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## Women's part-time wage penalties across countries

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# **Luxembourg Income Study Working Paper Series**

**Working Paper No. 467**

**Women's Part-Time Wage Penalties Across Countries**

**Elena Bardasi and Janet C. Gornick**

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**Luxembourg Income Study (LIS), asbl**

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## WORKING FOR LESS?

### WOMEN'S PART-TIME WAGE PENALTIES ACROSS COUNTRIES

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*Forthcoming in Feminist Economics*

#### ABSTRACT

This paper investigates wage gaps between part- and full-time women workers in six OECD countries in the mid-1990s. Using comparable micro-data from the Luxembourg Income Study (LIS), for Canada, Germany, Italy, Sweden, the UK, and the US, the paper first assesses cross-national variation in the direction, magnitude, and composition of the part-time/full-time wage differential. Then it analyzes variations across these countries in occupational segregation between part- and full-time workers. The paper finds a part-time wage penalty among women workers in all countries, except Sweden. Other than in Sweden, occupational differences between part- and full-time workers dominate the portion of the wage gap that is explained by observed differences between the two groups of workers. Across countries, the degree of occupational segregation between female part- and full-time workers is negatively correlated with the position of part-time workers' wages in the full-time wage distribution.

#### KEYWORDS

Female labor supply, part-time employment, wage differentials

JEL codes: J21, J24, J31

## INTRODUCTION

Do part-time women workers earn less than their full-time counterparts and, if so, what are the determinants of the pay differential? In this paper, we use cross-nationally comparable micro-data from the Luxembourg Income Study (LIS) to analyze the relative wages of part-time women workers in six industrialized countries in the mid-1990s.<sup>1</sup> While a number of single-country studies assess part-time pay penalties within North American and in European countries, very little research systematically compares part-time pay penalties across countries, and even less uses multivariate designs.<sup>2</sup> Our aim is to help fill this gap in the literature on part-time work.

Specifically, we assess whether women pay a penalty when they choose part-time work and whether this penalty varies across labor markets at similar levels of economic development but with differing occupational structures. We analyze the sources of part-time/full-time wage penalties in the United States, Canada, and four European countries, focusing in particular on the portions of the pay differential that remain after accounting for human-capital differences (differences in age and education) between part- and full-time workers. Given that, in several countries, part-time workers are reported to be concentrated in low-paying occupations, we focus

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<sup>1</sup> In a companion paper we assessed the factors that influence women's selection into full-time employment, part-time employment, and non-employment (see Elena Bardasi and Janet C. Gornick 2003). We found that in most countries the dominant factors were indicators of family-related responsibility – including having young children and dependent elderly family members at home – although the magnitude of these family effects varied substantially across countries.

<sup>2</sup> An earlier article by Janet C. Gornick and Jerry A. Jacobs 1996 assessed part-time/full-time wage gaps in four countries (the US, the UK, Canada, and Australia), also using the LIS data. Our article expands on that study in several ways. First, we use more recent data. Second, we assess a more diverse group of countries, including two continental European countries (Germany and Italy) and one social democratic country (Sweden), and finally, we use a two-stage design that corrects for selection into non-employment, part-time employment, and full-time employment.

on one particular explanation for the part-time/full-time wage gap across these countries – namely, occupational segregation between the two groups of workers.

Prior research establishes that, in a number of industrialized countries, engagement in part-time work is associated with multiple costs for workers. The costs associated with working part-time include lower hourly wages (Jill Rubery 1992; Organisation for Economic Co-operation and Development[OECD] 1994; Laurie Bassi 1995; Janet C. Gornick and Jerry A. Jacobs 1996; Colette Fagan and Jacqueline O’Reilly 1998; Alan Manning and Barbara Petrongolo 2005; Frances McGinnity and Patricia McManus 2007),<sup>3</sup> reduced access to occupational and social insurance benefits (Linda Grant 1991; Frederike Maier 1992; OECD 1994; Susan Houseman and Machiko Osawa 1998), and limited opportunities for advancement (Chris Tilly 1990; Rachel A. Rosenfeld 1993). Furthermore, part-time workers often lack job security, risking both layoffs and cutbacks in hours worked, in part because they are less likely to be unionized (Richard S. Belous 1989). Finally, these losses have long-term consequences as well, as part-time work brings lower pension income in old age (Jay Ginn and Sara Arber 1998). The result is that part-time work is associated with economic disparities, both among women and between women and men.

The determinants of these differentials remain, to a large degree, an open question. Much research indicates that one influential factor, in a number of countries, is the concentration of part-time workers, especially women, in poorly-remunerated work due, some researchers argue, to limited demand for part-time workers in more remunerative occupations (Danièle Meulders and Robert Plasman 1993; OECD 1994; Mark Smith, Colette Fagan, and Jill Rubery 1998).

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<sup>3</sup> There is some evidence that, while gender pay gaps narrowed in recent years, part-time/full-time wage gaps widened (Mary Gregory and Sara Connolly 2001). This finding, however, most likely refers to the years prior to the passage and implementation of the 1997 EU Part-Time Directive, which requires pay equity between part- and full-

Part-time wage penalties have clear social consequences and substantial policy implications. In general, wage differentials not explained by productivity-related factors suggest the presence of some form of discrimination, which raises important equity considerations. In the case of part-time work, further equity concerns arise concerning the distribution of “family time” – in particular, concerning the short- and long-term costs associated with providing high levels of care for family members.

The existence of penalties attached to part-time work is particularly troublesome because part-time work is typically “women’s work,” so women disproportionately bear the systematic costs of part-time work. Although most part-time women workers “voluntarily” work part-time (Lei Delsen 1998), meaning that they have sought part-time hours, many women face substantial constraints on the supply side.<sup>4</sup> First, longstanding gender divisions of labor in the home leave women with disproportionate responsibilities for childrearing and other domestic tasks. And second, in several countries, many women seek part-time rather than full-time work due to difficulties in securing the preferred level of out-of-home childcare (see Harriet B. Presser and Wendy Baldwin 1980; Deborah Brennan 1993; Bronwen Cohen 1993; Janet C. Gornick and Marcia K. Meyers 2003). In this context, many couples with children often specialize, selecting a

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time workers in EU member countries. Member countries were required to implement the Directive by 2000.

<sup>4</sup> The debate about whether “voluntary part-time work” is truly voluntarily is an ongoing one. Catherine Hakim (1997) claims that women’s sex role preferences are heterogeneous and hence their work orientations and behaviors are as well. Therefore, she argues, many women employed part-time genuinely prefer undemanding part-time work. Other studies stress the high percentage of part-time workers who are “voluntarily” working part-time; Lei Delsen (1998) reports that in the European Union in the 1990s approximately 80 percent of female part-time workers and 65 percent of male part-time workers report voluntarily working part-time. A different perspective is offered by Brendan Burchell, Angela Dale, and Heather Joshi (1997), who observe that while labor force surveys attempt to distinguish between voluntary and involuntary part-time work, they do not ask why respondents might state a preference for part-time work – that is, whether this was “a forced choice or their own preference” (p. 217). A recent report by the British Equal Opportunities Commission (Michael Thewlis, Linda Miller, and Fiona Theaney 2004) shows that almost half of British women working part-time in 2001 did so because of caring responsibilities. We argue that, beyond the voluntary/involuntary issue, many women may choose part-time work, but they do not choose the range

full-time employed father and a part-time employed mother. If part-time employment comes at the price of lost remuneration and work opportunities, both in the short- and long-term, the implication is that many women pay a substantial price for assuming the role of primary (or only) family caregiver. Any social policy that aims to support the family, and achieve greater equality of roles and income between men and women, must consider the costs of engaging in part-time work.

## CROSS-NATIONAL FRAMEWORK, RESEARCH QUESTIONS, AND EXPECTATIONS

### **Cross-national variation: A pattern of variability and commonality**

In this study, we assess variation in part-time/full-time wage differentials across six industrialized countries: Canada, Germany, Italy, Sweden, the UK, and the US. These countries have varied welfare state and regulatory designs, as well as diverse labor market structures and female activity rates. From the perspective of the well-known “three worlds of welfare capitalism” (see Gøsta Esping-Andersen 1990), our countries include three “liberal” welfare states (Canada, the UK, and the US), two “conservative” welfare states (Germany and Italy), and one “social democratic” welfare state (Sweden). Esping-Andersen demonstrated that policy frameworks vary across these welfare state models and that they tend to have distinct labor market trajectories for women. Women’s employment rates are generally highest in social democratic countries, where the extensive provision of public services increases both supply and demand. Moderate levels of

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of costs that often come with it.

female employment are seen in liberal countries, where workers – including women – have especially limited access to unearned income. Conservative countries have the lowest levels of women’s employment, as a result of slow-growth service sectors and tax and transfer policies that encourage mothers to remain in the home. Janet Gornick (1999) and others have reported that while female employment rates do indeed vary along welfare state lines, rates of part-time work are much less predictable, and variation within welfare state models is substantial.

Preliminary descriptive analyses on activity rates, based on the LIS data, confirmed that these six countries are indeed diverse with respect to activity rates of both full- and part-time workers. As we report in Table 1, women’s activity rates vary widely and, for the most part, as expected. Women in social democratic Sweden report higher activity rates (83 percent) than in the three liberal countries and Germany (68 to 72 percent) and, especially, in Italy (46 percent).

