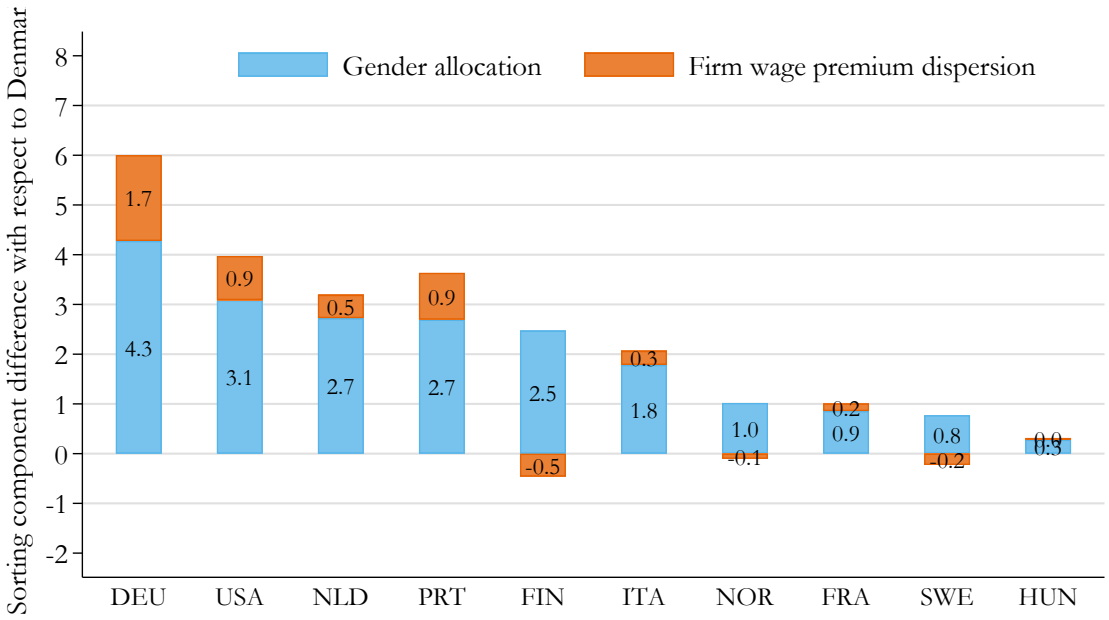
B. Firm Wage Wage Premium Dispersion



Notes: The top panel plots the relative gender composition of employment across rankings of firm wage effects (deciles of female firm fixed effects). For each firm wage decile, it shows the difference between the share of female employment and male employment (normalized by total gender employment). The bottom panel shows the average firm fixed effect by quintile for women.

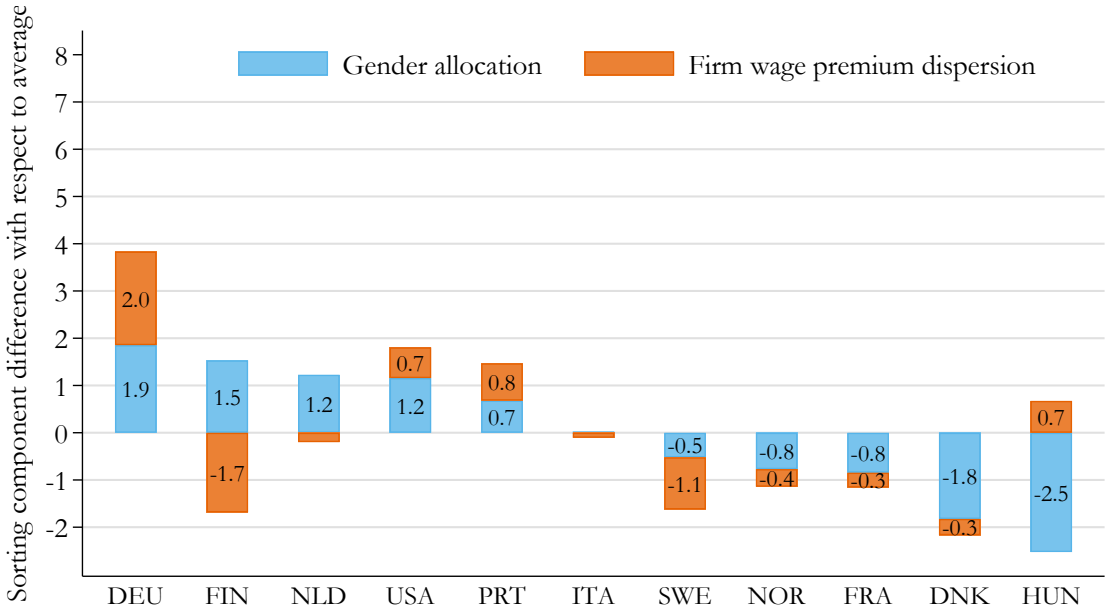
FIGURE A13. Decomposition of the Sorting Component of the Gender Wage Gap

A. Using a given country as benchmark



Note: The gender allocation channel explains 79% of absolute differences.
The wage dispersion channel explains 21% of absolute differences.

B. Using the average sorting component across countries as benchmark



Note: The gender allocation channel explains 61% of absolute differences.
The wage dispersion channel explains 39% of absolute differences.

Notes: The figure plots the Kitagawa-Oaxaca-Blinder (KOB) decomposition of the sorting component of the gender wage gap for each country with respect to a base category. Panel A uses as base category Denmark, the country with the lowest sorting component (0.1 log points). Panel B uses as base category the average of the sorting components across countries. The KOB decomposition split the difference with respect to the category into a gender allocation and a firm wage premium dispersion components. The KOB decomposition can be performed by fixing gender allocation or firm wage premiums at the reference level. This figure reports the average of the two decompositions. See equation A.1.

D. Comparing Unweighted and Weighted Results

D.1. USA

To assess the bias due to this potentially selected sample, we create weights from the 2013 Current Population Survey (CPS) Outgoing Rotation Group in order to make the Washington state data representative of the US workforce. First, using the CPS, we calculate sample proportion (p^{CPS}) for all possible interactions of age, gender, race/ethnicity, and educational attainment categories. In practice, these proportions are calculated by collapsing the data by values of these variables.[34] We then merge these proportions to the Washington state sample on age, gender, race/ethnicity, and educational attainment. In the Washington sample, we create the analogous proportions (p^{WA}). Finally, for each worker, we compute an adjustment factor ω by dividing the CPS proportion by the proportion in the Washington analysis sample, $\omega = \frac{p^{CPS}}{p^{WA}}$. ω is then used in the analysis as a frequency weight intended to adjust the Washington state sample to better reflect the US workforce.

In practice, the gender wage gap, the contribution of the firm effects to the gap, and the CCK decomposition of unweighted data are very similar to their reweighed counterparts. For example, Figure A14, Panel A, shows that the reweighted gender wage gap is slightly smaller (19.4%) compared to the unweighted gap (20.5%).

Figure A14, Panels B and C, show that the sorting effect accounts for about 34% of the unweighted firm-wage gender gap (and pay-setting for about 35%, making the total contribution of firm effect sum to 69%). When weighted, the sorting effect accounts for about 33% of the firm-wage gender gap (and pay-setting for 33%, making the total contribution of firm effect sum to 66%).

FIGURE A14. Comparing Unweighted and Reweighted Results

A. Gender Wage Gap

B. Firm Effects Gap

C. Sorting and Pay-Setting Effects

Notes: The figure compares the weighted and unweighted (denoted by "U") gender wage gap (panel A), firm effects gap (panel B), and CCK decomposition (panel C) in the Washington state baseline analysis sample. The reweighed result use weights calculated from the CPS. See Appendix E.1 for details.

[34] When doing this, we use the associated CPS household weights.

D.2.

Sweden

Throughout the paper, we use WSS data as we are interested in hourly wages. As noted above, the WSS data oversamples large firms. To determine whether the sampling weights effectively make the WSS sample representative of the population, we take two steps. First, we present summary statistics using these sampling weights and compare it to the full population sample. Second, to gauge the potential bias arising from a selected sample of firms, we produce both weighted and unweighted CCK decomposition results.

Table A.1 presents summary statistics across the two samples: the full population sample, and the WSS sample (unweighted versus weighted in columns 2 and 3, respectively). Overall, weighting makes sample statistics to be remarkably close to the full population sample. In the full sample, the monthly earnings gap is 21%, whereas in the WSS is around 20%.[35] Although the earnings levels differ somewhat, the gender earnings gap is similar across samples. Once we incorporate firm-level sampling weights, both the earnings level and the gender earnings gap become comparable to those in the full population. As expected, mean firm size and movers per firm is notably larger in the unweighted WSS sample. Once sampling probabilities are accounted for, mean firm size gets remarkably closer to firm size in the full population. Monthly earnings gap, age, firm size, movers per firm, fraction females at firms all look very similar to the full population sample when we use weights. This indicates that weighting compensates for the overrepresentation of large firms in the WSS data.

Table A.2 reports the main CCK decomposition for weighted and unweighted versions of the sample. The gender hourly wage gap, the contribution of the firm effects to the gap, and the CCK decomposition of unweighted data are very similar to their reweighted counterparts. For example, the weighted gender wage gap is slightly larger (9.23%) compared to the unweighted gap (9.01%). Total contribution of firm components is slightly larger for the unweighted. The sorting effect accounts for about 8.5% of the unweighted firm-wage gender gap (and pay-setting for about 10%, making the total contribution of firm effect sum to 18.5%). When weighted, the sorting effect accounts for about 6.4% of the firm-wage gender gap (and pay-setting for 8.2%, making the total contribution of firm effect sum to 14.6%).

[35] Since hourly wages are not observable in the full population sample, we provide monthly earnings gap.

