

**The Role of Segregation and Pay Structure on the Gender Wage Gap:
Evidence from Matched Employer-Employee Data for Spain***

Catalina Amuedo-Dorantes
San Diego State University & IZA

and

Sara de la Rica*
University of the Basque Country & IZA

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* Universidad del País Vasco. Avenida Lehendakari Aguirre, 83. 48015 Bilbao (Spain), e-mail: sara.delarica@ehu.es

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Abstract

This paper presents new evidence on the role of gender segregation and pay structure in explaining gender wage differentials of full-time salaried workers in Spain as of 1995 and 2002. Using data from the Spanish Wage Structure Surveys, we find that the raw gender wage gap decreased from 0.24 to 0.14 over the course of seven years. Average differences in the base wage have decreased from 0.09 to 0.05 and average differences in wage complements have decreased from 0.59 to 0.40. However, even after accounting for workers' human capital, job characteristics, idiosyncrasies in the pay structure and female segregation into low-paying industries, occupations, establishments, and occupations within establishments, the total gender wage gap within job cells is around 14 percent, the gap in the base wage is 5 percent and the gap in the wage complements are between 27 and 31 percent. The fixed-term nature of the work contract held by the worker does not play any role in explaining the gender wage gap. Decentralized collective bargaining widens the wage gap in 12 percent as of 2002. Female segregation –particularly into low-paying establishments and into low-paying jobs within establishments– accounted for a sizable and growing fraction of the female-male wage differential.

1. Introduction

Gender wage gaps continue to characterize modern labor markets despite their reduction over the past two decades in most industrialized countries (e.g. Altonji and Blank 1999, Gosling and Lemieux 2001). While some of the wage gap between men and women is attributable to human capital differences, most of the wage gap is explained by gender segregation into different types of jobs. In this vein, a variety of studies have shown women's concentration into low-paying occupations (Johnson and Solon 1986, Groshen 1991, MacPherson and Hirsch 1995). Likewise, some authors have found evidence of female segregation into low-paying establishments (Carrington and Troske 1998). Finally, Meyerson-Milgrom *et al.* (2001), Bayard *et al.* (2003), and more recently Gupta and Rothstein (2005) provide evidence of the importance of gender segregation at the occupation-establishment cell level in explaining existing gender wage gaps. Yet, as recently noted by Gupta and Rothstein (2005), less than a handful of studies have examined the role of gender segregation at multiple work levels in explaining persistent gender wage gaps due to the lack of representative datasets including detailed information on workers, establishments, and job characteristics.¹

In addition to gender segregation, specific idiosyncrasies of the pay structure determining the wage rates of men and women have also been shown to play a quantitatively large role in explaining gender wage gaps (Blau and Kahn 2001). Countries with wage setting mechanisms based on centralized collective bargaining agreements seem to display smaller gender wage gaps as these raise the relative pay of women often at the bottom of the wage distribution. Likewise, the composition of the workforce—specifically the extent of fixed-term employment—can also influence the gender wage gap through the differential incidence and effect of having a

¹ Abowd and Kramarz (1999), among others, also point out the importance of the use of matched employee-employer datasets in labor economics. Yet, such datasets are scarce and often non-representative of the populations

contingent work contract on the wages earned by men and women.

This paper adds to the existing literature on gender wage gaps with an analysis of the role of gender segregation and pay structure in explaining the gender wage gap in Spain using a large matched employer-employee dataset from 1995 and 2002. The availability of matched employer-employee database allows us to assess the role of gender segregation into low-paying industries, occupations, establishments and occupations within establishments (henceforth job cells). The literature on the impact of different levels of gender segregation on the female-male wage gap has primarily focused on the U.S. or Northern European countries, such as Denmark, Norway, and Sweden. Yet, there are noticeable differences between Northern European countries and Southern European countries that range from important differences in female labor force participation rates to the incidence of fixed-term work or the collective bargaining governing their pay systems. All these factors may not be trivial when explaining gender occupational segregation, which also differs substantially across countries.² In addition, Spain represents an interesting case given its specificities regarding the pay structure. First, collective bargaining is carried out at different levels of centralization. As it will be described below, most agreements are signed at industry level. However, some firms (usually some of the larger ones) sign on specific agreements on top of those agreed at industry level, hence carrying out decentralized wage setting³. We can assess the role of wage setting decentralization on the gender wage gap. Second, Spain has the highest incidence of fixed-term employment among the developed countries. The widespread use of fixed-term contracts may also affect the gender

of interest.

² In this regard, Dolado *et al.* (2004) document the lower occupational segregation characterizing some of the Southern European countries.

³ The Spanish industrial relations system, with sectoral contracts overlaid with optional firm-specific agreements is similar to the system in Italy (see Dell’Arlinga and Lucifora, 1994) and the Netherlands (see Hartog, Leuven and Teulings, 2002). Firm-specific bargaining also shares some similarities with the unionized versus non-unionized

wage gap if fixed-term contracts have uneven effects on the pay structures of men and women.

Finally, another contribution of our paper is that we exploit the available information on the composition of hourly wages. Gross hourly ordinary wages in Spain are the sum of two components: Base wage and wage complements. Collective bargaining determines the base wage associated to each of the job categories regulated by the agreement. In contrast, wage complements are based on productivity, work shifts, and other job related circumstances; therefore, they display a more discretionary nature. We thus examine the role of segregation and idiosyncrasies of the Spanish pay structure in explaining the gender wage gap in total gross hourly wages, as well as in their two aforementioned components.

We use data from the 1995 and 2002 Spanish Wage Structure Surveys –known by their acronyms: EES-95 and EES-02.⁴ These surveys include establishments in the manufacturing, construction and service industries. In addition to establishment level information, the surveys provide us with individual level data on gross hourly wages (including base wage and any wage complements), education, job tenure, occupation, type of work contract held and type of collective bargaining for a random sample of workers in each establishment. We estimate various log hourly wage regressions specifications to adequately measure the impact of segregation and pay structure idiosyncrasies on the overall gender wage gap, as well as on the gender gap in base wages and wage complements. Once we control for segregation at the job cell level and assuming that men and women working in the same establishment and in the same occupation do the same job, we can assess the extent to which there is “equal pay for equal work” gender wise as discussed in the “comparable worth” literature (e.g. Johnson and Solon

wage setting in the Anglo-Saxon countries, as the bargaining process under firm agreements reflects similar combination of political and economic forces that influence unionized wage setting in the UK and the US.

⁴Wage surveys similar to the EES 95 are also available in other EC countries, including France, Denmark, Germany, Sweden, and the United Kingdom.

1986). Additionally, it is feasible to evaluate the role paid by idiosyncrasies of the Spanish pay structure –from fixed-term employment to decentralization of collective bargaining processes– in explaining the gender gap in overall gross hourly wages as well as in base wages and wage complements.

Over the course of seven years, the raw total gender wage gap decreased from 0.24 to 0.14. Average raw differences in the base wage have decreased from 0.09 to 0.05 and average raw differences in wage complements have decreased from 0.59 to 0.40. However, after accounting for workers' human capital, job characteristics, idiosyncrasies of the pay structure and female segregation into low-paying industries, occupations, establishments, and occupation-establishment cells, the total adjusted gender wage gap within job cells is around 14 percent, the gap in the base wage is 5 percent and the gap in the wage complements are between 27 and 31 percent. The fixed-term nature of the work contract held by the worker does not play any central role in explaining the gender wage gap. Decentralized collective bargaining widens the wage gap in around 12 percentage points as of 2002, whereas it does not affect the gender wage gap in 1995. Female segregation –particularly into low-paying establishments and into low-paying jobs within establishments– accounted for a sizable and growing fraction of the female-male wage differential.

