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# Part-time employment, the gender wage gap and the role of wage-setting institutions: Evidence from 11 European countries

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## Abstract

We examine how far the over-representation of women in part-time jobs can explain the gender gap in hourly earnings, and also investigate how far wage-setting institutions are correlated with the overall gender wage gap and the female part-time wage gap. Using European Union Statistics on Income and Living Conditions (EU-SILC) 2009 data for 11 European countries, we implement a double decomposition of the gender wage gap: between men and women employed full-time and between full-time and part-time working women. This shows that the wage penalty of women employed part-time occurs mainly through the segregation of part-time jobs, but the full-time gender pay gap remains mostly unexplained. At the macro level, the gender wage gap tends to be higher in countries where part-time employment is more widespread. Some wage-setting institutions seem to reduce the female full-time/part-time pay gap and the gender gap among full-time workers.

## Keywords

Decomposition, labour force participation, part-time, wage gap, wage-setting institutions

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## Introduction

The European Employment Strategy has sought to promote and strengthen equal opportunity policies since 1999, but despite a slight improvement in most European countries, a substantial gender earnings gap remains throughout Europe. Governments are also encouraged to implement policies that facilitate greater reconciliation between work and family life, in particular by enhancing part-time employment, which has become widespread in Europe, with an average of one in five workers working part-time in the EU-27 in 2015, compared with 16 percent 10 years before.

However, developing part-time employment and reducing the gender earnings gap are potentially conflicting objectives, because part-time workers generally have lower hourly earnings than full-time employees (Bardasi and Gornick, 2008; Fernández-Kranz and Rodríguez-Planas, 2011; Manning and Petrongolo, 2008) and part-time workers are primarily women. This is a key factor explaining the gender pay differential (Goldin, 2014; Meurs and Ponthieux, 2015). Yet, little attention has been devoted to the role of part-time employment as an additional cause for the gender wage gap. Thus, we aim to investigate how far part-time work might increase gender wage inequalities.

Most research on the gender wage gap explains these penalties through individual characteristics, employer discrimination or the concentration of women into poorly paid occupations in the least-regulated and lowest paid sectors (Matteazzi et al., 2014; Meulders and Plasman, 1993). The gender wage gap varies across countries, and some studies have shown that high collective bargaining coverage, a high degree of centralization of wage bargaining and high minimum wages improve gender wage equality among full-time employees (Schäfer and Gottschall, 2015). Such approaches, however, have failed to address the role of industrial relation institutions for part-time employees.

This article measures the contribution of part-time employment to the gender earnings gap and investigates the role of both individual and wage-setting institutions in shaping wage inequalities. To this end, we compare 11 European countries using European Union Statistics on Income and Living Conditions (EU-SILC) data for the year 2009. Our contribution is twofold. First, we go further in studying the role that part-time employment plays in the overall gender wage gap. In doing so, we use an original wage gap decomposition analysis by splitting the overall gender wage gap into two parts: the full-time gender pay differential and the female full-time/part-time pay gap. Then, at the micro level, we analyse whether, and how far, each of these pay gaps can be explained by individual and job-related characteristics, selection into (full-time and part-time) employment and unobserved characteristics.

Our second contribution is at the macro level, using the differential prevalence of part-time jobs across European countries to explore the extent to which the pervasiveness of part-time employment is correlated with the overall gender wage gap and its three main components: the portion explained by gender differences in observable characteristics, the portion related to female selection into paid employment and the remaining unexplained portion. Then, we address national differences in wage-setting institutions to study the extent to which the predicted full-time gender pay gap, female full-time/part-time wage gap, male wage premium and female wage penalties are correlated with

bargaining coverage, wage bargaining coordination and centralization, government intervention in wage bargaining and minimum wages.

## Previous research

### *Determinants of the gender wage gap and the part-time wage gap*

There is considerable literature measuring and explaining the gender wage gap (see Meurs and Ponthieux, 2015, for a survey). Recent research shows that human capital factors, especially educational attainments, are now relatively unimportant, while career breaks for maternity, shorter working hours, gender occupational segregation and employer discrimination account for the largest portion of the gender pay gap (Blau and Kahn, 2016; Gannon et al., 2007).

Since men represent a small proportion of part-time workers, almost all analyses dealing with the contribution of part-time employment to wage inequalities focus only on women (exceptions are Garnero et al., 2014; O'Dorchai et al., 2007). They generally find a part-time wage penalty among female workers (Fernández-Kranz and Rodríguez-Planas, 2011; Manning and Petrongolo, 2008). Several explanations have been advanced. Part-timers have less work experience (Blank, 1998) and a lower commitment to paid employment because of individual preferences (Hakim, 2002) or family constraints (McRae, 2003). The part-time wage penalty may also be explained by the concentration of part-time jobs in poorly paid occupations and industries (Matteazzi et al., 2014; Meulders and Plasman, 1993) and by the existence of fixed employment costs (Montgomery, 1988). However, it may also reflect gender discrimination against part-time workers (Garnero et al., 2014).

### *Wage setting, wage inequality and the gender wage gap*

Less research has analysed the interplay between industrial relations and the gender wage gap (Schäfer and Gottschall, 2015). European countries differ strongly in terms of bargaining coverage, bargaining centralization and coordination and the presence and level of a statutory minimum wage (Matteazzi et al., 2017). In Central and Eastern Europe (CEE) and Anglophone countries, bargaining coverage is low and fragmented and the minimum wage level is low relative to median earnings. Government intervention in wage bargaining is also very limited in the UK. By contrast, collective bargaining covers almost all wage earners in Sweden, Slovenia, Belgium, France, Romania and Austria. Wage bargaining is also more coordinated in most Nordic and Continental European countries.

