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Occupational segregation and the Portuguese gender wage gap

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Abstract

This paper analyses the role of occupational segregation in explaining the overall gender wage gap in the Portuguese economy. The objective is to investigate to what extent wage disparities between male and female workers can be explained by differences in occupational distributions. The Brown *et al.* wage differential decomposition method is used, based on micro data of the year 2000, gathered by the Portuguese Ministry of Social Security and Employment. This method decomposes the total earnings gap into occupational segregation and within-occupation wage differences. Results reveal that a substantial portion of the gender wage differential in the Portuguese labor market is explained by within-occupation wage differences.

Keywords: occupational segregation, gender wage gap, wage decomposition.

1. Introduction

One of the most striking aspects of the transformations that have marked the Portuguese labor market over the last decades has been the sharp increase of women's participation in the labor force. The progress of women in relation to their integration into the labor market has been such that Portugal's female employment rate ranks among the highest within the European Union. However, and when compared to other European countries, Portugal presents what is considered a substantially high gender wage gap (Santos and Gonzalez, 2003).

Why do gender wage gaps exist? The factors that determine gender wage differentials have been the object of much discussion among economists. The result of this ongoing debate is the development of various theories that provide some important explanations for these differentials. It is important to note that most economists do not necessarily consider these theories as being mutually exclusive. Many authors refer to the possibility of more than one factor's contribution to the determination of the gap.

The traditional approach in analyzing the determinants of the wage gap is to consider both the role of differences in human capital characteristics and labor market discrimination. The human capital theory (Mincer and Polachek, 1974) suggests that the gap is due to the fact that, when compared to men, women have fewer labor market qualifications, such as formal education, experience, and training. The results of these differences in human capital are lower levels of productivity for women and, therefore, lower wages. In addition to differences in human capital characteristics, labor market discrimination is often pointed out as a main source of gender wage differentials. Blau and Ferber (1986: 229) consider that this form of discrimination exists when "two equally qualified individuals are treated differently solely on the basis of their sex**"**. Thus, in accordance with the discrimination theory, gender disparities in earnings arise from the unequal treatment of equally productive male and female workers.

More recently, and apart from the two traditional explanations referred to above, scholars have considered occupational gender segregation as an important factor underlying the differentials in gender earnings. This type of segregation exists when women and men are employed in different types of occupations: those typically occupied by women and those typically occupied by men (Preston, 1999). It is evident

that as wages vary considerably across occupations, gender occupational segregation will affect the gender wage gap. The segregation theory suggests that gender differences in pay stem from the fact that female-dominated jobs are generally paid more poorly than male-dominated jobs (Boraas and Rodgers, 2003).

The purpose of this paper is to study the role of occupational segregation in explaining the overall gender wage gap in the Portuguese economy. Specifically, the objective is to investigate to what extent wage disparities between male and female workers can be explained by differences in occupational distributions. Although several studies have focused the role of occupational segregation in accounting for gender wage disparities in different countries, including the U.S. (Brown *et al.*, 1980), Britain (Dolton and Kidd, 1994; Miller, 1987), Australia (Kidd, 1993), Canada (Kidd and Shannon, 1996), and China (Meng and Miller, 1995), there is still very little empirical research in this field. In the Portuguese case, and despite the existence of differences in the occupational distributions of male and female employees, there is no known study that attempts to highlight the contribution of theses differences to the observed gender wage differential.

Relying on micro data gathered annually by the Portuguese Ministry of Social Security and Employment (MSST), this paper uses the Brown, Moon, and Zoloth (1980) wage decomposition procedure to conduct the empirical analysis for the year 2000. This method decomposes the total earnings gap between male and female workers into a component due to within-occupation pay gaps (intra-occupational component) and a component due to the different occupational distributions of these workers (inter-occupational component).

This paper is organized as follows. Sections 2 and 3 describe the empirical model and the data set used, while section 4 presents and discusses the results. Concluding remarks are presented in section 5.