Furthermore, rates of part-time work among employed women also vary substantially across these countries, and they crosscut these welfare state models.<sup>5</sup> As is often reported, Sweden – our one social democratic exemplar – reports a high rate of female part-time work (34 percent of employed women), the highest among these six countries. Employed women in the two conservative countries report divergent rates of part-time work – 12 percent in Italy and a much higher 32 percent in Germany. There is also considerable variation across the much less regulated labor markets in the liberal countries; in the UK, part-time work (28 percent) is nearly as common as in Germany, while it is substantially less frequent in the US and Canada (19 percent).<sup>6</sup>

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<sup>5</sup> See section on “Data, variable construction, and sample” for the definition of part-time and the selection of the sample.

<sup>6</sup> For the most part, rates of part-time employment in these countries have changed fairly modestly in the years after



In contrast, the gendered nature of part-time work reveals a pattern of cross-national commonality. Men's part-time employment rates are far lower than women's in all of these countries, with fewer than 2 percent of employed men working part-time in Italy, Germany, and the UK, 3 percent in Canada, 5 percent in the US, and a high of 7 percent in Sweden. Thus part-time work remains largely "women's work;" across these countries, women constitute about 80 to 95 percent of the part-time workforce. In the remainder of this article, we present results on women workers only; samples of male part-time workers are too small for meaningful analyses.<sup>7</sup>

### **Research questions and expectations**

We began our empirical analyses with two interrelated research questions about the relative wages of part-time women workers across these diverse labor markets:

- In which countries do women who work part-time earn lower hourly wages than women who work full-time? To what extent is the part-time/full-time wage gap explained by worker and job-related characteristics and how does this explained portion vary across countries?

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the time to which our data pertains (the mid 1990s). Although there are no published statistics using a definition of part-time work that is consistent with ours (self-reported part-time work, excluding marginal workers) and with our age cut, we can report the trend using a 30-hour cutoff and a wider age group, based on OECD data (OECD 2006). Across the OECD countries as a whole, between the mid 1990s and 2005, about half of the countries reported an increase in part-time work, about a third indicated little change, and the remainder experienced a slight trend downward. Among our study countries, the prevalence of part-time work increased in Germany and Italy, remained stable in the three English-speaking countries (Canada, the UK, and the US), and declined somewhat in Sweden.

<sup>7</sup> Although our overarching interests include labor market inequality both among women and also between women and men, this study is limited to the wages of women workers, largely due to the small sample sizes of male part-time workers across countries. Earlier research suggests that while relatively few men are affected by part-time penalties, in a number of countries, those penalties are even larger for men than they are for women (Janet C. Gornick and Jerry A. Jacobs 1996; Mary Gregory and Sara Connolly 2001.)

- Is occupational segregation between part- and full-time workers a major explanatory factor underlying the part-time/full-time wage gap, and how does its contribution vary across countries?

We also began with a series of expectations, based on theory as well as prior research. First, we expected that part-time workers would earn significantly less per hour than full-time workers in (nearly) all countries for any given job, before observed differences between the two groups of workers are taken into account. We also expected that controlling for worker-related characteristics would reduce the pay gaps in all countries but not eradicate them.<sup>8</sup> As we discuss below, we thought that Sweden might be an exception, in which part-time workers might suffer no pay penalty with or without controls, or both.

Several factors lead us to expect part-time pay penalties in most countries. First, we expected to find unadjusted wage differentials that favor full-time workers, in part, because full-time workers are likely to have higher levels of human capital than part-time workers. The wage premium associated with that human capital differential creates an incentive to work longer (i.e., full-time) hours (substitution effect). It is also true, however, that because of the income effect, high wage earners might choose shorter (i.e.; part-time) hours. Which effect will prevail is an empirical question.

Another reason given for the existence of a full-time/part-time pay gap is that the unobserved characteristics of full- and part-time workers may differ. Catherine Hakim (1997) and

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<sup>8</sup> We refer to these pay gaps as “unadjusted” (without controls for observed differences) and “adjusted” (with controls for observed differences).

others have posited that this stems from the fact that women workers are very heterogeneous, and a substantial number whose priority is their non-market activity willingly choose undemanding employment, including part-time work. This suggests that full- and part-time women workers might differ on a host of unobserved traits. Presumably, women with the “part-time” traits are less productive on the job because their energy and attention are divided between employment and caregiving. These part-time workers might command lower wages than other women whose human capital is comparable but whose orientation is toward full-time employment and labor market attachment more generally. At the same time, others have concluded that part-time workers might be more productive, per hour, because they take fewer breaks per shift (see Hilda Kahne 1985). But ultimately, the point is that part- and full-time workers do not necessarily have the same distribution of unobserved characteristics and this may explain (part of) the wage gap.

A further reason to expect a wage gap between full- and part-time workers results directly from the existence of discrimination inside the enterprises. If part-time workers are systematically excluded from wage premiums and benefits accorded to full-time workers, or otherwise singled out for unfavorable treatment – employers may take advantage of their weaker bargaining power – part- and full-time workers with similar characteristics and in similar jobs will be paid differently.<sup>9</sup>

Finally, employers might pay part-time workers a lower effective hourly wage when they face high fixed labor costs such as forms of social insurance contributions that are assessed per

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<sup>9</sup> Although the concept of “discrimination” against part-time workers is not widely accepted in some countries, including the US, it is a relatively commonplace notion in much of Europe. According to the official language of the 1997 European Union Directive on Part-Time Work: “The purpose of the agreement is to eliminate discrimination against part-time workers and to improve the quality of part-time work” (Council of the European Union 1997). The EU terminology indicates that “discrimination” should be evaluated by comparing full- and part-time workers under a similar type of contract.

employee; the employer may lower the part-time hourly wage to compensate for the higher hourly fixed costs. While shifting fixed costs to the part-time worker has the negative effect of creating or increasing the wage gap vis-à-vis full-time workers, in principle it should have no adverse employment effect.

Second, we also began with the expectation that, in most of our countries, part- and full-time workers might be employed in different occupational groups and that those occupational differences could constitute a major explanatory factor underlying the part-time penalties. The cross-national literature on part-time work indicates that, in many countries, part-time workers are typically employed in the lowest paid occupations.

While it is well documented that part- and full-time workers report differing occupational distributions in a number of countries, the causality underlying that link has not been established with certainty. One possibility is that the causality operates primarily on the demand side, meaning that employers limit hiring part-time workers within some occupations while allowing or encouraging it in others. It is also possible that there is a substantial supply-side component, such that workers who choose part-time work disproportionately seek employment in a subset of occupations. Finally, workers in occupations that are more likely to offer part-time employment might be encouraged to reduce their hours.

The empirical literature on the question of what exactly underlies the overrepresentation of part-time workers in a subset of occupations is remarkably limited. The same could be said of the larger question as to why women more generally, both full- and part-time workers, are occupationally segregated from men. In an article entitled “Is There a Supply-Side to Occupational Sex Segregation?” Dina G. Okamoto and Paula A. England (1999) report empirical

evidence of supply-side factors, such as women's occupational aspirations, expectations, and gender role attitudes. But Okamoto and England conclude that supply-side factors overall explain only a small portion – less than 10 percent – of the variance in the occupational distribution. In a telling conclusion, they observe: “We believe...that both supply-side and demand-side factors are at work in perpetuating sex segregation. Yet we are struck by how modest our collective social science accomplishments are after several decades of research aimed at explaining occupational sex segregation” (1999:577).

The occupational segregation of part-time women workers from full-time women workers is clearly embedded in occupational sex segregation more generally, as female part-time workers are even more likely than their full-time counterparts to be employed in female-dominated occupations. A small body of research has directly tackled the question of the link between part-time work and occupation. Victoria Prowse (2005) summarizes the literature on this question:

There has been some debate over the source of this association between part-time employment and occupational status. Some authors argue that there exist constraints or structural factors which prevent women who work part-time from obtaining jobs in high occupations... Alternatively, it has been suggested that the difference in the occupational attainment of full- and part-time workers is due to differences in observed and unobserved characteristics between the two groups of workers. (2005:2)

Prowse's own empirical study (using longitudinal data from the UK) concludes that structural factors explain between 56 and 87 percent of the difference in occupational attainment between the two groups of women workers.

Louisa Blackwell (2001) also used panel data from the UK to assess the link between part-time work and occupation. She concluded that “[t]he segmented nature of part-time work meant that women who switched to part-time hours...were often thrown off their occupational path into low-skilled, feminized work. There was some ‘occupational recovery’ when they resumed full-time work” (2001:146). Blackwell noted, however, that her empirical research did not clarify whether these women were “happy” to accept this tradeoff (shorter hours for downward occupational mobility) or if the mobility was “involuntary,” and she concluded that a qualitative methodological approach was called for to disentangle the underlying decision process.

Regardless of the exact causal mechanisms operating, we expected that the nature of occupational segregation between part- and full-time workers, and its association with workers’ pay, would vary across these six countries. Prior published research on the occupational structure of part-time work led us to expect to find part-time workers heavily segregated into low-paid occupation in the liberal countries (the UK, the US, and Canada), moderately so in Germany and Italy, and possibly not at all in Sweden where, we posited, the occupational structure might even narrow the part-time/full-time wage gap.