TABLE A.1. Descriptive statistics of the Swedish Data, 2010-2018

	Full population sample		Sample with hourly wage info **Unweighted**		Sample with hourly wage info **Weighted**	
	Men	Women	Men	Women	Men	Women
Gender earnings gap	-0.21		-0.20		-0.20	
Log monthly earnings	8.11	7.89	8.21	8.01	8.16	7.96
Mean age	39.9	39.4	40.6	40.1	40.1	39.9
Mean firm size	24.5	32.0	224.1	242.8	25.6	32.3
Movers per firm	29.4	18.7	97.1	59.9	39.2	23.8
Mean log VA/worker	11.1	11.0	11.3	11.2	11.2	11.2
Fraction females at firms	0.25	0.50	0.29	0.47	0.25	0.50
Number person-year obs.	10611095	5235547	4017199	2223040	4017199	2223040
Number of persons	1833459	1028690	943759	562211	943759.0	562211
Number of firms	190857	142681	11620	10417	11620	10417

Notes: This table reports descriptive statistics for the Swedish matched employer–employee data over 2010–2018 under three alternative samples. The first, "Full population sample," includes all private-sector worker–firm observations. The second, "Sample with hourly wage info, unweighted," restricts to jobs for which hourly wages are observed but does not apply any sampling weights. The third, "Sample with hourly wage info, weighted," uses the same restriction on observed hourly wages and applies firm sampling weights to recover population-representative figures. Within each sample, the columns labeled "Men" and "Women" show gender-specific means of the following measures: the gender earnings gap, the log of gross monthly earnings (in SEK), worker age, firm size, movers per firm, the log of firm value added per worker, and the fraction of female employees at the firm. The final three rows report the total counts of person-year observations, unique persons, and unique firms in each sample.

TABLE A.2. Main CCK decomposition in the Swedish data for with and without firm sampling weights, 2010-2018

	Unweighted	**Weighted**
Gender Wage Gap	9.01	9.23
Means of Firm Premiums		
Male Premium among Men	0.044	0.035
Female Premium among Women	0.027	0.021
Total Contribution of Firms Components	1.67	1.35
%	18.5	14.6
Decompositions of Contribution of Firm Components		
Sorting		
Using Male Effects	0.77	0.59
%	8.53	6.40
Using Female Effects	0.85	0.80
%	9.40	8.67
Pay-setting		
Using Male Distribution	0.90	0.76
%	9.95	8.24
Using Female Distribution	0.82	0.55
%	9.08	5.97

Notes: This table presents the CCK decomposition in Swedish private-sector data with and without firm-level sampling weights. Column (1) reports results from the unweighted sample; Column (2) applies firm sampling weights to recover population-representative estimates. Gender wage gap shows the unconditional log-point difference in mean hourly wages. Means of Firm Premiums reports the average firm-specific wage effect for men and for women. Total Contribution of Firm Components is the sum of the sorting and pay-setting components. In the Sorting block, "Using Male Effects" (resp. "Using Female Effects") is the log-point gap explained by workers' sorting when applying the male (resp. female) firm-premium estimates to both genders. In the Pay-setting block, "Using Male Distribution" (resp. "Using Female Distribution") is the log-point contribution of within-firm pay-setting differences given the male (resp. female) distribution of workers across firms. The following "%" row expresses each contribution as a share of the overall gap.

E. Further Information on the Data

In this Section, we describe for each country the main institutional background, the data sources at the firm and worker level, sample selection, and the particulars regarding definitions and construction of the variables. We also describe the sample selection of establishment/entreprises (firm) and workers.

E.1. United States: Washington state

E.1.1. Institutional setting

In the United States, wages are predominantly determined at the level of individual workers. When collective bargaining occurs, it typically transpires at the company level rather than on an industry-wide scale. The framework for collective bargaining is governed by the National Labor Relations Act (NLRA). As per data from the OECD, approximately ten percent of the American workforce were encompassed by collective bargaining agreements in 2020.[36] Government regulations that play a role in wage determination include minimum wage standards and regulations governing overtime pay.

Minimum wages. Minimum wage rates are set through federal, state, and local legislation. At the federal level, the Fair Labor Standards Act (FLSA) has maintained a minimum wage of $7.25 per hour since 2010.[37] However, states and localities may enact their own minimum wage laws, which can exceed the federal standard. For instance, during the period of analysis, Washington state's minimum wage consistently surpassed the federal minimum, making it the relevant wage floor. [38] Notably, Washington's minimum wage is adjusted annually based on changes in the Consumer Price Index. For instance, in 2001, the minimum wage stood at $6.72, whereas in 2014, it rose to $9.32.[39].

[36] https://www.oecd.org/employment/collective-bargaining-database-unitedstates.pdf

[37] Over the period covered by the available data, the federal minimum wage rate was changed three times: in 2008 to $5.85 (from $5.15), in 2009 to $6.55, and in 2010 to $7.25; see https://fred.stlouisfed.org/series/STTMINWGFG

[38] Furthermore, within Washington state, certain localities, such as the Seattle area, have implemented even higher minimum wage rates. Given limitations in data availability regarding the geographic location of workers and employers, we focus on the state-level minimum wage.

[39] See https://fred.stlouisfed.org/series/STTMINWGWA for this series

Overtime payments. FLSA also regulates the use of overtime payments. Specifically, "employees must receive overtime pay for hours worked over 40 in a workweek at a rate not less than time and one-half their regular rates of pay." (See the U.S. Department of Labor page https://www.dol.gov/agencies/whd/overtime).

Exemptions. Some workers are exempt from both the federal minimum wage and overtime pay regulations. These include employees in executive and professional roles and highly compensated employees (generally earning more than $100,00 per year).[40]

Parental leave policies. The federal Family and Medical Leave Act (FMLA) provides eligible workers up to 12 workweeks of unpaid leave a year. Since 2020, Washington state mandates paid family and medical leave; however, this policy was not in effect during the time period studied.

Pay transparency. Washington state did not have a pay transparency law until 2023, when it issued a final policy regarding the state's interpretation of the Equal Pay and Opportunities Act. Starting in January 1, 2023, job postings are required to contain pay and benefits information.

E.1.2. Literature

No exact analogue of the CCK regression has been estimated using U.S. data due to lack of information on work hours in U.S. Census Bureau's Longitudinal Employer Household Dynamics (LEHD) dataset. The LEHD includes information from records maintained by participating states' unemployment insurance (UI), which generally include data on earnings but not hours.[41]

The closest paper is by Sorkin (2017), who uses LEHD to estimate separate AKM models for men and women and estimate what share of the overall gender gap in earnings (not in hourly wages) is explained by men and women sorting to different employers. Sorkin finds that sorting explains about 26–28% of the 0.33 log-point gender earnings gap. Other related papers on the U.S. gender earnings gap that control for establishment characteristics include Goldin et al. (2017) and Barth et al. (2021).

[40] The complete list of exempt workers is listed at the U.S. Department of Labor page: https://www.dol.gov/agencies/whd/compliance-assistance/handy-reference-guide-flsa#8.

[41] In addition to Washington state, also Minnesota, Oregon, and Rhode Island collect data on work hours, but Washington is unique in using work hours to determine eligibility for unemployment insurance benefits. The data on work hours is not included in LEHD.

E.1.3. Data sources

The data come from the wage and unemployment insurance (UI) claim records maintained by the Employment Security Department (ESD) of Washington state.[42] The purpose of collecting the data is to administer the state's UI system, which collects quarterly earnings records from all *UI-covered* employers in Washington and the UI claims records of all individuals who claimed UI in Washington.[43] The data cover over 95% of all private sector jobs in Washington state[44] The data used in this study cover the period 2001:1–2014:4.

The wage records include (a) a worker identifier, (b) a year-quarter identifier, (c) an employer identifier, (d) the NAICS industry code of the employer, (e) the worker's earnings from that employer in that quarter, and (d) the worker's paid work hours from that employer in that quarter.

Data source for information on workers. The information on workers comes from the wage records, which allow to track each worker's employment history in Washington state (earnings, work hours, and employer), and the claim records that include demographic information (date of birth, gender, level of education, and race/ethnicity) for workers who claimed UI.[45]

Data source for information firms. The information on employers comes from the wage records, which allow us to observe an employer's industry and to calculate employer characteristics such as employment or average employer hours or earnings. Typically, the employer is the set of establishments operating in Washington under a single owner, so for a company operating entirely in Washington (with a single or multiple addresses) the employer is a firm, and for a company with one address in Washington, the employer is also an establishment.

[42] This Section relies heavily on Lachowska et al. (2022).

[43] Government agencies and private non-profits are not required to report quarterly earnings. Also, self-employed workers do not file quarterly earnings reports, and underground earnings are not reported.

[44] This number is based on the employment coverage estimate from the LEHD, which is based on UI wage records from over 40 states, see https://lehd.ces.census.gov/data/veo_experimental.html#employment-coverage.

[45] That demographic variables are available only for the subset of workers who claimed UI. For sample restrictions applied in this project, the match rate is about 51%. The incomplete match rate may raise concerns about the representativeness of the Washington sample for the Washington labor market as a whole. Analyses in Lachowska et al. (2022) show that UI claimants tend have lower levels of educational attainment but somewhat higher earnings than Washington state workers overall, yet basic estimates from Mincer-style wage regressions suggest similar coefficients to those estimated using CPS from WA.

Definition of earnings and hours worked. Worker's earnings from a given employer in given quarter include the compensation earned for work, back pay, bonuses, commissions, royalties, severance pay, sick-leave pay, and tips.[46]

Work hours are the worker's paid work hours from a given employer in given quarter. When reporting hours, employers are asked to report the "number of hours worked in the quarter," including regular hours, overtime hours, hours of vacation and paid leave. For salaried, commissioned, and piecework employees, employers are instructed to report actual hours unless those hours are not tracked, in which case they are instructed to report 40 hours per week.[47] The data do not allow us to distinguish whether a worker is salaried or paid hourly.

The availability of quarterly earnings and quarterly hours allows to construct an hourly wage rate for each worker from each employer by dividing earnings by hours.

Data access. The data described in this Section are restricted administrative UI wage and claims records provided by the Washington state ESD. Because of the confidential information contained, the data cannot be shared or otherwise re-disclosed. An online data-sharing request form is available at: https://fortress.wa.gov/esd/file/datasharing#client.

E.2. Denmark

E.2.1. Institutional setting

Basic wage levels, hours worked, vacation weeks, etc., are typically negotiated by trade unions and employer organizations at the sector level. For the private sector, final wage-setting is often determined in local negotiations at the firm level (see Dahl et al. (2013) for historical details on the development of wage negotiations in the Danish labor market). In the public sector, little adjustment takes place at the local level. Approximately 66 % of Danish workers are members of unions and wages set in collective bargaining cover 84 % of the Danish workforce (Kreiner and Svarer 2022).

