The Unequal Impact of Firms on the Gender Wage Gap

Marco G. Palladino, Antoine Bertheau, Alexander Hijzen, Astrid Kunze, Cesar Barreto, Dogan Gülümser, Marta Lachowska, Anne Sophie Lassen, Salvatore Lattanzio, Benjamin Lochner, Stefano Lombardi, Jordy Meekes, Balazs Murakozy, Oskar Skans. Preliminary.

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Abstract

We use matched employer-employee datasets for the United States and 10 European countries to analyze the role of firms in the gender wage gap. Five important facts stand out: (1) Firms play a key role in shaping gender wage gaps in all countries as well as differences between them. Gender gaps in firm wage premiums account for 50% of the overall gap in the United States and 10-30% in European countries. (2) There are important differences across countries in the relative importance of gaps in wage premiums within firms, due to gender differences in pay-setting, and between firms, due to the sorting of women in low-wage firms. (3) Cross-country differences in pay-setting are partly explained by the fact that women capture a smaller share of firm-wide productivity gains. They receive up to 15% less of surplus-driven rents than men. (4) Cross-country differences in sorting reflect the degree of wage premium dispersion between firms and gender segregation across firms paying different wages. Sorting is primarily driven by segregation. (5) Women are disproportionately employed in firms with a high prevalence of part-time work. These firms offer lower wage premiums, contributing to the gender wage gap.

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1. Introduction

Despite significant increases in the labor force participation of women and substantial progress in closing the gender gap in employment, women continue to earn significantly less than men in most OECD countries. It has been widely established, moreover, that these differences in pay between men and women cannot be attributed to differences in skills (e.g., educational attainment, work experience), but instead reflect differences in the kind of jobs similarly skilled men and women hold and the way similarly skilled men and women are remunerated for their efforts (Olivetti et al. 2024). Understanding why similarly skilled men and women earn different wages is not just central to broader policy discussions on gender inequality and inclusiveness but also sheds light on important research questions related to wage-setting and sorting in imperfectly competitive labor markets. Indeed, recent research on imperfectly competitive labor markets has renewed interest in the specific role that firms play in shaping wage inequality, including the gender wage gap (Card et al. 2018; Kline 2024a).

A key methodological advancement is the framework developed by Card et al. (2016) (CCK), which extends the Abowd et al. (1999) (AKM) model to analyze gender differences in firm-specific wage premiums within and between firms. The AKM model decomposes wage variation into a worker-specific component and an employer-specific wage premium that captures systematic differences in firm wage-setting practices for equally skilled workers. By separately estimating these firm-specific wage premiums for men and women, CCK allows quantifying the role of firms in shaping gender wage gaps due to (i) differences in bargaining power between men and women within firms (pay-setting) and (ii) differences in the types of firms in which men and women are employed (sorting). This methodology has been instrumental in shifting the focus of gender wage gap research beyond traditional explanations — such as productivity differentials (Mulligan and Rubinstein 2008), or gender-based preferences for flexibility and long work hours

(Goldin 2015) — toward a recognition that labor markets are imperfectly competitive and that firms play an active role in shaping gender wage gaps.

This paper provides the first harmonized cross-country analysis of firms and their role in explaining the gender wage gap. To this end, we make use of harmonized administrative matched employer-employee data from 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. The analysis is based on a uniform data preparation that defines the sample, constructs the relevant variables and implements the econometric framework to ensure the cross-country comparability of the results. The baseline analysis is restricted to employers in the private sector and dependent employees aged 25-55. The gender wage gap is consistently measured in hourly wages using detailed information on earnings and hours worked in all countries and consequently controls for differences in hours worked between men and women. Following the CCK methodology, AKM models are estimated separately for men and women, and hence allow documenting gender gaps in wage premiums within and between firms.

Our analysis yields several key insights. First, before moving to the analysis of the gender wage gap and the role of firms, we start by showing that firm wage premiums contribute to overall wage dispersion for both men and women in all countries. This importance of differences in wage premiums across firms provides an important precondition and rationale for focusing on the role of firms in the gender wage gap. We show important differences in the role of firms across countries. In Germany, Portugal, Italy, and the U.S., they account for 10% to 20% of wage dispersion, whereas their role is more limited elsewhere.[1] The unequal role of firms in wage dispersion across countries may also shape differences in the gender wage gap across countries. Differences in wage

[1]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.

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.

Second, firms significantly contribute to the gender wage gap in all countries as well as differences in gender wage gaps between them. Gaps in wage premiums are -systematically correlated to overall gaps in wages across countries: countries with larger gender wage gaps also tend to have larger gender wage premium gaps. However, the relationship between firm-specific wage premiums and the gender wage gap is far from perfect, as there are important differences in the importance of gaps in wage premiums in the overall gaps in wages across countries. In most European countries, including Sweden, Norway, France, Finland, Netherlands, Portugal, Italy, gaps in wage premiums account for 10–20 percent of the overall gender wage gap. In Germany and Hungary, gaps in wage premiums account for about 30 percent of the overall gap. In the United States, gaps in wage premiums are most important, accounting for nearly 50 percent of the overall gap.

Third, we document substantial differences across 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*). The pay-setting channel ranges from nero zero to seven log points across countries. The pay-setting channel is small in countries such as France, Norway and Sweden, whereas it is most pronounced in the United States followed by Hungary. Similarly, the sorting component varies from near zero to six log points. Countries with high sorting-driven disparities include Germany, the Netherlands, the US, and Portugal, while those with lower sorting disparities include Norway, Denmark, and France.

Fourth, we document significant differences in the importance of the pay-setting and sorting channels across groups of workers and firms within countries. In all countries, pay-setting disparities are more pronounced among high-wage workers and high-

premium firms. This is consistent with previous research that shows that individual wage bargaining tends to be more important for high wage workers (Lachowska et al. (2022b)) and high wage premium firms being more productive and hence increasing the availability of rents (Card et al. (2018); Kline (2024b)). The importance of the sorting channel increases over the life-cycle, 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 advancement of women up the job ladder (Kleven et al. (2019, 2024a)). These patterns tends to be very similar in different countries.

Fifth, to better understand cross-country differences in the importance of the pay-setting channel, we test whether productivity gains, or more precisely, the firm-specific surplus, is shared equally across genders in the same firm. Using firm pass-through (or rent-sharing) regressions of firm productivity on firm wage premiums, we find that women capture up to 15 percent less of surplus-driven rents than men, with notable heterogeneity across countries. In Finland, Italy, and Hungary, the gender rent-sharing gap is 15 percent, whereas in Portugal, Denmark, Norway, and France, it is closer to 10 percent. In the Netherlands, we do not detect a statistically significant rent-sharing gap. Our analysis also reveals a positive correlation between the magnitude of gender rent-sharing disparities and the pay-setting component of the gender wage gap. However, the correlation cannot fully account for cross-county differences in the pay-setting channel. This suggests that differences in the availability of rents also play a role.

Finally, we delve deeper into the cross-country differences in the sorting component of the gender wage gap by focusing on two channels: (i) differences across countries in the allocation of men and women across the firm wage premium distribution (*allocation channel*), and (ii) differences across countries in the dispersion of wage premiums across firms (*dispersion channel*). The allocation channel accounts for 60–80 percent of the observed cross-country differences in the sorting component of the gender wage premium gap. We investigate the potential role of non-wage differences across firms to

shed further light on the importance of the sorting channel. Using firm-specific wage premium elasticities to firm-specific mean hours worked, we find a positive relationship between firm wage premiums and working hours, with men exhibiting higher elasticities than women.[2] This suggests that long-hour work is more highly rewarded for men, reinforcing gender differences in firm wage premiums.

To substantiate our findings, we produce additional evidence using country-industry regression estimates. We build a country-industry dataset by aggregating information at this level from the different administrative sources. We find a strong relationship between gender wage and wage premium gaps, even after controlling for country and industry fixed effects. The within-R^2 is substantial, approximately 0.40, indicating a strong explanatory power. Our analysis further reveals that the average firm wage premium and the gender hours gap (i.e., the difference in mean hours worked by men and women) are significant predictors of the gender wage premium gap and its components. These findings suggest that rent-sharing and compensating differentials play a critical role in shaping gender wage gaps and highlight the influence of firms in driving these .

Contribution to the literature. This paper contributes to several strands of the literature. First and foremost, we build on research examining the role of firms in shaping gender wage inequality (Blau 1977; Groshen 1991; Card, Cardoso and Kline 2016). Prior studies using administrative data (e.g., Casarico and Lattanzio (2024); Palladino et al. (2024); Boza and Reizer (2024), among others, see Table 1) have linked firm-specific gender wage premiums to the gender wage gap. However, our study is the first to provide harmonized

[2] In all countries but in Hungary and in Germany the elasticity is between 0.03 to 0.035. In Hungary, the elasticity is much larger, close to 1 for males and 0.7 for females. In Germany, the elasticity is negative for both genders. The result is driven by a group of very low wage premium firms that do not employ part-time workers (see Figure **??**).

cross-country evidence across eleven economies.[3] A key contribution of our study is the harmonization of sample, variable construction and methodology, which enhances the comparability of estimates across countries.[4] Existing research often differs in sample selection criteria, the measurement of wages and econometric specifications, leading to variations in reported estimates and complicating cross-country comparisons. By using a uniform data preparation and analysis protocol, we ensure that differences in firm-specific wage premiums across countries reflect genuine economic disparities rather than methodological differences. Our findings confirm that firm-specific wage premiums are a major driver of gender wage inequality, but importantly, this study also shows that the magnitude of gender gaps in wage premiums and the mechanisms shaping them vary substantially across countries, potentially related to differences in job flexibility, institutional settings, gender norms and cultures (e.g, Goldin (2014); Boelmann, Raute and Schonberg (2021); Philippe and Skandalis (2023); Kleven, Landais and Leite-Mariante (2024a); Kleven, Olivero and Patacchini (2024b)).

Second, our analysis advances the literature on institutional wage setting and its role in gender inequality. In particular, several labor market institutions, such as centralized wage setting, unionization rates, and pay transparency, can impact the role of firms in gender inequality. We find that the pay-setting component of the gender wage gap is more pronounced in countries with less centralized wage-setting institutions, and this variation is linked to differences in productivity and wages. These results complement recent studies on the relationship between wage-setting mechanisms and gender inequality (Cullen 2024; Olsson and Nordström Skans 2024; Caldwell, Haegele and Heining 2025; Biasi and Sarsons 2022), providing new evidence on how likely labor market institutions shape firm-level gender disparities.

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

[4] See Blau and Kahn (2003), Olivetti and Petrongolo (2016) Penner et al. (2023) for other cross-country studies on the gender inequality.

Finally, we contribute to the literature on firm-specific wage premiums, non-wage amenities, and compensating differentials as sources of wage inequality (Sorkin 2017; Morchio and Moser 2024; Lachowska, Mas, Saggio and Woodbury 2023; Audoly, Bhuller and Reiremo 2024).´[5] In particular, Morchio and Moser (2024) propose a theoretical framework in which gender sorting into firms reflects differences in preferences for non-wage job attributes, and they find that compensating differentials explain much of firm-level wage dispersion in Brazil. While our primary focus is not on quantifying the exact split between sorting and compensating differentials, our findings suggest that variation in hours worked across firms is non-negligible in explaining gender wage disparities.

The remainder of the paper is structured as follows: Section 2 describes the datasets and sample selection criteria and presents descriptive statistics.[6] Section 3 describes the two-way fixed effects wage regression (AKM) and the decomposition of gaps in wage premiums into a pay-setting and a sorting channel (CCK). Section 4 presents the results on the contributions of firm wage premiums to wage inequality. . Section 6 explain variations in the gender wage premium gap across countries and the last section concludes.

2. Harmonized research design

Table 1 summarizes recent studies using North American and European data and applying CCK to quantify the extent to which gender difference in firm-wage premiums explain the gender gap in wages or earnings. The table indicates that the firm-wage premiums are important in all countries. However, this conclusion is potentially mis-

[5]See for papers that focus on nonwage job values, work flexibility, reduced hours, and shorter commutes, see among others, Hall and Mueller (2018), Adams et al. (n.d.),Wasserman (2023), Le Barbanchon et al. (2021).

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

leading because the research designs of these studies differ. Indeed, these papers differ in observation periods, sample cuts, whether earnings are adjusted by work time, and the sets of control variables. These discrepancies tend to produce different estimates of the impact of firms on the gender wage gap. The lack of comparable estimates makes it difficult to understand the sources of the gender wage gap across countries.

To address these limitations, we create a harmonized cross-country employer-employee dataset by integrating high-quality administrative data from the United States, Denmark, Finland, France, Germany, Hungary, Italy, the Netherlands, Norway, Portugal, and Sweden. This set of countries meets the central requirement of this study, which is the availability of work hours and, — at a minimum — information on the worker's gender and age.[7] The data period is at least ten years and covers 2010–2019.

2.1. Sample selection

To make the datasets consistent, we retain "prime-age workers," defined as aged 25 to 55 years. We keep workers employed in the private sector from sectors where most firms are for-profit organizations. In practice, we exclude the following industries from O to U in the NACE classification. These industries are: teaching, healthcare, culture, other services, private households with employed persons and extraterritorial organizations. However we conduct additional analysis in countries where we observe public sector employees.

We annualize the data regardless of the original data collection frequency. To do so, we define a worker's primary employer as the employer from whom the worker had the highest annual earnings. We drop observations with earnings less than 80% of the minimum hourly wage or 10% of median earnings. We omit student workers, apprentices, and "marginal jobs" for those countries where we can observe them.

[7] For example, the Canadian and the Austrian data do not contain work hours; and work hours are unavailable in most US linked employer-employee panels.

Table 2 summarizes each country's dataset and its main characteristics: the period covered, job and employer coverage, and the availability of information on workers and employers. The firm is defined as an employer (as opposed to an establishment).[8] Except for the United States and Germany, for which we have data for 2001–2014 (2010–2014), all the other countries' data span much of the 2010–2019 decade. The choice of time period is guided by wanting to focus on the most recent complete decade recent and improvements in some country's datasets.[9]

In Appendix B.1 to B.12 we provide more details for each country including the relevant institutional background, the data sources at the firm and worker level, and the particulars regarding definitions of the variables.

We define wages as the hourly wage rate, constructed by dividing labor earnings before taxes from the primary employer in a year by annual hours worked for the primary employer. The definition of hours is paid work hours or contractual hours if paid work hours are unavailable (as is the case in Hungary, Italy, and Sweden). Labor earnings in administrative data include overtime, bonuses, and severance payments when available. We deflate wages using the OECD CPI for each country with the base year set at 2015.

Because the CCK decomposition is only meaningful for employers who employ men and women, we drop single-gender firms (these constitute 95 to 100 percent of the raw analysis sample). Appendices B.1 to B.12 present tables summarizing the three following sub-samples: the initial analysis sample subject to the above selection criteria, a sample of dual-connected workers and firms (that is, a sample of firms that employer both men and women and are connected through worker mobility), and the dual-connected set for which we have information on value-added or sales data. For the remainder of the paper, we refer to the dual-connected set as the main analysis sample for each country.

[8] With the exception of Germany.

[9] For example, in Denmark data on hourly wage are available from 2008.

In addition to the main analysis samples, we present estimates based on two alternative samples. First, we add employees in the public sector to our main analysis sample (unavailable in the US, Italy, Portugal, and Hungary). We estimate the same models and decompositions using this sample to determine if the results pertaining to sorting and pay setting are affected by the choice of dropping public sector jobs. Second, we select firms with at least ten movers by gender over the observation period to test whether limited mobility leads to imprecisely estimated firm effect effects (Bonhomme et al. 2023). Results with public sector employees are presented in Section 5.5. Limited mobility has a minimal impact on our results.

2.2. Descriptive statistics

Table 3 provides descriptive statistics of the main analysis samples for each country and by gender. The first row shows the log of hourly wage rates. In every country, women's wages are lower than men's. Workers are, on average, between 38 and 40 years old, and in some countries, women are slightly younger than men. Women are more likely to work part-time (defined as less than 30 hours per week) than men. In most countries, the gender wage gap is similar across the entire sample and the sample firms in the dual-connected set.

The separation rate is the ratio of workers transitioning from primary employer j in year t to a different employer in the following year or to non-employment, divided by the number of j's employees in year t. Between 22 and 36% of employees are separating each year and women are more likely to separate. In all of the datasets, the average number of movers per firm is more than 20, which is an informative statistic for inferring if the estimated firm-wage premiums are precisely estimated.[10] We also report the share of baseline observations with productivity measures (unavailable for the United States

[10]The data from Sweden oversample larger firms; see Appendix B.12. Because the data from Sweden contain on average larger firms, on average there are also more movers per firm.

and Germany).

2.3. The Gender Hourly Wage Gap Across Countries

Figure 1, Panel A, reports the gender wage gap (i.e., the difference between the male and the female mean hourly wage) for the overall analysis sample, a dual-connected set sample, and a dual-connected set with information with value-added data. In most countries but Hungary, the restriction to a dual-connected sample lead to a similar gender wage gap (10% vs 16% in the DC sample). This is reassuring, as it means that the subsequent analysis on the dual-connected sample roughly represents the set of private sector jobs for workers between 25 and 55.

Figure 1, Panel B, reports the estimated OLS coefficient of a male dummy on the dual connected sample. The outcome variable is the log hourly wage. The model controls for year effects, third-order polynomials in age, and full-time status. We include education fixed effects in countries when the information is available in additional specifications.[11] Interestingly, once we include firm fixed effects in the regression, the gender wage gap drops in some countries but not in others. For instance, the drop is quite large in Germany and the USA. In other countries, like the Netherlands and France, the gender wage gap increases. However, this evidence is informative but purely descriptive: simply controlling for firms, for instance, does not address the issue that different types of workers sort into different firms. This result naturally leads us to consider the importance of firms in more detail in the next section.

[11] Once we include education dummies in most countries, the estimated gender wage gap is higher. This result reflects that women are more educated than men. See Figure **??**.

3. Estimation of firm-wage premiums and decomposition of the gender wage gap

We begin by describing the gender-specific AKM two-way fixed effects model and then discuss the CCK decomposition.

3.1. The AKM two-way fixed effects model

We start by estimating the following two-way fixed effects model separately for men and women in each country:

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

where $\ln w_{it}$ denotes the log hourly wage rate of worker i in firm $j \in \{1, ..., J\}$ in year t. α_i denotes a worker fixed wage effect that captures unobserved, time-invariant, and portable component of worker productivity. The worker fixed effect is equally valued by any employer. $\psi^{G(i)}_{J(i,t)}$ denotes a firm fixed wage effect that reflects any monetary advantages (or disadvantages) derived from being employed by employer j. X'_{it} is a vector of observables that includes a third-order polynomial in age, and year effects; this is the specification used by Bonhomme et al. (2023) in their cross-country study. To identify age, time, and worker fixed effects separately, we follow CCK in restricting the age-pay profile to be flat at 40. $r_{(i(J),t)}$ denotes the regression error term, which may contain a worker-firm match component.

Firm wage effects can be interpreted as reflecting inter-firm wage premiums arising from differences in firm wage policies rather than differences in workforce composition (Card et al. 2018). However, because we allow firm wage effects to differ for men and women by estimating equation (1) separately by G, we can interpret $\hat{\psi}^{G(i)}_{J(i,t)}$ as systematic

differences in a firm's wage policy toward men and women.

Equation (1) differs from the model used in Card et al. (2016) in that CCK's vector X allows a full interaction of year dummies with four education dummies and includes quadratic and cubic terms in age interacted with those education dummies. The reason equation (1) does not include these interaction terms is that education information is not available for France, Hungary, and Italy; see Table 2.[12]

Econometric assumptions. To identify firm fixed effects, we follow the literature (Kline (2024a)) in making the following assumptions. First, equation (1) assumes that worker and firm fixed effects are log additive, i.e., there are no complementarities between firm type and worker types. Consequently, the wage premium will be the same for all workers (or type G) in a firm regardless of their characteristics. Second, the model assumes exogenous mobility, i.e., the residual $r_{(i(J),t)}$ is uncorrelated with the probability of moving. Third, the model is static, ruling out the presence of lagged terms in determining firm-wage premiums.[13] The firm effects in equation (1) are estimated using a set of firms and workers connected through worker mobility. Because for each country we estimate equation (1) for each gender, we focus on the dual-connected set sample, i.e., the part of the connected set that contains both female and male workers.

Measurement errors in firm effects. Firm effects in equation (1) are identified through year-to-year worker mobility. Kline et al. (2020) and Bonhomme et al. (2023) show that limited mobility will lead to an upward bias in the estimated variance of firm effects.

[12] Estimating the model with education dummy interactions for countries other than France, Hungary, and Italy yields similar results to the main specification. The results are reported in Section 5.5.