Wage inequalities tend to be higher in countries with a liberal market economy, low bargaining coverage and highly decentralized wage-setting regimes than in more coordinated economies (Card, 2001; DiNardo et al., 1996; Kahn, 2015; Lee, 1999). Comparative research has indicated that wage-setting institutions affect gender wage inequalities: countries with largely unregulated labour markets have higher unexplained gender wage gaps (Christofides et al., 2013). Minimum wage systems reduce the gender wage gap by protecting the earnings of women employed in low-paid

occupations (Grimshaw et al., 2014; Schäfer and Gottschall, 2015), the extent of the effect depending on the level at which the minimum is set (Rubery et al., 2005). Results are mixed regarding the effect of collective bargaining on the gender wage gap. Elvira and Saporta (2001) find that unionization is associated with smaller gender pay gaps, especially in mixed or male-dominated industries. Blau (2012) and Schäfer and Gottschall (2015) also show that higher collective bargaining coverage improves gender wage equality. However, Booth and Francesconi (2003) and Arulampalam et al. (2007) show that unions may be less likely to represent the interests of women, especially those at the bottom of the wage distribution. Gender pay inequality also depends on the degree of coordination and integration of wage structures by occupation, firm and sector. Women's pay tends to be better protected by more coordinated bargaining systems (Blau and Kahn, 1992). However, Schäfer and Gottschall (2015) show that, compared to economy-wide or industry-wide levels, the sectoral level is less favourable.

Most of this research focuses on full-time workers only and does not address the part-time wage gap. The over-representation of part-time workers among the low-paid and less-unionized jobs in several countries raises the question whether wage-setting institutions reduce the part-time wage gap just as they do the full-time gender wage gap.

### *Varieties of part-time systems*

There are broad disparities across countries in terms of women's employment rates, but countries are even more heterogeneous with respect to female part-time employment (Matteazzi et al., 2017). CEE and Greece exhibit the lowest female part-time rates (below 10 percent), followed by Finland and other Mediterranean countries. At the other extreme, the Netherlands has the highest rate, with about three women out of four working part-time. Part-time employment rates among mothers are higher in almost all countries. Although part-time employment has also become more common among men, it remains below 5 percent at the European level.

Comparative research (Hall and Soskice, 2001) has shown that the extent of part-time employment depends on country-specific social policies, industrial relations and the type of welfare regime. Anxo et al. (2007) identify four broad national models corresponding to different welfare regimes with regard to 'time policies'. Nordic countries represent the 'universal breadwinner' model, with high female employment on both a full-time and long-term part-time basis and little marginal part-time work (Anxo, 2004), and motherhood has limited adverse effects on female employment. In countries with a 'modified breadwinner model', such as France, motherhood is associated with a withdrawal from paid employment for some groups of women; women are generally employed on a full-time basis, but long-term part-time work is also quite widespread. Mediterranean countries belong to the 'exit or full-time model', with very low female employment rates, especially for mothers, and a scarcity of part-time jobs. Finally, 'maternal part-time work' is typified by Germany, the Netherlands and the United Kingdom, where part-time employment rates are very high, and the hours generally worked by part-timers are low. There are important differences in the

quality of part-time work in the three countries. For instance, in the United Kingdom, part-time jobs are of very poor quality and confined to poorly paid sectors and occupations, while part-time work also negatively affects hourly wages and career advancement (Manning and Petrongolo, 2008). By contrast, part-time jobs in the Netherlands are of better quality in terms of both occupational profile and hourly earnings.

## Data and methods

### Data

Our empirical analysis is based on data provided by the EU-SILC, which allows comparative analysis of full-time and part-time hourly wages. We use the 2009 wave that provides information on annual labour earnings in 2008, before the ‘great recession’ that may have influenced women’s labour market attachment and the pattern of gender segregation, and hence the gender pay gap (Rubery and Rafferty, 2013).

Our sample comprises women and men aged 25 to 59 years living in Austria, Belgium, Finland, France, Germany, Italy, the Netherlands, Norway, Poland, Spain and the United Kingdom. Data limitations (small sample size of women in part-time jobs, especially in CEE, and high non-response rates for workplace characteristics, especially for Nordic countries) obliged us to exclude other countries. Our sample includes male and female wage earners and women voluntarily outside the labour market, but excludes the unemployed, self-employed, family workers, disabled and retired people. Because of their limited numbers, men who are inactive (4.11% overall) or working part-time (2.8% overall) are excluded.

Full-time/part-time employment is defined on the basis of self-classification rather than the actual number of hours worked.<sup>1</sup> The gross hourly wage (the standard indicator used in the literature) is computed as the ratio between gross monthly earnings (obtained by dividing the employee’s gross cash or cash equivalent annual income during the reference period and the number of months spent in employment during this period) and the number of hours usually worked per month (recalculated from the number of weekly hours declared at the time of the interview). We excluded the top and bottom 1 percent of the wage distribution in order to limit the influence of extreme values, and also those who reported working less than 5 hours or more than 60 hours per week. Current variables may have a lag between the end of the income reference period and the time of the interview. Since the timing mismatch could weaken the match between labour income (which refers to a past period) and the number of hours usually worked per week (which refers to the current situation), we include only workers who remained in the same job and who continuously worked either full-time or part-time. Furthermore, to ensure consistency between declared labour earnings and job-related characteristics, we exclude those holding more than one job. The sample thus over-represents workers whose working status is stable over the year, since the most precarious workers holding temporary jobs are probably excluded. This could be a limitation, but it allows analysis of the effects on wages of structural part-time jobs while excluding the effects of job insecurity. We conducted a robustness check of our results from the alternative definitions of hourly wage (Matteazzi et al., 2017).