The liberal countries are known for restricted part-time employment opportunities. In the UK for example, in response to labor shortages in the 1960s, an active state policy recruited women into part-time work. According to Brendan Burchell, Angela Dale, and Heather Joshi (1997), “jobs were set up in a context in which married women were seen as ‘a necessary expedient to tide over a period of labour shortage’ ...on the assumption that their primary responsibilities lay at home. Thus, part-time work was explicitly designed to be undemanding and

lacking in promotion prospects and responsibility. The ramifications of this are still being experienced by women today” (1997:211). Likewise, in the US, it is widely reported that part-time workers are concentrated in low-wage occupations. According to Jerome E. King (2000), 57 percent of all part-time workers in the US are employed in four relatively low-paying occupational groups: sales, clerical, food service, and handlers, equipment cleaners, helpers, and laborers. Sonia Drobnic and Immo Wittig (1997) report similar findings in the US, as does Robert J. Drummond (1992) in Canada.

The literature on part-time work suggests that, in contrast, in both Italy and Germany occupational segregation is likely to manifest differently, probably contributing less to the part-time/full-time wage differential. The low level of part-time work observed in Italy has been explained by both demand-side explanations (the negative attitude of unions toward part-time work, which has effectively deterred employers from hiring part-time workers) and supply-side factors (the overall low level of female employment). Tindara Addabbo (1997) reports that in Italy in the 1990s, unlike most other countries, part-time work has been disproportionately found in the manufacturing sector, where it is used as an alternative to layoffs. Thus we expected to find a relatively high share of female part-time workers in Italy in these kinds of blue-collar occupations; furthermore, we expected blue-collar wages for part-time workers to be relatively favorable as many of these workers would be full-time workers under normal conditions. And in Germany, recent evidence indicates that after the 1980s demand increased for part-time workers in skilled positions, with especially large increases in the higher levels of public service. According to Hans-Peter Blossfeld and Götz Rohwer (1997), most recent female entrants into part-time work are “civil servants, taking up the option of moving from full-time to part-time

work and back again without any serious disadvantages. These women could hardly be characterized as a marginal workforce” (1997: 172).

We expected yet another occupational story in Sweden where part-time work is even less marginalized. Marianne Sundström (1997) notes that in Sweden, “part-time work is not restricted to unqualified, low-level, and low-paid jobs; a considerable proportion of women with higher education also work part-time” (1997: 274). This is due, in part, to Swedish workers’ longstanding right – enacted in 1978 – to work reduced hours while their children are young. Furthermore, part-time workers in Sweden work longer hours than part-time workers in most other countries, in many cases approaching the hours of the full-time workers with whom they work side by side.

These institutional factors related to occupational structure lead us to expect to find the smallest (unadjusted) part-time/full-time pay gap in Sweden, and the largest gaps in the three liberal countries – Canada, the UK, and the US – with the magnitude of the wage gaps in Germany and Italy falling in between. Accordingly, we also expected that occupation would be a more important factor in pay gaps in the liberal countries than in the other countries.

Finally, we expected that the higher the occupational segregation of part-time workers the worse their relative position in the wage distribution with respect to full-time workers. We will close our analyses by considering the relationship between these two outcomes – occupational segregation and the relative position of part-time workers in the full-time earnings distribution – to explore the extent to which they capture the same labor market features.



## METHODS

### Estimating part-time/full-time wage differentials

In the first stage of our analysis, we estimate the wage gap between part- and full-time workers.

We estimate two wage equations, one (1) for part-time and the other (2) for full-time workers:

$$\ln Y_{iPT} = X'_{iPT} \beta_{PT} + u_{iPT} \quad (1)$$

$$\ln Y_{iFT} = X'_{iFT} \beta_{FT} + u_{iFT} \quad (2)$$

The dependent variable in each of the two equations is the logarithm of the hourly wage rate received by part- or full-time worker  $i$ . This is a function of individual and job characteristics including age, education, occupation and industry (vector  $X_{ij}$ ) plus unobserved differences ( $u_{ij}$ ),  $j=PT, FT$ .

Estimations of the two regressions, (1) and (2) above, using OLS may produce biased coefficients if the unobserved differences in  $u_{ij}$  are correlated with the individual propensity of being observed in either one of the two states  $j$ , which means there is endogenous selection into the state where the worker is observed. Our prior research (Elena Bardasi and Janet C. Gornick 2003) has indicated that selection of women in these countries into full- and part-time work is strongly predicted by individual and household characteristics. Therefore, it is highly likely that the observed groups of part- and full-time workers also differ in their unobserved characteristics. We accounted for the possibility of endogenous selection by adopting the well-known two-stage

Heckman procedure.<sup>10</sup> In the first step we estimate a multinomial logit model explaining the selection of women into full-time work, part-time work, and non-employment. Because non-employment is an alternative for women to part- or full-time work, we estimated a three-outcome equation in the first step. In the second step we estimated equations (1) and (2) where an extra - regressor – constructed based on the results of the first step – has been included to correct for selectivity:

$$\ln Y_{ij} = X'_{ij}\beta_j + \sigma_j \rho_j \frac{\phi[J(\eta_{ij})]}{F(\eta_{ij})} + v_{ij} = X'_{ij}\beta_j + \text{cov}(u_j, \eta_j)\lambda_{ij} + v_{ij} = X'_{ij}\beta_j + \delta_j \lambda_{ij} + v_{ij} \quad (3)$$

In equation (3),  $\lambda_{ij}$  is the “correction factor” computed from the multinomial logit and  $\delta_j$  its corresponding coefficient. Note that if  $\delta_j$  is found to be significantly different from zero, this will mean that correlation between the error term of the regression equation and the error term of the selection equation exists, meaning there is a significant effect due to unobserved characteristics. To identify the parameters  $\beta_j$  we need to include valid identifying variables in the selection equation.

After estimating the two human capital equations, we measure and decompose the part-time/full-time wage differential, using the Blinder and Oaxaca procedure (Alan S. Blinder 1973; Ronald L. Oaxaca 1973):

$$\overline{\ln w_{PT}} - \overline{\ln w_{FT}} = \sum_z \hat{\beta}_{zPT} (\bar{X}_{zPT} - \bar{X}_{zFT}) + \sum_z \bar{X}_{zFT} (\hat{\beta}_{zPT} - \hat{\beta}_{zFT}) + (\hat{\delta}_{PT} \bar{\lambda}_{PT} - \hat{\delta}_{FT} \bar{\lambda}_{FT}) \quad (4)$$

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<sup>10</sup> For details see James J. Heckman (1979), William H. Greene (1981), Lung-Fei Lee (1982, 1983), G. S. Maddala (1983), and Charles F. Mansky (1989).

where  $\hat{\beta}_{zj}$  are the estimated coefficients of variable  $z$  in the two wage equations and  $\bar{X}_{zj}$  are the average values of the variable  $X_z$  for the two groups of workers,  $j=PT, FT$ . This decomposition is performed under the assumption that the part-time wage structure applies to all workers.<sup>11</sup>

The first term on the right-hand side of equation (4) picks up the portion of the differential attributable to differences in observed characteristics. This is the portion of the gap that is often interpreted as the “fair part” of the differential. While we agree that it is analytically useful to isolate the contribution of observed characteristics as a group, we do not interpret this portion of the wage gap as necessarily “fair” because this would assume that the educational attainment of both part- and full-time employed women, as well the occupations and industries in which they are employed, are the result of unconstrained choices and behavior.

The second term captures the portion attributable to differences in the estimated coefficients. In the literature on wage gaps, this component is generally referred to as the “discrimination component.” Note that the difference between the constants is also included in this portion of the differential (as discussed in F. L. Jones and Jonathan Kelley [1984] and Ronald L. Oaxaca and Michael R. Ransom [1999]).

The last term is the part attributable to differences in the selection into each state due to unobserved traits of full- and part-time women. Because the selection effect depends on unobserved characteristics, in the decompositions (presented in Table 2) we group the difference in selection, coefficients, and constants into a single component that we define as the

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<sup>11</sup> We thought it more reasonable to imagine that full-time workers would be paid as part-time workers, because not all part-time jobs have a full-time counterpart. Although this does not need to be the case, in this case the opposite assumption produces broadly similar results (results not shown; available from the first author upon request).

“unexplained component” of the wage gap.<sup>12</sup> The further decomposition of the part of the differential attributable to observed traits into each single characteristic allows us to assess the contribution of occupation to the wage gap and opens the next stage of the analysis, which is concerned with occupational segregation.