[13] Bonhomme, Lamadon and Manresa (2019) find that the log additive specification is approximately accurate. Card, Heining and Kline (2013) use event-study figures to test whether wage changes following worker transitions from low to high-wage firms and transitions from high to low-wage firms are approximately symmetric. They conclude that symmetry implies that moving on the basis of a match effect is unlikely. Di Addario, Kline, Saggio and Sølvsten (2023) estimate an extension of the AKM model to include current employer and previous employer fixed effects find that "current" employer fixed effects explain much more of the variance of wages than "previous" employer fixed effects. Accordingly, they conclude that the static AKM is a good approximation of the wage-setting process.

However, in panels longer than six years (or for average number of movers per firm greater than ten) this is typically a minor issue (Lachowska et al. 2022a). For most countries we have access to a ten-year panel with an average number of movers per firm exceeding 20, which lessens concerns about limited mobility bias. Moreover, the average firm fixed effects are unbiased under the usual assumptions of AKM models (Bonhomme et al. 2023) and focus is not primarily on second moments. Nevertheless, to show that our findings are not sensitive to measurement errors in firm-effect estimates, we estimate our sample to firms with at least ten movers by gender over the observation period. We find very similar results.

3.2. The Gender Wage Premium Gap and its Decomposition

After estimating equation (1) by gender, we measure the gender wage premium gap, $E[\psi_j^M] - E[\psi_j^F]$. By dividing the gender wage premium gap by the gender wage gap, we can quantify the degree to which the gender wage premium gap explained by gender-differences in firm-wage premiums:

$$\frac{E[\psi_j^M] - E[\psi_j^F]}{E[w^M] - E[w^F]} \tag{2}$$

The numerator above — the gender wage premium gap — can be decomposed into a sorting component and a pay-setting component by using a Blinder-Oaxaca decomposition:

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

The first component on the right-hand side is interpreted as the pay-setting effect: the degree to which women obtain a smaller share of the wage premium than men at the same employer. The second component on the right-hand side reflects sorting: the

degree to which women sort to employers paying lower wage premiums to all their workers. The pay-setting component may contain differences in bargaining ("women don't ask"), see for example Babcock and Laschever (2009). It also contains monopsony power of firms (Manning (2021)).

Equation (3) estimates the sorting and pay-setting component over the distribution of jobs held by men. Although common in this literature, the choice of using men's jobs is arbitrary and equation (3) can also be estimated over the distribution of jobs held by women.[14]

4. Contributions of Firms Wage Premiums to Wage Inequality

We begin by quantifying the importance of employers on wages by estimating AKM models and decomposing the variation in wages.

4.1. AKM variance decompositions by country

To quantify the effect of firms on wages, we conduct the following decomposition of equation (1):[15]

$$\text{var}(\ln w_{i(J),t}) = \text{var}(\alpha_i) + \text{var}(\psi_{J(i,t)}) + 2\text{cov}(\psi_{J(i,t)}, \alpha_i) + \text{var}(r_{i(J),t}). \tag{4}$$

Firms' influence on the variance of wages is measured primarily through $\text{var}(\psi_J)$.

Figure 2 presents variance decompositions from estimating equation (1) for log wages separately by gender in each country. We apply the Kline, Saggio and Sølvsten (2020) correction to bias-correct firm and worker effects.[16] The leave-one-out sample

[14] 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 5.5.

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

[16] In France, we use an alternative method to adjust firm fixed effects. The results closely align with those of Palladino et al. (2024) and Azkarate-Askasua and Zerecero (2024).

is constructed by excluding entire worker-firm matches, following Bonhomme et al. (2023) and Kline et al. (2020).

The figure reveals significant cross-country variation in the firm wage component's contribution to wage dispersion among developed economies. In Germany (18–20%), Portugal (11–13%), Italy (11–12%), and the U.S. (10–13%), firm effects account for at least 10% of hourly wage variation for both genders. In other countries, the effect ranges between 5% and 10%. Specifically, firm effects explain 8–11% in the Netherlands, 6–7% in France and Norway, 4–5% in Finland, and 3–4% in Sweden.[17]

We compare the corrected and uncorrected variance decompositions in Appendix Figure A.2. As expected, following Bonhomme et al. (2023), 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 fewer than six years of data (e.g., Germany). However, as noted earlier, the high degree of worker mobility in most of our datasets—due to the length of the panel—suggests that firm effects in the main sample are estimated with relatively low error.

How do our findings 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 A.2 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

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

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.

4.2. Contributions of Person and Firm Effects

Additionally, we use our data to assess the relative importance of firm and worker components in explaining wage inequality. Following Kline (2024a), Figure A.3 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.

Panel B of Figure A.3 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.

5. Contributions of Firm Wage Premiums to the Gender Wage Gap

Next, we analyze the gender wage premium gap and the relative contributions of pay-setting and sorting, as outlined in Section 3.2. We begin by explaining the normalization of firm effects relative to a reference group, followed by the main decomposition results. We then explore additional findings by worker and firm characteristics and conclude with a robustness analysis.

5.1. Normalization of Firm Effects

To enable comparisons between fixed effects estimated separately for men and women, normalization is required. The standard approach is to identify "low-surplus" firms and set their gender-specific firm fixed effects to zero, under the assumption that these firms pay, on average, zero wage premiums to both genders (Card et al. 2016, 2018).

One common normalization method sets firm effects relative to the average firm effect in the hotel and restaurant sector, which is typically the industry with the least surplus to share (Card et al. 2016). Another widely used approach leverages value-added data, exploiting the observed "hockey-stick" relationship between firm value added per worker and firm wage effects: firm effects remain relatively flat for low value-added firms but increase linearly beyond a certain threshold (Card et al. 2016). Because value-added data are available for all countries except the U.S. and Germany, we adopt this approach.[18]

Figure A.5 illustrates the relationship between firm productivity and firm wage premiums across countries.[19] The figure presents mean estimated firm wage premiums from the AKM model for men and women, averaged across firms within 100 percentile

[18] For normalization by industry, we select the industry that (i) has the lowest firm effects for both males and females and (ii) employs at least 1% of the dual-connected sample. Results remain similar–available upon request–when using the lowest-paying sector with at least 3% or 5% of employment.

[19] For Portugal, sales data are used instead of value-added.

bins of productivity (measured as mean log value-added per worker). To improve readability, we rescale gender-specific wage premiums and productivity. 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. For each country, productivity is also rescaled to have a minimum value of one. Across all countries, we observe a consistent hockey-stick pattern: firm wage effects remain flat at low productivity levels and start increasing beyond a certain threshold.[20]

This figure provides several key insights for understanding firm contributions to the gender wage gap. First, cross-country differences in productivity dispersion are evident from the variation in the x-axis range. For instance, productivity extends to a maximum of approximately 5 in Italy but only 3 in Denmark, suggesting that the relative importance of pay-setting and sorting mechanisms may differ across countries due to productivity differences. Second, the relationship between gender-specific wage premiums and productivity varies in slope. In most countries, female wage premiums increase less steeply than male wage premiums, indicating that women may receive a smaller share of firm surplus. The Netherlands stands out as an exception, where no significant difference is observed.

5.2. Main Results

Figure 3, Panel A, plots the gender wage gap (y-axis) against the firm effects gap (x-axis). The gender wage premium gap, which captures the combined contribution of sorting and pay-setting components from equation 3, is central to this analysis. To illustrate the relative importance of the gender wage premium gap in explaining the overall gender wage gap, Panel A also includes diagonal reference lines indicating scenarios where the gender wage premium gap accounts for 10%, 20%, and 30% of the total gender wage

[20]The inflection point in the hockey-stick pattern is typically low across countries, except in Hungary. Results remain consistent under alternative normalization strategies (see below).

gap.

Figure 3 demonstrates that firm-specific wage premiums are a significant source of gender wage inequality and systematically correlate with the overall gender wage gap. The magnitude of the gender wage gap varies substantially across countries. It is highest in Germany, the Netherlands, Portugal, and the U.S., ranging between 20 and 25 log points, and lowest in France and Sweden (at 12 and 8.5 log points).[21] The gender wage premium gap also exhibits significant cross-country variation, with the highest being in the U.S. (11 log points) and the lowest in Sweden, France, and Norway (1–2 log points). In Portugal, the Netherlands, Italy, Denmark, and Finland, the gender wage premium falls between 2 and 5 log points. Two European countries, Germany and Hungary, have a gender wage premium gap above five log points.

Using the 10%, 20%, and 30% thresholds, we classify European countries into two broad groups based on the role of firm wage premiums in the gender wage gap. The first group includes Sweden, Norway, France, Finland, the Netherlands, Portugal, and Italy, where firm wage premiums account for 10–20% of the gap. The second group, comprising Germany and Hungary, sees firm wage premiums contributing 30% or more. This contrast is even more pronounced when compared to the United States, where firm wage premiums explain nearly 50% of the gender wage gap.

At first glance, the significant role of firm wage premiums in the United States, Germany, and Hungary may seem surprising. However, related research suggests that this pattern is not anomalous. While acknowledging that our research design differs in several respects, Boza and Reizer (2024) estimates an even larger firm effect in Hungary (40%), while Bruns (2019) finds a substantial increase in Germany, from 11% in the 1990s to 26% in the 2000s.[22] Additionally, Sorkin (2017) finds that 28% of the gender earnings

[21]These estimates are based on firms in the dual-connected set with available value-added data (Figure 1).

[22]Since our sample covers the period 2010–2014, it is plausible that the influence of firms on the gender wage gap continued to grow, particularly given the ongoing decline in unionization during this period (see Jäger et al. (2022), Figure 2). Moreover, Bruns (2019) highlights the role of unionization in compressing

gap can be attributed to the sorting component alone,[23] further supporting the idea that firm-level dynamics play an unequal role across countries.

Figure 3, Panel B, presents the decomposition of firm wage premiums into sorting and pay-setting components across countries. We analyze these components based on the distribution of jobs held by men. Perhaps even more striking than the overall impact of firm wage premiums on the gender wage gap is the cross-country variation in the relative importance of pay-setting versus sorting.

In the United States, Hungary, and Denmark, firm wage premiums primarily stem from pay-setting, with the pay-setting component contributing between two and seven log points. In contrast, in the Netherlands, Germany, Portugal, France, Finland, and Italy, the dominant factor is sorting, meaning that gender differences in firm-specific wage premiums are largely driven by where men and women work rather than how firms set pay.

Overall, Figure 3 highlights not only the heterogeneous impact of firm wage premiums on the gender wage gap but also the variation in their underlying sources across countries. In the remainder of this section, we further explore how these effects differ across subgroups of workers and firms, distinguishing between public and private sector jobs and considering various aspects of the research design.

5.3. Decompositions by worker and firm characteristics

Worker characteristics. We begin by examining how the sorting component varies with workers' age. Figure 4, Panels A, B, C and D present the gender wage gap and sorting component for two age groups: 25–29 and 50–55. It is important to note that we measure the hourly wage gap; the total earnings gap between men and women is even larger when accounting for labor supply decisions over the life cycle.

the gender wage gap (Table 7).

[23] Although he does not distinguish between the sorting and pay-setting components.

The distance from the 45-degree line reflects the extent to which the gender wage gap increases with age. In most countries, this difference is substantial. For instance, in Portugal, Germany, and the Netherlands, the unconditional gender wage gap is below 10 log points for workers aged 25–29 but rises to approximately 35 log points for those aged 50–55. Figure 4, Panel C, shows how the sorting component evolves enormously between these two age groups. With the exception of Denmark, all countries lie below the 45-degree line, indicating an increase in sorting over time. This pattern is particularly pronounced in Italy, Germany, and Portugal. In Germany, for example, the sorting component accounts for over 9 log points for workers aged 50–55, compared to just 2 log points for those aged 25–29. The pay-setting component plays no role in the evolution of the gender wage gap over the life cycle. How important are cohort effects in explaining our results? While we cannot directly test this, Casarico and Lattanzio (2024) distinguish between cohort and age effects. Their findings suggest that, at the same age, older cohorts exhibit larger gender gaps in earnings, firm wage premiums, and the sorting component compared to younger cohorts. Therefore, it is unlikely that our results are primarily driven by strong cohort effects.

Overall, these findings suggest that the gender wage gap driven by firm wage effects becomes more pronounced with age.[24]

Firm characteristics. Figure 5 decomposes the gender wage premium gap based on firms below and above the median firm wage premium. In all countries–except Germany–the pay-setting component increases with firm wage premiums. This growing gender gap in wage premiums may reflect the greater role of individual wage bargaining in high-wage firms. This interpretation aligns with Lachowska et al. (2022a), who find that wage bargaining is more common among high-wage workers, whereas wage posting (where

[24] Figure A.7 provides a decomposition by worker education level. We do not observe a clear pattern across countries.

wages are offered without negotiation) is more prevalent among low-wage workers.[25]

5.4. Public Sector, NonProfit Organizations and the Gender Wage Gap

So far, the analysis has focused exclusively on private-sector jobs because we do not observe public sector jobs in the United States, Portugal, or Italy. In other countries, like Germany, we observe a subset of public-sector jobs. However, it is well-documented that women are more likely than men to work in the public sector or in nonprofit organizations (NPOs) that operate for collective, public, or social benefit. Given this, it is important to examine how including public sector and NPO jobs affects the CCK decomposition of the gender wage gap.

Figure 6 contrasts the CCK decomposition results from our baseline sample, which includes only private-sector jobs, with those obtained when all jobs are included. The left panel shows that the gender wage gap is generally higher in the baseline sample, though the difference is relatively small, with several countries positioned on or near the 45-degree line. The most pronounced difference is observed in the Netherlands, where the gender wage gap exceeds 20 log points in the baseline sample but falls below 15 log points when all jobs are included.

The right panel of Figure 6 presents the sorting component for both samples. In Norway and the Netherlands, sorting is more pronounced in the baseline sample. However, in all other countries, the sorting component is substantially larger when public sector jobs are included. In France, Hungary, Denmark, and Finland, the sorting component ranges from zero to two log points in the baseline sample but increases to between two and four log points when all jobs are considered.

Overall, these findings indicate that women are more likely than men to sort into lower-paid jobs, which are more prevalent in the public sector and the nonprofit private sector. This suggests that studies focusing exclusively on private-sector jobs likely

[25] Appendix Figure A.4 presents the CCK decomposition by firm size and sectors.

underestimate the true extent of sorting in the broader labor market.

5.5. Alternative Normalization, Sample Cuts and Econometric Specifications

Alternative Decomposition. Figure A.8 presents the results of an alternative CCK decomposition. In our main decomposition, the pay-setting effect is estimated by comparing firm effects for men and women across the distribution of jobs held by men, while the sorting effect is measured by comparing the average firm effects for women across jobs held by men versus women. In the alternative decomposition, the pay-setting effect is instead estimated using the distribution of jobs held by women, and the sorting effect is calculated by comparing the average male wage premiums across jobs held by men versus women.

The results remain nearly identical across most countries, with one notable exception: the United States, where the pay-setting component is somewhat lower. However, even under this alternative decomposition, the U.S. continues to exhibit the highest pay-setting component among all countries analyzed.

Alternative normalization. Figure A.9 reports the firm effect gap using an alternative normalization approach. Instead of defining low-productivity firms as low-surplus firms, we normalize firm effects using all firms within the lowest-wage premium industry. It is important to note that this normalization affects only the pay-setting component and does not influence the sorting component.[26]

This additional analysis confirms that the firm effect gap remains largely unchanged across most countries. When applying this normalization to all firms in the baseline sample or the sample with firms with missing productivity (Panel A and B) —we obtain similar results for most countries. In some countries, such as Portugal, the firm wage

[26] In unreported results, we find that the level of industry aggregation used for normalization has minimal impact on the findings.

premium gap is larger, whereas in others, including Denmark, Hungary, and Finland, it is smaller, larger or similar depending on Panel A or Panel B. [27] The primary exception is Finland, where the pay-setting effect turns negative under industry-based normalization. We perform another normalization as productivity normalization is unavailable for Germany and the US. Specifically, we construct, at the firm-level, a measure of predicted surplus and normalize to zero firms in the bottom decile of the predicted surplus ranking. To measure surplus, we use the predicted mean wage of a firm, after taking into account the workforce's age, firm size, the fraction of full-time workers, the fraction of female, the level of education (if available), and year, 2-digit NACE 2. Rev industry, and local labor markets (using the NUTS classification) fixed effects

Figure A.10

Sample cuts and econometric specifications. Figure A.11, Panel A, 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. In most countries, the data cover a ten-year panel encompassing the entire private-sector workforce. However, in some cases, such as Italy and Hungary, the data include only a 50% random sample of workers. A potential concern is that low worker mobility might introduce greater sampling errors in firm effect estimates. However, our results suggest that this is not the case. Panel B of Figure A.11 examines the impact of restricting the analysis to certain industries (i.e., excluding education, healthcare, and other service sectors). The results remain largely unchanged when considering only jobs with available value-added information. This is expected, as in all European countries, firms that typically report financial data are for-profit entities.

Another potential concern is the limited set of observable worker characteristics

[27] Interestingly, the magnitude of the change in firm wage effects when shifting from low-productivity firms to low-industry firms as the normalization benchmark is very close to the initial estimate reported by Card, Cardoso and Kline (2016).

included in our main specification, which accounts only for year effects and third-order polynomials in age.[28]

Figure A.12 presents the sorting and pay-setting effects estimated 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.

6. Explanations for Variation in Firm Effect Gap and Its Components Across Countries

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

The results presented thus far indicate that a significant portion of the gender wage gap originates within firms, as women receive lower firm wage premiums than men in most countries. In this section, we interpret these findings through the framework of a rent-sharing model, in which women capture a smaller share of firm rents compared to men, despite working for the same employer.

In a monopsonistic labor market, firm productivity can impact wage outcomes. When high-productivity firms demand more workers than low-productivity firms, and search frictions prevent the marginal productivity of labor from equalizing across firms, wages for otherwise similar workers tend to be higher in more productive firms. If

[28] 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.

women's labor supply is less responsive (i.e., more inelastic) than men, the gender gap in firm wage premiums is expected to be larger in high-productivity firms, as women are less able to leverage outside options or bargaining power to capture a greater share of firm rents.

To test this prediction, we estimate the elasticity of firm wage premiums with respect to productivity. Specifically, we regress male and female firm-level wage premiums on log value added per worker (or log sales per worker in the case of Portugal). The estimated elasticity captures the degree of pass-through from firm-level productivity to wage premiums, allowing us to assess whether higher-productivity employers also offer higher wage premiums across genders. All regressions are weighted by the number of employees in the firm to account for firm size in the estimation.

Figure 7, Panel A, presents the estimated pass-through of firm productivity to wage premiums. On average, firm productivity pass-through to male wage premiums is 0.08 across countries, meaning that a 1% increase in labor productivity is associated with a 0.08% increase in wage premiums. Table 4 provides the detailed estimates and the number of observations for each regression. It is important to note that the sample in Sweden (and, to some extent, Finland) consists primarily of large firms, which may influence the estimates.

However, this average masks substantial heterogeneity across countries. Productivity pass-through is highest in Hungary, where it reaches 0.18, and lowest in Sweden, where it is just 0.01. This finding aligns with Hungary having the highest firm variance component in wages and Sweden having the lowest. The figure also reports estimates using female firm effects as the main predictor. On average, productivity pass-through to female wage premiums is slightly lower, at less than 0.1, but again exhibits considerable variation across countries.

Panel B of Figure 7 reports the ratio of male-to-female firm wage premium pass-through, estimated using an instrumental variables approach. Specifically, we instru-

ment firm wage premiums for male wages using firm wage premiums for female wages as the endogenous explanatory variable, with firm productivity serving as the instrument. The average ratio across countries is 0.89, indicating that women receive, on average, 89% of the rent-sharing benefits that men do.

The countries with the lowest ratios—Finland, Italy, and Hungary—have values at or below 0.85. Sweden, Portugal, and Denmark fall within the 0.85–0.90 range, while France, Norway, and the Netherlands exhibit ratios above 0.90. Notably, in the Netherlands, we cannot reject the null hypothesis of equal rent-sharing between men and women.

The results remain consistent when controlling for industry fixed effects (Table 4), suggesting that the relationship between productivity and wages is primarily driven by differences between firms within industries.[29]

Figure A.13 links the CCK pay-setting component from Figure 3 to the productivity pass-through estimates from Figure 7. To enhance readability, we express the pay-setting component as a share of the gender hourly wage gap, meaning that the y-axis represents the percentage of the gender wage gap attributable to pay-setting. The x-axis reflects the gender difference in productivity pass-through to wage premiums, measured in percentage points (i.e., the difference between the blue and pink estimates in Figure 7, Panel A).

The relationship is positive, even when using detailed industry fixed effects in the productivity pass-through estimation. Thus, as shown in Figure 3, Panel B, the pay-setting component serves as a meaningful predictor of the overall gender wage premium gap across countries.