### Micro-level analysis: decomposition of the gender wage gap

In order to evaluate the contribution of female part-time employment to the gender gap in pay, we perform a double decomposition of the gender wage gap as follows:

$$\bar{y}_m^{FT} - \bar{y}_f = \bar{y}_m^{FT} - \left[ (1-k)\bar{y}_f^{FT} - k\bar{y}_f^{PT} \right] = (\bar{y}_m^{FT} - \bar{y}_f^{FT}) + k(\bar{y}_f^{FT} - \bar{y}_f^{PT}) \quad (1),$$

where  $\bar{y}_m^{FT}$ ,  $\bar{y}_f^{FT}$ ,  $\bar{y}_f^{PT}$ , and  $\bar{y}_f$  are, respectively, the predicted mean log hourly wages for men working full-time, women working full-time, women working part-time, and all working women. The first part on the right-hand side of equation (1) is the full-time gender pay differential. The second part is the female full-time/part-time pay gap weighted by  $k$ , the share of women working part-time among all working women.

In order to measure how far the gender wage gap is influenced by observed characteristics (such as lower work experience and/or occupational segregation of part-timers), unobserved characteristics (related, for instance, to lower commitment to paid employment and/or discrimination of part-timers), and selection into employment, we decompose each of the two wage gaps using the Neuman-Oaxaca (2004) procedure, dividing each wage differential into three components: (1) an ‘explained part’, which is the part of the raw wage differential due to different observable characteristics between groups of workers; (2) an ‘unexplained part’, which is due to different returns to identical characteristics, unobserved heterogeneity or omitted variables and (3) the ‘selection part’, which reflects self-selection of women into full-time or part-time employment. The existence of a wage penalty or premium is captured by the difference between individual returns to observed characteristics and non-discriminatory rewards obtained from a pooled regression over all groups of workers (Neumark, 1988). Since job segregation may be a form of discrimination, we analyse its specific contribution to the gender wage gap.

Log wage equations for men and selectivity-corrected low-wage equations for women are estimated by ordinary least squares (Maddala, 1983). Explanatory variables are as follows: education, a second-order polynomial of labour market experience,<sup>2</sup> country of birth, region of residence, degree of urbanization of area of residence, occupation, being in a managerial position with supervisory responsibility, type of contract, economic sector of the local unit and firm size. Information about labour market experience is not available for Finland, the Netherlands, Norway and the United Kingdom. For these countries, we control for potential experience measured by the usual formula: ‘age – number of years in education – 6’. Potential experience is likely to overestimate women’s real labour market experience because it does not consider child-related career interruptions; thus, we include in the log wage regressions for these four countries the number of children by age group (0–5, 6–11, and 12 years or older).

To account for a possible sample selection problem, we estimate as an ordered probit model female status in employment: inactivity, part-time employment or full-time employment. Except for workplace variables, the same set of controls is included. We use common exclusion restrictions: the annual amount of other household incomes (Blundell et al., 2007), use of unpaid childcare and recourse to formal childcare services

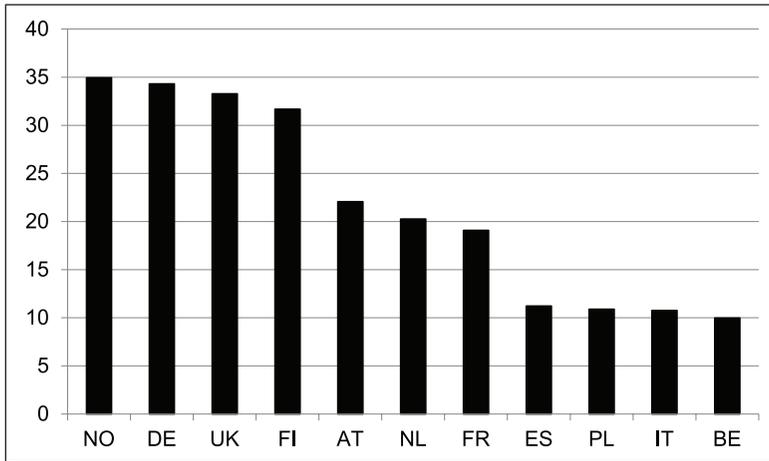
for children younger than 12 years. There exists broad evidence on the positive effect of formal childcare on women's full-time attachment to the labour market (Chevalier and Viitanen, 2002). Furthermore, it has been shown that support by extended families and grandparents plays an important role in explaining the labour force participation of women with children (Del Boca, 2002). Last, for those countries with available information on labour market experience, the number of children by age group is included in the participation decision.

### *Macro-level analysis: part-time employment, wage-setting institutions and wage inequalities*

In order to explore whether the spread of part-time employment explains the gender wage gap, we examine, at the macro level, the correlation between the rate of part-time employment and the predicted gender hourly wage gap. Since part-timers have lower earnings than full-timers and are more often women, we expect that the more widespread part-time employment, the larger the gender hourly wage gap. Thus, we explore whether the spread of part-time employment is more correlated with the observable workers' characteristics, the unobservable characteristics or selection – the explained, unexplained and selection parts of the gender wage gap. In the absence of discrimination, the prevalence of part-time employment should be more correlated with the explained part of the gender wage gap.

To analyse how wage-setting institutions affect the gender wage gap and which component of the gender wage gap is the most affected by wage-setting institutions, we examine the correlation, at macro level, between the predicted full-time gender and female full-time/part-time pay gaps with some wage-setting institutions. To check whether institutions might affect gender discrimination, we explore whether and how the unexplained portions of these two pay gaps are correlated with wage-setting institutions.