2. The Model

Related to the theoretical discussion of the determinants of the gender wage gap is the formulation of various mathematical and statistical methods aimed at decomposing wage differentials. One of the most often used methods for the decomposition of wage

differentials between two comparison groups was derived by Oaxaca (1973).[1] This traditional method decomposes wage differentials into two components: a component explained by observable differences in male and female productivity related characteristics and an unexplained (residual) component often taken as a measure of wage discrimination. The role of occupational segregation in explaining gender wage differentials is included in this decomposition method by incorporating a sequence of occupational dummies in the vector of productivity related characteristics. Thus, the occupational distribution is considered exogenous and its inclusion is likely to increase the explained component of the wage gap[2] and diminish the unexplained component.

Various authors, who have focused the role of occupational segregation in accounting for gender wage gaps, consider this treatment of occupational distribution a questionable approach. They argue that if the male and female difference in occupational distribution is itself a result of discriminatory factors, then it is not correct to consider the distribution as exogenously given and may be misleading. Discriminatory procedures in relation to occupational attainment should increase and not diminish the residual component attributable to sex discrimination.

An alternative decomposition procedure for accounting for the wage effect of occupational segregation is provided by Brown, Moon, and Zoloth. (1980). This method extends the traditional Oaxaca decomposition of the gender wage differential in order to incorporate the distinction between intra-occupational and inter-occupational wage differences. The purpose is to measure how much of the overall wage gap is due to differences in human capital or productivity-related characteristics within occupations and how much is explained by occupational segregation. This approach is innovative in the sense that the wage gap is decomposed across the entire distribution of occupations and that occupational attainment is treated endogenously. “The most interesting aspect about this decomposition approach is, thus, that more insights can be gained from the estimation of the portion due to within occupation wage differentials and the portion of the gap due to gender distinct distribution across occupations.”(Kunze, 2000: 57).

Following the Brown *et al.* wage decomposition procedure, the gender wage differential can be written as follows:

[1] This method was also derived in Blinder (1973).
[2] The fact that women tend to occupy lower-paying jobs is regarded as a legitimate reason for their lower pay.

$$(\overline{lnW^m} - \overline{lnW^f}) = \sum_{j=1}^{J} P_j^f (\overline{lnW_j^m} - \overline{lnW_j^f}) + \sum_{j=1}^{J} (P_j^m - P_j^f)\overline{lnW_j^m}, \qquad (1)$$

where $\overline{\ln(W^m)}$, $\overline{\ln(W^f)}$ are the log average wages of men and women; P_j^m, P_j^f are the proportion of men and women in occupation *j*, where j=1,…J; and $\overline{\ln W_j^m}$, $\overline{\ln W_j^f}$ are the log average wages of men and women within occupation *j*. The first term on the right hand side is the intra-occupational component which measures the part of the gap that is due to differences in mean wages within occupations. The second term on the right hand side is the inter-occupational component which represents the part of the differential that is due to differences in the distribution of men and women across distributions. Evidently, if within each occupation men and women earned on average the same, there would be no wage differential within occupations and so the intra-occupational term would be zero. On the other hand, if the portion of men and women were the same in each occupation, there would be no segregation and so the inter-occupational term would be equal to zero.

If both components are further decomposed into an explained and an unexplained (residual) component, the Brown *et al.* decomposition may be written the following way:

$$(\overline{lnW^m} - \overline{lnW^f}) = \underbrace{\underbrace{\sum_{j=1}^{J} P_j^f \hat{\beta}_j^m (\bar{X}_j^m - \bar{X}_j^f)}_{Explained} + \underbrace{\sum_{j=1}^{J} P_j^f \bar{X}_j^f (\hat{\beta}_j^m - \hat{\beta}_j^f)}_{Unexplained}}_{Intra-occupational} + \underbrace{\underbrace{\sum_{j=1}^{J} \bar{X}_j^m \hat{\beta}_j^m (P_j^m - \hat{P}_j^f)}_{Explained} + \underbrace{\sum_{j=1}^{J} \bar{X}_j^m \hat{\beta}_j^m (\hat{P}_j^f - P_j^f)}_{Unexplained}}_{Inter-occupational} \qquad (2)$$

where $\bar{X}_j^m, \bar{X}_j^f$ are matrices of the means of human capital characteristics in occupation *j*; $\hat{\beta}_j^m, \hat{\beta}_j^f$ are vectors of the estimated regression parameters in occupation *j*; and $\hat{P}_j^f$ is the vector of the predicted proportion of women who would be in occupation *j* if women faced the same occupational structure as that of men (non-discriminatory occupational structure).[3] The first two terms on the right hand side represent the intra-occupational component of the wage gap, while the third and fourth terms constitute the inter-occupational component. Both components are composite of explained and unexplained