### Measuring occupational segregation

We begin the analysis of occupational segregation by first describing the distribution of the two groups of workers across occupational categories and by showing average wage levels and unadjusted pay differentials across occupational groups. We then measure the level of segregation between part- and full-time workers using the Dissimilarity (or Duncan) index. The Dissimilarity Index captures the distribution of two types of workers across specific groups, where the groups are defined on the basis of a classification criterion, in this case occupation. For full- and part-time workers it is computed as:

$$DI = 1/2 \cdot \sum_i |\alpha_{iFT} - \alpha_{iPT}| \quad (5)$$

where  $\alpha_{iFT}$  indicates the proportion of full-time workers who are in group (occupation)  $i$  and  $\alpha_{iPT}$  the proportion of part-time workers who are in group  $i$ . The index is bound between 0 and 1

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<sup>12</sup> Although the inverse of the Mills’s ratios included in the wage regressions are based on estimated probabilities of being in a particular employment status, the determinants of a higher or lower wage for those who have a higher or lower probability of being in that employment status are not known. The selection bias arises from a correlation between the error terms of the selection and the wage equations, and while the estimated coefficients of the inverse of the Mills’s ratio can tell us whether such correlation is positive or negative and whether it is significant, they

and may be interpreted as the sum of the minimum proportion of part-time workers plus the minimum proportion of full-time workers who would have to change their occupation in order for the proportion part-time to be identical in all occupations (Richard Anker 1998). Therefore, the higher the index value, the higher the level of segregation in the labor market according to the classification adopted.

The magnitude of the index value depends heavily on the number of categories included in the classification system. Unfortunately, the LIS data do not allow a high level of detail; however, the level of detail is the same across countries, so comparisons can be carried out.

## DATA, VARIABLE CONSTRUCTION, AND SAMPLE

### Data

Our empirical analyses use micro-data from the Luxembourg Income Study (LIS) for the mid-1990s.<sup>13</sup> The LIS is an archive of micro-datasets from a large number of industrialized countries.<sup>14</sup> Individual- and household-level data on income, employment, and demographic variables are included in the datasets. The LIS staff has standardized the variables in the datasets, so cross-country comparisons are possible.

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cannot explain why this occurs because this correlation stems from characteristics that are all unobserved – such as higher ability, commitment, and productivity.

<sup>13</sup> The LIS datasets we use in our analysis are Canada 1994, Germany 1994, Sweden 1995, the UK 1995, and the US 1994. Our Italian results were calculated directly from the Banca d'Italia dataset (year 1995) because some key variables are missing in the LIS version.

## Variable definitions and samples

The dependent variable in the wage regressions is the logged hourly wage rate. Hourly wages are not directly available in the LIS dataset. We constructed them using annual gross earnings of the individual, average weekly hours worked, and the number of weeks worked during the income year, all variables for which we have information in these datasets and which allow us to take into account part-year workers and, of course, part-time workers.<sup>15</sup> We limit the influence of extreme values by dropping the top and the bottom five percent of the wage distribution.

In correcting the OLS wage regression for selection we account for three labor market statuses: non-employment, part-time employment, and full-time employment. Because of data limitations we pool the inactive and the unemployed,<sup>16</sup> treating that as an undifferentiated group (the non-employed). While we acknowledge that ideally the two groups should be kept separate, we believe that the costs of pooling are limited for two reasons. First, the distinction between unemployed and out-of-the labor force is less clear-cut for women than for men because many women do not seek employment – although they would prefer it – due to supply-side constraints, such as the lack of appropriate childcare. Therefore, even if we could distinguish between the two groups we would still have a lot of heterogeneity among women out of the labor force – a very broad group including genuine inactive, discouraged unemployed, as well as those not seeking work due to family-related constraints. Second, our main interest is in comparing the wages of

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<sup>14</sup> For details on the Luxembourg Income Study, and on the datasets, see <http://www.lisproject.org/>.

<sup>15</sup> In Italy gross earnings are not available and we used therefore net earnings.

<sup>16</sup> The “unemployment” status is not available in the Swedish dataset. Only students and retired people are identified as separate groups among the inactive, while all the remaining categories are pooled together under “not employed for other reasons.”

part-time and full-time workers; in that sense, the non-employed group is treated as a residual category.

A key decision involves the definition of part-time work. The definition of “part-time” in comparative research is always problematic because no statutory definition exists in most countries, and when definitions are adopted – for example, in national labor force surveys – they vary widely cross-nationally (Eurostat 1984;<sup>17</sup> European Industrial Relations Review [EIRR] 1990; OECD 1994; Alois Van Bastelaer, George Lemaître, and Pascal Marianna 1997). In this study, we adopt the self-definition of part-time work, which allows the adoption of the country-specific concept of part-time and, in each country, the sector- or industry-specific definition. In Sweden, self-definition was not available, so we imposed a thirty-hour cutoff, a part-time/full-time cutoff point frequently used in European labor force surveys.

In defining part-time employment, a second problem arises in that some workers report working fewer than ten hours per week. Following Hakim (1997), we define this employment status as “marginal part-time.” We exclude these workers from the group of part-time workers in the wage analyses and in the selection equation we combine them with the inactive and unemployed. One reason to exclude marginal part-time workers is that many of them hold so-called “junk” jobs – often occasional and temporary jobs – and we expect these workers to have idiosyncratic characteristics. Moreover, inaccurate reporting of weekly hours and/or annual earnings will produce, among such short-hour workers, large errors in the estimated hourly wage rate. Given that marginal part-time workers are relatively few in all of these countries (see Table

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<sup>17</sup> Eurostat (1984) reported that in the 1980s at least six different definitions of part-time work were in use in the European Community alone.

1), excluding them from the groups of part-time workers does not cause meaningful selection bias.

Finally, we exclude from our sample all agricultural and self-employed workers, due to well-known difficulties in measuring the hourly earnings of these two categories of workers. Moreover, we restrict the sample to the population aged 25 to 59, in order to exclude most students and retired persons, whose characteristics and labor market attachment are often different from part-time workers in the prime-age labor force.<sup>18</sup>

The independent variables in the wage equations include age, education (coded as low, medium, and high),<sup>19</sup> occupation, and industrial sector. Age both exerts an independent effect and acts as a proxy for total work experience.<sup>20</sup> As with education, the occupational classification had to be reduced to three broad groups to maximize cross-national comparability: “professionals,” “sales, clerical, and service,” and “blue-collar.”<sup>21</sup> Industrial sector dummies are included as well, to capture additional demand-side effects on the differentials.<sup>22</sup>

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<sup>18</sup> For more information on the coding of individual variables, please contact the first author.

<sup>19</sup> In a comparative context it is difficult to use detailed education categories, partly due to data limitations and partly due to fundamental differences in educational institutions across countries. Thus, we are able to construct only three education categories: “low,” “medium,” and “high.” In general, “low” means completion of the first stage of secondary education (eight to ten years of schooling), corresponding in most countries to the duration of compulsory education; “middle” corresponds to completing secondary education, and “high” indicates having attended or completed post-secondary education (either technical or academic).

<sup>20</sup> Labor economists often measure “total work experience” as age minus years of education minus age of compulsory school entry. We rejected this formulation because our education variables are generally categorical rather than continuous and, furthermore, because this estimation method is poorly suited to women.

<sup>21</sup> The LIS datasets do not include a high level of detail within occupational classification for two reasons. First, unlike Labor Force Surveys, many of the LIS surveys are primarily income surveys and they do not necessarily include three-digit ISCO codes for occupation. Second, in comparative research the level of detail in harmonized datasets is dictated by the “minimum common denominator” principle, so that the classification adopted for all countries has to correspond to the least detailed one.

<sup>22</sup> Industrial sector dummies include “agriculture,” “manufacturing,” “trade,” “transportation,” “finance/insurance,” “services,” and “public administration.” Unfortunately, information on the industrial sector is not available for Sweden and the UK.



In the selection equation, the dependent variable is the employment status of the working-age woman: non-employment, part-time employment, or full-time employment.<sup>23</sup> The validity of the selection model crucially depends on the instruments used to identify the wage equation's parameters. Along with the variables included in the wage equation (own age and education level),<sup>24</sup> we included other variables that are assumed to influence the probability of selection into full-time work, part-time work, and non-employment, but not the log wage level itself. For this purpose, we used a set of household variables typically used as instruments in this kind of analysis, namely parental status, marital status, and their interaction; the presence of young children of various ages; the presence of "dependent elderly" in the home; and "other household income." Other household income captures the total earnings of adult household members (other than the woman in question) plus the cash property income of the household as a whole. In economic terms, this captures the woman's "endowment".<sup>25</sup>

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<sup>23</sup> For a detailed discussion of the specification of the selection model, and the substantive results, see Elena Bardasi and Janet C. Gornick 2000. In the current paper, results from the estimation of the multinomial logit models are reported in Appendix Table 1. Sample means on all variables are available from the first author.

<sup>24</sup> Because they are not observed for non-employed women, occupation and industry variables had to be left out of the selection equation.

<sup>25</sup> This specification assumes, for simplicity, that the level of "other household income" is exogenous to a woman's own employment decisions. Although among married couples this assumption may be problematic, most labor economists consider this to be a reasonable assumption in the industrialized countries where very high rates of labor force participation and full-time work exists for married men.

## RESULTS

### **Part-time/full-time wage differentials**

The findings from the wage differential analysis are reported in Table 2.<sup>26</sup> The unadjusted wage gaps presented in the top row indicate that, as we expected, women who work part-time earn considerably less than full-time workers in five of the countries—and in all countries, except in Sweden, the gap is statistically significant.<sup>27</sup> Unadjusted wage penalties are largest in Italy and the US (22 percent), followed by Canada and the UK (12 to 15 percent), and Germany (8 percent). Sweden did, in fact, turn out to be an exception; women part-time workers earn slightly more (about 1 percent more) than full-time workers.<sup>28</sup>

In the subsequent rows of Table 2, we present the results of the Oaxaca decomposition of the full-time/part-time wage differential, computed according to equation (4). Here, we report the contribution to the wage gap of the two components: differences in observed characteristics and the unexplained component, where the latter captures differences in returns (and the constant) and in unobserved characteristics (the selection component).