We are interested in the roles of bargaining coverage, centralization of wage bargaining, coordination of wage bargaining and government intervention in wage setting, and we examine them using indicators taken primarily from Visser (2015). We also consider the role of minimum wages and use the OECD Kaitz index to do so. We analyse the impact of these wage-setting institutions one by one, because they might be highly correlated (Schäfer and Gottschall, 2015). Bargaining coverage is measured by the number of employees covered by wage bargaining agreements as a proportion of all wage earners with the right to bargain, adjusted for the possibility that some sectors or occupations are excluded from this right (Traxler, 1994). Centralization is measured by the predominant level at which wage bargaining takes place: the index ranges from 1 to 5, with higher scores suggesting a higher degree of centralization. The measure of wage coordination is an index that ranges from 1 to 5, with the lowest score indicating fragmented bargaining (mostly at the company level) and the highest referring to economy-wide bargaining. Government intervention in wage bargaining is measured by an index that ranges from 1 to 5, with the lowest score indicating that the government is entirely uninvolved and the highest reflecting government imposition of private sector wage settlements and a ceiling on bargaining outcomes.



**Figure 1.** Gender hourly wage gap as percentage of women's average hourly wage. AT: Austria; BE: Belgium; FI: Finland; FR: France; DE: Germany; IT: Italy; NL: the Netherlands; NO: Norway; PL: Poland; ES: Spain; UK: United Kingdom.

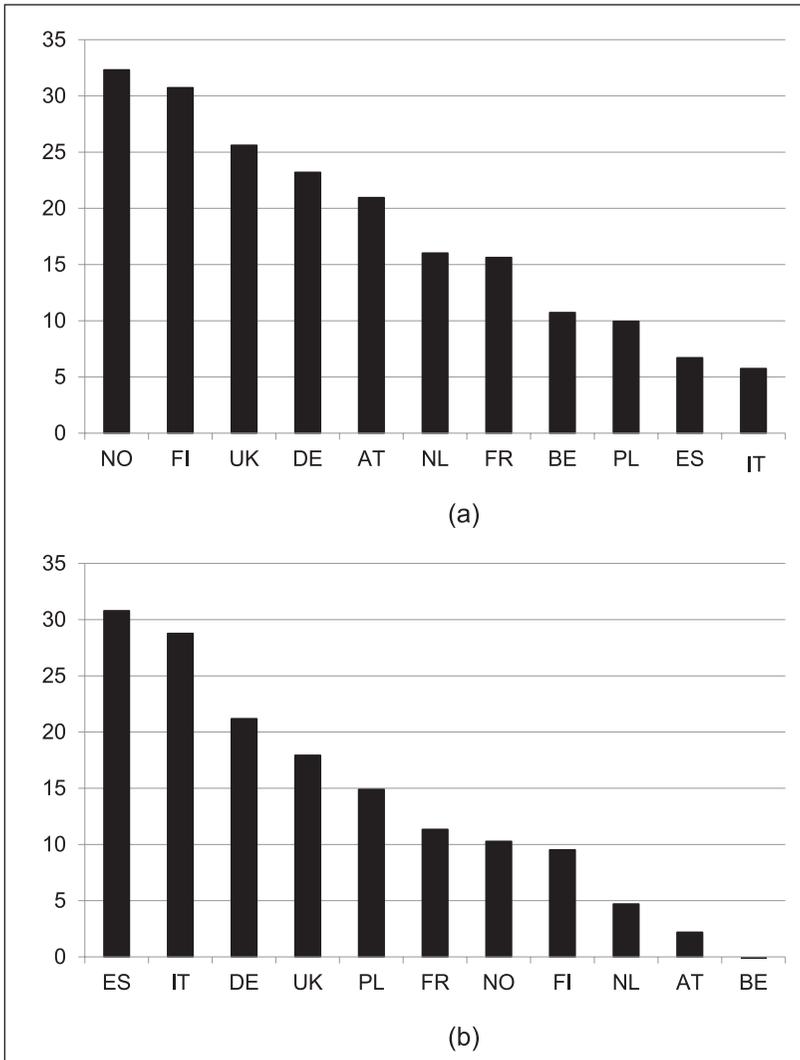
In line with previous empirical evidence, we expect the gender wage gap to be lower in presence of a high bargaining coverage, high minimum wages relative to median or mean wages, strong government intervention in wage bargaining and a high degree of coordination and centralization of pay negotiations across the economy, because these institutions tend to compress the wage distribution. Given that institutions tend to affect unskilled workers more than skilled ones (Koeniger et al., 2007), and that part-time workers have lower skills, on average, than their full-time counterparts, wage-setting institutions are more likely to shelter the lowest paid workers and should compress the wage gap between full-time and part-time workers.

## Results

### *Descriptive statistics*

Large cross-country differences are observed in the gender hourly pay gap (Figure 1). It is much wider in Germany, the United Kingdom and Nordic countries where, on average, men's hourly earnings are around 30 percent higher than those of women. The gender wage gap is much lower in Belgium, Southern countries and Poland where, on average, men earn about 10 percent more than women.

Figure 2(a) shows the hourly earnings differences between men and women in full-time employment as a percentage of full-time women's earnings. The largest full-time gender pay gap is found in Finland and Norway, the lowest in Southern Europe. Figure 2(b) displays the hourly earnings difference between women full-timers and part-timers as a percentage of part-time women's earnings. In contrast to the full-time gender pay gap, Southern countries exhibit the highest female full-time/part-time earnings gap. This evidence may suggest that in countries where part-time employment is not a widespread working arrangement, it is

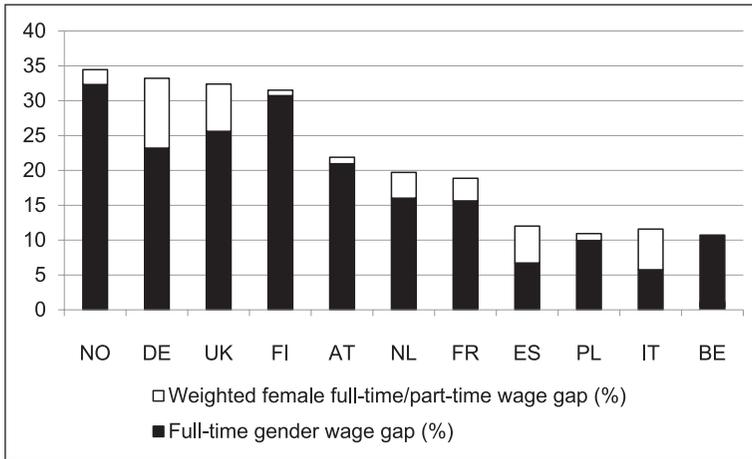


**Figure 2.** (a) Full-time gender wage gap (%). (b) Female full-time/part-time wage gap (%).

AT: Austria; BE: Belgium; FI: Finland; FR: France; DE: Germany; IT: Italy; NL: the Netherlands; NO: Norway; PL: Poland; ES: Spain; UK: United Kingdom.