The rest of the paper is organized as follows. Section 2 reviews the most relevant institutional aspects of the Spanish labor market, whereas section 3 describes the data employed in the empirical analysis. The methodology is explained in section 4 and results are presented and discussed in section 5. Section 6 concludes the study with a summary of our findings and allusions to policy implications.

2. Institutional Background

2.1. Women in the Spanish Labor Market

Before examining gender segregation and its role in explaining the female-male wage gap in Spain, some relevant characteristics of the Spanish labor market are worth discussing.

Perhaps one of the most important features of Southern European economies relative to the U.S. and Northern European nations is the lower rates of female labor force participation (e.g. Ariza *et al* 2005). As of 2001, the average female labor force participation rate in Spain was 65 percent relative to 81 percent in Denmark, 83 percent in Sweden and 75 percent in the U.K.

While the male-female employment rate gap has significantly decreased over time, Spain is still characterized by one of the largest gender employment rate differentials. In this regard, Dolado *et al.* (2004) report that, as of 1990, the male-female employment rate gap was 16.7 percent in the U.S., about 4.2 percent in Sweden, and 39.4 percent in Spain. This gap was also large in other Southern European nations, e.g. thirty-three percent in Italy and 36 percent in Greece. By 1999, the male-female employment gap had decreased to 31.7 percent in Spain, in part as a result of the higher educational attainment of women and their reduced fertility rates (Arellano and Bover 1995). However, Spanish women still display significantly lower labor force participation rates than women in Northern European OECD countries.

How strong is occupational segregation among working men and women? Relative to the U.S., Spain exhibits relatively low segregation indexes. Dolado *et al.* (2004) point out that this is particularly the case for highly educated workers, for whom these indexes are 36 percent in the U.S. relative to 29 percent in Spain. Nonetheless, the indexes are rather similar for low educated workers in both countries (49 percent in the U.S. versus 50 percent in Spain). These figures compare to segregation indexes in the order of 16 percent for highly educated workers and 40 percent for low educated workers in Denmark (Dolado *et al.* 2004).

Finally, how do Spanish women fare relative to men in terms of wages? Plasman and Sissoko (2004, Table 1) compute gender wage gaps for a variety of European countries. As of 1995, the average male-female wage gap was 0.18 in Denmark and 0.28 in Spain; in both instances smaller than the 0.33 gender wage gap reported by Bayard *et al.* (2003) for the U.S. as of 1990.

2.2. Collective Bargaining and Wage Setting in Spain

With the passage of the Spanish constitution in 1978, trade unions were legalized and wages, along with other working conditions, became the object of collective bargaining. As in many European countries, collective bargaining agreements cover a vast percentage of salaried workers, regardless of union membership⁵. There are different levels of collective bargaining that operate simultaneously in Spain: (1) nationwide industry level, (2) regional industry level, and (3) firm level. As an example, working conditions for workers in the metal industry are negotiated by union representatives and employers of the metal industry at the national level. However, in some areas of the country, regional union representatives may gather with employers and agree upon (usually) better working conditions stipulated in agreements that exclusively pertain to workers in the metal industry in that region. Those are the regional industry level agreements. Finally, in some typically large firms of the metal industry, worker representatives and employers may further negotiate the working conditions only pertinent to the firm employees (decentralized wage setting). In such instances, it is usual that agreements broader in scope, as is the case with nationwide agreements, serve as a benchmark to agreements with a narrower scope and coverage, as is the case with firm level agreements. To serve as reference of the coverage of each level agreement, around 25 percent of workers have their

working conditions governed by nationwide industry agreements, 55 percent of workers are covered by regional industry agreements and, for approximately 15 percent of workers, various aspects of the work relationship are negotiated at the firm level (for more details, see Card and De la Rica, 2005).

Finally, as mentioned in the introduction, total wages are the sum of two components: base wages and wage complements for productivity, work shifts or other work related job circumstances. On average, base wages account for about 65 percent of total (ordinary) wages. Collective bargaining agreements determine a specific base wage for each of the professional categories regulated by the agreement. These professional categories do not coincide with the international standard occupational classification but, rather, constitute a finer occupational break-down often specific to the agreement that defines them. Promotion usually entails scaling to a better-paying professional category, and hence to a higher base wage. Likewise, collective bargaining agreements specify a variety of wage complements, most commonly due to work shifts, safety, productivity, tenure, and commuting time. These wage complements account, on average, for approximately 35 percent of the total (ordinary) wage.

2.3. Fixed-Term Employment

The basic legislation governing work contracts is the Workers' Statute of 1980 (Estatuto de los Trabajadores, Ley 8/80, March, 10) and its 1984 reform. This reform regulated that fixed-term contracts could be used to promote employment without the past requirements for the activity to display a temporary nature. Fixed-term contracts could be signed for a minimum of six months and a maximum of three years. They could be renewed for a maximum of three years, a period after which the worker had to be either laid off or offered an indefinite contract.

⁵ The union affiliation in Spain is lower than 15 percent, but around 90 percent of salaried workers are covered by

If the worker was laid off, the firm could not hire another worker to perform the same job for at least one year. The greater employment flexibility and reduced dismissal costs associated to fixed-term contracts promoted their usage by employers. In fact, as shown by Güell and Petrolongo (1998), ninety-eight percent of new contracts registered in the employment office between 1986 and 1992 were fixed-term. As such, the distribution of contracts considerably changed and fixed-term contracts reached 33 percent of all contracts as of 1991 (Segura *et al.* 1991, Bentolila and Dolado 1994, Jimeno and Toharia 1993). The fraction of fixed-term contracts has barely changed since despite the 1994 and 1997 reforms intended to promote the use of indefinite work contracts (Kugler *et al.* 2002). Through its greater incidence on young, female and less educated workers, fixed-term employment can contribute to the gender wage gaps under examination.

III. Data

We use data from the 1995 and 2002 Spanish Wage Structure Surveys (EES 95 and EES 02). These datasets consist of random samples of workers from establishments with 10 or more employees in the manufacturing, construction and service industries.⁶ The sampling takes place in two stages. In the first stage, establishments are randomly selected from the Social Security General Register of Payments records, which are stratified by region and establishment size. In a second stage, a sample of workers from each of the selected establishments is also randomly selected. An average of 5 workers are interviewed in establishments with 10-20 employees, seven workers in establishments with 21-50 employees, twelve workers in establishments with 51-100 employees, twenty workers in establishments with 100-200 employees, and 25 workers in establishments with more than 200 employees. Overall, sample sizes are significantly larger

collective agreements.

than those provided by any other Spanish survey.⁷

Table 1 summarizes the main characteristics of both samples. Our initial EES-95 contains a total of 125,865 full-time workers (99,106 males and 26,759 females) from 14,347 different establishments, whereas EES-2002 contains 169,520 full-time workers (117,161 men and 52,359 women) from 21,621 establishments.⁸ The EES surveys collect detailed information on workers' wages (total wage, base wage and wage complements), as well as on workers' demographic (such as age and educational attainment) and job characteristics (including industry, occupation, contract type, type of collective bargaining, the establishment's market orientation, establishment size, and region). We drop individuals with missing wage information. Table 1 displays the weighted descriptive statistics for the two final samples of full-time employees.⁹ The wage variable is the gross hourly wage in euros. The figures for 1995 reveal that the average full-time gender wage differential was 0.24, thus similar to the unrestricted gender wage gap of 0.26 found by De la Rica and Ugidos (1995) using Spanish data from the 1991 ECBC survey. When we disaggregate the gross hourly wage into its two components, we observe that gender differences in the base wage were less than 0.10, whereas gender differences in wage complements reached 0.59 percent. Therefore, wage complements contributed the most to the raw gender wage gap. Additionally, men were, on average, older and less educated than full-time female workers. Regarding job characteristics, female workers were slightly more likely to hold a fixed-term contract, less likely to be covered by firm collective

⁶ Workers in establishments with 10 or more employees accounted for approximately 70.75 percent of the working population in Spain in both 1995 and 2002.