The results reveal that the composition of the part-time/full-time differential varies remarkably across countries. In the UK, differences in observed characteristics between part- and full-time workers – be they worker- and/or job-related – explain almost the entire unadjusted

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<sup>26</sup> The full regression results are reported in Appendix Table 2.

<sup>27</sup> These unadjusted part-time/full-time wage gaps are calculated as the exponential of the difference between mean logged part-time wage and mean logged full-time wage. They are unadjusted in the sense that no controls are taken into account.

wage gap (93 percent). This portion of the wage differential (in this case, comprising age, education, and occupation) is the one traditionally interpreted as the “fair” component. As we noted earlier, we resist the “fairness” interpretation, especially in this case because of the evidence that British women, as of the 1990s, continue to experience the effects of the 1960s policy that encouraged women to work part-time and effectively crowded these part-time workers into a subset of occupations (see Burchell, Dale, and Joshi 1997.)

In contrast, in Germany, Italy, the US, and Canada, the unexplained component is the dominant one. This unexplained component might capture discrimination against part-time workers, in that broadly similar full-time workers are paid more per hour. Or, it is possible that part- and full-time workers differ systematically in their unobserved traits, which could be supply- and/or demand-related, including, for example, differences in aptitude, motivation, tenure, or other worker- or job-related factors.<sup>29</sup>

As we expected, Sweden produces an unusual result. Women working part-time are earning as much as women working full-time, and in fact, they earn slightly more, although this small positive differential is not statistically significant. Part-time workers have characteristics associated with lower pay, as in all the other countries, but the unexplained component operates in the direction of shrinking the part-time/full-time differential.<sup>30</sup>

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<sup>28</sup> This finding is consistent with the results in one of the few studies investigating the wage differential between full- and part-time workers in Sweden (Carl le Grand 1991).

<sup>29</sup> Note that some of these factors are theoretically unobservable (aspects of motivation), while others are unobserved due to lack of information in the dataset (tenure). In work not shown here, we separated the returns and selection components in the decomposition. However, the standard errors of the two parts were so large in five of the six countries that their individual contributions could not be captured precisely, so we combine these components here.

<sup>30</sup> The wage differential in Sweden is so close to zero that the two components derived from the Oaxaca decomposition are large in percentage terms – 2.5 and 3.5 times the unadjusted gap. When converted into log-amounts, these quantities are nonetheless very small.

How do the wage gaps when adjusted for observed differences compare to the unadjusted ones? In the five countries with part-time wage penalties, the component of the gap attributed to observed characteristics is negative in all six countries because the observed differences widen the gap, which means that controlling for differences in these characteristics reduces the part-time/full-time wage gap, as we expected it would. At the same time, the portion of the unadjusted gap explained by observed characteristics varies dramatically.

The last row of Table 2 presents the adjusted wage gaps. The largest gaps – when observed worker- and job-related differences are accounted for – are still found in the US (18 percent) and in Italy (15 percent). However, the ranking of the UK shifts markedly; if part- and full-time workers had the same observed characteristics, the wage gap would not be significantly different from zero. Canada and Germany rank in an intermediate position (8 to 9 percent). Sweden's adjusted wage gap is actually larger than the unadjusted wage gap, meaning that when workers with similar characteristics are compared, the small wage advantage associated with part-time work increases, even though it still remains quite small.

Table 3 further decomposes the wage differentials, allowing us to see the separate contributions of the observed variables – age, education, occupation, and industry – in relation to both the explained component and the entire wage gap. Here we see an overall pattern of commonality. In the five countries with part-time wage penalties, occupation clearly dominates the portion of the gap attributable to observed characteristics and, with respect to the total gap, it accounts for 9 percent in Germany, 11 to 17 percent in Canada and the US, 30 percent in Italy, and over 50 percent in the UK. For the most part, the differences in age and education between the two groups of workers contribute much less. Furthermore, when industry information is

available, it generally explains far less than occupation; Germany is an exception where industry explains nearly as much as occupation. In Italy, differences in industrial sector actually narrow the part-time/full-time gap.

Rather than reflecting genuine differences in preferences, occupational differences between part- and full-time workers could be the result of occupational discrimination. For this reason, the last row of Table 3 presents the part-time/full-time wage differential adjusted only for “human capital” characteristics, i.e., age and education. Because age and education explain only a small proportion of the part-time/full-time wage gap in all of these countries, this adjusted differential is very close to the unadjusted one. In the case of Germany it is larger than the unadjusted differential, given that its part-time workers are older than full-time workers (the first row of Table 3 indicates that in Germany age is a negative component of the gap, in other words, it reduces it). According to this version of the adjusted wage differential, Canada, Germany, and the UK have similar differentials (around 9 to 12 percent), while the US and Italy still display the largest gaps, around 20 percent.

For the most part, the findings presented in this section are consistent with our prior expectations. Part-time wage penalties were found in five of the countries – again, with the exception of Sweden – and the pay penalties are reduced but not eradicated when we control for observed differences between the two groups of workers. Furthermore, to the extent that observed characteristics explain the part-time/full-time wage gaps, occupational differences dominate those portions of the unadjusted pay differentials. With more disaggregated education and occupation data we could probably explain an even higher fraction of the part-time/full-time wage gap.

And what of the country-specific findings? The results confirm our expectation that occupational differences between part- and full-time workers are extreme in the UK, and that those differences widen the part-time/full-time pay gap; the results in Table 3 indicate that 58 percent of the unadjusted gap in the UK is attributable to occupation. And the results in Sweden were also in line with our expectations in that they suggest the opposite, that is, that part-time workers are not penalized by occupational differences.

The German results are also consistent with our expectations that the occupational structure of part-time work is less disadvantageous in Germany than in the three liberal countries. Furthermore, our conjecture that Italian women in part-time work might be concentrated in manufacturing appears to be consistent with the finding that industrial differences between part- and full-time workers are either very small or actually narrow the wage differential in Italy. However, our related expectation that Italian part-time workers might be concentrated in comparatively well-paid blue-collar work is not consistent with the relatively large contribution of occupation to the pay gap; occupation explains 30 percent of the total pay gap. It may be that Italian part-time workers are concentrated in blue-collar occupations but blue-collar wages may be especially low for part-time workers. We will return to this in the following analysis.

The cross-national rankings in the pay gap itself surprised us to some degree. In particular, the relatively favorable results in Canada for part-time workers, especially when compared to the US, and the particularly large gaps seen in Italy, both for adjusted and unadjusted wages, were unexpected. In the next sub-section, we look for further explanations by analyzing occupational segregation and the “position” of part-time workers in their country’s full-time wage distributions.

### **Occupational segregation between part-time and full-time workers**

As reported in the top panel of Table 4, part-time workers in all six countries are under-represented in the most remunerative occupational category – the professional and administrative occupations, and that under-representation is especially sharp in the UK and in Italy. In Canada, the US, and Sweden, part-time workers are also under-represented at the bottom of the female occupational scale (in blue-collar occupations), while in Germany, the UK, and especially in Italy, the opposite is true. In all countries – except Italy – the majority of women part-time workers are employed in sales, clerical, and service occupations, as generally expected.

The top panel of Table 4 also reports the Dissimilarity Index values, which indicate the percentage of workers who would have to change occupational groups in order for part- and full-time workers to be proportionately represented across these groups. That value varies from a low of 7 percent in Germany; to between 13 and 16 percent in Canada, the US, and Sweden; to a substantially greater 24 percent in the UK and a high of 27 percent in Italy, where part-time workers are nearly absent in the professional/administrative occupational group and clearly over-represented among blue-collar workers.

The second panel of Table 4 reports the average wage by occupation, separately for full- and part-time workers; the part-time/full-time differential in percentage terms is reported in the bottom panel. These lower panels indicate three findings. First, with the exception of Italy, part-time workers are actually not concentrated in the occupational group with the lowest pay for women workers (the blue-collar group); the service/clerical/sales occupations in which they are

concentrated is somewhat higher paying in all six countries – even though they are still far lower paid than the professional/administrative groups. Second, part-time workers earn less than full-time workers in all occupational categories, with three exceptions: professionals/administrators in the UK and Germany and sales/clerical/service workers in Sweden. Third, in the occupational groups where most women part-time workers are employed – sales/clerical/service – the part-time/full-time differential is substantial in the five countries (except Sweden). The part-time penalty within this occupational group ranges from 18 percent in the US and Italy, to 7–10 percent in the UK and Germany, to only 4 percent in Canada.

The results in Table 4 help explain the unexpected cross-national rankings reported in the prior section, in particular the more favorable result in Canada compared to the US and the Italian result. Canadian part-time workers are more likely than their American counterparts to be in professional/administrative jobs and those in sales/clerical/service jobs face a smaller (within-occupation) part-time penalty. Italian women who work part-time constitute the most dramatic case of over-representation in the lowest paid grouping (the blue-collar occupations).