Overall, our findings indicate that differential rent-sharing between men and women is a significant determinant of the gender wage gap.

[29] For example, the estimate for Portugal is 0.077, closely aligning with CCK's estimate of 0.072.

6.2. Compensating Differentials for Hours?

A growing body of literature (e.g., Goldin (2015)) suggests that part of the gender wage gap arises due to compensating differentials for long work hours. As discussed in Card et al. (2016), if some firms offer compensation packages that combine high wages with long hours—packages that are less attractive to female than male workers—then at least part of the sorting component in firm wage premiums can be attributed to compensating differentials.

To quantify the relationship between average hours worked and firm wage premiums, we estimate the elasticity of mean hours to firm wage premiums following the approach in CCK, reporting both OLS and IV estimates for each country. The IV approach addresses potential division bias, as wages in most countries are calculated by dividing total annual earnings by annual hours worked. The results, presented in Table 6, indicate a positive relationship between hours and wage premiums in all countries except Germany.

Among countries with a positive relationship, the estimated coefficients for women are below 0.10 in Denmark, Finland, France, Italy, and Sweden, whereas in the Netherlands, Norway, Portugal, and the U.S., the elasticity exceeds 0.10. Notably, the estimated effect is substantially larger for male workers and can be up to twice as large in some countries (e.g., the U.S., Portugal, Norway, Finland, and Denmark). This suggests that firms with longer average work hours tend to offer higher wage premiums to men than to women. This pattern implies that high-hour firms follow different compensation structures by gender.

When we include industry fixed effects (NACE Rev. 2 at the first level of aggregation),[30] the estimated coefficients are slightly attenuated in most countries (see Ap-

[30] NACE Rev. 2 at the first level of aggregation includes the following industries: Agriculture; Mining; Manufacturing; Electricity and Gas; Water Supply; Construction; Wholesale and Retail Trade; Transportation and Storage; Accommodation and Food Services; Information and Communication; Financial and Insurance Activities; Real Estate; and Professional, Scientific, and Technical Activities.

pendix Table A.2).[31]

Figure 8 further explores the connection between hours worked and firm wage premiums. To do so, we focus on part-time workers. They are defined as those working fewer than 30 hours per week. The left panel shows that in countries where more women participate in the labor force, a higher proportion of workers are employed part-time. The right panel demonstrates that firms with a higher share of part-time workers tend to offer lower wage premiums, consistent with the IV estimate presented in Table 6.[32]

Overall our analysis suggests that firms offering high wage premiums are typically those that require long working hours on average or are less likely to provide opportunities for part-time employment.

6.3. Explaining Sorting: Gender Allocation or Wage Premiums Dispersion?

Our main results show substantial cross-country heterogeneity in the sorting component of the gender wage gap, ranging from six log points in Germany to close to zero in Denmark. These differences could arise through two channels: (i) differential allocation of men and women across the firm wage premium distribution, and (ii) dispersion in firm wage premiums.

Figure 9 illustrates visually these two channels. Panel A plots the difference between the fraction of males and females in employment in each quintile of firm wage premiums.[33] A negative relationship exists between the fraction of females relative to males and the firm wage premiums. Quantitatively, the relationship is strong in some countries. For instance, in Germany, there are about five percentage points more women

[31] Figure A.14 present a visualization of the link between firmw age premiums and firm-level hours worked. The figure split firm-level observations into terciles based on mean log hours worked and compute the difference in firm wage premiums and log mean hours between the top and bottom terciles for both variables.

[32] Figures **??** and **??** provide country-specific estimates.

[33] That is for each quintile i, we measure = $(\frac{F_i}{F} - \frac{M_i}{M}) * 100$, where M and F are the total number of females and males in our sample.

than men in the bottom quintile, whereas there are about eight percentage points less women than men in high-paying firms. Norway and Portugal also have fewer women represented in high-wage than in low-wage firms. In other countries, like Denmark, the relationship is non-existent. Having male and female working in different firm wage premiums is necessary to generate high sorting. Another relevant component is the dispersion of firm wage premiums across the "low" and "high" wage firms. To illustrate this point, Panel B shows the average firm wage premium by quintile in each country. The mean difference between the bottom and top quintiles is very large in Germany and Hungary. The average firm effect is -0.4 in the bottom quintile, whereas it is 0.4 in the top quintile. Making the difference between the bottom and top quintile, there is an 80-point log difference between high and low-paying firms. Compared to Finland, where the gender allocation is also high, the wage premium is smaller (about 20 log points).

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

$$\underbrace{\sum_{p=1}^{100} S_{p,c} \cdot \Psi^F_{p,c} - \sum_{p=1}^{100} S_{p,\mathrm{b}} \cdot \Psi^F_{p,\mathrm{b}}}_{\text{Total Difference}} = \underbrace{\sum_{p=1}^{100} (S_{p,c} - S_{p,\mathrm{b}}) \cdot \Psi^F_{p,\mathrm{b}}}_{\text{Allocation}} + \underbrace{\sum_{p=1}^{100} (\Psi^F_{p,c} - \Psi^F_{p,\mathrm{b}}) \cdot S_{p,c}}_{\text{Dispersion}} \tag{5}$$

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 10, Panel A reports the decomposition results for each country using as benchmark Denmark (the country with the lowest sorting component in our sample). We order from highest to lowest total sorting. For each country, we measure the importance of the gender allocation and firm wage premium dispersion channels. In all countries, the gender allocation channel is the dominant factor to explain the sorting differences across countries. To quantify the overall importance of each channel, we sum the absolute values of both components across all countries. While the allocation component explains the majority of cross-country differences (80% of total absolute variation), dispersion in firm wage premiums plays a substantial role, accounting for 20% of the variation. Panel B uses the average sorting across countries as a benchmark. In this decomposition, as expected because the gender allocation is more dispersed across firms on average compared to Denmark, the firm wage premium dispersion matters more (39 percent instead of 20 percent).

The results suggest that both channels - differential access (or willingness to work to due to different non-wage job attributes documented above) to high-paying firms and variation in firm wage premiums dispersion - contribute meaningfully to differences in the sorting component across countries.

6.4. Country-industry level estimates

So far, we've documented several key patterns in how firms contribute to gender wage gaps across countries. In this section, we aim to substantiate these findings by exploiting variation across the country-industry dataset we build by extracting the mean information at this level from the different administrative datasets.

Figure 11 illustrates the strong relationship between gender wage gaps and gender

wage premium gaps. The figure is a binscatter, where each point represents an industry-country observation, weighted by the industry-specific employment share.[34] The left panel shows this relationship within countries, while the right panel presents the same relationship after accounting for country and industry fixed effects. The within R^2 is high in both regressions, from 0.39 to 0.45.

Second, we investigate how industry characteristics relate to the components of the gender wage premium gap. We focus on two key features that emerged as important in our previous analyses: the average wage premium, which captures the availability of rents to be shared, and the hours gap between men and women, which relates to our findings about compensating differentials for low hours. Additional controls not displayed in the table are mean log productivity and separation rate at the industry level.[35]

We analyze the gender wage premium gap by regressing it on two key factors: the average wage premium (the mean of gender-specific firm wage effects) and the hours gap (the difference in log hours worked between men and women). Additionally, we control for several factors not displayed in the table, including the share of males working full-time, the share of females, and the separation rate.

Table 7 presents the results. Column (1) includes country fixed effects, column (2) adds both country and industry fixed effects, and column (3) selects covariates using a linear LASSO model, with cross-validation determining the LASSO penalty value. Column (1) suggests that industries with higher average wage premiums also exhibit larger gender wage premium gaps. Specifically, a 1 log point increase in the average premium corresponds to a 15 percent increase in the gender wage premium gap. The hours gap between men and women also plays a significant role, even after accounting for the average wage premium. A 1 log point increase in the hours gap corresponds to a

[34] We omit country-industry with representing less than 0.5% of employment.

[35] Because productivity is unavailable in Germany and the USA, the sample reduces from 486 to 391 observations.

7 percent increase in the gender wage premium gap. This effect remains stable even when we introduce 10 industry dummies.

Table 8 presents the same regression applied to the sorting component. The results indicate that the hours gap is a more significant determinant of sorting, while the wage premium loses statistical significance after controlling for broad industry heterogeneity. Conversely, in the pay-setting component (Table 9, the opposite is true: the mean wage premium is quantitatively more relevant than the hours gap.[36]

7. 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 11 developed economies, we document substantial cross-country variation in the extent to which firm wage policies drive gender disparities in pay. Our findings reveal that firm-specific wage premiums systematically correlate with the overall gender wage gap and that both the sorting and pay-setting components play critical roles in shaping these disparities.

Our analysis highlights key differences in the magnitude and composition of firm-driven gender wage gaps across countries. While in some economies, such as Denmark and France, firm-specific wage premiums account for a relatively small share of the gender wage gap, in others—such as Germany, Hungary, and the United States—firm effects explain a much larger portion. The decomposition of firm wage premiums into sorting and pay-setting components further underscores the importance of institutional wage-setting mechanisms: pay-setting disparities tend to be larger in countries with less centralized wage-setting institutions, whereas sorting effects are more pronounced

[36]Table A.3, A.4 and A.5 add as predictors the pay overtime hours and special payments for shift work. This variable is constructed from worker-level Structure of Earnings Survey dataset that we aggregate at the country-industry level. Consistent with evidence from the literature, non-regular hours predict the gender wage premium gap and its components.

in countries with greater firm-level wage dispersion.

Beyond cross-country differences, our study uncovers important common patterns. Across all countries, firm wage premiums become increasingly relevant as workers age, contributing to the widening of the gender wage gap over the life cycle. Additionally, when extending the analysis to include public sector and nonprofit jobs, we find that gender sorting into lower-wage firms becomes even more pronounced. Our results also show that women systematically receive a smaller share of firm-generated rents than men, reinforcing gender pay disparities even within the same firms.

Furthermore, our investigation into non-wage job characteristics suggests that compensating differentials play a role in gender wage gaps. Firms that require longer working hours tend to offer higher wage premiums, a pattern that disproportionately benefits male workers. This suggests that gender differences in firm wage premiums may partly reflect differential preferences and constraints regarding long-hour work, further reinforcing gender disparities in wage.

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.

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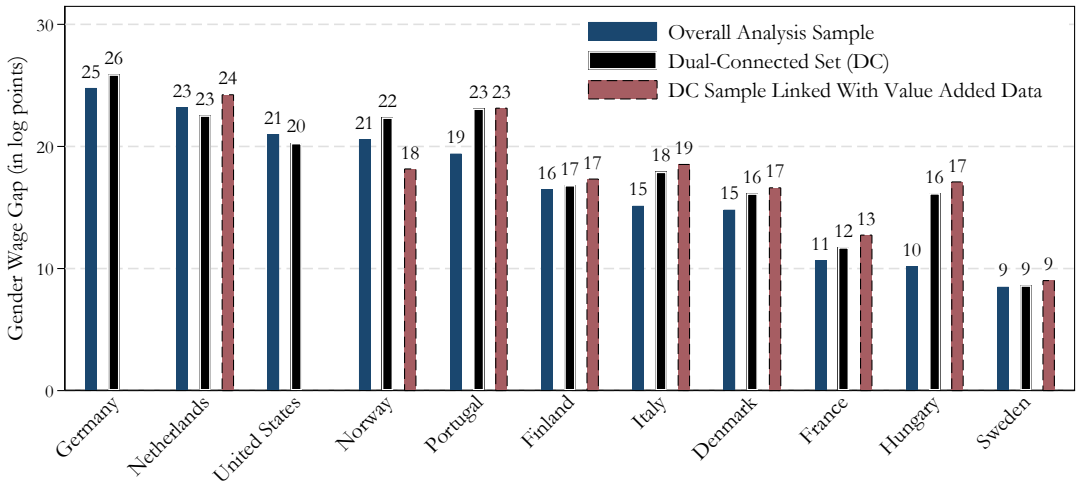
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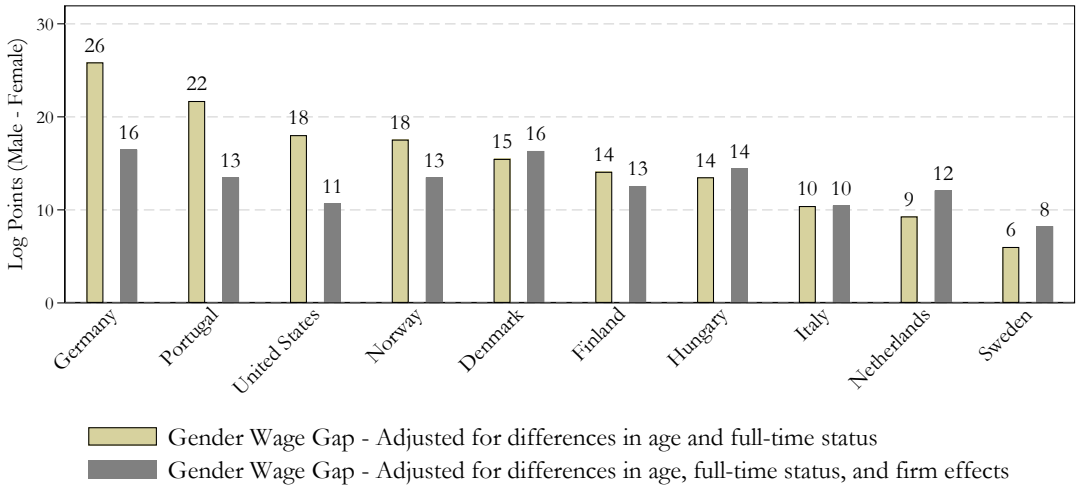
Figures

FIGURE 1. The Gender Wage Gap Across Countries

A. Unconditional Gender Wage Gap For Various Samples

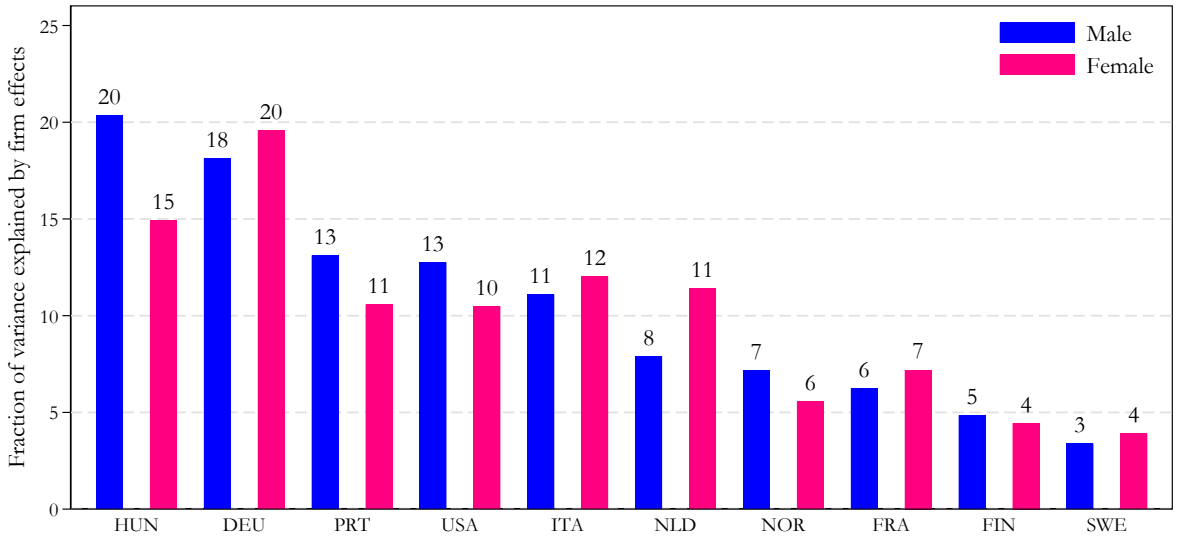


B. Conditional Gender Wage Gap



Notes: Panel A. 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. Panel B. The sample is the dual-connected set sample. The figure reports the OLS estimated coefficients of a male dummy. The outcome variable is the log hourly wage. The model controls for year effects, third-order polynomials in age, full-time status and for firm fixed effects (gray bar). The sample in Finland, the US, and Sweden are re-weighted based on worker characteristics. See text for details.

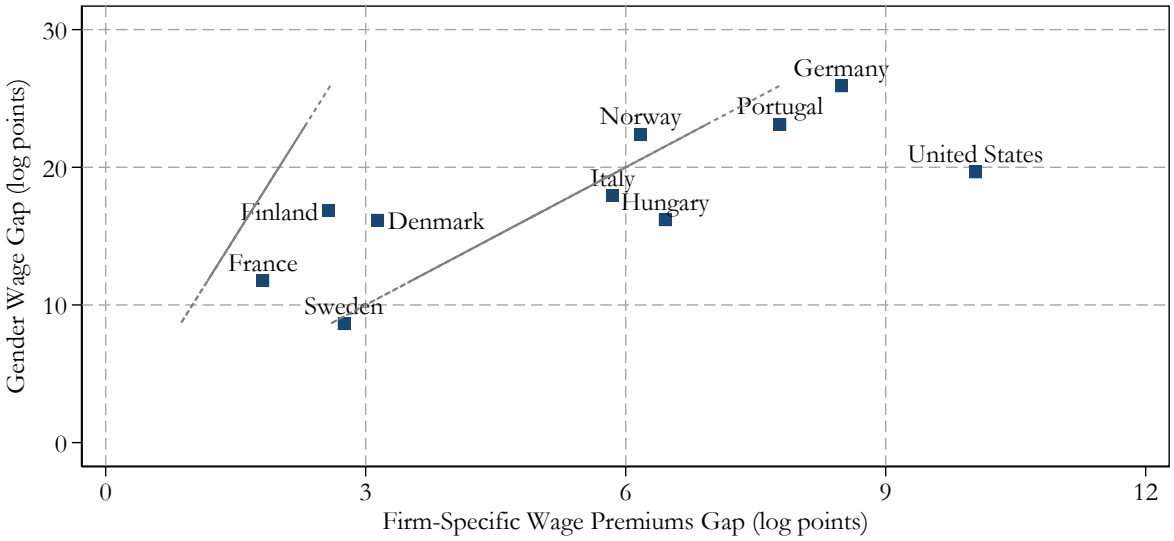
FIGURE 2. Firm Wage Premiums Contributions To Wage Inequality Across Countries



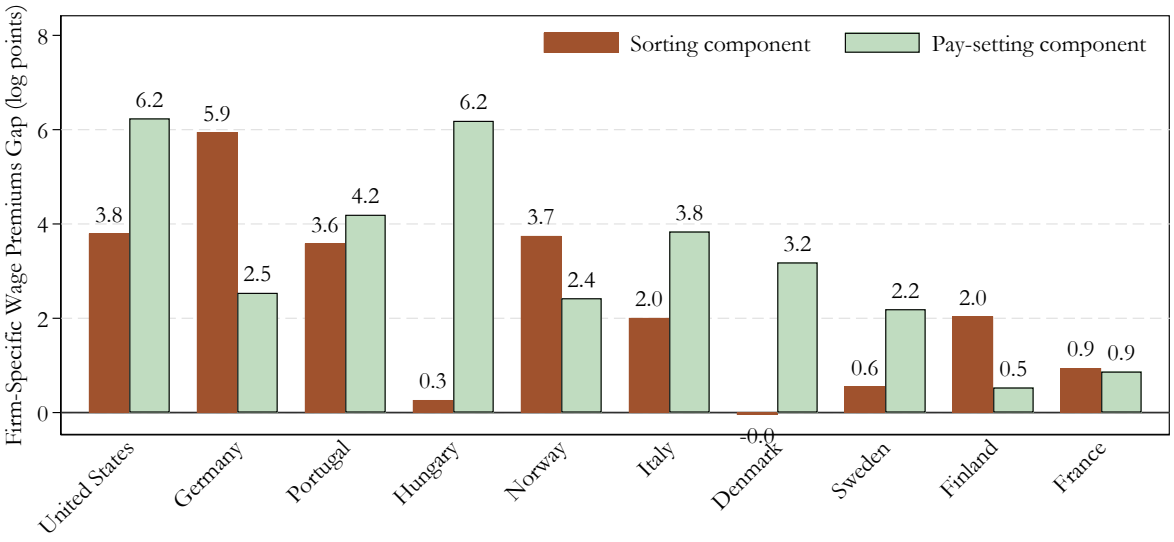
Notes: Figure shows the variance share due to firm wage premiums. We estimate firm wage premiums by estimating equation (1) separately by gender for each country. Variance components are biased-corrected using the Kline, Saggio and Sølvsten (2020) correction (except for France, where another method is used; see text for details). We compute a bias correction by leaving entire worker-firm matches out (i.e., spell level). The sample in Sweden and Finland oversample large firms. See text for details.