⁷ Unfortunately, surveys with individual level information on wages are scarce in Spain. In fact, information on individual wages for the nineties can only be found in the ECBC-1991 (see De la Rica and Ugidos (1995)) and in the European Panel of Households (1994-2001). However, their samples are significantly smaller and both are household surveys, thereby lacking the needed matched employer-employee information for this analysis.

⁸ Focusing on full-time workers ensures the comparability of our findings to those from other studies in the literature (e.g. Groschen 1991, Bayard et al. 2003, Gupta and Rothstein 2005).

⁹ The percentage of part-timers in our sample is about 5 percent, which is a little bit lower than the average part-time

agreements (as opposed to collective agreements negotiated at the industry level), and more likely to be employed in larger firms relative to their male counterparts. By 2002, the average gender wage gap had decreased to 0.14. This reduction in the gender wage gap was possibly driven by other equalizing factors such as: (1) the decline in the age difference between men and women to less than two years; (2) the significant increase in the percentage of women with a college degree (from 11 percent in 1995 to 29 percent seven years later), (3) the reduction in gender differences when it comes to the type of work contract held and (4) the increase in the percentage of women in larger firms, where wages are normally higher.

How segregated were Spanish workers as of 1995 and 2002? The answer to this question depends on the level at which segregation is measured. We use four different levels of employment segregation: industry, occupation, establishment, and occupation-establishment, which we will also refer to as the job cell level. There are 12 industries categories in our data and a total of 56 occupations when measured at the finest level, that is, the two-digit level of the ISCO-88 classification.¹⁰ Since the purpose of the analysis is to gain a better understanding of the size and composition of the gender wage gap at the job cell level, we are interested in using the finest occupational classification possible. However, because our data consist of a sample of workers at each establishment, some job cells are quite small. Therefore, we also carry out the analysis using a broader occupational classification, which results in just 7 occupational categories and bigger job cells, allowing us to assess the robustness of our findings to the use of alternative job cell sizes.

Table 2 displays the distribution of our sample by job cell size depending on whether we use the finest or the broader occupational classification as well as depending on whether we

rate in Spain, which is about 8.

restrict our attention to gender segregated job cells, respectively. According to the top panel of Table 2, more than 20 percent of our job cells contain only one individual and only 10 percent of the job cells have more than 10 workers when we employ the finest occupational classification possible. Given that the purpose of our analysis is to examine gender wage gaps within job cells, the bottom panel of Table 2 also displays the sample distribution by job cell size when we restrict our attention to gender integrated job cells using the finest occupational classification. Gender integrated job cells account for 24 to 34 percent of our original samples, already hinting on the extent of gender segregation. In contrast, when we use a broader occupational classification, only 10 percent of the job cells have 1 worker and an average of 25 percent of our job cells have more than 10 employees. Even as we restrict our sample to gender integrated job cells, we still retain between 38 percent and 48 percent of our original sample versus 24 to 34 percent when using the finest occupational classification possible. Thus, we will focus our discussion on the results when using the broader occupational classification and display the findings from our analysis when we use the finest occupational classification possible in the Appendix. Additionally, some of the analysis is carried out using all job cells as well as using exclusively gender integrated job cells as a robustness check.

The figures in Table 3 and Table A in the Appendix provide a preliminary assessment of the extent gender segregation in Spain as of 1995 and 2002 using the broader and the finest occupational classifications, correspondingly. One of the most notable findings is the fact that segregation progressively rises as we move from the industry, to the occupation, to the establishment and, finally, to the job cell level. For instance, according to the figures in Table 3, the average woman worked in an industry that was 4 percentage points more female than the

¹⁰ While there are more than 89 occupations at the two-digit level in the ISCO88 classification, fifty-six is the number of occupations that results once we exclude fisheries and focus on salaried workers.

industry employing the average male worker as of 1995. This percentage goes up to 11 and 31 percentage points as we compare the occupations and establishments, respectively, where the average female and male employee worked in. At any rate, segregation was the largest at the job cell level. In particular, as of 1995, the average female employee worked in a job that was 71 percent female as opposed to 7 percent female in the case of an average male employee. Over the seven year period under consideration, segregation increased at the industry, occupation, establishment and job cell level due to the growing concentration of women in primarily female industries, occupations, establishments and, to a lesser extent, jobs. The figures in Table A in the Appendix tell a similar story using the finest occupational classification.

IV. Methodology

We start by estimating a joint log wage regression for men and women where the gender wage gap can be explained as a function of individual human capital, job characteristics, and female segregation into low-paying industries, occupations, establishments, and occupations within establishments as captured by the proportion of women employed in each of these structures as follows:

$$(1) \quad w_{PIOEJ} = \alpha + \beta F_P + I\gamma_I + O\gamma_O + E\gamma_E + J\gamma_J + X_P\delta + Z_E\phi + \varepsilon_{PIOEJ}$$

where w is the log hourly wage; F is a dichotomous variable equal to 1 if the individual P is female; $I, O, E,$ and J are measures of the proportion of female workers at the industry, occupation, establishment or occupation-establishment (i.e. job cell) levels; X is a vector of individual observed characteristics, such as age, education and type of contract); and Z is a vector of work related characteristics that vary at the establishment level, such as establishment size, market orientation (i.e. whether the establishment's product is marketed at a local, national or international level), type of collective bargaining (i.e. whether it is firm-level bargaining or

industry bargaining), and regional location. A couple of facts are worth noting with regards to equation (1). First, to the extent that the proportions of women in each industry, occupation, establishment, and, in particular, job cell level are computed from a sample of workers in each establishment, there is room for measurement error. Thus, as Bayard *et al.* (2003), we re-estimate equation (1) using job cell dummies that capture job cell fixed effects in place of variables capturing the proportion of females at each level as follows:

$$(2) \quad w_{PIOEJ} = \alpha + \beta F_p + J\gamma_J + X_p\delta + \varepsilon_{PIOEJ}$$

where J now stands for job cell level fixed-effects.

Second, both equation (1) and equation (2) implicitly assume that the returns to observable characteristics do not differ by gender. As noted by previous researchers (e.g. Datta Gupta and Rothstein, 2005), the use of this specification allows for the comparability of our results to those found for other countries. Yet, given the empirical evidence on the differential returns to a variety of observable characteristics of men and women, we finally relax this assumption and estimate separate wage regressions by gender in yet a third specification.

V. Results

A) Pooled OLS Specification

For comparability purposes, Table 4A and Table 4B display the results from estimating equation (1) to examine the gender wage gap as well as the gender gap in the two wage components using the EES95 and EES02, respectively. The analysis is carried out using the broader occupational classification.¹¹ The regressions include individual descriptors (e.g. age, education and type of work contract), firm characteristics (e.g. type of collective bargaining,

¹¹ Although we omit the pooled OLS wage regressions that use the finest occupational classification from the text due to space limitations, we display the contribution of idiosyncrasies of the pay structure and gender segregation to the male-female wage gap from such estimations in Table B of the Appendix. In general, using a finer occupational

market orientation of the firm, establishment size and regional location), the percentage of women at the industry, occupation, establishment and job cell levels, and a female dummy. Additionally, column [2] incorporates interaction terms between the female dummy and the type of work contract or collective bargaining agreement governing the employee's work relationship to assess whether these affect working men and women differently.