Since the early 00's, the unemployment rate has on average been 4.4 % (Kreiner and Svarer 2022) and most employment spells are short (Andersen 2023). To receive unemployment insurance workers need to be members of a voluntary unemployment insurance fund. In the event of unemployment, insured workers receive 80 % of former

[46] https://esd.wa.gov/employer-taxes/zero-hour-reports.
[47] https://www.esd.wa.gov/employer-taxes/reporting-requirements.

earnings capped at DKK 20.359 (in 2024, EUR 2.730) for up to 2 years. This implies that low-income workers are well-insured and the replacement rate is decreasing with income above the cap. In 2010, the maximum duration of unemployment benefits was reduced from 4 to 2 years and the compensation rate was reduced from 90 to 80 %. Unemployed individuals who are uninsured or have been unemployed for longer than the maximum duration of benefits can receive means-tested social benefits.

Danish firms can easily adjust their workforce due to lax employment protection legislation. Low job security is accepted by unions and workers due to fairly generous employment insurance. The combination of a flexible labor market and high compensation rates is often referred to as the "flexicurity model". Moreover, active labor market policies include search assistance and retraining programs as well as monitoring of the recipients (see Kreiner and Svarer (2022) for details).

Minimum Wages. Denmark has never had a statutory minimum wage, but rather sector-specific wages set in collective bargaining. As of 2024, the basic wage set in collective bargaining for the hospitality industry was 144 DKK (EUR 19) and in farming the basic wage was set to 155 (EUR 21).

Family Policies. Denmark has a long tradition of family-friendly policies enabling the vast majority of mothers to participate in the labor market. These policies include heavily subsidized daycare for children, paid parental leave, and job protection while on leave. During the period of analysis, maternity leave is available for 14 weeks, parental leave - which in principle can be taken by either parent, but predominately used by mothers - is available for an additional 32 weeks, and fathers have the right to 2 weeks of paternity leave just following the birth of their child (Lassen 2021). Leave is compensated at levels corresponding to unemployment insurance, with most collective bargaining ensuring a top-up so earnings while on leave correspond to previous labor market income for 1-6 months. The childcare system for preschool children has universal coverage and is heavily subsidized. It covers child care services on weekdays between 7 am and 5 pm for children from the age of 6 months to the age of school start. Take-up is high and Danish children start daycare around the age of 10 months on average.

E.2.2. Literature

Gallen, Lesner and Vejlin (2019) is the closest paper. They study the gender wage gap using administrative data from 1980 to 2010. They find a GWG of 0.300 in 1980, and

around 0.201 in 2010. The fraction of the GWG that is unexplained stay constant over time (0.133 in 1980 and 0.127 in 2010). They quantify the role of the sorting effect using the same decomposition as Card et al. (2016). The sorting component explains just under 10% of the GWG for 1980 decade (estimated sorting effect: 0.026, and the GWG is 0.27). It explains about 15% in the 2000 decade (estimated sorting effect: 0.022, and the GWG is 0.208). The sorting effect is broadly similar to the estimated effect in Portugal, reported by Card et al. (2016).

Merlino, Parrotta and Pozzoli (2018) study job mobility within and between firms. They find that women are more likely than men to voluntarily move (proxy by job-to-job transitions) to other firms when they are high-wage females (proxied by residual wages). However, high-wage females are less likely than men to be promoted in the same firm.

E.2.3. Data sources

Data source for information on workers. We use several datasets to collect information on workers. The first dataset is called BEF. BEF contains information about the total population in Denmark. The status information for the individuals mainly refers to the beginning of the year (1 January). From this dataset, we retrieve information on worker age and gender.

The second data set is called UDDA. UDDA contains information on the highest achieved education and an indicator for whether the person is currently enrolled in education. We exclude students.

The third dataset is called IDAN (*IDA ansættelser*). From this dataset, we retrieve information on occupation, earnings, hours worked, and firm identifier. We use information from this dataset to define the dominant job. Occupation classification follows the ISCO classification. This data set also contains information on whether individuals are self-employed. Hours worked are defined as paid hours worked: Include contractual and overtime hours. Earnings is defined as the near-universe of taxable income.

Data source for information firms. We use the General Company Statistics called the FIRM dataset, which annually lists active companies in Denmark. FIRM is built from several Statistics Denmark registers. FIRM covers economic and employment information on all sectors and industries. Active companies are defined as companies with at least 0.5 full-time hours of work. The firm identifier is the CVR number, the legal firm identifier in Denmark. We use this dataset to retrieve information about the industry classification (NACE) and the regional classification (NUTS).

The register that is used in FIRM for the variable value-added is the Accounts statistic for Non-Agricultural Private Sector (Regnskabsstatistikken for private byerhverv), abbreviated APB therefrom.[48] APB only includes market activity and does not contain agriculture, fishing, ports, banks, insurance, public housing companies, or public administration. There is a data break in 2014 in the population of firms considered in APB. Since 2014, firms in utilities, regional and long-distance trains, and radio and TV stations have been included. Value added (*GF_VTV*) is defined using several items from the income statement (*Resultatopgørelse*). Those items are: sales and other operating income - cost of materials and equipment - costs of energy and subcontractors - rent paid - payments for temporary workers and operational leasing of goods, and ordinary write-offs and other external charges.

Data access. All datasets can be obtained by contacting the Research service (*Forskningsservice*) of Denmark Statistics. To our knowledge, datasets provided by DST do not contain a DOI number, complicating the replicability. The datasets that are used are recorded at a yearly frequency. Establishment identifiers are available, but our analysis focuses on the legal unit firm identifier (CVR number) and only changes due to firm restructuring. Individual identifiers are anonymized social security numbers (PNR number), and doesn't change over time. Contact Anne Sophie Lassen for questions.

E.3. Finland

E.3.1. Institutional setting

Collective bargaining agreements. In Finland, there is no statutory minimum wage. Instead, collective agreements at the industry or sector level specify the baseline terms and conditions to which employments contracts and relationships must comply. The conditions in each agreement include, among other things: basic salary, working hours, sickness allowance and other types of allowances, holiday compensation. Each agreement is reached between two parts: unions and employers' associations. In Finland there are two broad types of collective agreements: universally binding agreements and normally binding agreements. Under generally binding agreements, all companies operating in the given industry covered must comply with the regulations, including the employers that are not part of an employer's association. Collective agreements that

[48] This register is itself built from several sources: questionnaires, official annual accounts submitted in XBRL format to the Danish Business Authority (*Erhvervsstyrelsen*), the Danish tax authority (SKAT), Denmark's Statistics business register, and the Danish medicines agency (*Lægemiddelstyrelsen*).

are normally binding are only effective for the company or for the employer association that has signed it. It is possible for employers and employees to reach local agreements on certain terms and conditions of employment (e.g., performance pay). In general, collective agreements may impose restrictions on local agreements and have priority over local agreements. When considering both generally binding and normally binding agreements, about 90% of the Finnish workforce is covered by a collective agreement.

Parental leave and pay transparency policies. Finland is characterized by generous family policies. Fathers are entitled to paternity leave, mothers to maternal leave, and both are entitled to parental leave. Nowadays, maternal leave must start between 50 and 30 days before the scheduled due date and gives the right to maternity allowance. Fathers can take paternity leave for 54 days after childbirth. Parental leave can be taken after the child is born and parental allowance is paid for 320 days (equally shared among partners; some of the parental allowance can be transferred to the partner). It is also possibly to part-time work (and get partial parental allowance) for the same period. While in many ways the Finnish parental leave setting is comparable to those of other Nordic countries, one institutional feature sets it aside internationally. The Finnish home care allowance program (HCA) provides generous payments to mothers that prefer to stay home with their children from an age of 10 months (when children are entitled to a slot in public daycare) through 3 years old (Gruber, Kosonen and Huttunen 2023). Although the Finnish daycare system is public-funded and relatively high-quality by international comparison, the HCA has a long tradition (it was introduced in 1985, and take up is close to 80%). Among the other policies relevant for our setting, *pay transparency policies* deserve a specific mention, as they limit the scope for taste-based discrimination. Prior work in the Finnish context by Bizopoulou et al. (2024) describes and analyzes the pay transparency rules in Finland.

E.3.2. Literature

The previously mentioned paper by Gruber et al. (2023) uses municipality-level supplements and finds that the Finnish HCA negatively affects maternal labor market outcomes. In perspective, the initial child penalty on earnings for Finland is of about 70%, whereas this number is 30% for Denmark. This child penalty lasts for years after the birth of the first child, and the supplement variation in HCA is large enough to explain the immediate child penalty gap between Finland and Denmark. We are not aware of published papers implementing the CCK decomposition in the Finnish context.

When it comes to pay transparency policies, the working paper by Bizopoulou et al. (2024) analyzes the 2005 Finnish pay transparency policy that required firms to report wages of men and women in different job titles to their employees. The authors find that, after accounting for sorting, the policy reduced the gender wage gap which via increasing promotions to women, with no negative effects on firm-level productivity.

E.3.3. Data Sources

We use several administrative registers to build the information used in the analyses. FOLK registers allow to follow the population of Finnish workers over time and include the link to the main employer at the end of the year. These registers also include detailed demographic and socioeconomic characteristics (including yearly earnings and employment information, occupation, sector, and industry), and employer-level spells. Earnings at the primary employer are computed by using TAX databases (and scaled by months worked at the employer level). The information on hourly wages, including overtime and bonuses, and of hours worked is retrieved for the private sector from the Structure of earnings (SES) database. The SES covers 55-75% of the private sector in the period considered.

E.4. France

E.4.1. Institutional setting

France introduced an ambitious gender pay transparency law in 2019 that requires firms with more than 50 employees to report detailed statistics on the gender wage gap (Décret n°2019-15 du 8 janvier 2019).[49] France does not yet have a pay transparency law, but one of the left political party (La France insoumise) in June 2023 proposed a bill on pay transparency.

E.4.2. Literature

Palladino, Roulet and Stabile (2025) is the closest paper. In this paper, they investigate firms' contribution to the gender wage gap over time and the life cycle. They find larger estimates of firms' contribution compared to previous studies, driven by a higher bargaining component. Interestingly, despite a decline in the unconditional gender

[49]The report must contain the pay gap between men and women, wage increase rate between men and women, promotion rate between men and women, the percentage of employees who received a wage increase the year they returned from maternity leave, etc.

wage gap between 1995 and 2015, the gap in firm wage premiums and its decomposition remained constant. It increases with age, exclusively driven by the sorting component.