FIGURE 3. Gender Wage Premium Gap and the Gender Wage Gap Across Countries

A. Gender Wage and Firm Effects Gaps

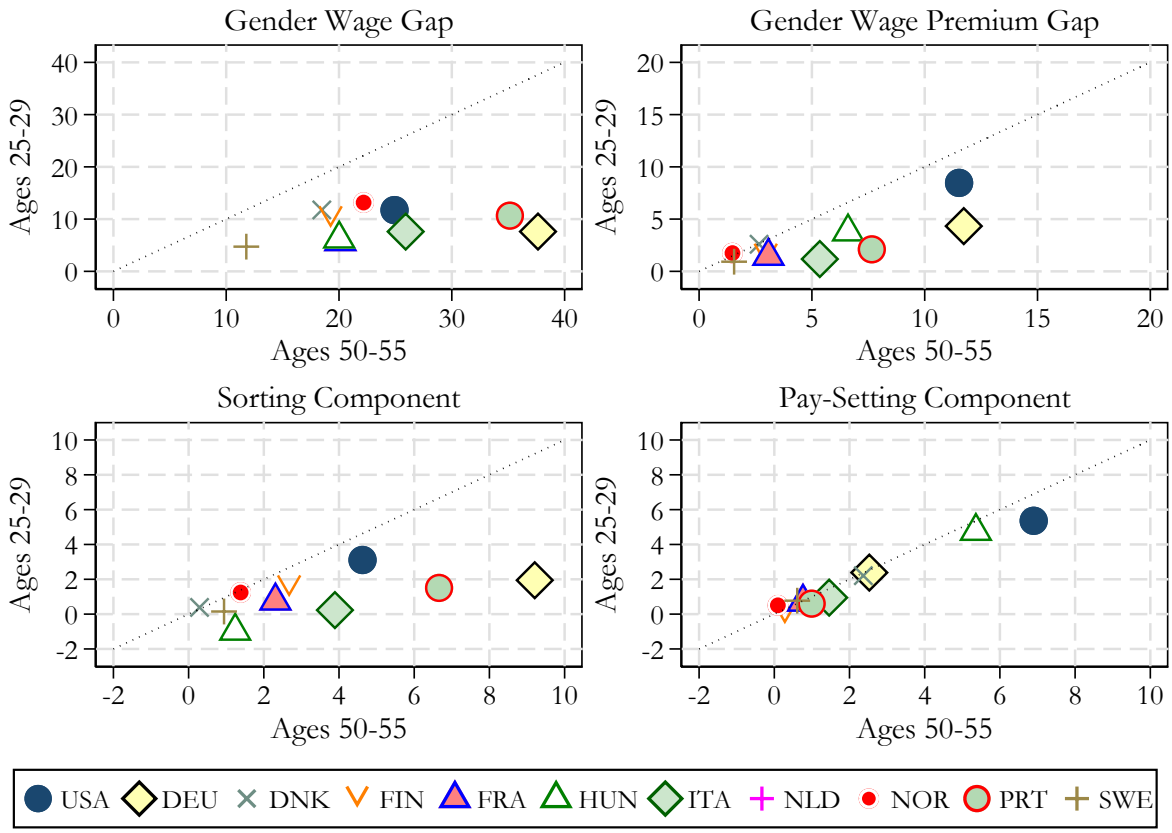


B. Decomposition of Firm Effects Gap into a Sorting and a Pay-setting Component



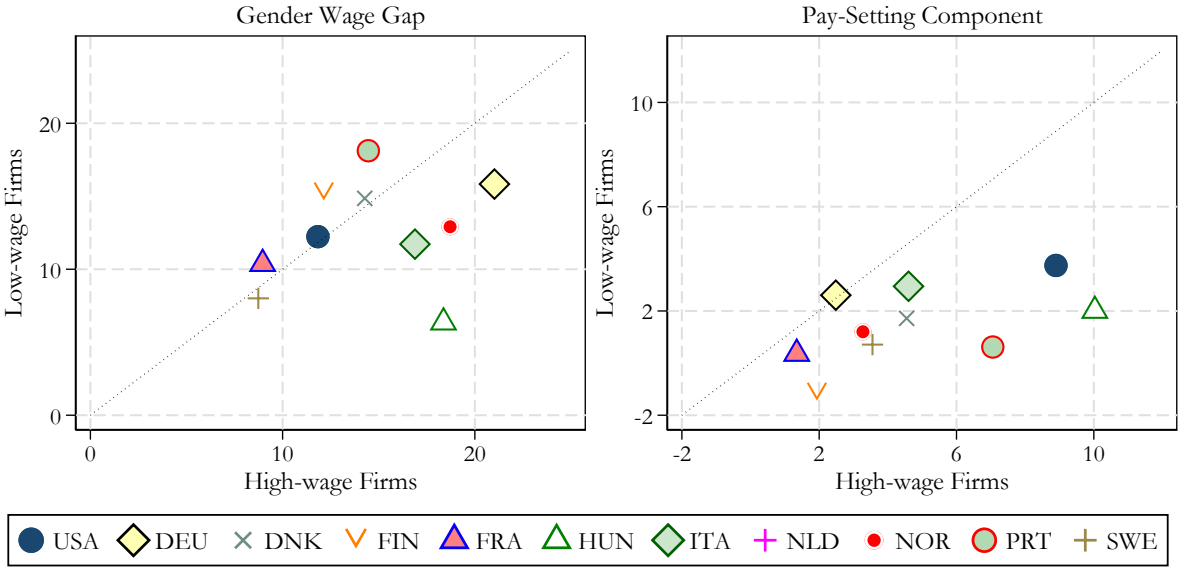
Notes: Panel A. The y-axis shows the unconditional gender hourly wage gap in the main sample, which consists of private sector workers aged 25-55. The x-axis displays the firm effects gap, calculated as the sum of sorting and pay-setting components. The diagonal lines represent scenarios where the firm effects gap accounts for 10%, 20%, and 30% of the total gender wage gap. Panel B. This panel decomposes the firm effects gap into its sorting and pay-setting components following Equation 3. Firm effects are normalized by setting the average wage premium to zero for low-surplus firms as shown in Figure 3. For European countries (except Portugal and Germany), low-surplus firms are identified using firm-level value-added per worker data. For Portugal, we use firm-level sales data instead. In the USA and Germany, where firm-level data is unavailable, we identify firms in the lowest-paying sector as low-surplus firms. The sample in Finland, the US, and Sweden are re-weighted based on worker characteristics.

FIGURE 4. Gender Wage Gap and Its Component Over the Life Cycle Across Countries



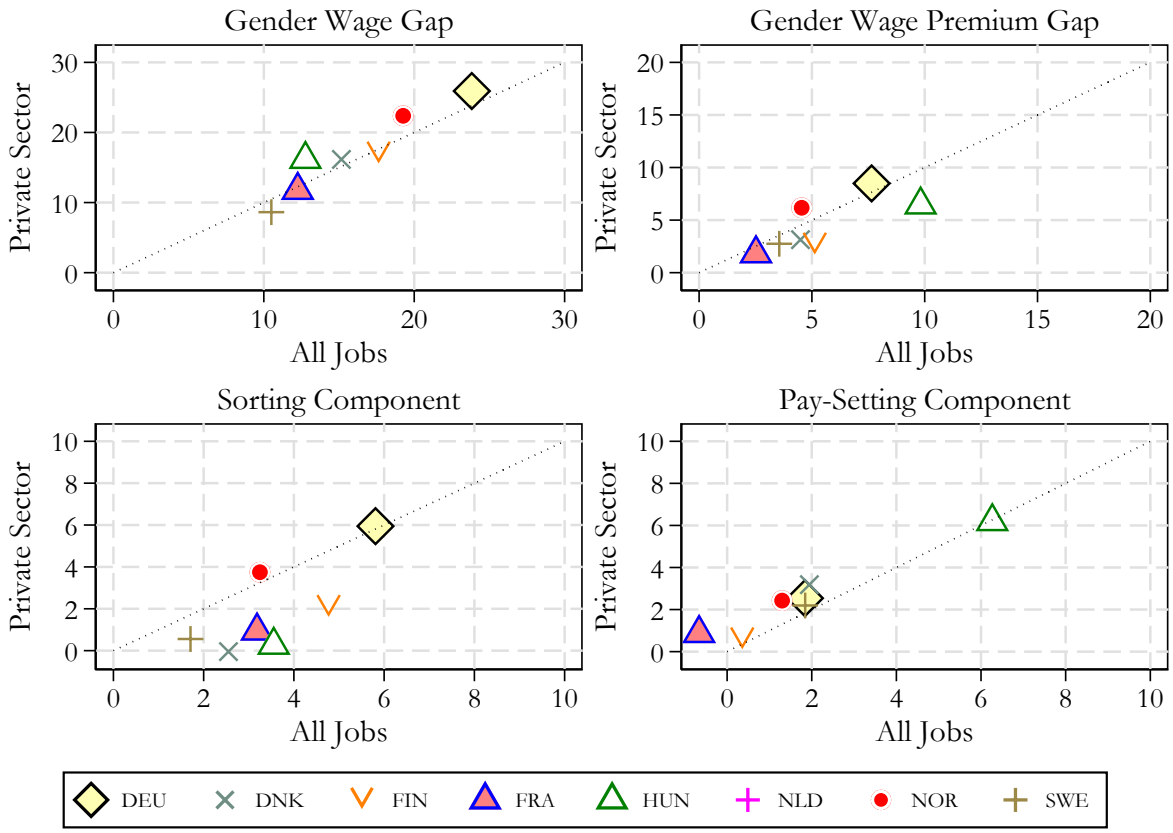
Notes: The figure on the top left plots the gender hourly wage gap for workers aged 25-29 versus 50-55. The figure on the top right plots the firm effect gap. The figure on the bottom left plots the sorting component of the firm effect gap. The figure on the bottom right plots the pay-setting component of the firm effect gap.

FIGURE 5. Gender Wage Gap and Its Components For Low and High Wage Premiums Firms Across Countries



Notes: The figure on the left plots the gender hourly wage gap for workers employed in firms in below the median of firm wage premiums (labeled as low-wage firms) distribution versus those employed above (labeled as high-wage firms). The top right figure plots the firm effect gap, the bottom left plots the sorting component, and the bottom right plots the pay-setting component.

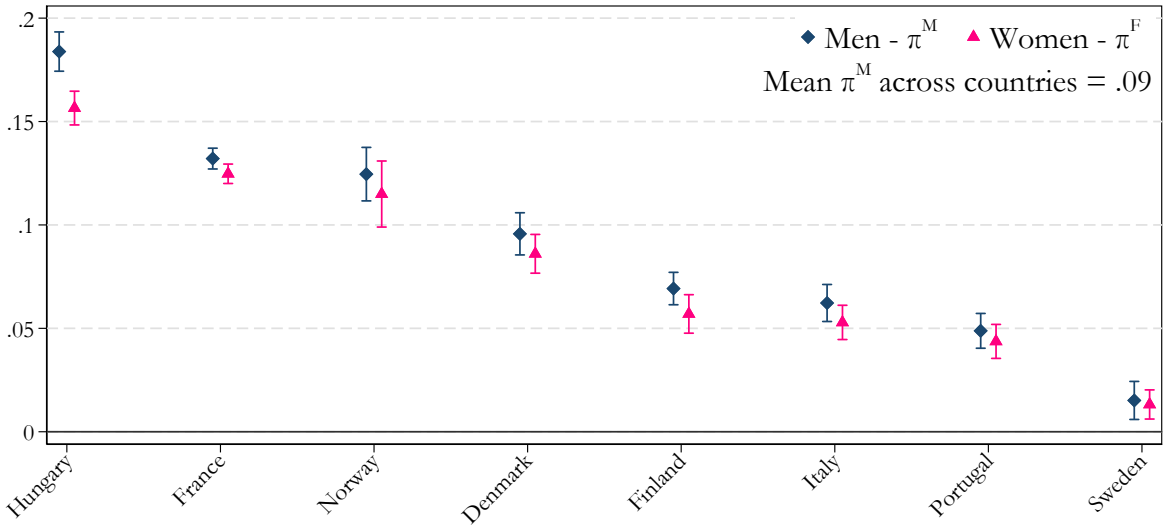
FIGURE 6. Gender Wage Gaps and Sorting in Private Sector Jobs versus All Jobs



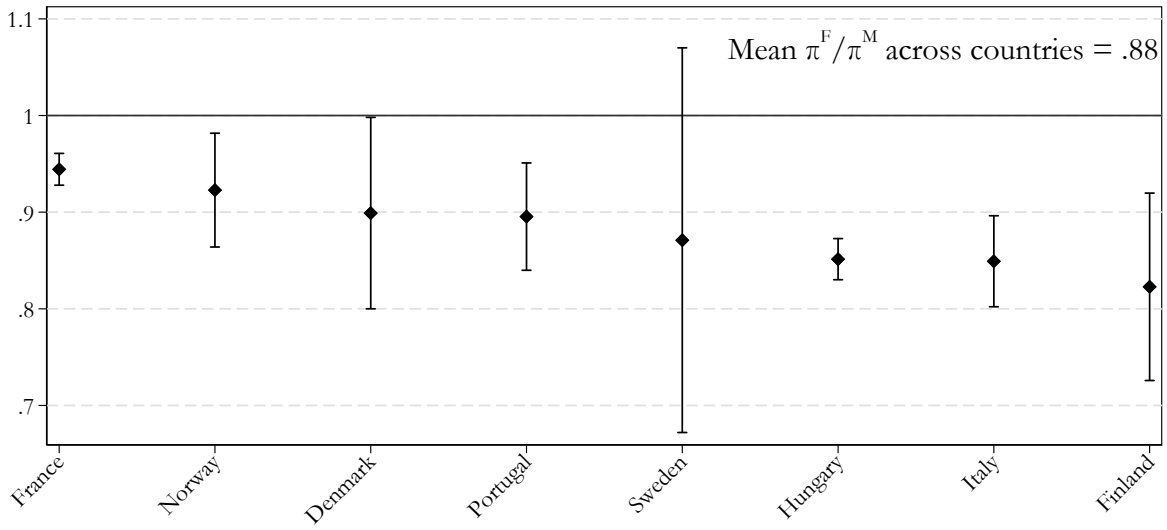
Notes: The figure on the left plots the gender hourly wage gap for private sector jobs (the baseline sample) and all jobs for workers. Private sector jobs excludes firms in the following industries: public administration, health, arts, other service activities, household employers, and extraterritorial organizations (NACE Rev.2 code O to U). In the USA, Italy and Portugal, only private-sector jobs are present in the data. The data covers around 60 percent of public sector jobs in Germany. See Appendix for details. The figure on the right plots the sorting component of the firm wage premiums gap.

FIGURE 7. Rent Sharing of Firm Wage Premium Across Countries

A. The Productivity Pass-Through to Wage Premiums

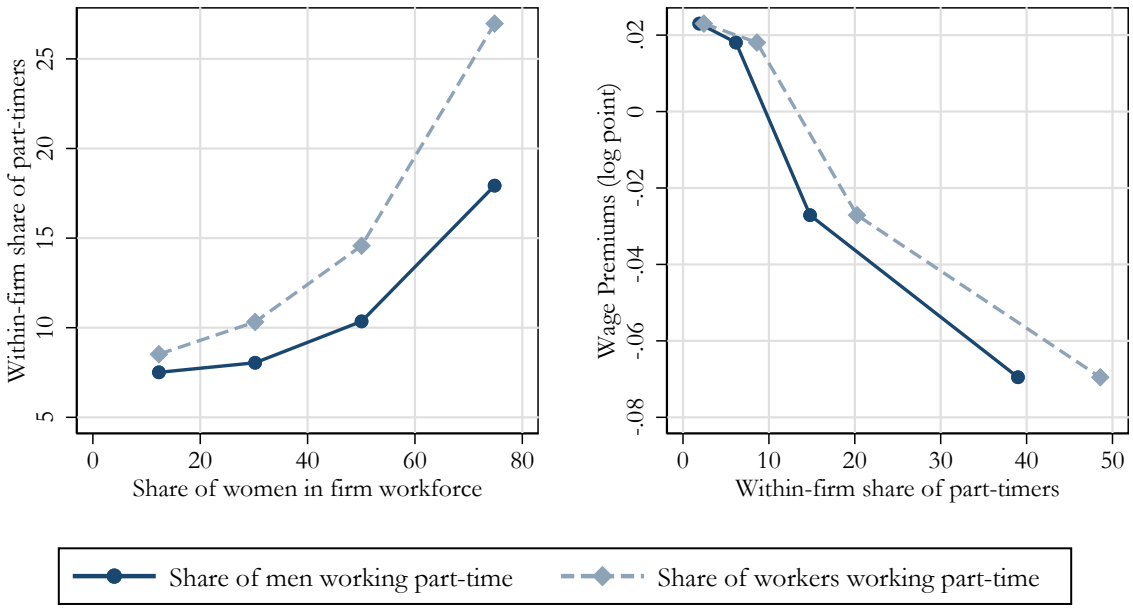


B. The Share of Male Rent-Sharing Captured by Women



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 B 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. See Table 4 for details.

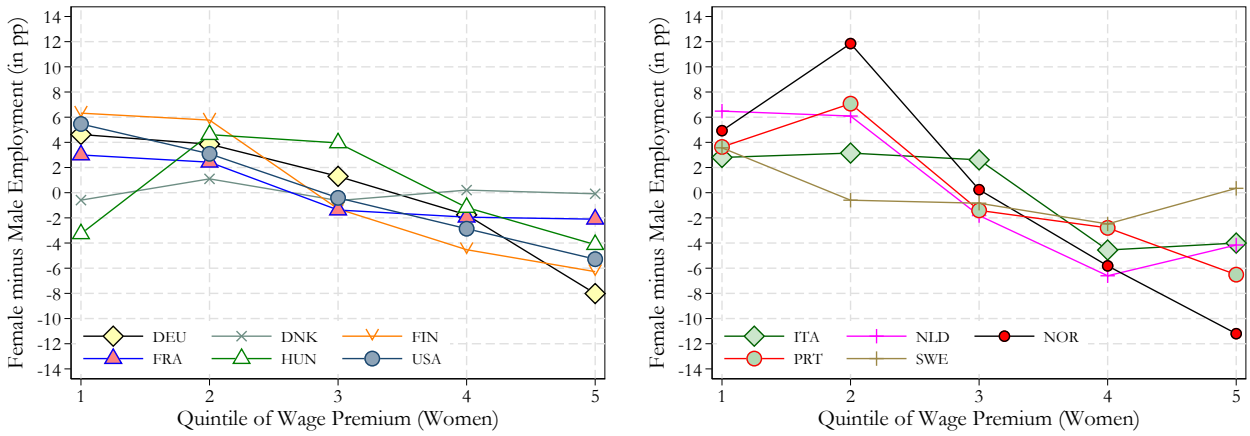
FIGURE 8. Part Time Jobs and Firm Wage Premiums



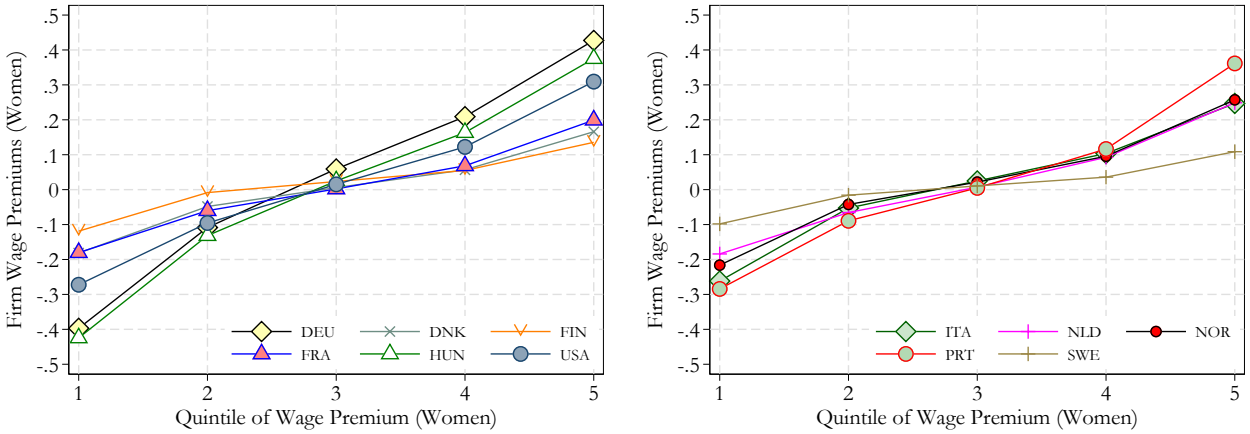
Notes: The left figure plots the relationship between the share of part-timers and the share of women in the firm workforce across countries. The right figure plots the relationship between the firm wage premiums and the firm's share of part-timers. See Appendix Figures **??** and **??** for the country-specific figures.