Even after accounting for individual and firm characteristics as well as for gender segregation at various levels, women continue to earn around 14 percent less than their male counterparts. Most of this difference originates in gender gaps in wage complements. Indeed, adjusted women's base wages are only around 6 percent lower than those of men in the two years under consideration. However, women's wage complements are, on average, 27 percent and 31 percent lower than the wage complements earned by men in 1995 and 2002, respectively.

As noted in the Introduction, idiosyncrasies of the pay structure can affect male and female wages differently and, as such, the observed gender wage gaps. As already noted, we focus on fixed-term employment and decentralization wage setting. A couple of findings are worth discussing. First, as shown by the temporary employment literature, workers with fixed-term contracts earn approximately 18 percent and 16 percent less than their counterparts with indefinite work contracts as of 1995 and 2002, respectively. As we saw earlier for the female dummy, most of this gap originates in differences in the wage complements earned by men and women. On average, as of 1995, wage complements earned by women were about 35 percent lower than the wage complements earned by men (26 percent lower in 2002). However, do fixed-term contracts contribute to widening the gender wage gaps through a differential impact on male and female earnings? Column [2] in Tables 4A and 4B address this question via the

classification allows us to attribute more of the gender wage gap to segregation at the occupational and job cell levels.

inclusion of an interaction term between the type of work contract held and the worker's gender. The presence of fixed-term contracts actually helps contain the gender wage gap by penalizing male earnings to a greater extent than female earnings in both 1995 and 2002.

A second finding related to the idiosyncrasies of the Spanish pay structure worth emphasizing refers to the impact of the type of collective bargaining on the gender wage gaps. In this regard, column [1] in Tables 4A and 4B reveals that having a decentralized collective bargaining agreement (i.e. a firm level agreement) raises workers' wages by approximately 11 to 12 percent more than a more centralized collective bargaining agreement (i.e. a national or regional industry level agreement). This higher wage is the by-product of an equivalently higher base wage and wage complements. Yet, the interaction term between the decentralized collective bargaining agreement and the female dummies in column [2] indicates that the type of collective bargaining did not significantly add to the gender wage gap as of 1995. However, by 2002, the returns to a decentralized wage setting were 6 percent lower for women than for men, widening the gender wage gap.

At any rate, gender segregation at the industry, job and establishment levels continue to play a crucial role in explaining the gender wage gap. Female jobs are primarily penalized via wage complements and this penalty has slightly risen from 1995 to 2002.

Table 5 goes one step further quantifying the contribution of gender, fixed-term employment, collective bargaining and segregation to the overall observed gender wage gaps in Panel A for 1995 and in Panel B for 2002. Column [1] displays differences in the average characteristics of men and women. Columns [2], [3] and [4] show the relative contribution of gender, fixed-term employment, collective bargaining and segregation to the overall gender

wage gap as well as to its two components.¹² Being female explains most of the gender wage gaps. Fixed-term employment helps to contain the gender wage gap, and decentralized wage setting does not play an important role in explaining the overall gender wage gaps¹³. Instead, it is female segregation into low-paying establishments and occupations within establishments that contribute the most to explaining the gender wage gap after workers' sex in both 1995 and 2002. In fact, the female-male wage differential would have decreased by 31 percent (8.91+22.40) in 1995 and by 71 percent (24.15+47.20) in 2002 if men and women would have been identically distributed across establishments and occupations within establishments. Finally, it is worth noting that, with the exception of gender and decentralized bargaining –both of which contribute to the male-female wage gap primarily via their contribution to the gender gap in base wages, segregation has a similar contribution to the male-female wage gap via gender differences in base wages as well as in wage complements.

B) Fixed-effects Specification

As noted earlier in the Methodology section, sampling error in the proportion of women at the establishment and, in particular, occupation-establishment level can be severe when not using the entire population. We can address this shortcoming replacing the variables indicative of the percent of women in the industry, occupation, establishment, and occupation-establishment levels for a full set of job cell fixed-effects. We thus estimate the fixed-effects wage regression specified in equation (2) using the gross hourly wage as well as each of its two components as our dependent variables. As with equation (1), all estimations include individual

¹² We have used the returns in columns [1] from Tables 4A and 4B when computing the contribution of gender, fixed-term employment, decentralized collective bargaining and segregation to the gender wage gap and its two components.

¹³ Note that this contribution is computed from columns [1] of tables 4. Hence, differences in the returns to firm-bargaining are not allowed. We will relax this assumption later and compute the contribution from separate log wage estimations by gender.

characteristics, such as age, age squared, education and the type of work contract held by the employee. Results using the broader occupational classification are displayed in Table 6.¹⁴ It is worth stressing that measurement error in the proportion female variables appears to have a negligible impact when it comes to measuring and decomposing the gender wage gap as the results from the pooled OLS and the fixed-effects estimations barely change. As in Tables 4A and 4B, women still earned 14 to 15 percent less than similar men within the same job cell in the two years under consideration. Likewise, the gender contribution to the gender wage gap as well as to the gender gap in base wages and wage complements is practically unchanged.

One of the criticisms that can be made to the findings in Table 6 is the fact that the female coefficient in the fixed-effects model is exclusively identified by the information provided by gender-integrated job cells, which account for 38 to 48 percent of our original samples (see Table 2). Therefore, we repeat the analysis in Table 6 exclusively using gender-integrated job cells to gauge the extent to which our results are robust to the estimation with a lesser number of observations. Although not shown herein, the contribution of workers' sex to the female-male wage difference remains practically unchanged when only gender-integrated cells are used.¹⁵

C) Separate Wage Regressions for Men and Women

Both the pooled-OLS and fixed-effects estimations impose the restriction of equal returns to various individual and job characteristics for men and women. Yet, there is ample evidence on these returns varying by gender. Therefore, in what follows, we estimate separate wage regressions for men and women using the gross hourly wage as well as each of its components as our dependent variables. Subsequently, we compute the relative contribution of fixed-term

¹⁴ The results using the finest occupational classification are shown in Table C in the Appendix. As with the pooled

employment, decentralized collective bargaining and female segregation into low-paying industries, occupations, establishments, and jobs in explaining the observed gender wage gaps.¹⁶ Finally, to the extent that measurement error in the proportion female variables appears to have a negligible impact when it comes to measuring and decomposing the gender wage gaps, we use the specification in equation (1) so as to distinguish the role of gender segregation at various levels on the gender wage gaps.

Tables 7A and 7B display the results from the by-gender wage regressions for 1995 and 2002, respectively. Several findings are worth discussing. First, as of 1995, the returns to a university education are about 22 percentage points larger for men than for women. Most of this gap is due to differences in the base wage returns to a university degree. In other words, differences in the premium to being highly educated are primarily due to the fact that men occupy better-paying professional categories than women. However, the premium to decentralized wage setting is similar for both men and women across the various wage components. Other job characteristics, such as the fixed-term nature of the work contract held by the worker, have a slightly larger penalty (much of which comes via reduced wage complements) for men than for women. Finally, there are important gender differences in the penalties associated to working in female occupations and establishments, both of which primarily originate in lower wage complements. Working in a female occupation does not penalize women, but it reduces male wages by approximately 9 percent. In contrast, being employed in a primarily female establishment has a negligible impact on male wages, whereas it

OLS results, using a narrower occupational classification allows us to explain more of the gender wage gap.

¹⁵ These results are available from the authors upon request.