also not well paid, mainly because it may be concentrated in poorly paid occupations or sectors. In Austria and the Netherlands, hourly earnings of part-timers are very close to those of full-timers, while they are even slightly higher in Belgium. These three countries display high rates of female part-time employment, suggesting a negative macro relationship between the prevalence of part-time employment and the full-time part-time pay gap.

Figure 3 shows how far the two pay differentials contribute to the overall gender wage gap. The female full-time/part-time wage gap is weighted by the percentage of women



**Figure 3.** Gender, full-time gender and female full-time/part-time wage gap (%).

AT: Austria; BE: Belgium; FI: Finland; FR: France; DE: Germany; IT: Italy; NL: the Netherlands; NO: Norway; PL: Poland; ES: Spain; UK: United Kingdom.

working part-time. Even though part-time employment is widespread in Northern Europe, Belgium and Austria, this plays a minor role in explaining the overall gender wage gap in these countries. Conversely, in Italy and Spain, where part-time employment is not very common, the female full-time/part-time wage gap accounts for about 40 percent of the gender wage gap. Part-time employment also explains a significant share of the gender wage gap in Germany, the Netherlands and the United Kingdom, where this type of work schedule is quite common for women. Thus, the diffusion of part-time employment does not in itself seem to be the main factor explaining the gender wage gap. Much more important may be the institutional context and the nature of part-time employment: whether it is primarily a means for maintaining the work–family balance or is mainly a flexible working arrangement imposed by employers.

### Wage gap decomposition results

Table 1 shows the decomposition results of the *full-time gender wage gap*<sup>3</sup> in an explained part, a male wage premium part, a female wage penalty part and a selection part. In most countries, less than half of the full-time gender wage gap is explained by the observed socio-economic and job-related characteristics included in the regression. In Spain, differences in these characteristics globally fail to explain the earnings difference between full-time men and women. In Italy and Poland, the explained part is even negative, suggesting that full-time women have better characteristics than men and that, in the absence of discrimination or unobserved characteristics significantly affecting the gender pay gap, they would have earned more than men.

The last four columns of Table 1 show the separate contributions to the explained part of human capital indicators, vertical segregation (the concentration of women in inferior and worse paid positions),<sup>4</sup> horizontal segregation (concentration of men and women in

**Table I.** Decomposition results for the full-time gender wage gap.

	Log wage difference	Explained part	Male full-time wage premium	Female full-time wage penalty	Selection part	Explained part in detail			
						Human capital indicators	Vertical segregation	Horizontal segregation	Other
AT	0.19	0.06	0.05	0.14	-0.06	0.02	0.00 (NS)	0.04	-0.00 (NS)
BE	0.09	0.02	0.01	0.10	-0.05 (NS)	-0.01	-0.01	0.04	-0.00 (NS)
FI	0.22	0.11	0.05	0.07	-0.01 (NS)	-0.02	0.06	0.06	0.00
FR	0.15	0.07	0.03	0.01 (NS)	0.03 (NS)	0.00 (NS)	0.02	0.05	-0.00
DE	0.20	0.09	0.06	0.07	-0.03 (NS)	0.02	-0.01 (NS)	0.08	-0.00 (NS)
IT	0.05	-0.04	0.04	0.12	-0.06	-0.01	-0.03	-0.00 (NS)	-0.00
NL	0.11	0.04	0.03	0.11 (NS)	-0.06 (NS)	0.01 (NS)	-0.01 (NS)	0.03	0.01
NO	0.22	0.12	0.05	0.05 (NS)	0.00 (NS)	-0.02	0.02	0.12	-0.00 (NS)
PL	0.08	-0.03	0.04	0.12	-0.05	-0.02	-0.03	0.03	-0.00
ES	0.09	-0.01 (NS)	0.04	0.13	-0.07	0.01	-0.03	0.01 (NS)	-0.00 (NS)
UK	0.19	0.08	0.07	0.18	-0.13	-0.01	0.04	0.03	0.01

AT: Austria; BE: Belgium; FI: Finland; FR: France; DE: Germany; IT: Italy; NL: the Netherlands; NO: Norway; PL: Poland; ES: Spain; UK: United Kingdom.

NS: Statistically non-significant at the 0.1 level.

Human capital indicators include education level and a second-order polynomial of experience or potential experience, according to country. As a proxy for vertical segregation, we use occupation and being in a managerial position. As a proxy for horizontal segregation, we include firm size, type of contract and economic activity of the firm. Other characteristics include region of residence, degree of urbanization and the number of children by age group, according to country.

different sectors of economic activity, types of firm or types of contract) and other individual characteristics. In Belgium, Finland, Italy, Norway, Poland and the United Kingdom, the negative sign associated with human capital comes from a structural effect: in these countries the percentage of women with tertiary education is much higher compared to men. This may also be related to the fact that we control for potential experience in three of these countries. By contrast, in Austria, Germany and Spain, the percentage of the pay differential explained by human capital is significantly positive at around 10 percent.