FIGURE 9. Gender Allocation and Firm Wage Premium Dispersion

A. Gender Allocation Across Deciles of Firm Wage Premium



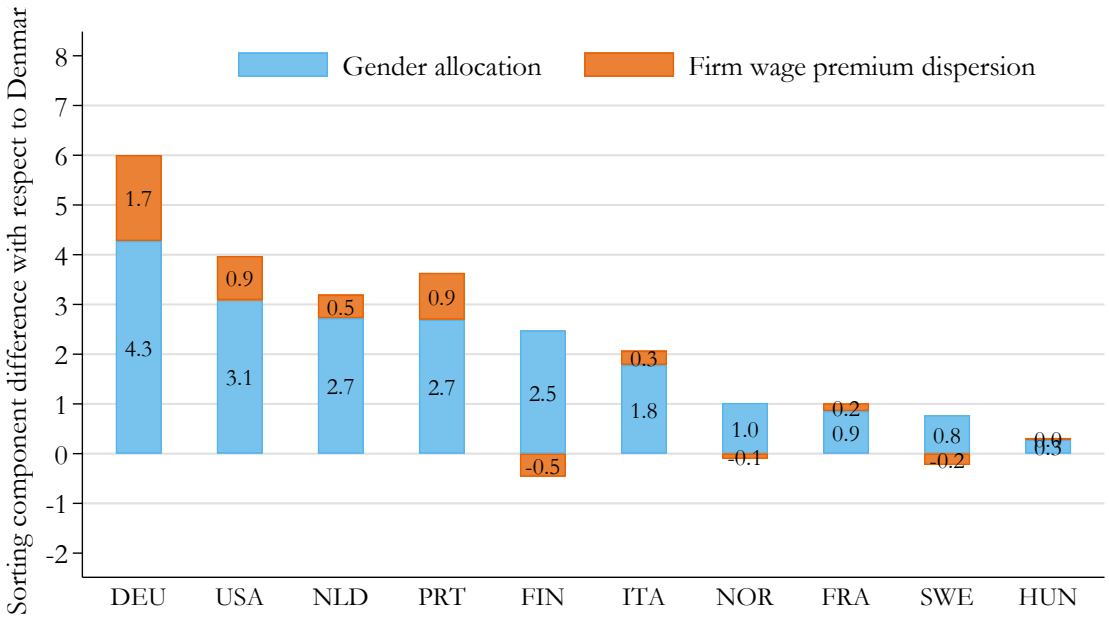
B. Firm Wage Wage Premium Dispersion



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.

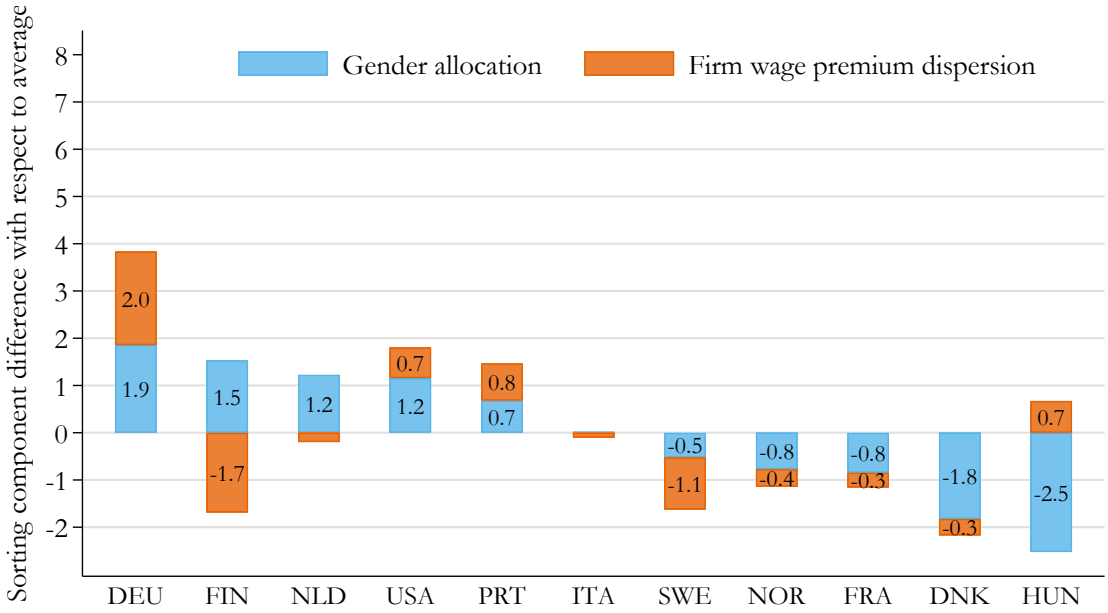
FIGURE 10. Decomposition of the Sorting Component of the Gender Wage Gap

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.

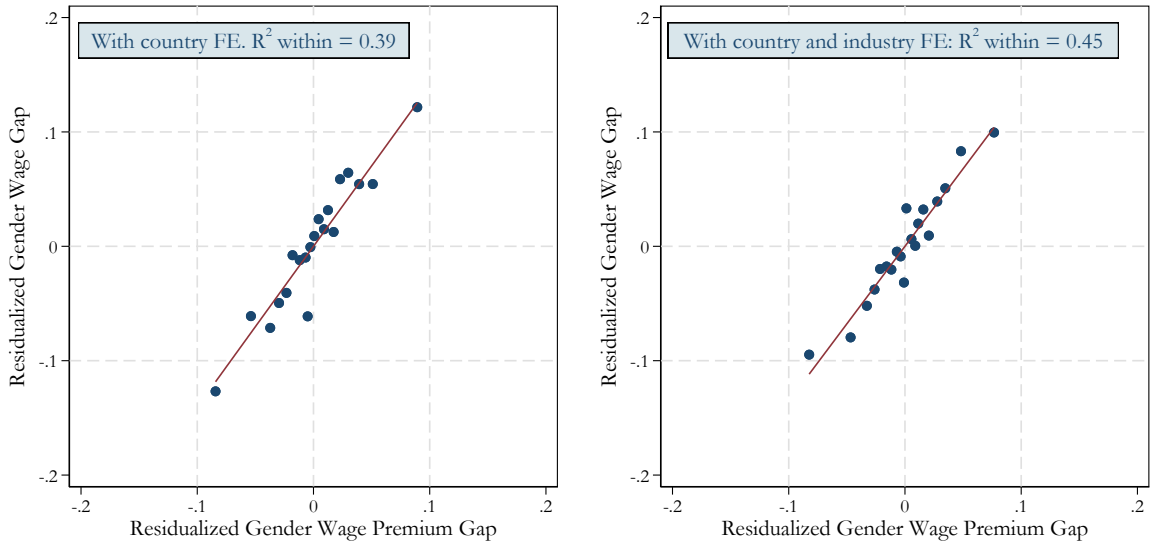
B. Using the average sorting component across countries as benchmark



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 5.

FIGURE 11. Correlation of Gender Wage Wage and Gender Wage Premium



Notes: Binscatter at the country-industry level. An industry is a NACE rev. 2 category. We plot the gender wage gap and the gender wage premium after residualization on country fixed effects (left panel) and country and industry fixed effects (right panel). Industry fixed effects are 10 dummies. We exclude country-industry observation representing less than 0.5% of total employment within country. Number of observations: 486 (the number of the industry varies from 40 to 47 across the 11 countries). Observations are weighted by the employment share of the industry.

Tables

TABLE 1. Review of Research Designs and Estimates

Paper	Country	Wage Type	Period	GWG	Firm Gap (GWG %)	Sorting (GWG %)	Pay Setting (GWG %)
Li et al. (2023)	Canada	Annual	2001–15	.268	.061 (22.8)	.029 (10.8)	.032 (11.9)
Sorkin (2017)	USA	Annual	2000–08	.335	—	.093 (27.7)	—
Card et al. (2016)	Portugal	Hourly	2002–09	.234	.049 (21.2)	.047 (19.9)	.003 (1.2)
Casarico and Lattanzio (2024)	Italy	Weekly	1995–15	.204	.069 (33.8)	.042 (20.5)	.027 (13.3)
Palladino et al. (2024)	France	Hourly	2014–19	.128	.020 (15.8)	.011 (8.7)	0.009 (7.1)
Bruns (2019)	W. Germany	Daily	2001–08	.247	.064 (25.9)	.063 (25.4)	.001 (0.3)
Gallen et al. (2019)	Denmark	Hourly	2000–09	.208	—	.033 (15.8)	—
Masso et al. (2022)	Estonia	Monthly	2006–17	.271	.109 (40.1)	.077 (28.5)	.031 (11.6)
Boza and Reizer (2024)	Hungary	Hourly	2003–16	.236	.098 (41.5)	.044 (18.6)	.054 (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 Firm Gap 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	2001–14	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	C	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	3.02 (0.53)	39.47	11.49	30.12	71	47	NA	3.74	643.51	52.65
	Female	2.80 (0.52)	39.68	17.43	31.28	76	28	NA	2.17	395.81	52.65
DEU	Male	3.05 (0.57)	40.81	7.09	19.96	45	26	NA	38.59	10438.95	426.21
	Female	2.79 (0.54)	40.66	31.81	22.95	45	14	NA	21.75	6336.22	426.21
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)	39.89	8.01	23.84	45	53	84.74	6.18	1104.09	57.98
	Female	3.02 (0.47)	40.10	25.92	26.15	51	32	59.50	4.71	938.99	57.98
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.

TABLE 4. The Productivity Pass-Through to Wage Premiums

Country	Number of Firms	Regressions of Firm Effects		Ratio:
		Male Firm Effects	Female Firm Effects	Column (3) / Column (2)
	(1)	(2)	(3)	(4)
HUN	50,944	0.184 (0.005)	0.157 (0.004)	0.851 (0.011)
NOR	52,158	0.123 (0.007)	0.112 (0.008)	0.914 (0.032)
DNK	47,800	0.096 (0.005)	0.086 (0.005)	0.899 (0.051)
FRA	506,994	0.078 (0.003)	0.073 (0.003)	0.935 (0.009)
FIN	8,470	0.069 (0.004)	0.057 (0.005)	0.823 (0.049)
ITA	227,847	0.062 (0.005)	0.053 (0.004)	0.849 (0.024)
NLD	114,437	0.057 (0.003)	0.057 (0.003)	0.988 (0.020)
PRT	92,381	0.049 (0.004)	0.044 (0.004)	0.895 (0.028)
SWE	6,016	0.015 (0.005)	0.013 (0.004)	0.871 (0.102)

Notes: Columns 2-3 report coefficients of gender-specific firm effects by country. All specifications include a constant, and are estimated at the firm level. Ratios in column 4 are estimated by instrumental variables, treating the firm effect in female wages as the dependent variable, the firm effect in male wages as the endogenous explanatory variable. Standard errors, clustered by firm, in parentheses.

TABLE 5. The Productivity Pass-Through to Wage Premiums: with controls for industry

Country	Number of Firms	Regressions of Firm Effects		Ratio:
		Male Firm Effects	Female Firm Effects	Column (3) / Column (2)
	(1)	(2)	(3)	(4)
HUN	50,943	0.167 (0.006)	0.144 (0.005)	0.862 (0.013)
NOR	52,157	0.102 (0.005)	0.090 (0.005)	0.886 (0.032)
DNK	47,800	0.096 (0.004)	0.078 (0.004)	0.812 (0.028)
FRA	506,994	0.069 (0.002)	0.065 (0.002)	0.948 (0.009)
FIN	8,469	0.052 (0.004)	0.043 (0.004)	0.822 (0.065)
ITA	227,846	0.042 (0.004)	0.035 (0.004)	0.831 (0.030)
NLD	114,437	0.040 (0.003)	0.039 (0.003)	0.966 (0.022)
PRT	92,381	0.033 (0.002)	0.026 (0.002)	0.797 (0.037)
SWE	6,015	0.007 (0.002)	0.006 (0.002)	0.900 (0.223)

Notes: Columns 2-3 report coefficients of gender-specific firm effects by country. All specifications include a constant, and are estimated at the firm level. Ratios in column 4 are estimated by instrumental variables, treating the firm effect in female wages as the dependent variable, the firm effect in male wages as the endogenous explanatory variable. Standard errors, clustered by firm, in parentheses.

TABLE 6. Relationship Between Firm Effects and Mean Hours

	IV Male	IV Female	OLS Male	OLS Female
DEU	-0.32	-0.29	-0.14	-0.12
	(0.01)	(0.01)	(0.00)	(0.00)
DNK	0.13	0.03	0.03	0.01
	(0.00)	(0.00)	(0.00)	(0.00)
FIN	0.16	0.04	0.06	0.04
	(0.03)	(0.02)	(0.01)	(0.01)
FRA	0.07	0.04	0.02	0.02
	(0.00)	(0.00)	(0.00)	(0.00)
HUN	0.98	0.69	0.32	0.21
	(0.02)	(0.02)	(0.01)	(0.01)
ITA	0.09	0.06	0.05	0.03
	(0.00)	(0.00)	(0.00)	(0.00)
NLD	0.26	0.20	0.09	0.04
	(0.01)	(0.00)	(0.00)	(0.00)
NOR	0.24	0.12	0.03	0.01
	(0.01)	(0.01)	(0.00)	(0.00)
PRT	0.31	0.15	0.06	0.01
	(0.02)	(0.01)	(0.00)	(0.00)
SWE	0.18	0.07	0.06	0.06
	(0.03)	(0.02)	(0.02)	(0.02)
USA	0.35	0.16	0.05	0.06
	(0.01)	(0.01)	(0.00)	(0.00)

Notes: Table reports IV and OLS estimates of the relationship between firm wage effects and mean hours worked without industry controls. For IV estimates, the log mean hours of workers at the same firm in the other gender group is used as an instrument. Standard errors, clustered by firm, in parentheses.

TABLE 7. Predictors of the Gender Wage Premium Gap

	(1)	(2)	(3)
Wage premium	15.16 (4.24)	13.18 (4.00)	12.99
Hours gap	7.18 (2.82)	7.37 (2.53)	6.78
Observations	391	391	391
Adjusted R^2	0.250	0.343	
FE	Country	Country + Industry	Country + Industry
Lasso	NO	NO	YES

Notes: OLS regressions at the country-industry level. An industry is a NACE rev. 2 category. Wage premium is the average firm wage premium for males and females. The hours gap gap is the difference between the log hours worked for males and females. We exclude industries representing less than 0.5% of employment. Additional controls not displayed: mean log productivity and separation rate at the industry level. Industry fixed effects are 10 dummies. Robust standard errors are in parentheses.

TABLE 8. Predictors of the Sorting Component

	(1)	(2)	(3)
Wage premium	4.55 (2.33)	3.56 (2.39)	1.92
Hours gap	4.45 (1.47)	6.30 (1.46)	3.75
Observations	391	391	391
Adjusted R^2	0.078	0.188	
FE	Country	Country + Industry	Country + Industry
Lasso	NO	NO	YES

Notes: OLS regressions at the country-industry level. An industry is a NACE rev. 2 category. Wage premium is the average firm wage premium for males and females. The hours gap gap is the difference between the log hours worked for males and females. We exclude industries representing less than 0.5% of employment. Additional controls not displayed: mean log productivity and separation rate at the industry level. Industry fixed effects are 10 dummies. Robust standard errors are in parentheses.

TABLE 9. Predictors of the Pay-Setting Component

	(1)	(2)	(3)
Wage premium	10.44 (2.80)	9.44 (2.74)	10.19
Hours gap	2.57 (1.99)	0.84 (1.70)	0.23
Observations	391	391	391
Adjusted R^2	0.385	0.431	
FE	Country	Country + Industry	Country + Industry
Lasso	NO	NO	YES

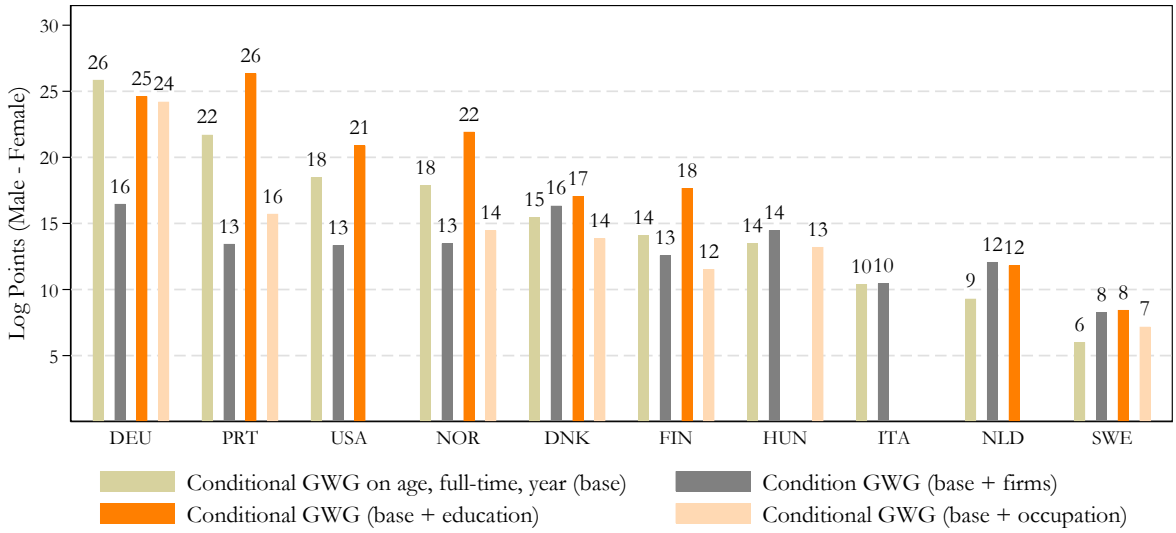
Notes: OLS regressions at the country-industry level. An industry is a NACE rev. 2 category. Wage premium is the average firm wage premium for males and females. The hours gap gap is the difference between the log hours worked for males and females. We exclude industries representing less than 0.5% of employment. Additional controls not displayed: mean log productivity and separation rate at the industry level. Industry fixed effects are 10 dummies. Robust standard errors are in parentheses.

Appendix

A. Additional Figures and Tables

A.1. Figures

FIGURE A.1. Conditional Gender Wage Gap

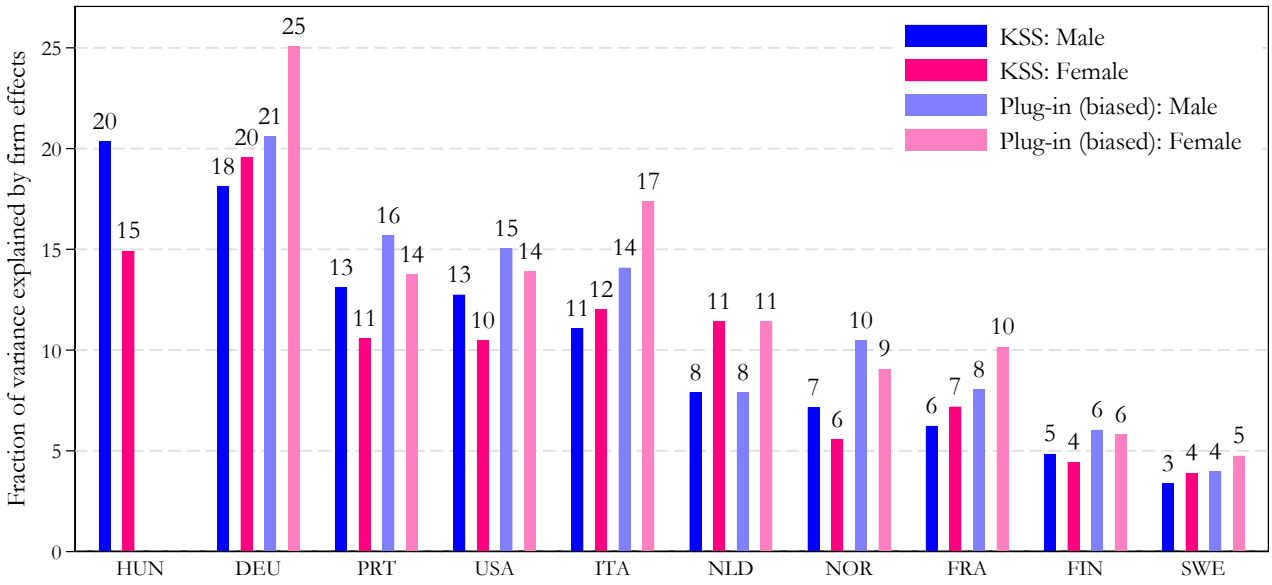


Notes: The figure reports the OLS estimated coefficients of a male dummy. The outcome variable is the log hourly wage. The model controls for year effects, third-order polynomials in age and full-time status, ("Base"); with firm fixed effects ("base + firm"), with four educational categories ("base + educ."); and three-digit occupation fixed effects ("base + occupation").