¹⁶ Since results using a broader occupational classification are always quite similar to the results using the finest occupational classification made available (see Tables B and C in the Appendix), we only show and discuss the findings using the broadest occupational classification. However, the results using the broader occupational classification are available from the authors upon request.

reduces female wages by approximately 21 percent.

Secondly, there are significant changes in the determination of the gender wage gap during the seven year period between 1995 and 2002. Specifically, the returns to a university education turn out to be practically the same for men and women, with higher education raising women's wage complements to a greater extent than men's wage complements. Additionally, the wage premium for decentralized bargaining becomes higher for men than for women. Finally, there continue to exist significant gender differences in the wage penalties associated to working in female environments as of 2002. Working in female industries lowers male wages mostly via reduced wage complements, whereas it does not significantly alter female wages. In contrast, working in female establishments and female jobs lowers male wages some but, primarily, female wages via lower wage complements. These gender differences in the rewards to the individual and job characteristics confirm that imposing equal coefficients is too restrictive.

Table 8 displays the contribution of the pay structure and segregation to the average gender wage gap when the coefficients are freed up. As with the joint analysis of men and women, fixed-term work reduces the gender wage gap since fixed-term contracts impose a larger wage penalty on men than on women. In contrast, decentralized bargaining widens the gender wage gap by 12 percent as men enjoy a higher return to this type of wage setting via higher base wages than those earned by similar women. Given that decentralization in wage setting affects only 15 percent of workers in our sample, the contribution of this institutional feature to the overall gender wage gap is by no means negligible. This result for 2002 is in accordance with Blau and Kahn (2003) findings, in the sense that the higher the decentralization the higher the overall wage gap.

Likewise, the contribution of gender segregation to the male-female wage gap rises from 1995 to 2002. Particularly notable is the contribution of female segregation into low-paying establishments and low paying jobs via their contribution to the gender gap in base wages. As such, these findings are suggestive of men working in female occupations, establishments, or jobs, as well as men in work arrangements governed by decentralized bargaining agreements being more likely to occupy better-paying professional categories than their female counterparts.

VII. Summary and Policy Implications

This paper presents new evidence of the role of idiosyncrasies of the pay structure as well as gender segregation at the industry, occupation, establishment, and occupation-establishment levels in explaining gender wage differentials of full-time salaried workers in Spain during 1995 and 2002. The literature on the impact of different levels of gender segregation on the female-male wage gap has focused on the U.S. and Northern European countries, such as Denmark, Norway, and Sweden. Yet, Spain displays very distinct labor market features characteristic of Southern European nations, such as low female labor force participation rates, a high incidence of fixed-term employment and a collective bargaining setting that operates at different levels of centralization. As noted earlier in the paper, these differences may not be trivial when explaining gender segregation and wage gaps, which also differs substantially across countries (e.g. Blau and Kahn 2001, Dolado *et al.* 2004).

Using data from the Spanish Wage Structure Surveys, we find that the full-time female-male wage ratio was 76 percent in 1995 and it increased to 86 percent by the year 2002. These gender differentials are smaller than the ones found by Bayard *et al.* (2003) for the U.S. and by Gupta and Rothstein (2005) for Denmark, yet significantly larger than the wage gap previously

documented for Sweden by Meyersson Milgrom *et al.* (2001).¹⁷ As such, these figures underscore the importance of country level studies when examining gender wage gaps and their determinants.

When measuring female segregation into low-paying occupations and jobs, we resort to two different occupational classifications: a broad classification that allows for larger job cells in the regression analysis and a two-digit level classification that captures female segregation into low-paying occupations and jobs better. Regardless of the occupational classification used, we find that segregation is the largest at the occupation-establishment level, with the average woman working in a job cell that was 71 percent to 72 percent female and their male counterparts working in a job cell that was only 7 percent to 13 percent female as of 1995 and 2002, respectively. Similar findings have been reported for Denmark (Gupta and Rothstein 2005). Yet, over the seven year period under examination, segregation –as measured by the percentage point difference in femaleness– decreased at the job cell level, whereas it increased at the industry, occupation, and establishment levels.

We estimate various log hourly wage specifications using: (1) controls for the proportion of females in the industry, occupation, establishment, and occupation-establishment levels; (2) occupation-establishment level fixed-effects; and (3) separate pooled OLS wage regressions for men and women to address gender differences in the returns to all observed characteristics. Likewise, we exploit the information on the two wage components of ordinary wages: base wages and wage complements, and estimate the three log hourly wage specifications mentioned above for total ordinary wages and for their two components. Overall, the findings are robust to

¹⁷ Bayard *et al.* (2003) document a gender wage gap of 38 percent for the U.S. as of 1990. Gupta and Rothstein (2005) find a gender wage differential for Denmark of 47 percent in 1983 and of 41 percent as of 1995. Finally, other studies, as Meyersson Milgrom *et al.* (2001), reveal a small wage gap between 1.4 to and 5 percent from 1970 to 1990 in Sweden.

the econometric specification being used, with the major differences emerging from the type of occupational classification being used in the analysis. Specifically, the use of a narrower occupational classification helps explain more of the gender wage gap. However, while we display the results using the two occupational classifications, we focus our discussion on the results that surface from using a broader occupational classification since the latter ensures larger job cell sizes. The following key results are worth summarizing.

First is the fact that, even after controlling for basic individual and job characteristics, idiosyncrasies of the pay structure, and gender segregation, the adjusted gender wage gap within job cells is around 14 percent, the gap in the base wage is 5 percent and the gap in the wage complements are between 27 and 31 percent. A second finding worth noting is that the fixed-term nature of the work contract held by the worker does not play any role in explaining the gender wage gap. Regarding decentralized bargaining, it widens the gender wage gap by 12 percent as men enjoy a higher return to this type of wage setting via higher base wages than those earned by similar women. This result is in accordance with Blau and Kahn (2003) finding that decentralization in the wage setting led to higher overall gender wage gaps. As a final result worth emphasizing, we find that female segregation at the job, establishment, and occupational levels accounted for a sizable and growing fraction of the female-male wage differential via its contribution to the gender gap in base wages.

In sum, over the course of seven years, the raw gender wage gap decreased; yet, after accounting for workers' human capital, job characteristics, idiosyncrasies of the pay structure and female segregation into low-paying industries, occupations, establishments and job cells, women still earned about 14 percent and 15 percent than their male counterparts. As Groshen (1991) emphasized for the U.S., we find that the contribution of workers' sex to the Spanish

female-male wage differential not only was the largest, but it also increased over the time period under consideration. Under the assumption that men and women working in the same establishment and in the same occupation do the same job, we can conclude that there is no “equal pay for equal work”. Consequently, there is ample scope for equal pay legislation to help reduce the significant gender wage gap within narrowly defined job cells. However, as Meyersson Milgrom *et al.* (2001), Bayard *et al.* (2003), and Gupta and Rothstein (2005), we also find that female segregation into low-paying industries, establishments and, in particular, job cells, follow workers’ sex in order of magnitude when explaining the persistent gender wage gap. Therefore, the importance of combining equal pay legislation with policies in the lines of equal employment and promotion opportunities, and affirmative action when targeting persistent gender wage gaps.