Labour market segregation, especially its horizontal dimension, accounts for a sizable part of the observed full-time gender wage gap. In all countries, full-time women are more likely than men to be clustered in less-valued sectors of economic activity and to be employed with temporary contracts and in small enterprises that pay lower wages. Vertical segregation contributes to explaining the full-time gender wage gap in Northern European countries, France and the United Kingdom. In contrast, the explanatory power of vertical segregation is negative in Belgium, Italy, the Netherlands, Poland and Spain, where the percentage of full-time women employed in high-valued occupations is higher relative to men. The explanatory power of other individual and household characteristics (last column) is very limited in all countries.

Selection into full-time employment has a large effect in Italy, Poland and Spain. In these countries, female full-time workers suffer the highest wage penalty. This result may suggest that in countries where female employment is low, working women are mainly employed on a full-time basis and are positively selected in the labour market, but they are even more discriminated against. Selection is also significant in Austria and the United Kingdom, countries with a very high part-time employment rate. This suggests that in countries with a high prevalence of part-time jobs, women working full-time might be positively selected in the labour market.

But the main part of the wage difference between male and female full-time workers remains unexplained and could be attributed to unobserved characteristics. The sum of the male full-time premium and the female full-time wage penalty (larger in magnitude in most countries) represents a large share of the raw differential. This might be due to omitted variables (occupations and industries are controlled for at a relatively aggregated level, and some variables such as training and tenure are not available) or discriminatory behaviours toward male and female workers.

Table 2 shows the decomposition results for the *female full-time/part-time wage gap*. In all countries, nearly the entire gap is explained by socio-demographic and workplace characteristics, in contrast to what was observed for the full-time gender pay differential. In Austria, Finland, France, the Netherlands, Norway, Poland and Spain, the explained part is even greater than 100 percent. This means that, given their observed characteristics, female full-time workers should earn more than part-timers. In France, Germany, Italy, and the Netherlands, female part-timers undergo a wage penalty.

The relative contributions of explanatory variables to the female full-time/part-time wage gap display two important features. First, human capital indicators matter in explaining the female full-time/part-time earnings difference. This is because full-timers have a higher average educational level and more labour market experience than part-timers. Second, the female full-time/part-time wage gap occurs mainly through segregation of part-time jobs. The percentage of the explained part due to segregation, without

**Table 2.** Decomposition results for the female full-time/part-time wage gap.

	Log wage difference	Explained part	Female full-time wage penalty	Female part-time wage penalty	Selection part	Explained part in detail			
						Human capital indicators	Vertical segregation	Horizontal segregation	Other
AT	0.07	0.12	-0.14	0.03 (NS)	0.06 (NS)	0.03	0.06	0.03	-0.00 (NS)
BE	-0.00 (NS)	0.07	-0.10	-0.01 (NS)	0.04 (NS)	-0.00 (NS)	0.06	0.02	0.00 (NS)
FI	0.05	0.15	-0.07	-0.14 (NS)	0.10 (NS)	0.02	0.08	0.04	0.00 (NS)
FR	0.12	0.12	-0.01 (NS)	0.09	-0.08	0.01	0.05	0.05	0.01
DE	0.21	0.17	-0.07	0.09	0.03 (NS)	0.02	0.09	0.06	0.00 (NS)
IT	0.23	0.18	-0.12	0.09	0.08	0.04	0.07	0.08	-0.00 (NS)
NL	0.05	0.06	-0.11 (NS)	0.03	0.06 (NS)	-0.01 (NS)	0.04	0.04	-0.02
NO	0.08	0.10	-0.05 (NS)	0.16 (NS)	-0.14 (NS)	0.01 (NS)	0.05	0.05	-0.00 (NS)
PL	0.18	0.26	-0.12	-0.02 (NS)	0.06 (NS)	0.05	0.13	0.08	-0.01
ES	0.26	0.27	-0.13	0.02 (NS)	0.09	0.06	0.11	0.10	0.00 (NS)
UK	0.20	0.17	-0.18	-0.00 (NS)	0.21	0.02	0.12	0.04	-0.01

AT: Austria; BE: Belgium; FI: Finland; FR: France; DE: Germany; IT: Italy; NL: the Netherlands; NO: Norway; PL: Poland; ES: Spain; UK: United Kingdom.

NS: Statistically non-significant at the 0.1 level.

Human capital indicators include education level and a second-order polynomial of experience or potential experience, according to country. As a proxy for vertical segregation, we use occupation and being in a managerial position. As a proxy for horizontal segregation, we include firm size, type of contract and economic activity of the firm. Other characteristics include region of residence, degree of urbanization and the number of children by age group, according to country.

distinguishing between the vertical and horizontal, is much higher in Northern European countries, Austria and Belgium. The vertical dimension of job segregation contributes the most to explaining the full-time/part-time wage gap. In other words, the concentration of part-timers in low-paid occupations at the bottom of the employment hierarchy is the main driver of their lower wages relative to women working full-time.

## **Gender wage gap, part-time employment and wage-setting institutions**

### *The spread of part-time employment and the gender wage gap*

The overall gender wage gap tends to be higher in countries where the share of part-timers is higher (Figure 4, Panel a). Differences in observable characteristics (education, type of occupation and industry) contribute substantially to explaining the gender wage gap in countries where part-time employment is widespread (Figure 4, Panel b). By contrast, the unexplained part of the gender wage gap tends to be lower in countries where part-time employment is more widespread (Figure 4, Panel c). The contribution of selection to the overall gender wage gap is small in all countries (Figure 4, Panel d). This evidence suggests that part-time employment contributes to the gender wage gap and that part-time workers are less discriminated against or have less relevant differences in unobservable traits in countries where part-time is more widespread.