E.4.3. Data sources

Our dataset is derived from the matched employer-employee registers in France known as DADS data. This comprehensive dataset provides valuable information on workers' employment, including their earnings, their hours of work, their firm and other administrative data for each of their jobs. The data is pseudonymous, with individuals being assigned unique codes that change annually, enabling cross-sectional analysis. However, it does not allow for long-term panel analysis for workers. Traditionally, panel analysis of workers in France has been conducted using the *DADS Panel*. This panel consists of a sample of individuals who are followed over time, with a sampling frequency of 1/24 before 2002 and 1/12 after.

To enhance our analysis, we utilize a recently constructed and nearly exhaustive workers' panel based on the original dataset described in detail by Babet, Godechot and Palladino (2025). The DADS files for each year provide job variables at the individual level for the current and the previous year. This overlap allows for matching between yearly files at the worker level based on common information such as establishment ID, gender, number of hours worked, job duration, dates of employment, municipality of work and residence, earnings, and age. Using these matching procedures, Babet, Godechot and Palladino (2025) achieved a high matching success rate of 98% for individuals between 2002 and 2019.

E.5. Italy

E.5.1. Institutional setting

Italy has taken significant steps to address the gender pay gap through legislative measures. The primary legislation addressing gender equality, including pay equity, is the Code of Equal Opportunities (*Codice delle Pari Opportunità*, Legislative Decree No. 198/2006), which extended and strengthened an older piece of legislation from the 1990s (Law 191/1991). This code has been amended several times to strengthen provisions related to gender equality in the workplace, and in 2021, Italy introduced new legislation (Legislative Decree No. 162/2021) requiring greater pay transparency and measures to ensure equal pay for men and women. Specifically, companies with more than 50 employees are required to report on gender pay gaps and publish this information.

These reports should include details on salaries, bonuses, and other forms of compensation. Companies that comply with equal pay standards can obtain a certification, which not only serves as a public recognition, but can also result in tax incentives and favorable public procurement conditions. Conversely, failure to comply with reporting requirements can result in administrative penalties and fines.

E.5.2. Literature

Casarico and Lattanzio (2024) is the closest paper to ours. They analyze the role of firm pay policy in shaping the gender wage gap in Italy between 1995 and 2015. Using matched employer-employee data on the universe of employees in the non-agricultural private sector, they document that gender differences in firm pay premiums explain around one-third of the average gender wage gap, with sorting playing a dominant role in determining these differences. The contribution of firms varies along the wage distribution and, in particular, the pay-setting channel is stronger in the top decile of wages. Moreover, the paper shows that firms have increasingly explained a larger share of the gender wage gap over time, with a smaller role for the sorting channel. Cohort effects are also important determinants of the wage and firm premium gap, with older cohorts showing larger gaps over their careers than younger cohorts of the same age. Finally, the paper relates firm-specific gender differences to heterogeneity in mobility across firms, showing that women are more likely to move to lower-paying firms and to those with higher intra-firm gender inequality, thereby exacerbating the gender pay gap over the life cycle.

E.5.3. Data sources

We use a representative sample of 50 percent of firms from 2005 to 2019 in the non-agricultural private sector, available through an agreement between the Italian Social Security Institute (INPS) and the Bank of Italy. The firm-level data are matched with information on all workers ever employed by these firms. This includes the entire workforce of the sampled firms, as well as the complete employment histories of individuals who passed through these firms.

The data include detailed information on work contracts (annual earnings, weeks worked, contract type, hours type, broad occupation, contractual hours, municipality of work, hiring and separation dates, and reasons for separation), worker demographics (gender, year of birth, province of residence), and firm characteristics (6-digit industry,

opening and closing dates, and balance sheets for a sub-sample).

Earnings are measured as full net annual earnings, including all forms of cash compensation, grossed up for income taxes and social security contributions. To measure work intensity, we use full-time equivalent (FTE) weeks worked, with FTE weeks for part-time workers adjusted by the ratio of monthly paid hours to contractual hours for full-time jobs. FTE weekly earnings are then calculated as the ratio of annual earnings to FTE weeks, providing an equivalent measure of hourly earnings in the absence of overtime.

E.6. Germany

E.6.1. Institutional setting

Wage setting. Wage formation is highly diverse. Firms can opt into collective bargaining agreements at the sectoral level, where wages are negotiated between employers' associations and trade unions. Alternatively, firms may choose to negotiate directly with a union at the firm level. At the start of the sample used in this paper's analysis, collective bargaining coverage in Germany was about five times higher than in the U.S. According to the OECD database, in 2010, collective agreement coverage was around 60% in Germany compared to only 13% in the U.S. Union density was about 19% in Germany and approximately 11% in the U.S. Labor unions play a crucial role in enforcing employment agreements. On the other hand, wages can also be negotiated individually between workers and firms without union involvement. Firms are always allowed to voluntarily pay wages higher than those fixed in collective agreements. Binding collective agreements have been declining for years in both East and West Germany. This process is clear and ongoing. Using establishment level survey data from Germany, **?** show that the share of workers covered by collective agreements have been declined between 2000 and 2015 from 68% to about 58%. Although many firms still use sectoral collective agreements as a reference for negotiating wages and working conditions, there is no legal obligation to do so, leading to a lack of security for employees. In June 2017, "The Act to Promote Transparency in Wage Structures among Women and Men" came into effect, prohibiting direct or indirect remuneration discrimination based on gender "with regard to all elements of remuneration and conditions of remuneration" (Section 3 (1)).

E.6.2. Literature

Bruns (2019) explores the role of growing wage differentials between firms, utilizing linked employer-employee data for West Germany from 1995-2008. He finds that firm-specific pay premiums caused the gender wage gap to increase from accounting for 11 percent of the 24.7 log point gender gap to 26 percent of the same gap. He also demonstrates that the sorting effect significantly outweighs the pay-setting effect. Bruns (2019) shows that during the sample period 2001-2008, the pay-setting effect—differences in gender specific wage premia within firms—was negligible compared to the impact of gender segregation across firms with varying wage premia. Consistent with this result, **?** show that unions and works councils do not dampen the gender pay gap. All of this suggests that the primary source of firm wage premium differentials between genders is the underrepresentation of women in high- wage firms. **?** show that this may be a results of women applying significantly less at high wage firms compared to men, while conditional on applying firms select women with the same probability compared to men.

E.6.3. Data sources

We use data from the Institute for Employment Research (IAB) of the German Federal Employment Agency. The primary dataset is the Integrated Employment Biographies (IEB), which provides comprehensive records of employment and unemployment spells as documented by the German social security system. The IEB contains detailed information such as the start and end dates of employment spells, total earnings, occupation and industry codes, as well as individual worker characteristics like gender, age, and education.

Hours worked. Additionally, for certain years, the data includes information on working hours sourced from the German Social Accident Insurance. Between 2010 and 2014, employers reported individual total hours worked via the social security notification system, which can be linked to the administrative IEB data. Reporting work hours schemes vary across employers, that means some report actual hours, some report contractual hours, others report a "full-time worker reference value". To mitigate these differences, we follow **?** and correct reported hours, so that they uniformly reflect contractual hours (without overtime) across employers. See **?** for details.

Public sector jobs coverage. The Federal Office of Statistics (source: Statistisches Bundesamt: Personal des öffentlichen Dienstes, www.destatis.de) reports that in 2010 civil servants who are not in our data (because they are not subject to social security contributions) sum up to around 36.8 % (1,69 out of 4,59 million employees in the public sector).

Imputations of hourly wages. On average roughly 6 % in the IEB are top-coded. To compute hourly wages, we follow a two-step process. First, we calculate gross daily wages using total earnings and the total duration of each worker's employment spell, then deflate these wages using the CPI. We also follow standard procedures to impute censored wages above the social security contribution limit. Second, we divide earnings by hours worked, leveraging the significant advancement in data availability by linking our dataset with hourly wage data from 2010-2014 (see **?**. Annual earnings are right-censored at the contribution assessment ceiling ("Beitragsbemessungsgrenze"), which is determined by the statutory pension fund and may be adjusted annually. We define a wage observation as censored whenever the reported wage exceeds 99% of the censoring thresholds. Following **?** and Card et al. (2013), we fit a series of tobit regressions to impute the right tail of the wage distribution.[50] Assuming the error term is normally distributed but with different variances for each education and age category, we impute censored wages for each year as the sum of the predicted wage and a random component, drawn from separate normal distributions with mean zero and variances specific to each education and age category.

E.6.4. Data access

The data outlined in our article are social insurance data of administrative origin, which are processed and kept by the Institute for Employment Research (IAB) according to German Social Code III. There are certain legal restrictions due to the protection of data privacy. The data contain sensitive information and therefore are subject to the confidentiality regulations of the German Social Code (Book I, Section 35, Paragraph 1). The data are held by the IAB, Regensburger Str. 104, D-90478 Nurnberg, iab@iab.de,

[50] We estimate tobit regressions by year, sex, education, and age group, controlling for variables such as worker age, average log wage in other years, the fraction of censored wages in other years, the number of full-time employees at the current establishment and its square, an indicator for large firms, average years of schooling and the fraction of university graduates at the current establishment, the average log wage of coworkers, the fraction of coworkers with censored wages, an indicator for individuals observed in only one year, an indicator for employees in one-worker establishments, and an indicator for region.

phone: +49 911 1790. Our data, computer programs, and results will be archived by the IAB to meet the objective of good scientific practice. This approach also extends to all data that cannot be shared directly. Interested researchers can access the data through the Research Data Centre (FDZ) of the German Federal Employment Agency at the IAB. The FDZ of the German Federal Employment Agency (BA) at the IAB is intended mainly to facilitate access to BA and IAB micro data for noncommercial empirical research using standardized and transparent access rules. The FDZ mediates the relationship between data producers and external users. For this purpose, the FDZ provides separate workplaces for guest researchers at different locations. Access can be granted only after successful application and approval.