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Table 1
Descriptive Statistics

Variables	Men		Women	
	Mean	S.D.	Mean	S.D.
EES-1995				
Ln Hourly Total Wage	1.82	0.48	1.58	0.42
Ln Hourly Base Wage	1.31	0.45	1.22	0.39
Ln Hourly Wage complements	0.54	1.09	-0.05	1.15
Age	40.29	10.77	35.54	9.61
% Primary or less	0.37	0.34	0.22	0.35
% Secondary	0.53	0.49	0.67	0.47
% University	0.10	0.30	0.11	0.31
% Temporary Contracts	0.23	0.42	0.22	0.41
% Firm col. bargaining	0.24	0.43	0.17	0.38
% firm size 1 (10-19)	0.21	0.40	0.18	0.38
% firm size 2 (20-49)	0.27	0.44	0.24	0.43
% firm size 3 (50-99)	0.13	0.34	0.14	0.38
% firm size 4 (100-199)	0.11	0.31	0.12	0.35
% firm size 5 (>199)	0.27	0.44	0.30	0.46
Observations	91,071		22,449	
EES-2002				
Ln Hourly Total Wage	2.07	0.49	1.93	0.48
Ln Hourly Base Wage	1.58	0.41	1.53	0.41
Ln Hourly Wage complements	0.80	1.12	0.40	1.24
Age	38.92	10.95	36.88	10.0
% Primary or less	0.29	0.40	0.26	0.46
% Secondary	0.55	0.49	0.55	0.50
% University	0.16	0.36	0.29	0.45
% Temporary Contracts	0.24	0.42	0.19	0.38
% Firm col. bargaining	0.18	0.38	0.14	0.35
% firm size 1 (10-49)	0.44	0.49	0.35	0.47
% firm size 2 (20-199)	0.26	0.46	0.24	0.42
% firm size 3 (>199)	0.30	0.46	0.42	0.49
Observations	105,226		43,392	

Note: Weighted means reported. All wage variables are measured in euros.

Table 2
Sample Distribution

Size of Job-Cell	EES-1995				EES-2002			
	56 categories		7 categories		56 categories		7 categories	
	Freq.	Cumul. Distrib.	Freq.	Cumul. Distrib.	Freq.	Cumul. Distrib.	Freq.	Cumul. Distrib.
1 worker	28,531	25.13	15,876	13.99	34,792	23.37	19,744	13.26
2 workers	18,698	41.60	14,948	27.15	22,492	38.48	18,376	25.61
3 workers	14,880	54.71	14,559	39.98	17,511	50.24	16,875	36.94
4 workers	12,300	65.55	13,768	52.11	15,875	60.91	16,868	48.27
5 workers	9,350	73.78	11,485	62.22	12,385	69.23	14,210	57.82
6 workers	6,084	79.14	7,992	69.26	8,976	75.26	10,920	65.15
7 workers	4,571	83.17	5,845	74.41	7,056	80.00	8,421	70.81
8 workers	3,256	86.04	4,600	78.46	5,400	83.62	6,496	75.17
9 workers	2,772	88.48	3,519	81.56	4,716	86.79	5,715	79.01
10 workers	2,150	90.37	3,270	84.45	3,240	88.97	4,960	82.35
11-35 workers	11,352	100	17,652	100	5,390	100	26,275	100
Total size		113,520				148,866		

	Gender Integrated Cells in the EES-1995				Gender Integrated Cells in the EES-2002			
2 workers	2,832	11.12	2,848	8.25	4,922	10.15	4,974	7.89
3 workers	3,153	23.50	3,660	18.83	5,121	20.71	5,787	17.08
4 workers	3,296	36.44	4,076	30.66	5,944	32.97	6,572	27.51
5 workers	2,805	47.46	3,640	41.12	4,870	43.01	6,145	37.26
6 workers	2,052	55.51	3,030	49.78	4,158	51.59	5,196	45.51
7 workers	1,785	62.52	2,464	56.80	4,123	60.09	4,788	53.11
8 workers	1,376	67.92	2,152	63.06	3,024	66.33	3,856	59.23
9 workers	1,197	72.62	1,683	67.91	2,862	72.23	3,600	64.94
10 workers	1,010	76.59	1,640	72.65	1,970	76.30	3,260	70.11
11-23 workers	5,962	100	9,531	100	11,491	100	18,833	100
Total size	25,468		34,723		48,488		63,008	

Table 3
Gender Segregation at Various Work Levels
(Broader Occupational Classification - 7 categories)

Variables	Men		Women	
	Mean	S.D.	Mean	S.D.
EES-95				
% Female industry	0.19	0.082	0.23	0.073
% Female occupation	0.18	0.110	0.29	0.143
% Female establishment	0.16	0.170	0.47	0.256
% Female establishment-occupation	0.07	0.164	0.71	0.283
Observations	91,071		22,449	
EES-2002				
% Female industry	0.27	0.16	0.41	0.18
% Female occupation	0.27	0.16	0.40	0.12
% Female establishment	0.19	0.22	0.57	0.25
% Female establishment-occupation	0.13	0.21	0.72	0.26
Observations	105,226		43,392	

Note: Weighted statistics reported.

Table 4A
Dep. variable: Log hourly Wages
Joint Estimations Men and Women
(Broader Occupational Classification - 7 categories)
EES-1995

Variables	Total Wage		Base Wage		Wage Complements	
	[1]	[2]	[1]	[2]	[1]	[2]
Raw wage gap: $LnW_{women} - LnW_{men}$		-0.24		-0.09		-0.59
Female dummy	-0.136 (0.003)	-0.148 (0.004)	-0.056 (0.003)	-0.062 (0.004)	-0.269 (0.009)	-0.274 (0.013)
Fixed-term contract	-0.181 (0.003)	-0.192 (0.004)	-0.09 (0.003)	-0.103 (0.004)	-0.354 (0.011)	-0.352 (0.012)
Firm-level bargaining	0.117 (0.006)	0.116 (0.006)	0.125 (0.008)	0.123 (0.008)	0.090 (0.015)	0.086 (0.016)
Fixed-term contract*Female dummy	---	0.054 (0.007)	---	0.016 (0.007)	---	-0.010 (0.025)
Firm-level bargaining*Female dummy	---	0.003 (0.009)	---	0.011 (0.012)	---	0.026 (0.028)
Age	0.043 (0.001)	0.043 (0.001)	0.028 (0.0008)	0.028 (0.0008)	0.081 (0.002)	0.081 (0.002)
Age-squared	-0.0004 (9.9e ⁻⁶)	-0.0004 (9.9e ⁻⁶)	-0.0002 (1.0e ⁻⁵)	-0.0002 (1.0e ⁻⁵)	-0.0007 (2.8e ⁻⁵)	-0.0007 (2.8e ⁻⁵)
Secondary education	0.149 (0.004)	0.149 (0.004)	0.116 (0.004)	0.116 (0.004)	0.166 (0.010)	0.166 (0.010)
University education	0.577 (0.007)	0.576 (0.007)	0.428 (0.009)	0.428 (0.009)	0.576 (0.020)	0.576 (0.020)
% Female in industry (12 categories)	-0.145 (0.028)	-0.156 (0.028)	0.142 (0.032)	0.139 (0.033)	-0.858 (0.079)	-0.854 (0.080)
% Female in occupation (7 categories)	-0.025 (0.016)	-0.024 (0.016)	0.039 (0.020)	0.039 (0.020)	-0.073 (0.047)	-0.074 (0.047)
% Female in establishment	-0.069 (0.011)	-0.071 (0.011)	0.017 (0.013)	0.016 (0.013)	-0.469 (0.034)	-0.468 (0.034)
% Female in job cell	-0.084 (0.008)	-0.084 (0.008)	-0.055 (0.009)	-0.055 (0.009)	-0.141 (0.024)	-0.139 (0.024)
R-squared	0.462	0.462	0.227	0.240	0.259	0.259
Observations			113,520			

Notes: All wage regressions include a constant, the market orientation of the establishment, establishment size and regional dummies. The following are used as reference categories: indefinite work contracts, national or regional industry level bargaining, primary education or less. Standard errors are calculated allowing for clustering at the job-cell level.