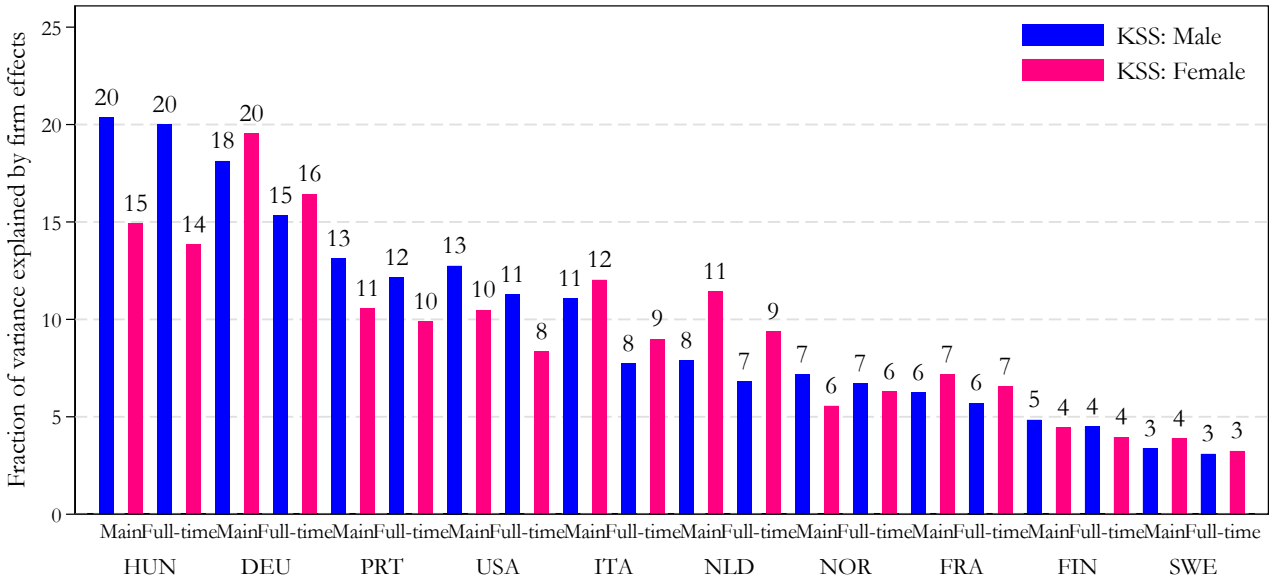
$\text{size}_{g}wg_{s}orting_{b}arg_{s}catter$

FIGURE A.2. Additional Results on Firm Wage Effect Variance Shares

A. Main Sample



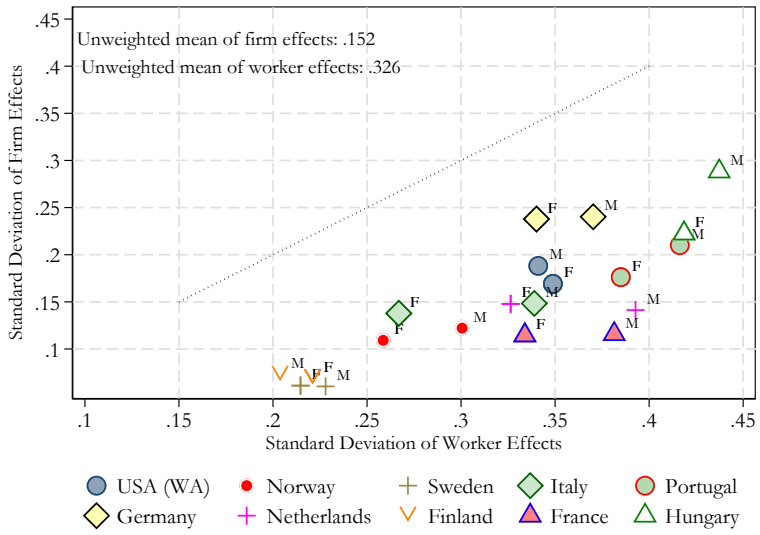
B. Sample With An Higher Threshold on Annual Earnings



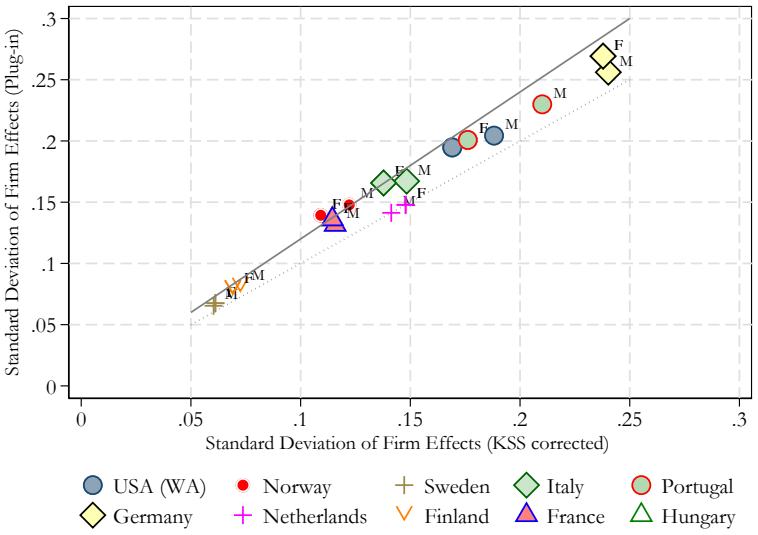
Notes: Figure shows the variance share due to firm wage premiums. We estimate firm wage premiums by estimating equation (1) separately for each country. Variance components are biased-corrected using the Kline, Saggio and Sølvsten (2020) correction. We compute a bias correction by leaving the entire 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 A.3. Standard Deviation of Worker and Firm Effects

A. Worker and Firm Wage Effects

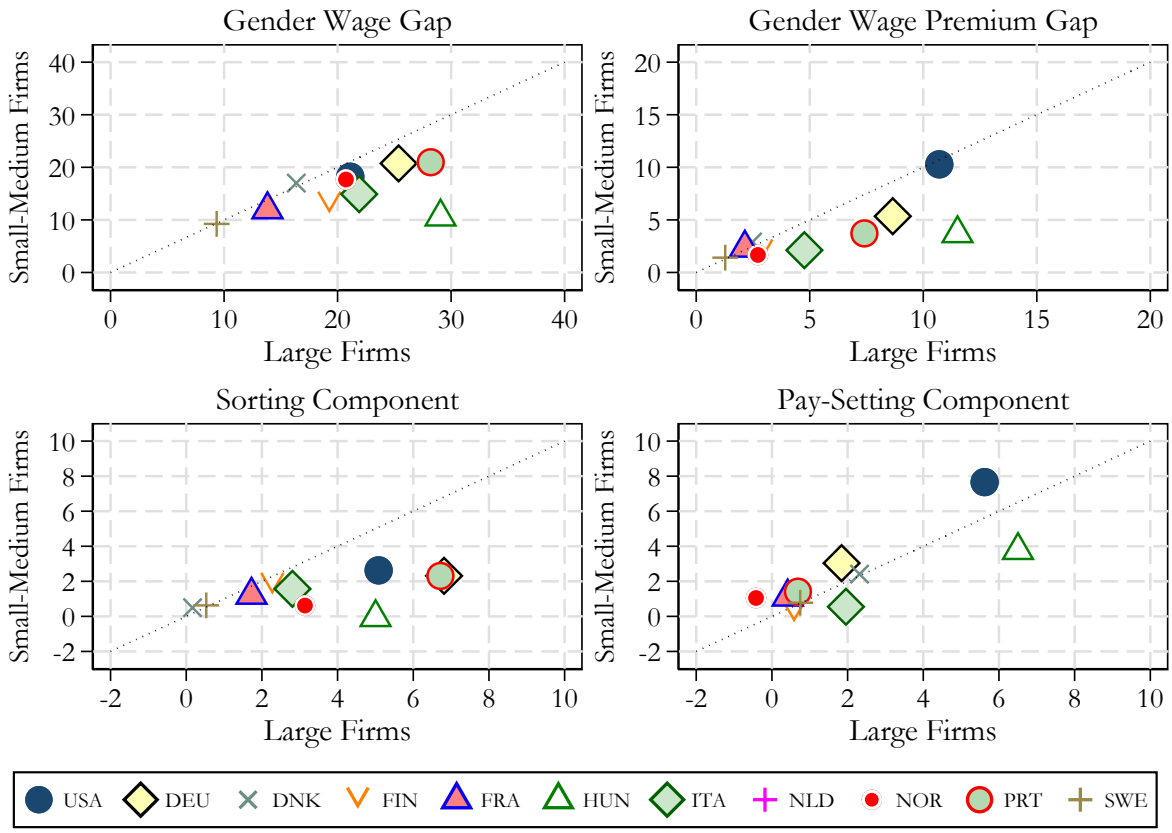


B. Firm Effects: Corrected vs Uncorrected



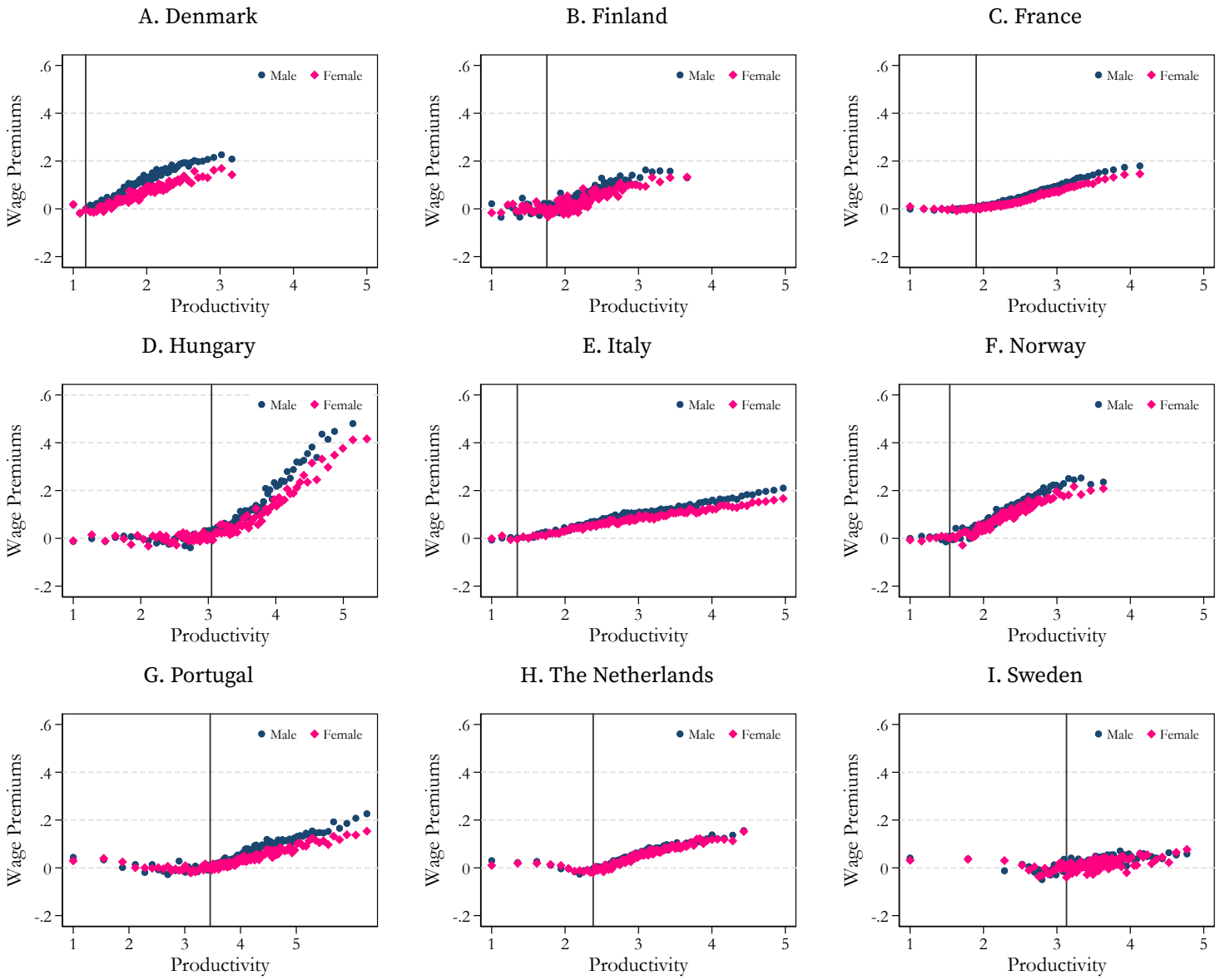
Notes: Panel A. Bias corrected standard deviations of person and firm effects using the Kline, Saggio and Sølvsten (2020) correction (except for France, where another method is used; see text for details). The dotted gray line gives what one should expect if worker and firm components are equally important 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.

FIGURE A.4. Gender Wage Gap and Its Components For Low and High Wage Premiums For Small and Large Firms



Notes: The figure plots the hourly gender wage gap, the sorting, and pay-setting components by firm size. The small and medium-sized firms group includes firms with at least 249 employees. The large firm group includes firms with at least 250 employees.

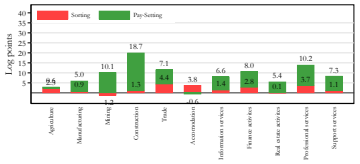
FIGURE A.5. Firm Wage Premiums versus Productivity Across Countries



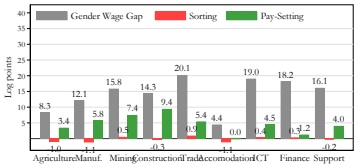
Notes: The figures represent the relationship between gender-specific firm wage premiums effects (arbitrary normalization) and firm-level productivity. Specifically, the points shown represent mean estimated firm wage premiums from the AKM models for men and women averaged across firms with 100 percentile 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 A.6. The Contribution of Firm Effect Gap Across Sectors

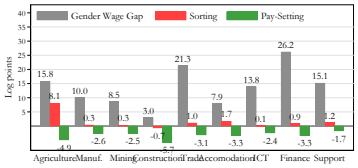
A. USA



B. Denmark



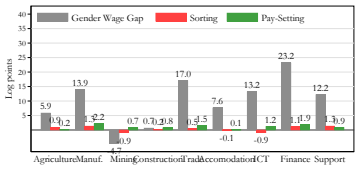
C. Finland

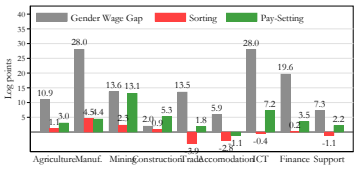


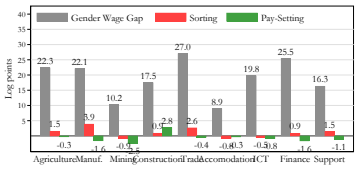
D. France

E. Hungary

F. Netherlands



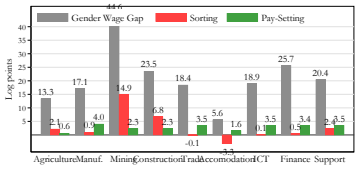


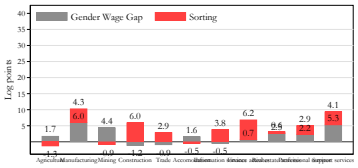


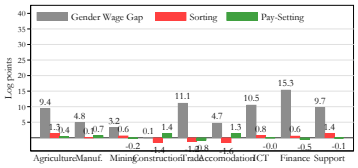
G. Norway

H. Portugal

I. Sweden

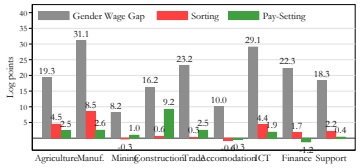


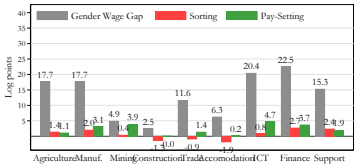




J. Germany

K. Italy

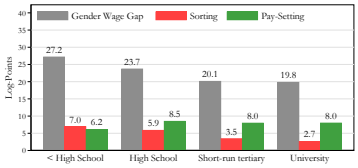




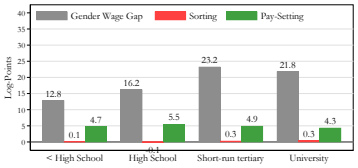
Notes: This figure shows the contribution of the firm effect gap (the sorting and the pay-setting components) by sector. The ICT sector stands for information services. The finance sector includes real estate activities. The support services sector includes professional services. Agriculture and extraction of raw materials sectors are not displayed.

FIGURE A.7. The Contribution of Firm Effect Gap Across Education Groups

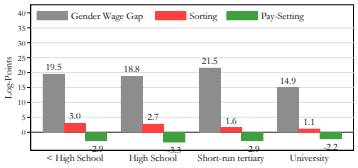
A. USA



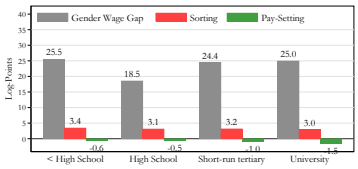
B. Denmark



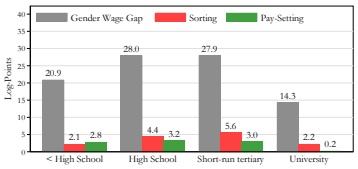
C. Finland



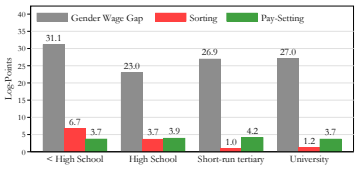
D. Netherlands



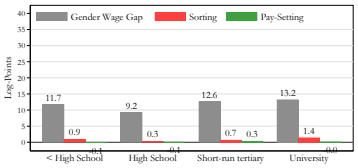
E. Norway



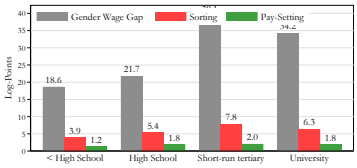
F. Portugal



G. Sweden

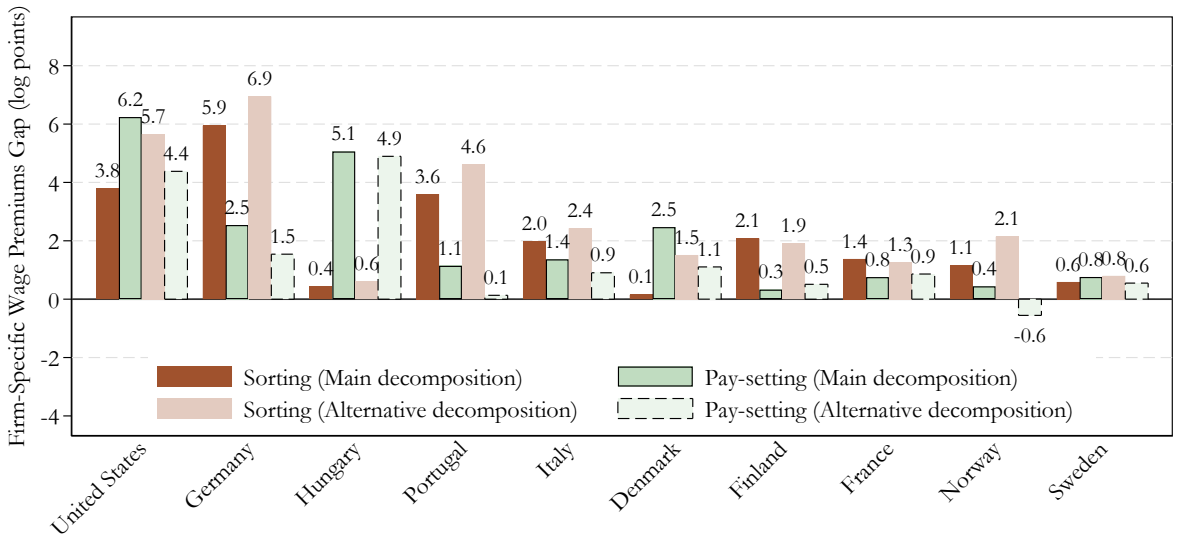


H. Germany



Notes: This figure shows the gender wage gap, the sorting and pay-setting components by educational attainment.