E.7. Hungary

E.7.1. Institutional setting

Hungarian employment protection institutions are flexible and closer to the Anglo-Saxon institutions than to those found in other continental countries. It is relatively easy to dismiss workers (Tonin et al. 2009) and wage bargaining takes place mostly at the individual level. The dominant for of collective wage bargaining is at the firm level. Union membership was 10.2% percent in 2014, one of the lowest in the OECD.[51] Unions participate in the country-level bargaining forum called National Interest Reconciliation Council, which makes only non-binding recommendations (Rigó 2012). Part time work contracts add up to only 5 percent of the workforce and most employment contracts usually assume full time employment and pre-specify 8-hour working days.

Family policies allow women stay home for 3 years in many cases after the birth of each child, even though a set of policies centered around tax incentives for women to go back to work. Policies also allow mothers to retire early, after 40 years, including the time spent with children.

E.8. Literature

Boza and Reizer (2024) uses and AKM-type decomposition and finds that the total gender wage gap in the private sector is 23.4 percent. According to their results, 9.5 percentage points of this total gender gap can be attributed to the gender difference in firm-specific wage premia, from which 4.2 percentage points come from sorting and 5.3 percentage points from pay-setting. The paper documents that the gender wage gap

[51] OECD Employment and Labor Market Statistics.

is much higher in firms where which pay either performance payments or overtime. In fact, performance payments and overtime payments contribute 60 percent to the gender gap in firm premia and 25 percent to the overall gender gap.

E.8.1. Data sources

Data sources for information on workers. The main datasource on workers is administrative data based on social security records, collected by the Social Security Administration. It covers a random 50% of the population and records earnings from different employers each month as well, as well as occupation, days worked and contracted hours. At the same time, the data does not include information on the education for most of the workers. This dataset is provided by the Databank of Centre for Economic and Regional Studies.

Data sources for information on firms. The main data source on firms comes from Corporate Tax Declarations, collected by the Hungarian Tax and Customs Authority (NAV). Firms conducting double bookeeping are obliged to submit these declarations each year, while other firms submit a simplified form. These data includes financial information, number of employees and the firm's industry code. This dataset is provided by the Databank of Centre for Economic and Regional Studies.

Definition of earnings and hours worked. We use the social security data to calculate gross earnings for the workers main job, by following the harmonized guidelines of this project. The number of hours worked is contracted hours.

Data access. These confidential datasets are managed by the Databank of Centre for Economic and Regional Studies.

E.9. Portugal

E.9.1. Institutional setting

In August 2018, Portugal passed pay transparency legislation (*Lei 60/2018 de 21 de Agosto*) mandating the development of two yearly assessments on the GWG. First, a general assessment on general and sectoral gender pay gaps. Secondly, a firm-level assessment of gender wage disparities by professional category and qualifications. Firms with identified gender-based differences have to justify those differences, or alternatively

present and enact a plan to correct the disparities within a period of 12 months. Non-compliance is considered an administrative offense and firms risk sanctions. To the current date and to the best of our knowledge, there is no evidence on the impact of the pay transparency law in Portugal on the GWG.

E.9.2. Literature

The closest study is Card, Cardoso and Kline (2016). They study the impact of firm-specific wage premiums on the gender wage gap, using QdP data for 2002-2009. They use "fuzzy matching" as firm identifiers are not present in both the QP and the financial data. Overall, they have current-year employer financial data for about 66% of the person-year observations in their QP sample from 2006 to 2009.

The overall GWG in the dual-connected set of men and women is 0.234.[52] 21.2% (0.049) of the overall GWG is explained by firm-specific pay premiums. The sorting component explains 15% of the GWG (0.035). The bargaining channel explains 1.2% of the GWG (0.003). Sorting rise with age and are more important among less educated workers. Bargaining effect is larger for highly educated workers.

Another related paper is Cardoso, Guimarães and Portugal (2016a). Using QdP data for the period 1986-2008, they find that one-fifth of the gender gap can be explained by allocation to firms of different quality, while another one-fifth is due to allocation to jobs of different quality.

Cardoso, Guimarães, Portugal and Raposo (2016b) use QdP data for the period 1991-2013. They they find a significant decrease of the raw GWG from 32 to 20 percent. The improvement in the gender wage gap can be fully attributed to composition effects: the adjusted GWG remained roughly constant at around 25 percent over this period.

E.9.3. Data sources

The data source is the Quadros de Pessoal (referred to as QP) from 2010 to 2019. This dataset is gathered annually by the Portuguese Ministry of Employment. Each October, it is legally required that firms with at least one salaried employee provide workforce information. The dataset encompasses virtually the universe of firms and establishments, along with information on their respective workforce as of October each year. Consequently, it only contains information on jobs for employed individuals during October. The dataset excludes the public administration and independent contractors.

[52] The GWG correspond to 0.18 log points in the analysis sample with value added data (see Table 1).

Data source for information on workers. The QdP data contains worker-level information reported by firms on each employee's gender, education, occupation, date of hire, earnings and hours worked.

Data source for information firms. At the firm-level, the QdP data contains information on industry (NACE), regional location (NUTS), firm size (number of employees) and sales per worker. We use sales per full-time equivalent employment at the firm level to measure firm productivity. Our focus on the legal unit firm identifier, although establishment identifiers are available.

Definition of earnings and hours worked. The hourly wage at the main employer in October is defined as the ratio between total monthly earnings and total hours worked. Total monthly earnings include the individual's monthly base salary, regular salary supplements (e.g. tenure-related premiums), overtime and bonuses. Total hours worked refer to monthly contractual hours and overtime hours.

E.10. Netherlands

E.10.1. Institutional setting

In the Netherlands, the proportion of women (and men) in employment is relatively high (about 74% for women and 82% for men in 2020). However, although about three out of four men work full time (in the Netherlands defined as working 35 or more hours), only one out of four women works full time.
For consistency with other countries, throughout the analyses on the Netherlands, full-time employment is defined as working 30 hours or more.

E.10.2. Literature

The closest study is Schneck (2021), who analyses wage inequality in the Netherlands in the period 2001–2016. Schneck applies the AKM model, only to a sample of employed men, and finds that between-firm wage variation explains almost entirely the overall wage dispersion. Decomposing the between-firm wage components, the paper finds that the increase in this component is explained for 45% by the average worker effects (i.e. worker segregation), 39% by the covariance of the worker and firm effects (i.e. worker sorting) and for 12% by the firm fixed effect. The paper does not study gender wage inequalities over time.

E.10.3. Data sources

The administrative data from Statistics Netherlands cover the entire population of Dutch individuals.

Data source for information on workers. Demographic, household and job characteristics are observed based on several datasets. *GBPERSOONTAB* contains an individual identifier ('rinpersoon') and individuals' demographic characteristics including gender, birth date and nationality, for the universe of individuals. *HOOGSTEOPLTAB* contains information on a person's highest level of educational attainment. As information on educational information is unobserved for those who graduated before 1995, for the Netherlands five categories are used: missing information, and four categories based on ISCED: less than high school (ISCED 0 to 2), high-school/vocational (ISCED 3 and 4), short-run tertiary and bachelor (ISCED 5 and 6); and Master, Phds or similar (ISCED 7 and 8). *GBAADRESOBJECTBUS* contains an individual identifier ('rinpersoon') and the anonymized individuals' home address identifier ('rinobjectnummer') for the universe of housing spells including start and end dates. *VSLGWBTAB* contains the home address ('rinobjectnummer') and regional identifiers for the universe of house addresses. *SPOLISBUS* contains an anonymized individual identifier ('rinpersoon') and monthly information on gross wages components (including 'basisloon'), hours worked ('aantverlu'), type of contract, full-time/part-time status, and a firm identifier ('beid'), for the universe of employment spells including start and end dates (both dates are measured from January 2006 onwards, so job tenures are counted from this point onwards). Hourly wage is computed by dividing total gross wages by the number of paid working hours. The number of weekly days worked is not observed in the data. We use data from 2010 until 2019, and aggregate the monthly data from the dataset *SPOLISBUS* based on (predominantly) monthly income statements to an annual level. For employees who worked shorter than a calendar year, we compute annualized variables based on the length of the job spell in the given calendar year. The main limitation of the Dutch administrative data on employees is that occupational information is not available.

Data source for information firms. At the firm-level, we use the datasets *Betab* and *ABR*. These annual datasets contains an anonymized firm identifier ('beid') and information on economic sector and firm size for the universe of firms. Firms are defined as entities, and each entity has control with legal basis over its own activities, as defined by Statistics Netherlands consistent with the Eurostat recommendations manual on business

registers. Note that large firms could consist of multiple entities, i.e. an organization, but this depends on the control with legal basis of activities across these entities. The dataset *NFO* contains data on the organization's net sales ('r01') and the cost of raw and auxiliary materials, purchases and other operating expenses ('r02'). Value added is equal to the sum of r01 and r02. The variable productivity is defined based on the organization's value added divided by the organization's number of full-time equivalent workers, where the organization's number of full-time equivalent workers equals the total organization's paid working hours divided by 1924.

Definition of earnings and hours worked. Hours worked refer to monthly actual paid working hours and do include overtime. In addition, in the case of unpaid leave, working hours decrease, whereas in the case of paid leave and holidays, working hours and monthly wages are unaffected. Hourly wage is defined as the ratio of monthly gross wages divided by monthly working hours. Earnings are defined as monthly earnings from employment, unaffected by paid leave but affected by unpaid leave. Observations are retained for the individual-year observations where the hourly wage is over 0.2 of the median hourly wage, by year, and if the observations correspond to fewer than 60 paid working hours.

Disclaimer. We are grateful to Statistics Netherlands (Centraal Bureau voor de Statistiek, CBS) for providing access to the administrative data. Results are based on calculations using non-public microdata from Statistics Netherlands. Under certain conditions, these microdata are accessible for statistical and scientific research. For further information: microdata@cbs.nl and https://www.cbs.nl/en-gb/our-services/customised-services-microdata/microdata-conducting-your-own-research.
For questions: j.meekes@law.leidenuniv.nl

E.11. Norway

This study uses employer-employee matched data for the population of workers and firms for Norway for the period 2010 to 2019 which we constructed by merging several registers of the Norwegian administrative data at the individual and enterprise level.