Table 4B
Dep. variable: Log hourly Wages
Joint Estimations Men and Women
(Broader Occupational Classification - 7 categories)
EES-2002

Variables	Total Wage		Base Wage		Wage Complements	
	[1]	[2]	[1]	[2]	[1]	[2]
Raw wage gap: $LnW_{women} - LnW_{men}$		-0.14		-0.05		-0.40
Female dummy	-0.145 (0.003)	-0.139 (0.003)	-0.057 (0.002)	-0.051 (0.002)	-0.313 (0.007)	-0.296 (0.009)
Fixed-term contract	-0.156 (0.004)	-0.164 (0.004)	-0.109 (0.003)	-0.115 (0.003)	-0.258 (0.011)	-0.239 (0.012)
Firm-level bargaining	0.114 (0.006)	0.128 (0.006)	0.108 (0.007)	0.121 (0.006)	0.103 (0.015)	0.111 (0.016)
Fixed-term contract*Female dummy	---	0.034 (0.006)	---	0.023 (0.006)	---	-0.063 (0.020)
Firm-level bargaining*Female dummy	---	-0.060 (0.008)	---	-0.055 (0.009)	---	-0.027 (0.024)
Age	0.033 (0.007)	0.031 (0.007)	0.016 (0.0006)	0.017 (0.0006)	0.065 (0.002)	0.066 (0.002)
Age-squared	-0.0002 (8.9e ⁻⁶)	-0.0002 (8.9e ⁻⁶)	-0.0001 (8.5e ⁻⁶)	-0.0001 (8.5e ⁻⁶)	-0.0005 (2.4e ⁻⁵)	-0.0005 (2.4e ⁻⁵)
Secondary education	0.103 (0.004)	0.102 (0.004)	0.08 (0.003)	0.084 (0.003)	0.143 (0.011)	0.145 (0.011)
University education	0.564 (0.006)	0.563 (0.006)	0.448 (0.006)	0.448 (0.006)	0.709 (0.016)	0.709 (0.016)
% Female in industry (12 categories)	-0.142 (0.017)	-0.147 (0.017)	-0.08 (0.017)	-0.011 (0.017)	-0.359 (0.047)	-0.355 (0.047)
% Female in occupation (7 categories)	0.139 (0.013)	0.140 (0.013)	0.146 (0.013)	0.146 (0.013)	-0.002 (0.037)	0.0006 (0.037)
% Female in establishment	-0.089 (0.009)	-0.091 (0.010)	-0.028 (0.009)	-0.054 (0.009)	-0.313 (0.029)	-0.311 (0.029)
% Female in job cell	-0.112 (0.006)	-0.116 (0.007)	-0.073 (0.006)	-0.078 (0.006)	-0.201 (0.020)	-0.203 (0.020)
R-squared	0.448	0.449	0.294	0.290	0.245	0.245
Observations				148,618		

Notes: All wage regressions include a constant, the market orientation of the establishment, establishment size and regional dummies. The following are used as reference categories: indefinite work contracts, national or regional industry level bargaining, primary education or less. Standard errors are calculated allowing for clustering at the job-cell level.

Table 5
Relative Contribution of Pay Structure and Segregation
to the Gender Wage Gap from Joint Estimation Men and Women
(Broader Occupational Classification - 7 categories)

Variables	EES-95			
	Mean Women-Mean Men	Total Wage	Base Wage	Wage Complements
Female dummy	1	56.6	63.3	45.59
Fixed-term contract	-0.01	-0.1	-0.01	-0.1
Firm-level bargaining	-0.07	3.41	9.72	1.06
Industry segregation	0.04	2.41	-6.31	5.81
Occupational segregation	0.11	1.14	-4.76	1.36
Establishment segregation	0.31	8.91	-5.85	24.64
Job-cell level segregation	0.64	22.40	39.11	15.29
	EES-2002			
	Mean Women-Mean Men	Total Wage	Base Wage	Wage Complements
Female dummy	1	100	100	78.5
Fixed-term contract	-0.05	-5.57	-10.9	-3.25
Firm-level bargaining	-0.04	3.25	8.64	1.03
Industry segregation	0.14	14.20	22.40	12.56
Occupational segregation	0.13	-12.90	-37.96	0
Establishment segregation	0.38	24.15	21.28	29.73
Job-cell level segregation	0.59	47.20	86.14	29.64

Note: The estimations used to compute the relative contribution to the gap are those reported in columns [1] of tables 4A and 4B. The relative contribution to the gap is calculated as follows: {[coefficients from columns [1] of table 4A (for EES-95) and table 4B (for EES-2002) *Mean Diff. Women-Men (column 1 table 5)]/raw wage gap}.

Table 6
Fixed-Effects Estimation of Log Wage Differentials by Gender
(Broader Occupational Classification - 7 categories)

Variables	EES-1995		
	Total Wage	Base Wage	Wage Complements
Coefficient of Female Dummy	-0.153 (0.003)	-0.063 (0.003)	-0.281 (0.008)
Relative Contribution to Gap	63.75	70.0	47.62
R-squared	0.307	0.146	0.157
Observations		113,520	
Number of Groups		38,666	
	EES-2002		
	Total Wage	Base Wage	Wage Complements
Coefficient of Female Dummy	-0.141 (0.002)	-0.056 (0.001)	-0.309 (0.005)
Relative Contribution to Gap	100	100	77.25
R-squared	0.24	0.14	0.13
Observations		148,618	
Number of Groups		48,425	

Note: Estimations also include personal characteristics as age, age-squared, education and type of contract.

Table 7A
Separate Log Wage Regressions for Men and Women
(Broader Occupational Classification - 7 categories)
EES-1995

Variables	Total Wage		Base Wage		Wage Complements	
	Men	Women	Men	Women	Men	Women
Age	0.045 (0.0009)	0.039 (0.001)	0.029 (0.001)	0.026 (0.002)	0.082 (0.002)	0.083 (0.006)
Age-squared	-0.0004 (1.1e ⁻⁴)	-0.0003 (2.1e ⁻⁵)	-0.0002 (1.1e ⁻⁵)	-0.0002 (2.6e ⁻⁵)	-0.0007 (3.0e ⁻⁵)	-0.0007 (7.1e ⁻⁵)
Secondary education	0.145 (0.004)	0.140 (0.007)	0.115 (0.004)	0.102 (0.008)	0.152 (0.011)	0.190 (0.025)
University education	0.596 (0.007)	0.453 (0.011)	0.441 (0.010)	0.346 (0.012)	0.561 (0.022)	0.561 (0.036)
Fixed-term contract	-0.185 (0.004)	-0.153 (0.006)	-0.099 (0.004)	-0.088 (0.007)	-0.342 (0.012)	-0.364 (0.026)
Firm-level bargaining	0.110 (0.006)	0.127 (0.009)	0.122 (0.008)	0.136 (0.011)	0.072 (0.017)	0.121 (0.030)
% Female in industry (12 categories)	-0.165 (0.032)	-0.134 (0.042)	0.112 (0.037)	0.234 (0.048)	-0.737 (0.085)	-1.348 (0.154)
% Female in occupation (7 categories)	-0.087 (0.019)	0.039 (0.024)	-0.005 (0.022)	0.080 (0.027)	-0.206 (0.050)	0.097 (0.083)
% Female in establishment	0.022 (0.014)	-0.214 (0.016)	0.084 (0.017)	-0.085 (0.027)	-0.326 (0.040)	-0.613 (0.054)
% Female in job cell	-0.120 (0.014)	-0.096 (0.012)	-0.056 (0.017)	-0.069 (0.014)	-0.219 (0.039)	-0.167 (0.038)
R-squared	0.447	0.438	0.227	0.212	0.228	0.237
N. observations	91,071	22,449	91,071	22,449	91,071	22,449

Note: All wage regressions include a constant, the market orientation of the establishment, establishment size and regional dummies. The following are used as reference categories: indefinite work contracts, national or regional industry level bargaining, primary education or less. Standard errors are calculated allowing for clustering at the job-cell level.