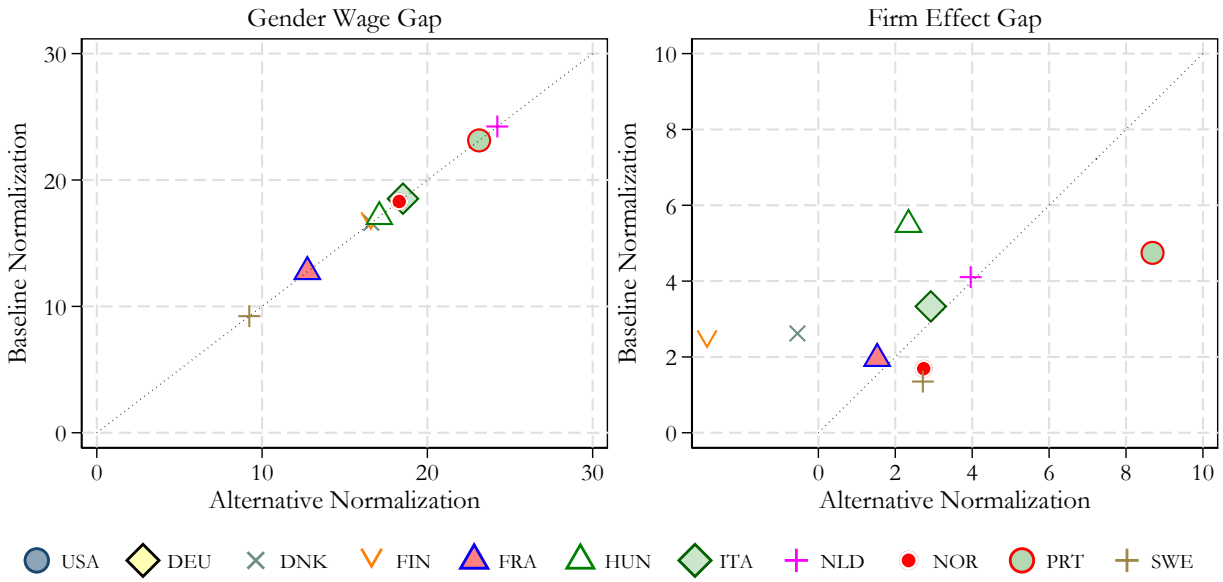
FIGURE A.8. Gender Wage Premiums Gap: Alternative Decomposition



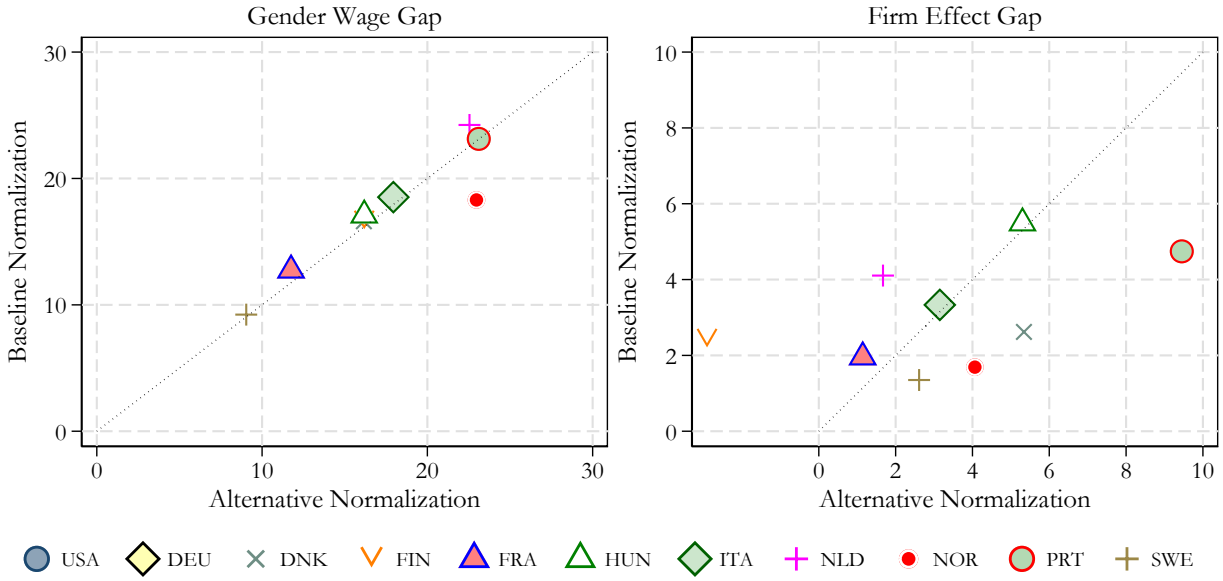
Notes: The figure reports the alternative decomposition of the sorting and pay-setting components. The pay- setting effect is calculated using the distribution of jobs held by women, and the sorting effect is calculated by comparing the average value of the male wage premiums across jobs held by men versus women.

FIGURE A.9. Gender Wage Premiums Gap: Normalization of Firm Effects

A. Industry Normalization For Firms With Non-Missing Productivity Data



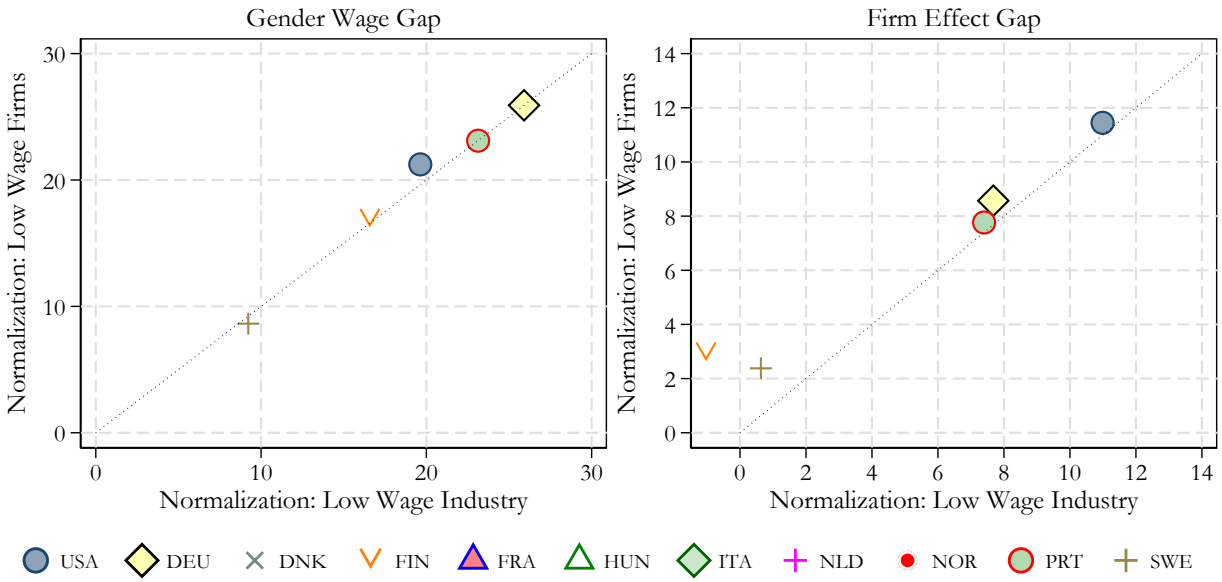
B. Industry Normalization For All Firms



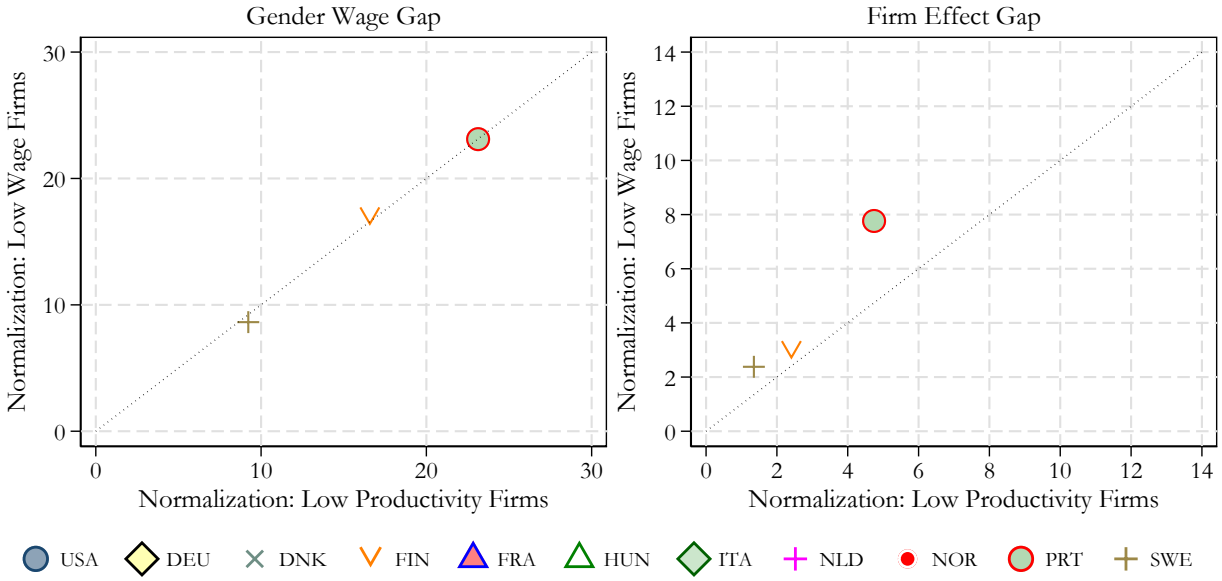
Notes: The figure shows the gender wage gap and firm effect gaps for the main normalization (firm effects of low-productivity firms is set to zero) against one alternative normalization (firm effects of the lowest paying industry is set to zero). Panel A includes firms with non-missing productivity data. Panel B includes all firms.

FIGURE A.10. Gender Wage Premiums Gap: Normalization of Firm Effects

A. Low Wage vs Low Industry Normalization



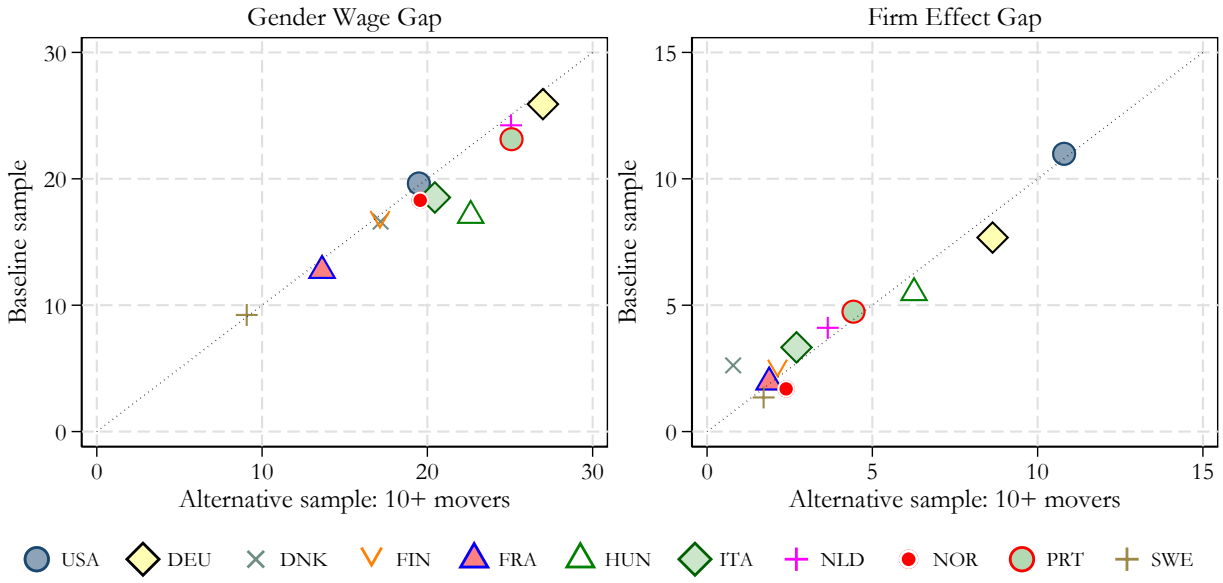
B. Low Wage vs Low Productivity Normalization



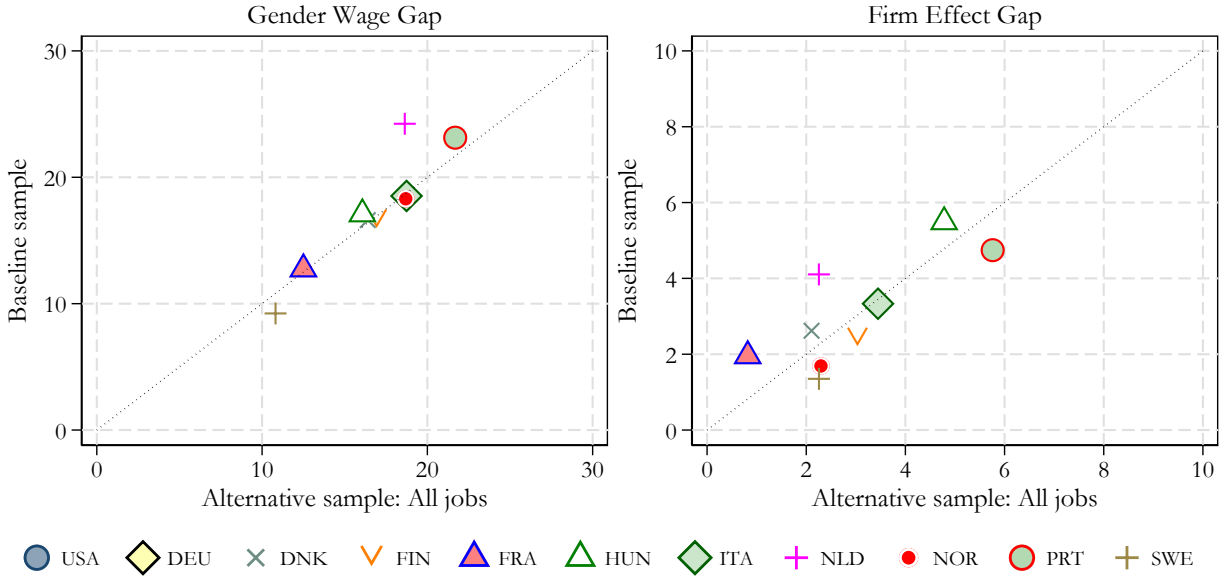
Notes: The figure shows the gender wage gap and firm effect gaps for different normalizations. Panel A compares the normalization using all firms in the first decile of the predicted firm-level mean hourly wage (labeled “Low Wage") vs low industry (NACE 2. Rev classification at one level of aggregation). Panel B compares “Low Wage" to Low Productivity firms (defined using the kink shown in Figure 3).

FIGURE A.11. Gender Wage Premiums Gap: Sample Cuts

A. At least 10 movers by gender

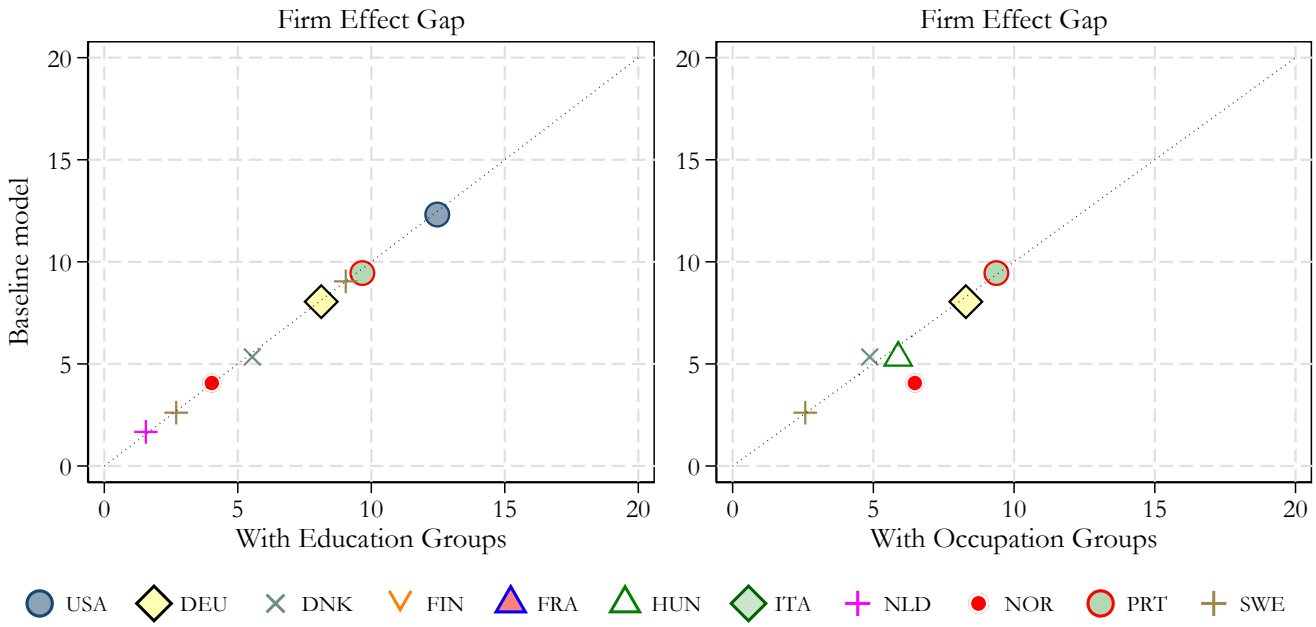


B. All jobs with value-added data



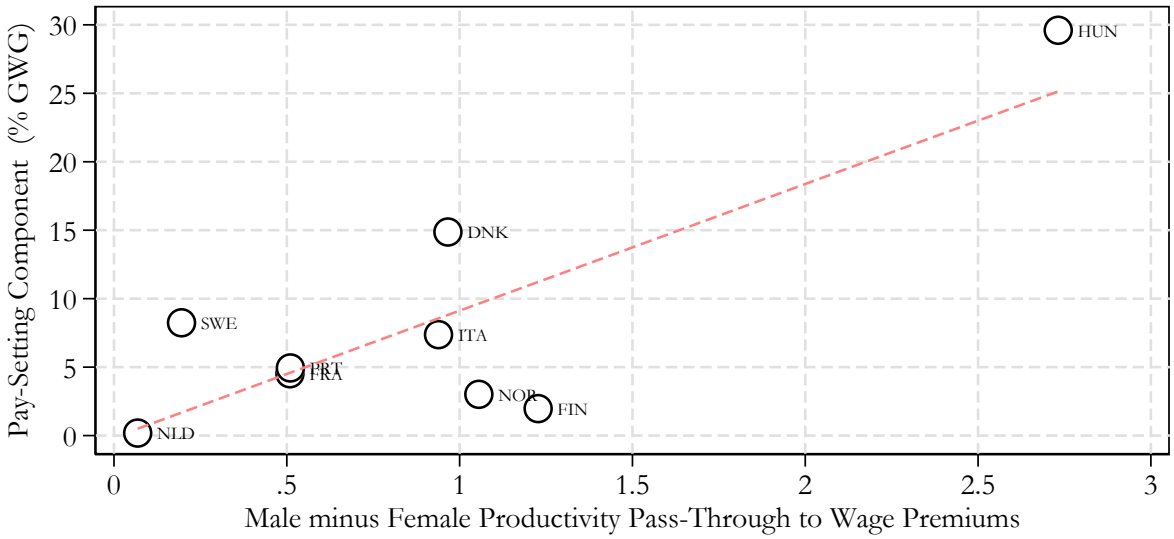
Notes: Panel A. The figures show the gender wage gap and the firm effect gap in the main sample against the alternative sample. The alternative sample consists of workers employed in firms with at least ten movers by gender over the entire time period. Panel B. The alternative sample consists of all jobs with value-added data (i.e including the health, teaching industries etc)

FIGURE A.12. Gender Wage Premiums Gap: Model specification



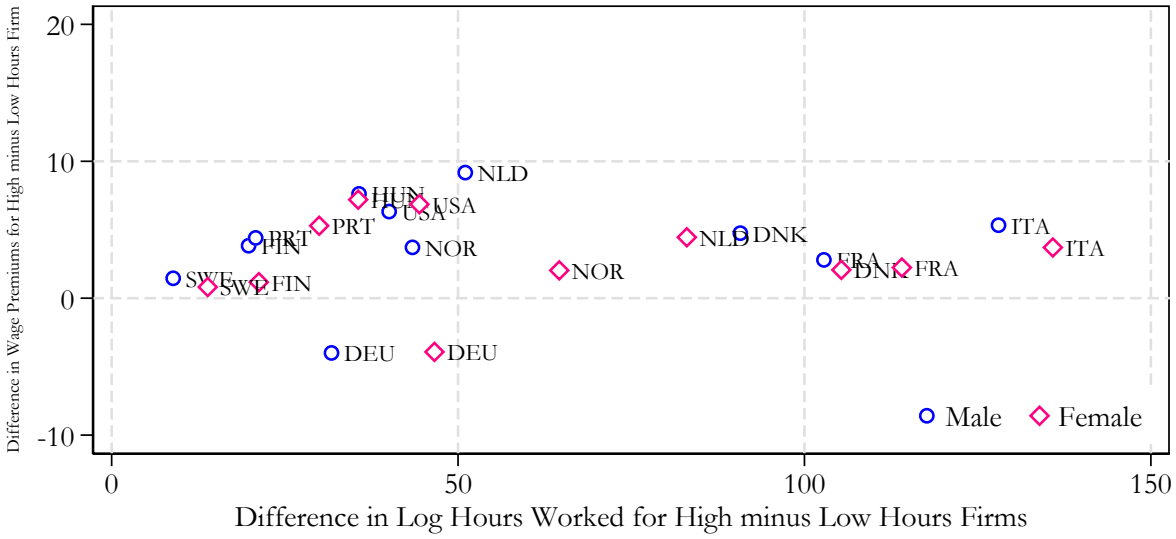
Notes: The figure reports the firm wage premium gap using education groups and occupation groups in the AKM model.