[3] This procedure assumes that in the absence of discrimination, women would be distributed across distributions according to male allocation.

portions. The portions that are explained capture the wage differential attributable to differences in human capital characteristics between males and females, while those that are unexplained reflect the wage differential attributable to differences in estimated coefficients (regarded as labor market discrimination).

An important aspect of this procedure is the computation of the non-discriminatory occupational structure for women ($\hat{P}_j^f$). This requires an estimation of a model of occupational attainment. Brown *et al.* specified a reduced form multinomial logit model of occupational attainment for male employees. This probability model may be defined as:

$$P_{ij}^m = \frac{\exp(\gamma_j^m Z_i^m)}{\sum_{j=1}^{J} \exp(\gamma_j^m Z_i^m)} \qquad i=1,...\mathbf{N},\ j=1,\ldots J \tag{3}$$

This model specifies that the probability of a male worker *i* being in occupation *j* is defined according to a vector of exogenous variables affecting supply and demand decisions, *Z*. In order to simulate the non-discriminatory occupational female distribution, the estimated male multinomial logit coefficients are combined with the vector of female personal characteristics.

In summary, the general procedure to estimate the Brown *et al.* wage decomposition involves three main steps. First, the female predicted occupational distribution is calculated based on the estimation of a probability model of occupational attainment. Second, for each occupation and gender category, wage equations are estimated to obtain the values of $\hat{\beta}_j^m$ and $\hat{\beta}_j^f$. Finally, the information obtained in the preceding steps is used to calculate the intra-occupational and inter-occupational components of equation (2), which are then summed to obtain the total gender wage differential.

3. The Data

The analysis is performed for the year 2000[4], based on micro data gathered by the Portuguese Ministry of Social Security and Employment (MSST). These data are based on an inquiry that every establishment with wage earners is legally obliged to fill out.

[4] Given that 2000 is the last year for which information is available.

The inquiry includes information on firms and establishments, such as their size, location, economic activity and employment, as well as information on workers, for instance, gender, age, occupation, schooling, skill, tenure with the current firm, monthly wages and hours worked.

The sample consists of 1,742,171 (1,016,005 male employees and 726,166 female employees) non self-employed full-time workers[5], whose ages range from 16 to 64. For the year in analysis, approximately 58% of the labor force corresponds to male workers. Table 1 presents the distribution of male and female employees over the nine major occupational groups defined by the Portuguese National Classification of Occupations.

Table 1. Distribution of Employees by Major Occupational Groups (%), 2000

Occupational Group	Males	Females
Occupation 1. Executive civil servants, industrial directors and executives	3.2	1.5
Occupation 2. Professionals and scientists	4.0	4.1
Occupation 3. Middle management and technicians	13.3	8.5
Occupation 4. Administrative and related workers	12.0	24.2
Occupation 5. Service and sales workers	8.1	22.3
Occupation 6. Farmers and skilled agricultural and fisheries workers	0.3	0.2
Occupation 7. Skilled workers, craftsmen and similar	30.3	18.3
Occupation 8. Machine operators and assembly workers	16.9	6.1
Occupation 9. Unskilled workers	11.9	14.8

Source: Computations based on Portugal, MSST (2000).

As shown above, male and female employees are clustered in different occupations. Male employees tend to dominate production work, as well as plant and machine operation. Top and middle managerial jobs are also male-dominated, while female workers are concentrated in administrative and service occupations.