Finally, Figure 1 assesses the relationship between the degree of occupational segregation (between part- and full-time workers) and part-time workers’ “position” in the full-time wage distribution. The horizontal axis of Figure 1 presents country values on the occupational Dissimilarity Index (see Table 4). The vertical axis of Figure 1 presents the female part-time workers’ median wage relative to the female full-time wage distribution within their country, a second indicator of the part-time/full-time differential (and one that is independent of wage dispersion). The vertical axis of Figure 1 shows that part-time workers are most favorably positioned in Sweden, where a part-time worker at the fiftieth percentile in the part-time



distribution earns a wage equivalent to that of a full-time worker at the forty-third percentile in the full-time distribution. The median part-time worker's wage corresponds, in their country's full-time distribution, to the thirty-eighth percentile in Germany, the thirty-sixth in Canada, the twenty-sixth percentile in the US and the UK, and the twenty-third percentile in Italy.

Figure 1 indicates that the degree of occupational segregation between part- and full-time workers is a fairly strong predictor of part-time workers' relative position in their country's full-time wage distribution; the correlation coefficient is 0.73. The figure also reveals that Sweden and the US, both of which have moderate levels of segregation, deviate from the line. Earlier results illuminate this finding. In Sweden, the vast majority of female part-time workers are in sales/clerical/service occupations, where they enjoy a small pay premium (+3.2 percent). Thus, unlike in the other five countries, part-time workers' wages in Sweden closely match those reported by full-time workers, which pushes them up in the vertical dimension. In the US, part-time workers are also overrepresented in sales/clerical/service occupations; however, in the US, part-time workers in these occupations face a substantial negative wage differential relative to their full-time counterparts (-17.6 percent), one of the largest differentials reported within an occupational grouping in any of these countries.

## SUMMARY OF FINDINGS AND DIRECTIONS FOR FUTURE RESEARCH

### Summary of findings

In our first set of analyses, we found part-time wage penalties for women in five countries – with the exception of Sweden; however, the magnitude of the penalty, as well as its composition, varies markedly across countries.<sup>31</sup> Unadjusted wage gaps (at the mean) are largest in Italy and the US (22 percent), followed by Canada and the UK (12 to 15 percent), and Germany (8 percent). In contrast, Swedish part-time women workers earn slightly more than full-time women workers (+1 percent).

The extent to which observed differences explain the wage penalties varies enormously, accounting for as little as 9 percent in Germany, and as much as 93 percent of the gap in the UK. In the five countries with part-time wage penalties, the portion of the gap that is explained by observed differences is largely explained by the occupation component, about half of the explained portion in the US, nearly two-thirds in the UK, and 80 percent or more in Canada, Germany, and Italy. For the most part, differences in age and education between the two groups of workers contribute much less to the wage penalties.

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<sup>31</sup> We have argued that women part-time workers in a number of countries experience wage penalties compared to women full-time workers, and that these wage differentials signal inequality among women and (because part-time work is typically feminized) between women and men. It is important to stress, however, that the relationship between the female part-time/full-time gap and the gender wage gap is not straightforward. It is possible that in some countries, all women may be doing quite poorly in the labor market; they could be occupationally segregated from men and gender wage gaps could be large. Yet it could still be the case that, among women in that country, the part-time/full-time wage gap is relatively small. We did not address this directly in this paper in our empirical analyses.

Our second set of analyses revealed that part-time workers are substantially segregated from full-time workers by occupation in the countries with part-time pay penalties. Especially high levels of occupational segregation (Dissimilarity Index  $> .250$ ) are found in the UK, where 59 percent of female part-time workers perform service/clerical/sales jobs (compared to 41 percent of full-time working women), and in Italy, where 53 percent of female part-time workers are in blue-collar occupations (compared to 30 percent of Italian full-time employed women). The Italian case is the unusual one, where women part-time workers are concentrated in blue-collar occupations, which is also the lowest paid of the three groups across all six countries. Furthermore, occupational segregation is highly correlated with the position that part-time workers occupy in their respective full-time wage distributions. While these findings are illuminating, they are, of course, limited by the broad occupational categories that we used in order to achieve cross-national comparability.

### **Directions for future research: comparative policy analysis**

Our results reveal that there is considerable commonality across the six countries. In all six, part-time work is “women’s work” and, except in Sweden, women part-time workers earn substantially less than their full-time counterparts, even after controlling for observed differences. In several countries, the gendered nature of part-time work and the presence of substantial part-time/full-time wage differentials indicate that part-time work is associated with labor-market inequalities both among women and between women and men.

At the same time, there is also marked variation across countries. The extent to which that variation is shaped by difference in social and labor market policies that relate directly to part-time work remains an open question. Four important, and inter-related, questions stand out as a basis for future research into the interplay between policy and part-time pay penalties across countries.

First, to what extent do differences in cross-national policy explain the varying levels of occupational segregation between part- and full-time workers? Part-time workers in some countries are more integrated with full-time workers, and policy clearly plays a role. In Sweden, for example, since 1978 parents have the right to work part-time at pro-rated pay until their children reach eight years of age. As a result, many Swedish women who work part-time occupy the same jobs they held in the past – and will return to in the future – as full-time workers. Swedish working time policy is complemented by family leave policies that allow leave to be combined with part-time hours, which, likewise, leads to higher levels of integration between part- and full-time workers. The 1997 European Union (EU) Directive on Part-Time Work, implemented in 2000, is expected to reduce the occupational segregation of part-time workers in member countries. It directs employers to “give consideration” to workers who request transfers between part- and full-time work. Furthermore, several EU member countries – including Germany, the UK, and the Netherlands – recently implemented legislation granting some groups of workers formal rights to request to shift to part-time work without changing jobs, occupations, or employers (Gornick and Meyers 2003; Ariane Hegewisch 2005). Presumably, in countries without working-time policies like these, substantial numbers of women who seek part-time hours are forced to select particular occupations in which part-time work is overrepresented and,

in many cases, relatively poorly remunerated. The extent to which policy configurations open opportunities for part-time work across a full range of occupations is an important area for future research.

Second, does cross-national policy variation help explain variation in the magnitude of the wage differential – in particular, the component that remains unexplained and could, at least partially, be attributed to “discrimination?” There has been substantial policy development in recent years, at both the supra-national and national levels, aimed at insuring equity in remuneration between part- and full-time workers holding either the same or comparable jobs.<sup>32</sup> For example, both the 1994 adoption of the ILO’s *Part-Time Work Convention* and *Recommendation* as well as the 1997 EU’s *Directive on Part-Time Work* were intended to assure equal pay for part-time workers (Patrick Bolle 1997). When the EU Directive came into effect, some European countries already had national regulations in place that provided protections for part-time employees. In some countries, the legislation was even more favorable to part-time workers than the guidelines laid out in the Directive (OECD 1999). Other countries have since moved to enact new legislation. Protections for part-time workers outside Europe are far weaker, typically limited to minimum wage coverage.

The effectiveness of anti-discrimination and pay equity legislation, such as the new regulations that have recently come into force across Europe as a result of the EU Directive, remains to be seen; a period of evaluation is now underway. Preliminary findings on the impact of the Directive as it was implemented in UK law suggest that its effectiveness may be very limited. Aileen McColgan (2000) reports that the majority of British part-time workers are de

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<sup>32</sup> These policy developments came into effect in Europe after the years covered by our empirical results.

facto excluded from the benefit of the UK regulation because the law requires that part-time workers be treated fairly relative to a “full-time comparator,” that is, a full-time worker engaged in broadly similar work and employed on the same type of contract. According to the UK government’s estimates, reported by McColgan, less than one-sixth of the part-time workers in the UK have a “comparator.” This is linked to the fact that part- and full-time workers, in many countries – including the UK – work in different sectors and/or under different conditions, placing many part-time workers beyond the reach of most pay equity legislation. The development, implementation, and effectiveness of part-time equity policies constitute an important line of inquiry for future research.

Third, to what extent do public policies that relate to non-wage compensation reinforce or counteract part-time wage penalties? We find clear evidence that part-time workers in five of these countries earn less in cash wages than do full-time workers, both before and after controls. But we know little about how non-wage compensation either exacerbates or offsets these wage penalties, and how that varies across diverse policy settings. In addition to calling for pay equity, the recent EU *Directive on Part-Time Work* also requires member countries to enact equal treatment measures with respect to part-time workers’ occupational benefits, training, career-enhancing opportunities, and working conditions. The effects of country-level policies on part-time workers’ non-cash rewards, both in Europe and in North America, is a third crucial area for future research.

Fourth, will policy measures aimed at raising the quality and/or availability of part-time employment lead to unintended negative consequences for women and men seeking part-time work and/or for all women seeking employment? If employers find it onerous to compensate

part-time workers equitably vis-à-vis full-time workers, they may decrease their demand for part-time workers, effectively reducing options for persons who wish to work reduced hours. If employers are pressured or required to allow full-time workers to shift to part-time work, they may hesitate to hire women (or parents), whom they expect will be most likely to take-up options to shorten their hours. This question fits squarely into a growing body of contemporary policy research that asks the broader question: Do work-family reconciliation policies harm women's (or parents') employment prospects due to discriminatory behavior on the part of employers who resist being forced to accommodate their needs? The possibility that public protections for part-time workers may have harmful consequences is an important line of analysis and one that demands attention as these policies take hold and grow.