FIGURE A.13. The Pay-setting Component and Productivity Pass-Through



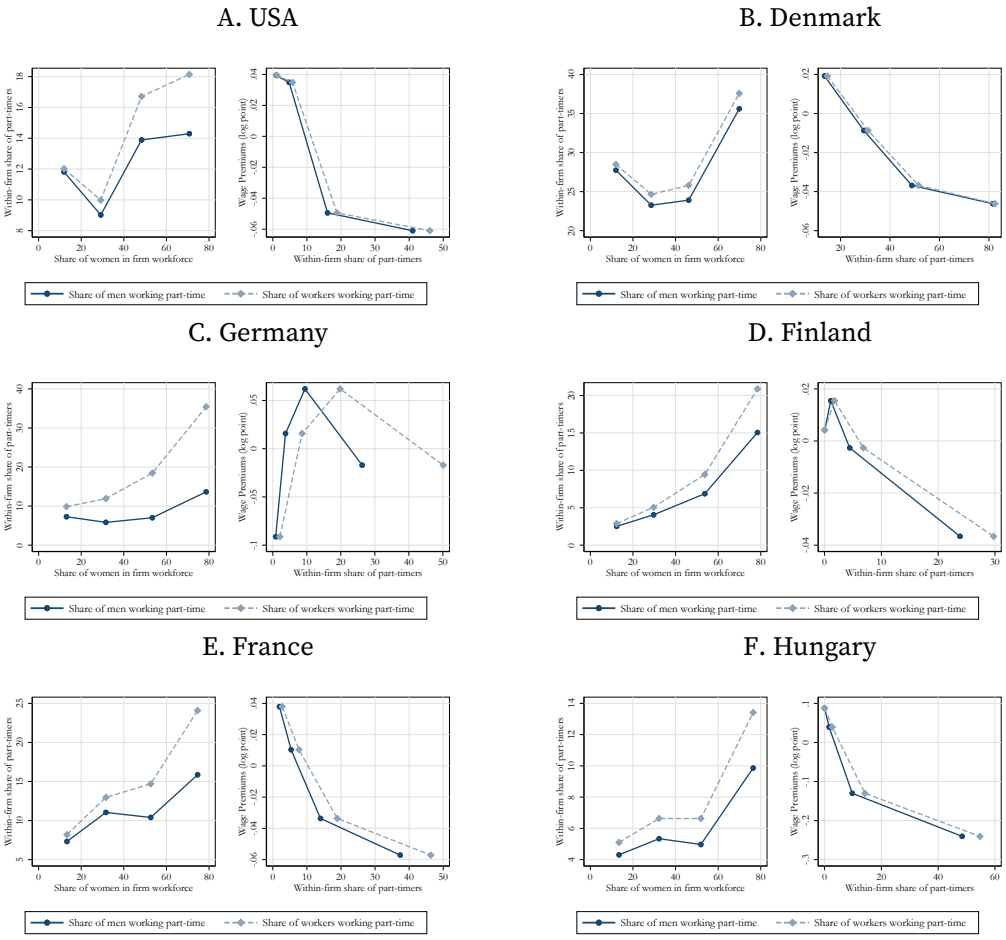
Notes: The figure plots the fraction of the gender wage gap explained by the pay-setting component against the difference in percentage points of the productivity pass-through to firm-specific wage premiums for males and females. The figure reports the productivity pass-through to wage premiums for models with and without controlling for industry (using NACE Rev. 2 categories at the second level of aggregation). The slope from the associated regression (with industry controls) is printed on the figure in red. Germany and USA do not contain firm-level value-added data.

FIGURE A.14. Firm Wage Premiums Against Mean Hours Worked



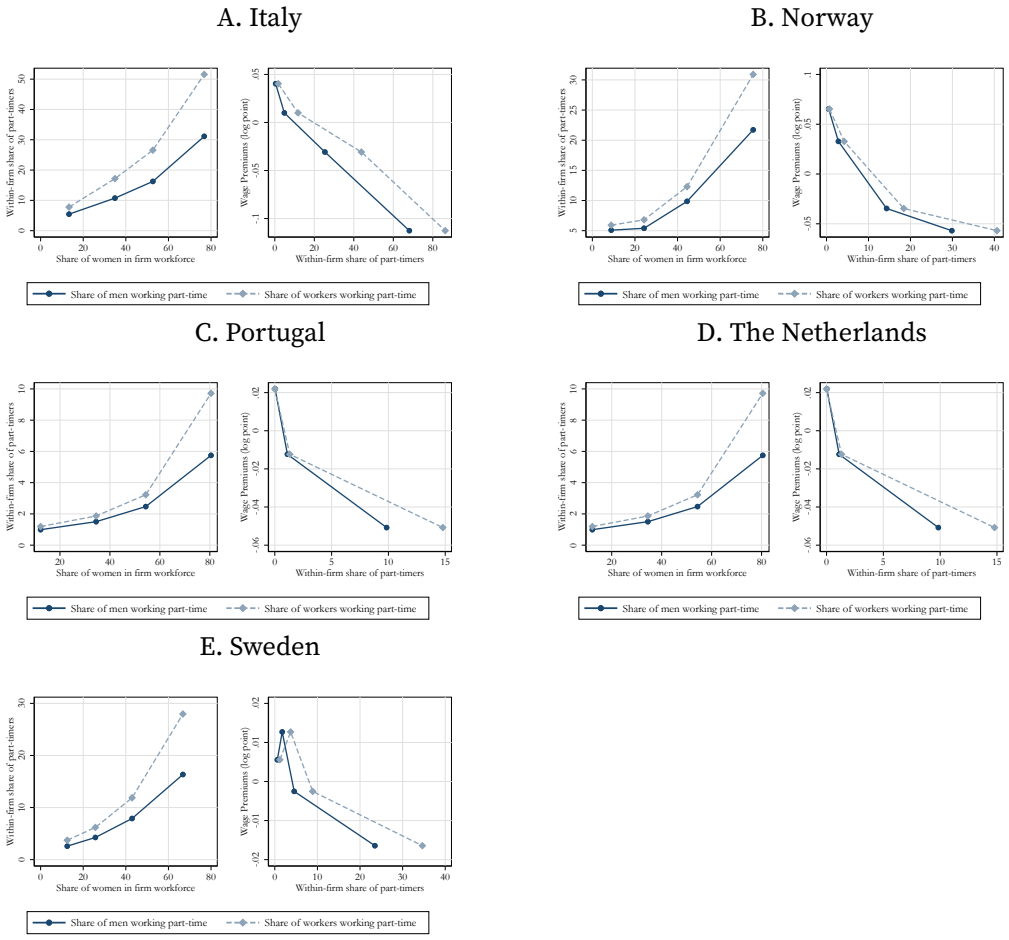
Notes: Firms are divided into deciles based on their mean hours worked. Within each decile, we estimate the average firm wage premium. We then calculate the difference in mean hours between the top and bottom deciles and apply the same approach to measure the difference in firm wage premiums between high- and low-hours firms. The negative difference for Germany indicates that high-hours firms offer lower wage premiums than low-hours firms.

FIGURE A.15. 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 A.16. 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.

A.2. Tables

TABLE A.1. Overview of Wage-setting Institution In Our Sample

Country	Union density	Coverage	Excess coverage	Bargaining vertical	horizontal
Some wage floors at the sectoral level:					
Sweden	62	90	28	3	4
Finland	66	89	23	4	4
Denmark	67	80	15	3	4
Norway	52	73	21	3	4
Netherlands	17	78	61	3	4
Germany	17	56	39	3	4
Portugal	15	74	59	3	2
France	8	98	90	3	2
Wages set locally the firm level:					
Hungary	10	23	13	1	1
United States	11	12	1	1	1

Note: Reorganized data from Boeri and Ours (2021).

TABLE A.2. Relationship Between Firm Effects and Mean Hours

	IV Male	IV Female	OLS Male	OLS Female
DEU	-0.37	-0.38	-0.20	-0.13
	(0.01)	(0.01)	(0.00)	(0.00)
DNK	0.11	0.02	0.02	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
FIN	0.11	-0.00	0.03	0.02
	(0.03)	(0.02)	(0.01)	(0.01)
FRA	0.05	0.03	0.01	0.01
	(0.00)	(0.00)	(0.00)	(0.00)
HUN	0.89	0.63	0.28	0.17
	(0.02)	(0.02)	(0.01)	(0.01)
ITA	0.07	0.03	0.03	0.01
	(0.00)	(0.00)	(0.00)	(0.00)
NLD	0.22	0.12	0.06	0.02
	(0.01)	(0.00)	(0.00)	(0.00)
NOR	0.18	0.07	0.01	-0.01
	(0.01)	(0.01)	(0.00)	(0.00)
PRT	0.29	0.13	0.05	0.00
	(0.02)	(0.01)	(0.00)	(0.00)
SWE	0.15	0.04	0.02	0.05
	(0.04)	(0.03)	(0.02)	(0.02)
USA	0.06	0.04	-0.00	-0.00
	(0.01)	(0.01)	(0.00)	(0.00)

Notes: Table reports IV and OLS estimates of the relationship between firm wage effects and mean hours worked with industry controls (20 major industries). For IV estimates, the log mean hours of workers at the same firm in the other gender group is used as an instrument. Standard errors, clustered by firm, in parentheses.

TABLE A.3. Predictors of the Gender Wage Premium Gap

	(1)	(2)	(3)
Wage premium	13.43 (4.45)	11.48 (4.32)	11.57
Hours gap	5.80 (2.94)	6.64 (2.68)	4.20
Pay for overtime	0.42 (0.20)	0.17 (0.18)	0.06
Pay for shift work	-0.01 (0.12)	0.01 (0.12)	0.12
Observations	384	384	384
Adjusted R^2	0.239	0.322	
FE	Country	Country + Industry	Country + Industry
Lasso	NO	NO	YES

Notes: OLS regressions at the country-industry level. An industry is a NACE rev. 2 category. Wage premium is the average firm wage premium for males and females. The hours gap gap is the difference between the log hours worked for males and females. We exclude industries representing less than 0.5% of employment. Additional controls not displayed: mean log productivity and separation rate at the industry level. Industry fixed effects are 10 dummies. Robust standard errors are in parentheses.

TABLE A.4. Predictors of the Sorting Component

	(1)	(2)	(3)
Wage premium	4.08 (2.52)	2.40 (2.71)	1.45
Hours gap	4.25 (1.58)	6.44 (1.58)	4.68
Pay for overtime	0.07 (0.10)	-0.10 (0.11)	-0.11
Pay for shift work	0.10 (0.07)	0.15 (0.07)	0.11
Observations	384	384	384
Adjusted R^2	0.089	0.198	
FE	Country	Country + Industry	Country + Industry
Lasso	NO	NO	YES

Notes: OLS regressions at the country-industry level. An industry is a NACE rev. 2 category. Wage premium is the average firm wage premium for males and females. The hours gap gap is the difference between the log hours worked for males and females. We exclude industries representing less than 0.5% of employment. Additional controls not displayed: mean log productivity and separation rate at the industry level. Industry fixed effects are 10 dummies. Robust standard errors are in parentheses.

TABLE A.5. Predictors of the Pay-Setting Component

	(1)	(2)	(3)
Wage premium	9.21 (2.81)	8.91 (2.80)	9.51
Hours gap	1.39 (1.99)	-0.07 (1.78)	
Pay for overtime	0.36 (0.13)	0.28 (0.13)	0.22
Pay for shift work	-0.12 (0.08)	-0.14 (0.08)	0.00
Observations	384	384	384
Adjusted R^2	0.371	0.412	
FE	Country	Country + Industry	Country + Industry
Lasso	NO	NO	YES

Notes: OLS regressions at the country-industry level. An industry is a NACE rev. 2 category. Wage premium is the average firm wage premium for males and females. The hours gap gap is the difference between the log hours worked for males and females. We exclude industries representing less than 0.5% of employment. Additional controls not displayed: mean log productivity and separation rate at the industry level. Industry fixed effects are 10 dummies. Robust standard errors are in parentheses.

B. 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.

B.1. United States: Washington state

B.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.[37] 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.[38] 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. [39] 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.[40].

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

[38] 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

[39] 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.

[40] 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).[41]

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.

B.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.[42]

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).

[41] 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.

[42] 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.

B.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.[43] 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.[44] The data cover over 95% of all private sector jobs in Washington state[45] 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.[46]

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.[47] We then merge these proportions to the Washington state sample on age, gender, race/ethnicity, and educational attainment.

[43] This section relies heavily on Lachowska et al. (2022).

[44] 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.

[45] 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.

[46] 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.

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

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 A.17, Panel A, shows that the reweighted gender wage gap is slightly smaller (19.4%) compared to the unweighted gap (20.5%).

Figure A.17, 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 A.17. 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 B.1 for details.

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.

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.[48]

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.[49] 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.

B.2. Denmark

B.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

[48] https://esd.wa.gov/employer-taxes/zero-hour-reports.
[49] 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.

B.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.

B.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.[50] 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.

B.3. Finland

B.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

[50] 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 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%).

B.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.

B.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.

B.4. France

B.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).[51] 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.

B.4.2. Literature

Palladino, Roulet and Stabile (2024) 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 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.

[51] 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.

B.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 (2022). 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 (2022) achieved a high matching success rate of 98% for individuals between 2002 and 2019.

B.5. Italy

B.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.

B.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.

B.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.

B.6. Germany

B.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)).

B.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.

B.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.[52] 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.

B.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, 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

[52] 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.

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.

B.7. Hungary

B.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.[53] 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.

B.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 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.

[53] OECD Employment and Labor Market Statistics.

B.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.

B.9. Portugal

B.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.

B.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.[54] 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.

B.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.

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.

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

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.

B.10. Netherlands

B.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.

B.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.

B.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

B.11. Norway

We use data for the period 2010 to 2019 for which we can construct employer-employee matched data for the population of workers and firms with hours of work with the Norwegian register data.

B.11.1. Institutional setting

Unions, wage bargaining and Minimum wages. The Norwegian collective wage bargaining system is characterised by negotiations involving employer organizations, labor unions, and the government. The system is characterized by centralized "main agreements" which set the general framework. Typically, the industry setting the main agreement is the one most exposed to competition and trade. The other industries then negotiate next by decentralized negotiations at the individual company or industry level for specific wage and working condition adjustments. Less than 20 percent of employees are not covered by collective bargaining agreements (Visser, 2016). The Norwegian system is therefore a highly coordinated system of wage bargaining by international comparison. Norway has no minimum wage law in place. However, wage floors negotiated by the unions are high.

Family policies. The Norwegian labor market is characterised by overall high employment and high female employment rates. Female employment rates have substantially increased since the early 1970s when the share was 43 percent (SSB, the Labor force survey). The share of employed women has been between 72 to 76 percent during the 2000s (see Nilsen, 2022).

Parental leave policies. Norway has generous job-protected and paid parental leave in place since 1993 when 47 weeks of paid leave were introduced. The wage replacement rate is 100 percent and leave can be extended by 10 weeks by going down to 80 percent. In 1993, it was introduced that 4 weeks of leave were earmarked for fathers. Despite that also before parents could share leave, fathers did not take any longer leave. The paternity quota has been extended several times, first in 2005 to 5 weeks. By today the father quota is 15 weeks.

Childcare. Norway has public highly subsidized childcare in place which was expanded to high coverage first through the child-care act in 1974 for the 3 to 6 years old. In 2002, the second childcare act led to the expansion of childcare for the 1 to 2 years old. Since 2008, 80 percent of a birth cohort from age 1, referred to as full coverage of demand for childcare, can have a childcare place in their municipality. School starts at age 6. Alongside publicly provided childcare Norway still has a cash-for-care policy for parents of children of age 1 who do not use public childcare. This scheme has been however little used since 2008.

Definition of Full-time work. Full-time work is in Norway 37.5 hours per week.

B.11.2. Literature

In international comparison Norway has been described as one of the most gender equal countries in the world (see World Economic Forum) and having a low gender pay gap in terms of full-time adjusted median earnings (5 percent according to the OECD statistics). In Norwegian register data studies, however, the average gender gap is monthly wages is 12.4 percent in 2021 (Grini and Fløtre, 2023, SSB report). Adjusted for age, age squared, education and full-time versus part-time work Penner, et al. (2023, Nature Human Behavior) report a gap of 20 percent in 2018.

Even though family policies are often credited for explaining high female employment in Norway and Scandinavia overall, studies have shown that expansion of childcare for the 3-6 year old in the 1970s had no impact on female employment (Havnes and Mogstad, 2011), expansionary parental leave policies had little if any no positive effect on female employment (Dahl et al. 2013) and careers (Corekcioglu, et al. 2023). Expansion of childcare for the youngest had positive employment effects for women (Andersen and Havnes, 2019; Kunze and Liu, 2019).

Andresen, M. E., Havnes, T. (2019). Child care, parental labor supply and tax revenue. Labour Economics, 61, 101762. Dahl, G. B., Løken, K. V., Mogstad, M., Salvanes, K. V. (2016). What is the case for paid maternity leave?. Review of Economics and Statistics, 98(4), 655-670. Havnes, T., Mogstad, M. (2011). Money for nothing? Universal child care and maternal employment. Journal of Public Economics, 95(11-12), 1455-1465. Kunze, A. and X. Liu (2019): Universal Childcare for the Youngest and Maternal Employment, IZA Discussion Paper No. 12146/2019.

B.11.3. Data sources

Data sources for information on workers. We use the employment statistics for two periods: the employment statistics (called aa-lto register) for 1995 to 2014 as well as the new employment register already merged with more extensive information on employees and employers by month (called a-form register) for the period 2015 to 2022. Both registers cover the population of employee contracts and are event history data sets. We construct a yearly employer-employee matched panel data set for the population of employees where earnings are observed in November of every year.

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 idendifier, enterprise identifier, industry, public sector) and the job characteristics incl. hours of work and occupation. Using the unique person identifier, we follow workers over time and merge to these data information on gender and year of birth from the population registers. We construct age as calender year minus the year of birth. We 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 time series data since 2000. For the final estimation, we keep the period 2010 until 2019.

Data sources for information on firms. Using the unique organisation number, we merge enterprise-level information collected by the *Brønnøysund register center* through the cleaned and documented version by Berner et al. (2016). We calculate establishment and enterprise size as the number of employees per year.

Berner E, Mjøs A, Olving M (2016) Norwegian corporate accounts. Working Paper 11/16, Center for Applied Research at NHH, SNF, Bergen, Norway.

Definition of earnings and hours worked. 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.

Data access. The data used for the empirical analysis in the paper are Norwegian register data that we have gained access to through Statistics Norway (SSB) that has anonymized person, establishment and enterprise identifiers consistently across registers and prepared the raw data.

B.12. Sweden

B.12.1. 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.[55] 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))

Parental leave policies. Parental benefit is paid out by the government (the Swedish Social Insurance Agency) for 480 days for one child. For 390 days, the compensation is 80% of employees' income. For the remaining 90 days, the compensation is set at SEK 180 per day. Each parent is entitled to half of the time.[56]

B.12.2. 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) Albrecht et al. (2018) Bronson and Thoursie (2019) Meyersson Milgrom et al. (2001)

B.12.3. 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

[55] https://www.oecd.org/employment/emp/collective-bargaining-Sweden.pdf

[56] See https://www.forsakringskassan.se/english/parents/when-the-child-is-born/parental-benefit for more information.

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. We can observe both the firm identifier and the physical workplace.

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. This data, however, does not include hours worked. Instead, we use Wage structure statistics data (WSS, Lönestrukturstatistik), very large sample at the firm level.[57] 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. Occupation codes are available for workers sampled in the WSS throughout. However, there is a change in occupation codes over the analysis period. Until 2013 these data use codes based on ISCO-96. Starting from 2014, the coding

[57] This part closely follows Fredriksson et al. (2018)

structure switches to ISCO-08. The codes are not linked across 2013-2014 as this is hard to do with any confidence.

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.

C. Descriptive Statistics For Various Samples By Country

TABLE A.6. 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.7. 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.8. 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.9. 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.10. 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.11. 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.12. 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.13. 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.14. 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.15. 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.16. 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.

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