E.11.1. Data sources

We have constructed a yearly employer-employee matched panel data set for the population of employees and firms. From the employment registers, we extract yearly information on the main job during a calendar year and earnings paid for work and all related characteristics of the employer (establishment identifier, enterprise identifier, industry, institutional sector) and the job characteristics incl. hours of work and occupation. Using the unique person identifier, we further merge information on gender and year of birth that is used to construct age from the population registers. We further merge education categories from the education registers based on the constructed highest level of education an individual has achieved. For generating tenure within establishment we use the individual time series data since 2000. Using the unique enterprise that is organisation number, we merge selected enterprise-level variables collected by the *Brønnøysund register center* through the cleaned and documented version by Berner et al. (2022). We calculate establishment and enterprise size as the number of employees per year.

We use the annual and monthly wage paid by the main employer. It includes the agreed monthly wage, irregular additional payments and bonus payments. Pay for overtime is not included. We measure hours as the total hours of work during a year in the main job. The hourly wage is then defined as the ratio of total earnings in year t divided by the total hours in year t. We also keep weekly hours that are agreed in the contract of an employee.

References:

Berner E, Mjøs A, Olving M (2022) Norwegian corporate accounts. Working Paper 04/22, Center for Applied Research at NHH, SNF, Bergen, Norway.

E.12. Sweden

Institutional setting. Sweden does not have a minimum wage. The labor market operates under collective agreements established at the sectoral level, covering the majority of workers and stipulating terms of employment, including the wage-setting process. Collective bargaining coverage rate is quite high in Sweden, more than ninety percent of the workforce were covered in 2015. Wage-setting process involves three stages: First, unions and employer organizations form central agreements setting the frame for wage formation. Then, bargaining at the local (establishment) level occurs, where the local union and firm representatives translate the central agreement to the establishment

level. Finally, wages at the individual level are negotiated between the manager and the worker. In practice, wages are set in bilateral negotiations between the employer and the worker. This decentralized approach allows for considerable employer discretion in wage setting, although the scope varies across agreements.

Sweden is known for its high gender equality. The employment rates for women in Sweden are among the highest in the world, and there are relatively small employment differences between men and women, although part-time work is more prevalent among women. In 2018, the employment rates for women and men aged 20–64 were 75% and 78%, respectively (OECD 2024)

Literature. To the best of our knowledge, similar analyses (CCK) have not been performed previously in a Swedish setting, despite very active research on gender differences in Swedish data. Classic references on Swedish data include: (Albrecht et al. 2003, 2018; Bronson and Thoursie 2019; Meyersson Milgrom et al. 2001).

Data sources. We use a comprehensive RAMS matched employer-employee database from Statistics Sweden (SCB), encompassing labor earnings of all workers linked to firms and employees from 2010 to 2018. We complement the employment information with socioeconomic characteristics from the LOUISE dataset. The data on wages and occupations come from a firm level survey Wage Structure Statistics (WSS, Lönestrukturstatistik) conducted by Statistics Sweden.

Data source for information on workers. Demographic data are collected from Statistics Sweden's LOUISE register, including the entire Swedish population aged 16 to 74. These data include demographic information such as the year of birth, gender, and the highest completed education level.

Data source for information firms. The information on employers comes from RAMS and WSS, all linked through anonymized firm and establishment identifiers. We can observe an employer's industry and calculate employer characteristics such as employment or average earnings.

Definition of earnings and hours worked. The earnings-spells include the first and last month of employment, so we can calculate monthly gross labor earnings using RAMS. These data are collected from tax registers, and the reporting is mandatory. However,

they do not include hours worked. Instead, we use Wage Structure Statistics data (WSS, Lönestrukturstatistik), very large sample at the firm level. WSS data are collected during a measurement week in September for private sector and in November for public sector, including workers who have worked at least one hour with pay. All public sector employees are included. However, the sampling of private sector firms is stratified by firm size with the sampling probabilities 3, 12, 41, 70, and 100 percent for the firm size intervals 1–9, 10– 49, 50–199, 200– 499, and 500–, respectively. Approximately 50% of private sector workers is included every year. If a firm is sampled in a given year, all workers belonging to all establishments are included. The wage measure reflects the employee's wage during the sampling month expressed in full-time monthly equivalents. All wage components, e.g., piece-rate and performance pay, except overtime pay, are included. All salaries are calculated for full-time in order to be able to make comparisons for the time unit month. Thus, we compute hourly wages and daily wages using this full-time equivalent wages. In practice, we divide full-time equivalent monthly wages by 165 to get hourly wages.

Data access. Data is accessed through an online portal provided by Statistics Sweden. Other researchers can purchase the data from Statistics Sweden, conditional on the same protocol as the research group. We can provide access to the data for replication purposes.

F. Descriptive Statistics For Various Samples By Country

TABLE A.3. Descriptive Statistics in the Washington Administrative Data, 2001-2014

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	2.98	2.77	3.00	2.80	.	.
Std. dev.	0.53	0.52	0.54	0.53	.	.
Mean age	39	39	39	39	.	.
Part-time (%)	14	20	11	17	.	.
Separation (%)	31	33	30	32	.	.
Mean firm size	43	56	119	124	.	.
Movers per firm	7	4	18	11	.	.
Mean log VA/worker	0.00	0.00	0.00	0.00	.	.
Fraction females at firms	0.24	0.55	0.29	0.50	.	.
Social care sector	0.00	0.00	0.00	0.00	.	.
Number person-year obs.	1,465,309	766,738	1,064,690	612,622	.	.
Number of persons	464,506	257,079	350,469	207,147	.	.
Number of firms	71,012	52,893	17,246	17,246	.	.

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	2.96	2.75	2.97	2.78	.	.
Std. dev.	0.52	0.49	0.53	0.49	.	.
Mean age	39	39	39	39	.	.
Part-time (%)	15	22	12	20	.	.
Separation (%)	31	32	31	31	.	.
Mean firm size	53	57	133	137	.	.
Movers per firm	7	6	18	14	.	.
Mean log VA/worker	0.00	0.00	0.00	0.00	.	.
Fraction females at firms	0.27	0.62	0.32	0.57	.	.
Social care sector	0.10	0.33	0.13	0.32	.	.
Number person-year obs.	1,721,201	1,232,020	1,314,732	992,794	.	.
Number of persons	536,817	389,269	426,253	321,062	.	.
Number of firms	84,317	79,133	23,910	23,910	.	.

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour. The social care sector includes include public administration, education, human health activities, residential care activities and Social work activities without accommodation (i.e NACE code 84 to 88).

TABLE A.4. Descriptive Statistics in the German IAB Data, 2010-2014

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	2.97	2.73	3.05	2.79	.	.
Std. dev.	0.57	0.54	0.57	0.54	.	.
Mean age	40	40	40	40	.	.
Part-time (%)	7	35	7	31	.	.
Separation (%)	20	23	19	22	.	.
Mean firm size	19	19	45	45	.	.
Movers per firm	10	6	25	14	.	.
Mean log VA/worker	11.29	11.14	11.32	11.17	.	.
Fraction females at firms	0.24	0.58	0.27	0.52	.	.
Social care sector	0.00	0.00	0.00	0.00	.	.
Number person-year obs.	49,563,213	28,257,241	38,587,140	21,750,570	.	.
Number of persons	13,155,660	8,168,368	10,438,866	6,336,209	.	.
Number of firms	1,428,388	1,358,133	426,196	426,196	.	.

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	2.97	2.74	3.04	2.80	.	.
Std. dev.	0.57	0.51	0.57	0.51	.	.
Mean age	40	41	40	40	.	.
Part-time (%)	8	37	7	34	.	.
Separation (%)	20	22	20	22	.	.
Mean firm size	20	18	45	44	.	.
Movers per firm	10	7	22	16	.	.
Mean log VA/worker	11.28	11.01	11.30	11.04	.	.
Fraction females at firms	0.27	0.66	0.30	0.60	.	.
Social care sector	0.06	0.29	0.07	0.28	.	.
Number person-year obs.	53,936,510	43,042,328	42,865,380	32,515,468	.	.
Number of persons	14,275,701	12,077,096	11,551,797	9,290,901	.	.
Number of firms	1,639,380	1,813,237	542,283	542,283	.	.

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour. The social care sector includes include public administration, education, human health activities, residential care activities and Social work activities without accommodation (i.e NACE code 84 to 88).

TABLE A.5. Descriptive Statistics in the Danish administrative Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.41	3.26	3.44	3.27	3.42	3.26
Std. dev.	0.40	0.36	0.41	0.35	0.39	0.35
Mean age	40	40	40	40	40	40
Part-time (%)	27	33	25	32	25	32
Separation (%)	28	27	27	26	30	29
Mean firm size	18	25	36	39	42	47
Movers per firm	18	13	41	23	39	21
Mean log VA/worker	11.32	11.30	11.34	11.32	11.34	11.32
Fraction females at firms	0.26	0.51	0.30	0.49	0.29	0.48
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	5,513,301	2,997,736	4,581,129	2,698,865	3,784,425	2,153,791
Number of persons	1,061,348	626,533	930,026	567,421	846,657	504,013
Number of firms	169,372	114,603	59,257	59,257	47,008	46,254

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.39	3.25	3.41	3.25	3.42	3.26
Std. dev.	0.39	0.31	0.39	0.30	0.39	0.35
Mean age	40	40	40	40	40	40
Part-time (%)	28	31	26	30	25	32
Separation (%)	27	23	26	23	30	29
Mean firm size	27	34	49	53	39	43
Movers per firm	21	25	43	42	35	19
Mean log VA/worker	11.32	11.30	11.34	11.32	11.34	11.32
Fraction females at firms	0.34	0.66	0.38	0.64	0.29	0.48
Social care sector	0.21	0.55	0.23	0.57	0.00	0.00
Number person-year obs.	7,205,081	7,188,861	6,351,049	6,779,244	3,893,770	2,191,938
Number of persons	1,307,802	1,247,303	1,200,522	1,194,530	866,601	514,744
Number of firms	190,521	143,987	80,122	80,122	53,213	52,256

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

TABLE A.6. Descriptive Statistics in the Finnish Administrative Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.03	2.87	3.04	2.87	3.03	2.85
Std. dev.	0.36	0.34	0.36	0.34	0.35	0.34
Mean age	40	40	40	40	40	40
Part-time (%)	4	15	4	15	4	16
Separation (%)	23	26	22	25	22	26
Mean firm size	80	86	139	138	139	138
Movers per firm	39	31	99	64	91	52
Mean log VA/worker	11.17	10.94	11.18	10.96	11.18	10.96
Fraction females at firms	0.27	0.57	0.28	0.55	0.27	0.54
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	2,749,168	1,741,972	2,575,431	1,633,772	2,400,042	1,418,842
Number of persons	584,789	391,758	526,467	361,115	507,296	330,855
Number of firms	24,483	20,335	9,038	9,038	8,458	8,461