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The data themselves are available for public access through the Luxembourg Income Study (<http://www.lisproject.org>).



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Table 1 – Activity rates and part-time rates in six countries (percentages)

	<i>Canada</i>		<i>US</i>		<i>UK</i>		<i>Germany</i>		<i>Italy</i>		<i>Sweden</i>	
	<i>% of all</i>	<i>% of employees</i>	<i>% of all</i>	<i>% of employees</i>	<i>% of all</i>	<i>% of employees</i>	<i>% of all</i>	<i>% of employees</i>	<i>% of all</i>	<i>% of employees</i>	<i>% of all</i>	<i>% of employees</i>
<i>Women:</i>												
Full-time	48.2	81.1	52.4	81.2	39.3	71.9	36.1	68.2	31.1	88.0	40.7	66.3
Part-time	11.5	18.9	12.5	18.8	15.4	28.1	16.6	31.8	4.4	12.0	20.6	33.7
Marginal part-time	2.0	–	1.7	–	3.3	–	1.1	–	0.2	–	3.2	–
Employed	68.5		71.7		67.7		68.2		45.9		82.7	
Non-employed	31.5	–	28.3	–	32.3	–	31.9	–	54.1	–	17.3	–
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<i>Male part-time rate</i>	3.3		4.6		1.5		1.4		1.4		6.8	
<i>Female share in part-time employment</i>	83.7		79.1		94.9		94.3		84.5		83.3	

Notes: Persons in the military are excluded from the sample. ‘Employees’ include all non-agricultural wage-and-salary workers. The sample is restricted to persons aged 25–59. Part-time status is self-defined, except in Sweden where it is defined as fewer than thirty hours per week. Marginal part-time work is defined as one to nine hours per week.

Table 2 – Decomposition of part-time/full-time wage differential in six countries (percentages)

	<i>Canada</i>	<i>US</i>	<i>UK</i>	<i>Germany</i>	<i>Italy</i>	<i>Sweden</i>
Total (unadjusted) differential	-11.7 ***	-21.7 ***	-15.1 ***	-8.4 ***	-22.1 ***	+1.1
<i>Component attributable to:</i>						
Characteristics	-20.5 ***	-21.3 ***	-92.8 ***	-8.9	-35.0 ***	-151.5 ***
Unexplained portion (returns, constant, selection)	-79.5 ***	-78.7 ***	-7.3	-91.1 ***	-65.0 ***	+251.5 ***
<i>Total</i>	-100.0	-100.0	-100.0	-100.0	-100.0	+100.0
Adjusted differential	-9.4 ***	-17.5 ***	-1.1	-7.7 ***	-15.0 ***	+2.8 ***

*Notes:* Persons in the military are excluded from the sample. The sample is restricted to non-agricultural wage-and-salary workers. The sample is restricted to persons aged 25–59. Marginal part-time workers (fewer than ten hours) are excluded. The distribution of wages has been cleaned of outliers by dropping the top and the bottom five percent. The total differential indicates the gap between part-time and full-time workers in percentage terms (-11.7 means that part-time workers are earning 11.7 percent less than full-time workers). The decomposition is expressed as a percentage of the total differential. In the table a negative component indicates that that component widens the gap between part-time and full-time workers (at the disadvantage of part-time workers), thus explaining a portion of the unadjusted wage differential. A positive number indicates that that component actually reduces the unadjusted wage differential (works in favor of part-time workers). The adjusted differential has been computed as the total (unadjusted) differential reduced by the percentage attributable to observed characteristics. \*\*\* indicates significance at the 1 percent level.

Table 3 – Decomposition of portion of gap attributable to observed characteristics

	Canada		US		UK		Germany		Italy		Sweden	
	<i>As a % of the charact. component</i>	<i>As a % of the total wage gap</i>	<i>As a % of the charact. component</i>	<i>As a % of the total wage gap</i>	<i>As a % of the charact. component</i>	<i>As a % of the total wage gap</i>	<i>As a % of the charact. component</i>	<i>As a % of the total wage gap</i>	<i>As a % of the charact. component</i>	<i>As a % of the total wage gap</i>	<i>As a % of the charact. component</i>	<i>As a % of the total wage gap</i>
Age	1.0	0.2	0.1	0.0	8.4	7.8 ***	-136.7	-12.2 **	0.9	0.3	12.2	-18.5 ***
Education	6.3	1.3	19.8	4.2 ***	29.5	27.3 ***	45.9	4.1 *	18.7	6.5	86.2	-130.6 ***
Occupation	81.7	16.8 ***	53.2	11.3 ***	62.1	57.6 ***	101.3	9.0 ***	85.9	30.1 ***	1.6	-2.4
Industry	11.0	2.3	26.9	5.7 ***	NA	NA	89.5	8.0	-5.5	-1.9	NA	NA
Total	100.0	20.6	100.0	21.2	100.0	92.7	100.0	8.9	100.0	35.0	100.0	-151.5
Adjusted differential <sup>HC</sup>	-11.5***		-20.8***		-10.0***		-9.0***		-20.8***		+2.7***	

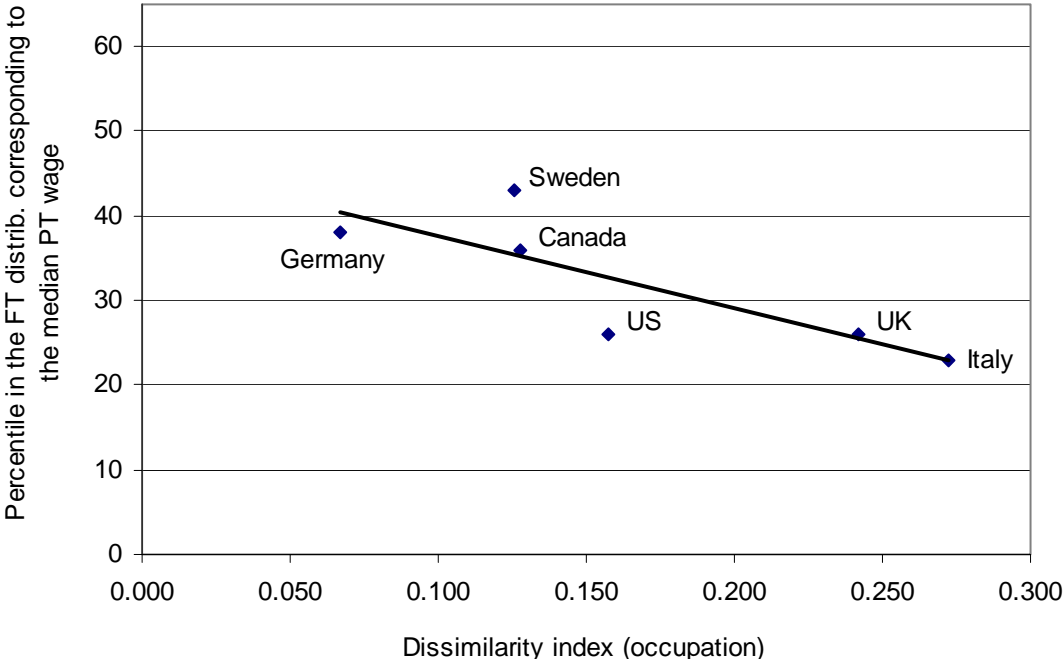
Notes: See note to Table 2 for the sample definition. The “adjusted differential<sup>HC</sup>” is the total (unadjusted) differential reported in the first row of Table 2 reduced by the percentage attributable to age and education. \*\*\* indicates significance at the 1 percent level, \*\* indicates significance at the 5 percent level, and \* indicates significance at the 10 percent level. These significance levels are reported only once but apply to both columns of each country; NA indicates “not available.”

Table 4 – Distribution of full-time and part-time workers across occupations and average wage by occupation and employment status

	<i>Canada</i>		<i>US</i>		<i>UK</i>		<i>Germany</i>		<i>Italy</i>		<i>Sweden</i>	
	<i>Full-time</i>	<i>Part-time</i>	<i>Full-time</i>	<i>Part-time</i>	<i>Full-time</i>	<i>Part-time</i>	<i>Full-time</i>	<i>Part-time</i>	<i>Full-time</i>	<i>Part-time</i>	<i>Full-time</i>	<i>Part-time</i>
<i>Distribution of full-time and part-time workers across occupations (%)</i>												
Profess./administrative	46.3	36.7	34.9	24.1	42.3	18.0	29.8	22.4	31.6	4.5	15.5	5.6
Sales/clerical/services	44.5	58.3	53.4	68.9	40.7	58.9	53.5	57.8	38.8	42.8	78.5	90.3
Blue-collar	9.2	5.0	11.7	7.0	17.0	23.1	16.7	19.8	29.6	52.7	6.0	4.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Dissimilarity Index values	.128		.157		.242		.067		.273		.126	
<i>Average wage by occupation</i>												
Profess./administrative	16.29	16.14	14.41	12.37	8.46	9.58	24.48	25.40	16.00	12.24	100.59	94.64
Sales/clerical/services	12.91	12.45	10.37	8.55	6.09	5.65	21.61	19.48	12.07	9.96	83.28	85.92
Blue-collar	12.20	11.38	9.57	8.09	5.11	5.00	18.02	15.00	9.62	8.73	80.75	77.52
<i>Average part-time/full-time wage differential by occupation (%)</i>												
Profess./administrative	-0.9%		-14.2%		+13.2%		+3.8%		-23.5%		-5.9%	
Sales/clerical/services	-3.6%		-17.6%		-7.2%		-9.9%		-17.5%		+3.2%	
Blue-collar	-6.7%		-15.5%		-2.2%		-16.8%		-9.3%		-4.0%	

Notes: See note to Table 2 for the sample definition. The average wage is expressed in national units; for Italy, it is given in thousands of lire.