### *Wage-setting institutions and earnings inequality*

Table 3 shows the correlation of wage-setting institutions with the predicted full-time gender pay gap and the female full-time/part-time wage differential. With the exception of the level of collective bargaining coverage, wage-setting institutions are more effective at reducing the pay gap between women in full-time and part-time jobs than between male and female full-time employees. Indeed, greater involvement of governments in wage bargaining, together with more centralized and a more coordinated wage bargaining, are negatively correlated with the pay gap between female full-timers and part-timers. Our results suggest that wage inequality between female full-timers and part-timers diminishes with the relative level of statutory minimum wage.<sup>5</sup> This is in line with studies affirming that a policy goal pursued by setting relatively high minimum wages also limits wage dispersion, especially in the lower tail of the distribution, because it provides a minimum floor (Autor et al., 2016; Lee, 1999). Bargaining coverage that is more encompassing and wage bargaining that is more centralized and coordinated are also negatively associated with the pay gap between female full-timers and part-timers. By contrast, the relation with the full-time gender wage gap is not statistically significant.

To summarize, our empirical evidence is in line with other studies (Blau, 2012; Kahn, 2015; Koeniger et al., 2007): it suggests that wage-setting institutions are more effective at compressing earnings at the bottom of the wage distribution. As a result, they are more effective in reducing the female full-time/part-time pay gap than the full-time gender wage difference because women, especially those employed on a part-time basis, are more likely to be in the lower tail of the wage distribution.

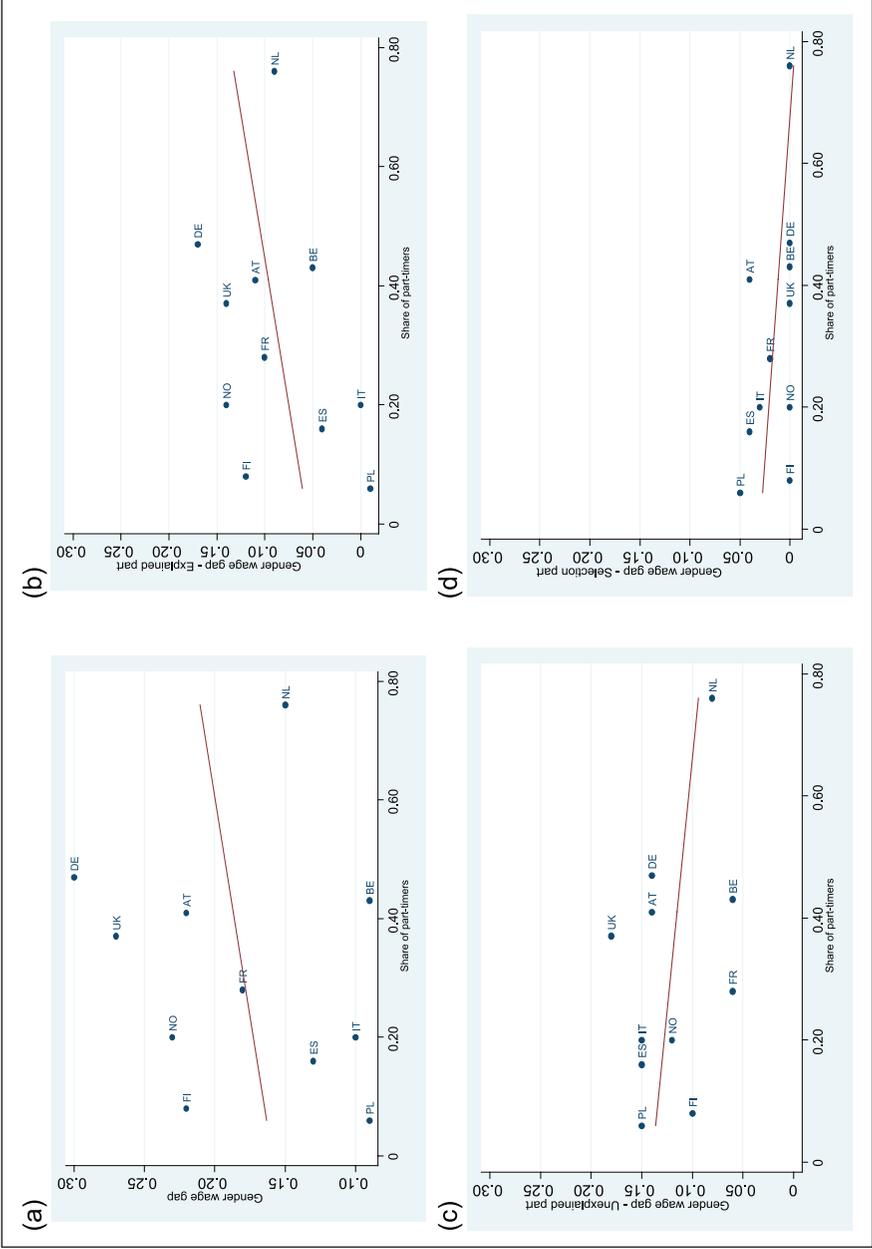


Figure 4. Share of part-timers and predicted gender wage gap (Panel a), explained part (Panel b), unexplained part (Panel c) and selection part (Panel d).

**Table 3.** Correlation of wage-setting institutions with predicted wage differences and their unexplained parts.

	Predicted full-time gender wage gap	Predicted female full-time/part-time wage gap	Male wage premium/overall gender wage gap	Full-time female wage penalty/overall gender wage gap	Part-time female wage penalty/overall gender wage gap
Government intervention in wage bargaining (Govint)	-0.21 (0.33)	-0.65*** (0.25)	-0.57** (0.27)	-0.28 (0.32)	-0.17 (0.33)
The predominant level at which wage bargaining takes place (Level)	-0.13 (0.33)	-0.51** (0.29)	-0.64*** (0.26)	-0.11 (0.33)	0.10 (0.33)
Coordination of wage-setting (Coord)	0.13 (0.33)	-0.62*** (0.26)	-0.62*** (0.26)	-0.28 (0.32)	-0.08 (0.33)
Adjusted coverage	-0.12 (0.33)	-0.45 (0.30)	-0.54** (0.28)	-0.23 (0.32)	0.25 (0.32)
Kaitz index <sup>a</sup> (median)	0.31 (0.47)	-0.59 (0.40)	-0.59* (0.40)	-0.61* (0.40)	0.83*** (0.28)
Kaitz index <sup>a</sup> (mean)	0.30 (0.48)	-0.67* (0.37)	-0.68** (0.37)	-0.62* (0.39)	0.77** (0.32)

Source: Govint, Level, Coord, and Adjusted coverage are derived from Visser's database (2015). Kaitz index is derived from the OECD database (2014).