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.02	2.85	3.03	2.85	3.02	2.84
Std. dev.	0.36	0.32	0.36	0.32	0.35	0.34
Mean age	40	41	40	41	40	40
Part-time (%)	4	12	4	12	4	15
Separation (%)	23	24	22	23	23	27
Mean firm size	116	115	180	174	128	126
Movers per firm	42	62	90	120	77	48
Mean log VA/worker	11.16	10.91	11.17	10.93	11.17	10.93
Fraction females at firms	0.37	0.71	0.39	0.71	0.28	0.57
Social care sector	0.23	0.61	0.24	0.62	0.01	0.10
Number person-year obs.	3,656,129	4,768,551	3,495,641	4,624,910	2,465,597	1,610,131
Number of persons	765,501	946,334	711,843	911,767	526,607	390,258
Number of firms	30,075	27,625	13,535	13,535	10,366	10,368

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

TABLE A.7. Descriptive Statistics in the French Administrative Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	2.88	2.77	2.90	2.79	2.89	2.76
Std. dev.	0.46	0.42	0.46	0.43	0.45	0.42
Mean age	39	39	39	38	39	38
Part-time (%)	12	30	12	29	12	30
Separation (%)	28	29	27	29	28	30
Mean firm size	23	25	42	43	42	43
Movers per firm	24	16	54	32	54	31
Mean log VA/worker	4.20	4.12	4.24	4.13	4.24	4.13
Fraction females at firms	0.28	0.55	0.30	0.53	0.29	0.52
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	74,657,286	46,663,660	65,622,545	42,171,308	60,752,972	37,170,277
Number of persons	17,061,367	11,656,165	14,849,448	10,549,494	14,010,689	9,628,806
Number of firms	1,411,500	1,196,096	548,851	548,851	503,020	501,994

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	2.90	2.79	2.93	2.81	2.93	2.81
Std. dev.	0.46	0.39	0.46	0.39	0.47	0.43
Mean age	39	40	39	39	39	38
Part-time (%)	14	30	14	28	14	28
Separation (%)	29	26	28	26	31	32
Mean firm size	27	29	63	64	52	53
Movers per firm	9	9	24	22	22	14
Mean log VA/worker	4.50	4.34	4.59	4.38	4.59	4.38
Fraction females at firms	0.34	0.64	0.38	0.62	0.31	0.54
Social care sector	0.19	0.45	0.22	0.48	0.02	0.09
Number person-year obs.	39,758,505	37,667,337	33,635,520	33,340,390	24,494,556	16,486,098
Number of persons	14,336,036	13,237,298	12,124,020	11,756,204	9,297,592	6,602,822
Number of firms	1,245,419	1,136,655	416,386	416,386	321,130	320,714

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

TABLE A.8. Descriptive Statistics in the Hungarian Administrative Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	6.70	6.60	6.84	6.67	6.85	6.68
Std. dev.	0.63	0.56	0.64	0.57	0.64	0.57
Mean age	39	39	38	39	38	39
Part-time (%)	8	15	5	11	4	10
Separation (%)	27	28	26	28	27	29
Mean firm size	18	20	43	45	47	50
Movers per firm	10	7	23	18	22	17
Mean log VA/worker	8.61	8.50	8.78	8.64	8.78	8.64
Fraction females at firms	0.27	0.63	0.33	0.57	0.33	0.57
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	3,989,959	2,878,313	2,900,496	2,255,559	2,613,539	2,035,183
Number of persons	825,401	644,898	640,062	522,594	597,932	487,862
Number of firms	205,098	176,353	56,910	56,910	49,672	49,290

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	6.72	6.64	6.82	6.70	6.83	6.67
Std. dev.	0.62	0.53	0.62	0.53	0.62	0.56
Mean age	39	40	39	40	39	39
Part-time (%)	8	12	5	9	5	11
Separation (%)	28	30	27	30	26	29
Mean firm size	24	25	57	59	47	50
Movers per firm	12	13	27	32	22	16
Mean log VA/worker	8.57	8.45	8.70	8.56	8.70	8.56
Fraction females at firms	0.31	0.68	0.37	0.64	0.33	0.57
Social care sector	0.22	0.41	0.28	0.46	0.13	0.12
Number person-year obs.	5,562,938	5,368,465	4,408,991	4,535,714	3,126,261	2,375,859
Number of persons	1,047,195	1,034,853	880,024	908,240	691,935	563,499
Number of firms	268,792	252,975	84,458	84,458	61,160	60,681

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

TABLE A.9. Descriptive Statistics in the Italian Administrative Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	2.62	2.47	2.67	2.49	2.68	2.50
Std. dev.	0.44	0.39	0.45	0.40	0.44	0.39
Mean age	40	39	40	40	40	40
Part-time (%)	11	43	10	41	8	40
Separation (%)	23	24	22	24	21	24
Mean firm size	13	15	24	26	34	37
Movers per firm	16	12	32	22	42	28
Mean log VA/worker	4.23	3.95	4.21	3.95	4.21	3.95
Fraction females at firms	0.26	0.58	0.30	0.54	0.29	0.54
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	29,969,725	18,389,656	24,485,896	15,828,641	21,433,689	13,468,240
Number of persons	4,550,005	2,986,602	4,050,506	2,712,558	3,823,888	2,506,530
Number of firms	1,035,295	821,341	376,269	376,269	223,855	221,871

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	2.62	2.46	2.66	2.48	2.68	2.49
Std. dev.	0.45	0.40	0.45	0.40	0.44	0.39
Mean age	40	39	40	39	40	40
Part-time (%)	11	43	10	41	9	41
Separation (%)	23	25	22	24	22	24
Mean firm size	12	14	24	25	33	35
Movers per firm	16	12	31	22	41	28
Mean log VA/worker	4.23	3.98	4.21	3.97	4.21	3.97
Fraction females at firms	0.26	0.60	0.30	0.55	0.29	0.54
Social care sector	0.01	0.05	0.02	0.05	0.01	0.03
Number person-year obs.	30,917,605	19,842,291	25,445,030	17,020,059	22,049,190	14,128,883
Number of persons	4,621,933	3,115,471	4,146,330	2,840,484	3,895,677	2,590,204
Number of firms	1,105,702	934,738	416,383	416,383	243,145	241,095

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

TABLE A.10. Descriptive Statistics in the Dutch Administrative Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.05	2.82	3.05	2.82	3.04	2.79
Std. dev.	0.51	0.44	0.51	0.44	0.49	0.42
Mean age	40	39	39	39	39	39
Part-time (%)	11	52	11	50	11	51
Separation (%)	24	26	24	27	26	29
Mean firm size	29	41	62	66	78	84
Movers per firm	24	21	60	36	73	41
Mean log VA/worker	4.10	3.92	4.08	3.91	4.08	3.91
Fraction females at firms	0.27	0.54	0.29	0.51	0.28	0.50
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	21,948,900	12,675,814	19,320,406	11,469,130	15,879,101	8,771,416
Number of persons	3,625,149	2,353,960	3,306,765	2,180,420	2,982,414	1,893,285
Number of firms	504,414	344,029	176,865	176,865	113,805	112,994

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.08	2.93	3.08	2.94	3.05	2.86
Std. dev.	0.49	0.40	0.49	0.40	0.48	0.41
Mean age	40	40	40	40	39	39
Part-time (%)	12	58	12	57	11	55
Separation (%)	23	22	23	22	26	29
Mean firm size	36	46	73	77	81	88
Movers per firm	27	34	62	60	69	50
Mean log VA/worker	3.84	3.15	3.81	3.10	3.81	3.10
Fraction females at firms	0.32	0.66	0.34	0.64	0.30	0.59
Social care sector	0.16	0.46	0.18	0.47	0.07	0.28
Number person-year obs.	26,923,621	25,212,917	24,363,699	23,326,236	17,489,820	12,762,316
Number of persons	4,241,322	3,914,235	3,941,949	3,702,089	3,307,729	2,685,861
Number of firms	564,024	430,795	219,918	219,918	132,161	131,317

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

TABLE A.11. Descriptive Statistics in the Norwegian Administrative Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.23	3.02	3.25	3.03	3.26	3.08
Std. dev.	0.46	0.46	0.46	0.46	0.46	0.46
Mean age	39	40	39	40	39	39
Part-time (%)	8	27	8	26	7	20
Separation (%)	22	24	21	23	22	24
Mean firm size	22	33	44	50	36	40
Movers per firm	24	20	53	33	49	25
Mean log VA/worker	4.30	4.24	4.33	4.26	4.33	4.26
Fraction females at firms	0.27	0.62	0.30	0.61	0.26	0.52
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	7,646,678	5,330,110	6,558,297	5,014,025	5,550,553	2,991,603
Number of persons	1,261,374	1,010,130	1,130,209	961,037	989,663	591,083
Number of firms	171,999	112,637	62,713	62,713	55,749	55,212

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.23	3.04	3.25	3.05	3.26	3.07
Std. dev.	0.45	0.44	0.45	0.43	0.46	0.45
Mean age	39	40	39	40	39	39
Part-time (%)	9	27	9	27	8	22
Separation (%)	22	22	21	22	22	24
Mean firm size	25	33	46	51	35	39
Movers per firm	27	35	56	59	45	28
Mean log VA/worker	4.29	4.18	4.31	4.20	4.31	4.20
Fraction females at firms	0.31	0.66	0.34	0.65	0.28	0.58
Social care sector	0.11	0.30	0.12	0.30	0.05	0.22
Number person-year obs.	8,786,763	8,000,396	7,719,998	7,512,805	6,028,149	4,000,621
Number of persons	1,366,264	1,239,053	1,243,807	1,180,878	1,063,466	763,312
Number of firms	194,161	143,358	79,327	79,327	66,850	66,331