Figure 1 – Relationship between the Dissimilarity Index for occupation and the relative position of part-time workers in the full-time workers' wage distribution



Appendix Table 1 – Multinomial logit results (relative risk ratios and significance level)

	Canada	US	UK	Germany	Italy	Sweden
<i>Full-time</i>						
Married	0.99	0.82 **	1.46 **	1.03	0.48 **	1.87 **
Parent	0.55 **	0.79 **	0.17 **	0.48 **	1.48	1.09
Married×parent	1.38 **	1.11 *	2.06 **	1.21	0.75	0.87
Children 0–2	0.58 **	0.51 **	0.35 **	0.06 **	0.75 **	0.69 **
Children 3–5	0.55 **	0.50 **	0.36 **	0.29 **	0.78 *	0.77 **
Children 6–11	0.57 **	0.61 **	0.47 **	0.48 **	0.66 **	0.63 **
Children 12–7	0.99	0.94 *	1.39 **	1.00	0.64 **	0.85
Spouse dependent 18–64	0.50 **	0.56 **	0.27 **	0.57 **	0.93	0.40 **
Adult dependent 18–64 (no spouse)	0.59 **	0.75 **	0.58 **	0.88	0.64 **	dropped
Adult dependent 65–74	0.64 **	0.62 **	0.51 **	0.61 *	0.69 **	0.52 **
Adult dependent 75+	0.72 **	0.81 **	0.55 *	0.62	1.04	dropped
Adult dependent 65–74×child 0–5	3.07 **	1.62 **	10.48 **	2.10	0.54	dropped
Other household income	1.00 **	1.00 **	1.00	0.99 **	1.05 *	1.00 **
Other household income squared	1.00 **	1.00 **	1.00	1.00	1.00 **	1.00 **
Age	1.31 **	1.18 **	1.28 **	1.18 **	1.70 **	1.10 **
Age squared	1.00 **	1.00 **	1.00 **	1.00 **	0.99 **	1.00 **
High education level	4.55 **	4.28 **	3.05 **	3.41 **	5.52 **	3.35 **
Medium education level	2.82 **	2.50 **	2.29 **	1.50 **	3.84 **	2.11 **
<i>Part-time</i>						
Married	1.17 *	1.03	2.44 **	2.13 **	0.67 *	2.80 **
Parent	0.63 **	0.87 *	0.92	2.36 **	3.00 **	1.44 *
Married×parent	1.69 **	1.48 **	1.66 *	0.58 *	0.52	0.85
Children 0–2	0.69 **	0.63 **	0.41 **	0.14 **	0.86	0.61 **
Children 3–5	0.84 **	0.69 **	0.61 **	0.42 **	0.83	1.20 *
Children 6–11	0.94	0.93	0.69 **	0.70 **	0.52 **	1.11
Children 12–17	1.13 *	1.15 **	0.88	0.87	0.60 **	0.92
Spouse dependent 18–64	0.48 **	0.52 **	0.38 **	0.70 *	0.75	0.42 **
Adult dependent 18–64 (no spouse)	0.72 **	0.75 **	0.61 **	0.95	0.61 **	dropped
Adult dependent 65–74	0.87	0.77 **	0.36 **	0.82	0.88	0.76
Adult dependent 75+	0.63 **	0.76 **	1.03	1.16	1.21	dropped
Adult dependent 65–74×child 0–5	1.21	1.20	dropped	2.04	0.49	dropped
Other household income	1.01 **	1.00 **	1.00	1.00	1.01	1.00 **
Other household income squared	1.00 **	1.00 **	1.00	1.00	1.00	1.00 **
Age	1.11 **	1.09 **	1.13 **	1.19 **	1.73 **	0.99
Age squared	1.00 **	1.00 **	1.00 **	1.00 **	0.99 **	1.00
High education level	3.31 **	2.80 **	1.24	2.54 **	1.63 **	1.48 **
Medium education level: medium	2.14 **	1.99 **	1.40 **	1.61 **	2.51 **	1.70 **
<i>Observations – total</i>	22607	37084	3856	3806	5248	7609
<i>Observations – part-time</i>	2820	4709	631	634	258	1648
<i>Observations – full-time</i>	10995	20148	1575	1501	1765	3245
<i>Observations – non-worker</i>	8792	12227	1650	1671	3225	2716
<i>Log-likelihood</i>	-20241.11	-32971.42	-3418.14	-3446.87	-3645.01	-7631.25
<i>Pseudo R2</i>	0.084	0.073	0.135	0.118	0.147	0.056

Notes: The comparison group is the outcome “non-worker.” Relative risk ratios (rather than coefficients) are reported in this table. The relative risk ratio associated with a one unit change in the explanatory variable is measured as  $\exp(b_i)$  where  $b_i$  is the estimated coefficient of variable  $i$ . The base categories are: not married, not a parent, no children (or adult children), no dependent adults, and low education level. \*\* indicates significance at the 5 percent level and \* indicates significance at the 10 percent level

Appendix Table 2 – Wage estimation results

	Canada		US		UK		Germany		Italy		Sweden	
	Coeff.	Robust s.e.	Coeff.	Robust s.e.	Coeff.	Robust s.e.	Coeff.	Robust s.e.	Coeff.	Robust s.e.	Coeff.	Robust s.e.
<i>Part-time</i>												
Lambda	-0.15	0.079	-0.21	0.045	-0.04	0.080	-0.04	0.089	-0.14	0.130	-0.07	0.035
Age	0.03	0.012	0.00	0.007	-0.03	0.018	0.03	0.020	0.04	0.024	0.03	0.007
Age squared	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
High education level	0.05	0.040	0.27	0.024	0.39	0.077	0.13	0.076	0.06	0.049	0.13	0.021
Medium education level	-0.02	0.040	0.11	0.024	0.15	0.047	0.00	0.044	-0.03	0.058	0.04	0.018
Professional	0.23	0.028	0.25	0.020	0.37	0.058	0.18	0.044	0.17	0.071	0.02	0.033
Blue-collar	-0.08	0.058	0.01	0.029	-0.07	0.043	-0.16	0.045	-0.12	0.043	-0.09	0.038
Trade	-0.14	0.030	-0.14	0.017			-0.17	0.044	0.03	0.041		
Transport	0.13	0.067	0.09	0.043			0.10	0.083	0.09	0.348		
Finance	0.02	0.036	0.01	0.026			0.29	0.075	-0.03	0.159		
Manufacturing	-0.05	0.058	0.02	0.030			-0.14	0.053	0.05	0.040		
Public administration	-0.09	0.061	-0.06	0.050			0.07	0.045	0.00	0.063		
Constant	1.99	0.304	2.26	0.193	2.33	0.403	2.36	0.483	1.66	0.631	3.92	0.150
No. of observations	2543		4247		568		587		219		1473	
Adj. R <sup>2</sup>	0.092		0.161		0.276		0.187		0.191		0.059	
<i>Full-time</i>												
Lambda	-0.07	0.021	-0.02	0.015	0.01	0.027	-0.15	0.033	0.02	0.036	-0.18	0.036
Age	0.02	0.004	0.03	0.003	0.02	0.008	0.02	0.008	0.03	0.008	0.04	0.005
Age squared	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
High education level	0.18	0.019	0.36	0.014	0.26	0.027	-0.00	0.039	0.15	0.031	0.05	0.022
Medium education level	0.09	0.017	0.19	0.012	0.11	0.023	-0.07	0.023	0.07	0.032	0.01	0.017
Professional	0.21	0.008	0.26	0.007	0.26	0.020	0.17	0.023	0.21	0.017	0.13	0.017
Blue-collar	-0.00	0.018	-0.05	0.011	-0.12	0.024	-0.14	0.027	-0.10	0.019	0.03	0.027
Trade	-0.12	0.013	-0.09	0.009			-0.14	0.030	0.04	0.032		
Transport	0.20	0.017	0.19	0.013			0.03	0.046	0.11	0.063		
Finance	0.02	0.011	0.05	0.009			0.23	0.038	0.17	0.042		
Manufacturing	0.03	0.015	0.09	0.009			0.07	0.025	0.05	0.027		
Public administration	0.16	0.011	0.11	0.011			0.04	0.024	0.13	0.026		
Constant	1.78	0.093	1.34	0.058	1.26	0.156	2.60	0.152	1.56	0.196	3.54	0.129
No. of observations	9843		18113		1415		1360		1574		2897	
Adj. R <sup>2</sup>	0.187		0.251		0.316		0.176		0.442		0.157	

Notes: The standard errors have been corrected following the procedure described by Lee (1983) in order to handle the problem of heteroskedasticity of the residuals illustrated by Heckman (1979) and Greene (1981). The base categories are low education level, working in sales/clerical/services occupation, and working in agriculture.