<sup>a</sup>Kaitz index takes zero values for countries where a statutory minimum wage does not exist. In model estimation, we also control for a dummy variable equal to one if a statutory minimum wage exists, and zero otherwise.

Significance level: \*15 percent, \*\*10 percent, \*\*\*5 percent. Values in italics are significant at the 20 percent level. Standard errors are in parenthesis.

The last three columns of Table 3 show the correlation between wage-setting institutions and the unexplained parts of the gender wage gap: the male wage premium, the female full-time wage penalty and the female part-time wage penalty. All wage-setting indicators are negatively and significantly correlated with the male wage premium. Men's rewards due to unobserved characteristics tend to be reduced as a result of the wage-compression effects from more inclusive collective bargaining coverage, higher levels of minimum wages, greater involvement of governments in wage-setting and more centralized and coordinated wage bargaining. For full-time workers, the Kaitz index is negatively correlated with both the male wage premium and the female wage penalty. This means that higher levels of minimum wages benefit mostly women by compressing wage dispersion. For women in part-time jobs, the higher the Kaitz index the higher the wage penalty, which is somewhat surprising. But this result is driven by France, the country with the highest Kaitz index and a positive part-time wage penalty, while the other countries with a statutory minimum wage have no female wage penalty. All other wage-setting indicators have no effect on the reduction in the female full-time/part-time penalty. Overall, wage-setting institutions contribute to diminishing the gender wage gap by reducing the male premium. They also reduce the female part-time/full-time wage gap.

## Discussion and conclusion

We have examined the extent to which part-time employment explains the gender gap in hourly earnings in 11 European countries, using EU-SILC microdata. We also investigated how far the gender wage gap and its components are correlated with the rate of part-time employment and with wage-setting institutions.

The econometric analysis shows some common features across European countries. First, women in part-time jobs are highly segregated into poorly paid sectors and, especially, low-paid occupations. Both vertical and horizontal segregation explain most of the pay differences between women working full-time and women working part-time. Second, the wage gap between female full-timers and part-timers is largely explained by job characteristics and individual characteristics, mainly human capital. In most European countries, there is no 'discrimination' against part-timers (except for the endogenous discrimination associated with both vertical and horizontal segregation). This might be related to wage protection policies for part-time workers and the guarantee of a minimum hourly wage. Third, the gender wage gap among full-timers remains mostly unexplained after controlling for a large set of variables. Women employed on a full-time basis appear to be discriminated against in comparison to their male full-time colleagues. In most countries, women full-timers are also segregated into low-paid sectors and less-valued occupations relatively to men.

The comparative analysis shows that the gender wage gap tends to be higher in countries where part-time employment is a widespread working arrangement. However, the gender gap between female part-timers and full-timers in these countries is mainly explained by observable characteristics. In Germany, the Netherlands and the United Kingdom, part-time employment is more widespread than in Southern Europe and is more developed in female-dominated and low-paid sectors, which thus explains a large share of the gender wage gap. The comparative analysis also shows that wage-setting

institutions seem to reduce the female full-time/part-time pay gap by compressing earnings at the bottom of the wage distribution, and they reduce the gender gap among full-time workers by compressing the male unexplained wage advantage.

This study has some limitations. First, given the very low participation of men in part-time employment, we cannot measure the gender pay gap among part-timers. Second, we cannot control for some observable characteristics (such as training and tenure) and thus we may overestimate the unexplained part of the gender full-time wage gap. Third, our measurements of wages and working hours are self-reported. Given the possible under-declaration of higher wages and over-declaration of long working hours, the observed wage inequalities may be underestimated.

The increase in part-time employment has been a means for increasing labour force participation in many European countries, but at the price of an increased gender gap. We show that in countries where part-time work is widespread, the gender hourly pay gap is larger. However, we also show that this is far from the only factor that explains the gap. Furthermore, the evidence of a substantial unexplained gender wage gap in Europe calls for a strengthening of policies against wage discrimination, which could be achieved through a combination of policy measures: (1) an equal pay policy enacted through equal pay legislation and anti-discrimination laws that focus on maintaining equal wages for full-time workers; (2) an equal opportunity policy that enables women to have more continuous working careers and that encourages the desegregation of employment by gender and working hours and (3) the strengthening of wage-setting institutions with a focus on the upper part of the wage distribution, which deserves more attention since it is at the heart of gender wage inequalities, especially in a context where the labour market participation of highly educated women is increasing.

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### **Notes**

1. Respondents reporting long hours tend to overestimate the time spent working (Robinson et al., 2011). Given this bias, the hourly gender wage gap may be compressed.
2. Experience is measured by self-reported labour market experience, with no distinction between part-time and full-time work. The EU-SILC data do not provide information on tenure with the current employer. However, job tenure only marginally contributes to the gender wage gap (Blau and Kahn, 2016), which limits the possible omitted variables problem.
3. First- and second-stage estimation results are available from the authors upon request.
4. As a proxy for vertical segregation, we include the occupation and holding a managerial position.
5. The result is statistically significant when we use the Kaitz index based on mean wages instead of median wages, which are less sensitive to outlying values (Boeri, 2012).

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