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

TABLE A.12. Descriptive Statistics in the Portuguese QP Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	1.86	1.67	1.96	1.73	1.96	1.72
Std. dev.	0.57	0.52	0.58	0.53	0.58	0.53
Mean age	39	39	39	38	39	38
Part-time (%)	1	6	1	6	1	6
Separation (%)	24	25	23	25	23	25
Mean firm size	14	16	32	33	33	33
Movers per firm	13	10	32	24	32	24
Mean log VA/worker	11.26	11.12	11.39	11.22	11.39	11.22
Fraction females at firms	0.27	0.63	0.31	0.59	0.31	0.59
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	9,970,313	7,166,548	7,527,280	5,688,495	7,490,537	5,652,437
Number of persons	1,908,803	1,420,885	1,483,404	1,146,844	1,481,018	1,144,674
Number of firms	309,921	280,358	92,984	92,984	92,186	92,173

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	1.87	1.68	1.96	1.74	1.96	1.74
Std. dev.	0.57	0.51	0.58	0.53	0.58	0.53
Mean age	39	39	39	39	39	39
Part-time (%)	2	6	2	6	2	6
Separation (%)	23	23	23	23	23	24
Mean firm size	15	15	32	33	33	33
Movers per firm	13	11	30	25	30	25
Mean log VA/worker	11.19	10.75	11.29	10.86	11.29	10.86
Fraction females at firms	0.29	0.68	0.33	0.64	0.33	0.64
Social care sector	0.04	0.21	0.05	0.20	0.04	0.19
Number person-year obs.	10,632,988	9,606,084	8,203,480	7,527,071	8,121,353	7,318,953
Number of persons	2,015,699	1,811,564	1,595,336	1,455,489	1,589,213	1,441,579
Number of firms	335,732	331,943	108,910	108,910	107,633	107,699

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

TABLE A.13. Descriptive Statistics in the Swedish Data, 2010-2019

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.11	3.03	3.11	3.03	3.10	3.01
Std. dev.	0.35	0.32	0.35	0.32	0.33	0.31
Mean age	40	40	40	40	40	39
Part-time (%)	5	22	5	22	5	22
Separation (%)	23	27	23	27	23	28
Mean firm size	224	242	304	307	292	295
Movers per firm	97	59	168	94	153	80
Mean log VA/worker	11.33	11.25	11.33	11.25	11.33	11.25
Fraction females at firms	0.29	0.47	0.30	0.47	0.28	0.46
Social care sector	0.00	0.00	0.00	0.00	0.00	0.00
Number person-year obs.	4,017,199	2,223,040	3,932,391	2,193,821	3,485,189	1,829,048
Number of persons	943,759	562,211	904,820	547,843	829,064	482,569
Number of firms	11,620	10,417	6,526	6,526	6,016	6,014

	Overall Analysis Sample		Dual-Connected Sets		With Productivity	
	Men	Women	Men	Women	Men	Women
Log Hourly Wage	3.10	3.00	3.11	3.00	3.09	2.99
Std. dev.	0.35	0.31	0.35	0.31	0.33	0.31
Mean age	40	40	40	40	40	40
Part-time (%)	6	25	6	25	6	25
Separation (%)	24	29	23	29	24	30
Mean firm size	196	206	257	259	283	285
Movers per firm	84	61	139	94	139	87
Mean log VA/worker	11.31	11.19	11.32	11.19	11.32	11.19
Fraction females at firms	0.31	0.53	0.32	0.53	0.30	0.52
Social care sector	0.03	0.17	0.03	0.17	0.03	0.17
Number person-year obs.	4,275,569	2,866,186	4,188,149	2,821,643	3,649,375	2,289,875
Number of persons	1,017,959	754,556	978,235	734,129	881,185	630,646
Number of firms	14,401	13,412	8,553	8,553	7,002	7,001

Notes: Overall analysis sample in columns (1)–(2) includes workers age 25–55. Wages are measured in real (2015 = 100) euros per hour.

References

Albrecht, James, Anders Björklund, and Susan Vroman, "Is there a glass ceiling in Sweden?," *Journal of Labor Economics*, 2003, *21* (1), 145–177.

___, Mary Ann Bronson, Peter Skogman Thoursie, and Susan Vroman, "The career dynamics of high-skilled women and men: Evidence from Sweden," *European Economic Review*, 2018, *105*, 83–102.

Andersen, Torben M., "The Danish labor market, 2000–2022," *IZA World of Labor*, 2023, p. 404.

Babet, Damien, Olivier Godechot, and Marco G. Palladino, "In the Land of AKM: Explaining the Dynamics of Wage Inequality in France," *Banque de France Working Paper N° 987*, 2025.

Barth, Erling, Sari Pekkala Kerr, and Claudia Olivetti, "The dynamics of gender earnings differentials: Evidence from establishment data," *Journal of Labor Economics*, 2021, *39* (2), 367–408.

Bizopoulou, Aspasia, Elias Einiö, and Tuomo Virkola, "Pay Transparency, Wage Setting and Worker Sorting," Technical Report, Working paper 2024.

Bonhomme, Stéphane, Kerstin Holzheu, Thibaut Lamadon, Elena Manresa, Magne Mogstad, and Bradley Setzler, "How Much Should We Trust Estimates of Firm Effects and Worker Sorting?," *Journal of Labor Economics*, 2023, *41* (2), 291–322.

Boza, István and Balázs Reizer, "The Role of Flexible Wage Components in Gender Wage Difference," Technical Report, IZA Discussion Papers 2024.

Bronson, Mary Ann and Peter S Thoursie, "The wage growth and within-firm mobility of men and women: New evidence and theory," *Unpublished. https://economicdynamics. org/meetpapers/2018/paper_923. pdf. Accessed March*, 2019, *25*, 2021.

Bruns, Benjamin, "Changes in workplace heterogeneity and how they widen the gender wage gap," *American Economic Journal: Applied Economics*, 2019, *11* (2), 74–113.

Card, David, Ana Rute Cardoso, and Patrick Kline, "Bargaining, sorting, and the gender wage gap: Quantifying the impact of firms on the relative pay of women," *Quarterly Journal of Economics*, 2016, *131* (2), 633–686.

___, Jörg Heining, and Patrick Kline, "Workplace Heterogeneity and the Rise of West German Wage Inequality," *Quarterly journal of economics*, 2013, *128* (3), 967–1015.

Cardoso, Ana Rute, Paulo Guimarães, and Pedro Portugal, "What drives the gender wage gap? A look at the role of firm and job-title heterogeneity," *Oxford Economic Papers*, 2016, *68* (2), 506–524.

___, ___, ___, and Pedro S Raposo, "The sources of the gender wage gap," *Banco de Portugal Economic Studies*, 2016, *2016*, 2.

Casarico, Alessandra and Salvatore Lattanzio, "What firms do: Gender inequality in linked employer-employee data," *Journal of Labor Economics*, 2024, *42* (2), 000–000.

Dahl, Christian M., Daniel le Maire, and Jakob R. Munch, "Wage Dispersion and Decentralization of Wage Bargaining," *Journal of Labor Economics*, 2013, *31* (3), 501–533.

Gallen, Yana, Rune V. Lesner, and Rune Vejlin, "The labor market gender gap in Denmark: Sorting out the past 30 years," *Labour Economics*, 2019, *56*, 58–67.

Gerard, François, Lorenzo Lagos, Edson Severnini, and David Card, "Assortative matching or exclusionary hiring? the impact of employment and pay policies on racial wage differences in brazil," *American Economic Review*, 2021, *111* (10), 3418–3457.

Goldin, Claudia, Sari Pekkala Kerr, Claudia Olivetti, and Erling Barth, "The Expanding Gender Earnings Gap: Evidence from the LEHD-2000 Census," *American Economic Review*, May 2017, *107* (5), 110–14.

Gruber, Jonathan, Tuomas Kosonen, and Kristiina Huttunen, "Paying Moms to Stay Home: Short and Long Run Effects on Parents and Children," Technical Report, National Bureau of Economic Research 2023.

Kline, Patrick, "Firm wage effects," *Handbook of Labor Economics*, 2024, *5*, 115–181.

___ **, Raffaele Saggio, and Mikkel Sølvsten**, "Leave-out estimation of variance components," *Econometrica*, 2020.

Kreiner, Claus Thustrup and Michael Svarer, "Danish Flexicurity: Rights and Duties," *Journal of Economic Perspectives*, November 2022, *36* (4), 81–102.

Lachowska, Marta, Alexandre Mas, and Stephen A Woodbury, "How Reliable Are Administrative Reports of Paid Work Hours?," *Labour Economics*, 2022, *75*, 102131.

Lassen, Anne Sophie, "Gender Norms and Specialization in Household Production: Evidence from a Danish Parental Leave Reform," Working Papers, Copenhagen Business School, Department of Economics January 2021.

Li, Jiang, Benoit Dostie, and Gaëlle Simard-Duplain, "Firm pay policies and the gender earnings gap: the mediating role of marital and family status," *ILR Review*, 2023, *76* (1), 160–188.

Masso, Jaan, Jaanika Meriküll, and Priit Vahter, "The role of firms in the gender wage gap," *Journal of Comparative Economics*, 2022, *50* (2), 454–473.

Merlino, Luca Paolo, Pierpaolo Parrotta, and Dario Pozzoli, "Gender differences in sorting," *Industrial Relations: A Journal of Economy and Society*, 2018, *57* (4), 671–709.

Milgrom, Eva M Meyersson, Trond Petersen, and Vemund Snartland, "Equal pay for equal work? Evidence from Sweden and a comparison with Norway and the US," *Scandinavian Journal of Economics*, 2001, *103* (4), 559–583.

OECD, "OECD (2024), Employment rate (indicator)," 2024.

Palladino, Marco G., Alexandra Roulet, and Mark Stabile, "Narrowing industry wage premiums and the decline in the gender wage gap," *Labour Economics*, 2025, *94*, 102693.

Rigó, Mariann, "Estimating union-non-union wage differential in hungary," *Unpublished PhD dissertation chapter. Central European University*, 2012.

Schneck, Colja, "Trends in Wage Inequality in the Netherlands," *De Economist*, 2021, *169* (3).

Sorkin, Isaac, "The role of firms in gender earnings inequality: Evidence from the United States," *American Economic Review, Papers and Proceedings*, 2017, *107* (5), 384–387.

Tonin, Mirco et al., "Employment protection legislation in central and east European countries," *SEER-South-East Europe Review for Labour and Social Affairs*, 2009, (04), 477–491.