Table 7B
Separate Log Wage Regressions for Men and Women
(Broader Occupational Classification - 7 categories)
EES-2002

Variables	Total Wage		Base Wage		Wage Complements	
	Men	Women	Men	Women	Men	Women
Age	0.031 (0.0008)	0.033 (0.001)	0.015 (0.007)	0.021 (0.001)	0.065 (0.002)	0.067 (0.004)
Age-squared	-0.0002 (1.0e ⁻⁴)	-0.0003 (1.6e ⁻⁵)	-0.0001 (9.8e ⁻⁶)	-0.0002 (1.5e ⁻⁵)	-0.0005 (2.5e ⁻⁵)	-0.0005 (4.8e ⁻⁵)
Secondary education	0.096 (0.004)	0.121 (0.006)	0.082 (0.004)	0.087 (0.006)	0.116 (0.012)	0.223 (0.022)
University education	0.557 (0.007)	0.559 (0.008)	0.423 (0.007)	0.458 (0.009)	0.646 (0.018)	0.792 (0.024)
Fixed-term contract	-0.157 (0.004)	-0.142 (0.005)	-0.115 (0.004)	-0.091 (0.005)	-0.241 (0.012)	-0.311 (0.018)
Firm-level bargaining	0.124 (0.006)	0.087 (0.009)	0.109 (0.007)	0.079 (0.009)	0.114 (0.017)	0.168 (0.009)
% Female in industry (12 categories)	-0.198 (0.019)	0.035 (0.022)	-0.080 (0.019)	0.114 (0.020)	-0.581 (0.053)	-0.129 (0.067)
% Female in occupation (7 categories)	0.152 (0.014)	-0.006 (0.020)	0.193 (0.014)	-0.033 (0.019)	-0.019 (0.039)	0.023 (0.071)
% Female in establishment	-0.056 (0.013)	-0.169 (0.012)	-0.070 (0.013)	-0.077 (0.011)	-0.155 (0.036)	-0.486 (0.041)
% Female in job cell	-0.038 (0.012)	-0.203 (0.010)	-0.008 (0.012)	-0.172 (0.010)	-0.089 (0.033)	-0.303 (0.032)
R-squared	0.422	0.485	0.286	0.309	0.201	0.277
N. observations	105,226	43,392	105,226	43,392	105,226	43,392

Note: All wage regressions include a constant, the market orientation of the establishment, establishment size and regional dummies. The following are used as reference categories: indefinite work contracts, national or regional industry level bargaining, primary education or less. Standard errors are calculated allowing for clustering at the job-cell level.

Table 8
Relative Contribution of the Pay Structure and Segregation
to the Gender Wage Gap from Separate Log Wage Regressions
(Broader Occupational Classification - 7 categories)

Variables	EES- 1995		
	Total Wage	Base Wage	Wage Complements
Fixed-term contract	-3.7	-3.7	0.0
Firm-level bargaining	2.00	6.84	-0.5
Industry segregation	-0.01	-36.1	28.79
Occupational segregation	-11.35	-26.62	-11.15
Establishment segregation	43.60	51.60	40.52
Job-cell level segregation	24.53	49.53	17.22
	EES- 2002		
	Total Wage	Base Wage	Wage Complements
Fixed-term contract	-7.64	-20.62	0.3
Firm-level bargaining	12.55	30.2	0.01
Industry segregation	-48.43	-136.6	21.20
Occupational segregation	31.02	130.62	-3.58
Establishment segregation	61.20	61.18	61.89
Job-cell level segregation	100.8	245.6	51.64

Note: Relative contribution to the gap= $\{(\text{Mean Women} \times \text{Coefficient for Women from separate regressions} - \text{Mean Men} \times \text{Coefficient for Men from separate}) / (\text{raw wage gap})\} \times 100$.

APPENDIX TABLES

Table A
Gender Segregation at Various Work Levels
(Finest Occupational Classification - 56 categories)

Variables	Men		Women	
	Mean	S.D.	Mean	S.D.
EES-95				
% Female industry	0.19	0.07	0.23	0.07
% Female occupation	0.15	0.16	0.37	0.18
% Female establishment	0.14	0.17	0.47	0.26
% Female establishment-occupation	0.06	0.15	0.71	0.27
Observations	91,071		22,449	
EES-2002				
% Female industry	0.27	0.14	0.42	0.17
% Female occupation	0.21	0.20	0.51	0.22
% Female establishment	0.19	0.21	0.57	0.26
% Female establishment-occupation	0.09	0.19	0.78	0.25
Observations	105,226		43,392	

Table B
Relative Contribution of the Pay Structure and Segregation
to the Gender Wage Gap from Joint Regressions for Men and Women
(Finest Occupational Classification – 56 categories)

Variables	EES-95			
	Mean Women- Mean Men	Total Wage	Base Wage	Wage Complements
Female dummy	1	45.8	54.44	39.61
Fixed-term contract	-0.01	-0.82	-9.7	-0.6
Firm-level bargaining	-0.07	3.25	9.48	1.03
Industry segregation	0.04	1.01	-8.88	4.67
Occupational segregation	0.21	13.91	15.63	11.46
Establishment segregation	0.32	11.33	-1.31	26.57
Job-cell level segregation	0.71	19.82	31.55	10.58
EES-2002				
	Mean Women- Mean Men	Total Wage	Base Wage	Wage Complements
Female dummy	1	77.14	80.0	63.5
Fixed-term contract	-0.05	-5.75	-11.3	-3.3
Firm-level bargaining	-0.04	3.25	8.56	1.04
Industry segregation	0.14	5.83	-17.92	9.1
Occupational segregation	0.13	7.42	10.4	6.04
Establishment segregation	0.38	24.7	47.88	30.11
Job-cell level segregation	0.59	46.77	56.0	29.64

Note: The estimations used to compute the relative contribution to the gap are those reported in columns [1] of tables 4A and 4B. The relative contribution to the gap is calculated as follows: {[coefficients from columns [1] of table 4A (for EES-95) and table 4B (for EES-2002) *Mean Diff. Women-Men (column 1 table 5)]/raw wage gap}.

Table C
Fixed-Effects Estimation of Log Wage Differentials by Gender
(Finest Occupational Classification - 56 categories)

Variables	EES-1995		
	Total Wage	Base Wage	Wage Complements
Coefficient of Female Dummy	-0.122 (0.003)	-0.048 (0.003)	-0.237 (0.008)
Relative Contribution to Gap	50.83	53.3	40.16
R-squared	0.295	0.142	0.161
Observations		113,520	
Number of Groups		51,188	
EES-2002			
	Total Wage	Base Wage	Wage Complements
Coefficient of Female Dummy	-0.106 (0.002)	-0.039 (0.001)	-0.250 (0.006)
Relative Contribution to Gap	75.71	78.0	62.75
R-squared	0.23	0.123	0.13
Observations		148,618	
Number of Groups		63,516	

Note: Estimations also include personal characteristics as age, age-squared, education and type of contract.