Tables A1 and A2 (included in the Appendix) present the mean values of all the variables for male and female employees across occupations and that are used in the

[5] Due to their low representation, observations regarding public administration and agricultural sectors were excluded. Observations with zero as a value for the variables birth date, admission date, and schooling were dropped due to incoherent information. Observations with missing data in relation to the variables subject to analysis were also excluded.

econometric analysis. In relation to pay, the earnings of male employees are on average higher than that of female employees across all occupations. Overall, male employees are older and have more work experience. In general, tenure with the current firm is also greater for male workers than for women workers. In relation to the economic sector, male and female employees have different distributions. Male workers are concentrated in the commerce, construction, and transportation/communication economic branches, whereas female workers tend to be concentrated in the commerce, textiles and social services sectors.

4. Results

Following the Brown *et al.* decomposition procedure, a reduced form multinomial logit model of occupational attainment is estimated for the male sample in order to calculate the female predicted occupational distribution. Table 2 presents the results of this estimation. The model includes controls for years of schooling, years of job experience (and its square), years of tenure with the firm (and its square), and the logarithm of firm size, as well as variable dummies for economic sectors and region. The majority of the regression coefficients are statistically significant at the 0.01 level. A likelihood ratio test of the overall fit of the specification leads to the rejection of the null hypothesis that all slope coefficients are equal to zero.

The results obtained from the estimation of the male multinomial logit occupational attainment model are used to estimate the predicted female occupational attainment if women were to be allocated into occupations on the same basis as men. Specifically, a simulated occupational distribution of female employees is obtained by substituting the female vector of personal characteristics into the estimated male probability model, and summing over the predicted probabilities of being in each occupation. According to the estimated results, and given their characteristics, if women were to face the same occupational structure as that estimated for men, the proportions of top managers, professionals/scientists, and middle managers/technicians would increase while the proportions of female employees in all other occupational groups would fall. Among the changes, the increase in the professionals/scientists group would be the sharpest, suggesting that this is the main area for improvement in relation to female workers. On

the other hand, the fall in administrative and service/sales workers would also be very substantial for women.

Table 2. Results of the Multinomial Logit Model of Occupational Attainment for Male Employees, 2000

Variable	Occ. 1	Occ. 2	Occ. 3	Occ. 4	Occ. 5	Occ. 6	Occ. 8	Occ. 9
Intercept	-11.583*** (-195.46)	-11.827*** (-199.17)	-4.477*** (-120.57)	-2.370*** (-63.17)	-0.446*** (-10.65)	0.321*** (2.55)	-0.112 *** (-3.00)	1.787*** (48.97)
Education	0.879*** (306.54)	1.038*** (321.39)	0.503*** (297.90)	0.337*** (198.27)	0.172*** (80.26)	-0.116*** (-12.74)	0.010*** (6.39)	-0.071*** (-40.37)
Experience	0.147*** (60.44)	0.035*** (14.09)	0.080*** (56.76)	-0.013*** (-9.33)	-0.045*** (-26.46)	-0.062*** (-9.99)	0.015*** (11.83)	-0.088*** (-71.25)
Experience^2	-0.001*** (-11.08)	0.001*** (14.37)	-0.001*** (-26.60)	0.0004*** (18.26)	0.001*** (26.54)	0.002*** (16.00)	0.00002 (1.03)	0.002*** (73.62)
Tenure	0.012*** (5.00)	0.021*** (7.72)	-0.0001 (-0.35)	0.029*** (20.19)	0.012*** (6.60)	-0013* (-1.85)	-0.020*** (-16.66)	-0.066*** (-46.74)
Tenure^2	-0.0003*** (-3.76)	-0.0001 (-0.69)	0.001*** (15.58)	-0.0001** (-2.33)	0.0002*** (3.30)	-0001*** (-5.11)	-0.00002 (-0.63)	0.0004*** (8.98)
Food, beverages, tobacco	-1.922*** (-36.04)	-3.432*** (-61.47)	-2.265*** (-66.18)	-2.123*** (-61.04)	-3.065*** (-70.47)	-2.937*** (-42.92)	-0.945*** (-28.60)	-1.846*** (-54.01)
Textiles, clothing, footwear	-1.915*** (-37.13)	-3.697*** (-63.24)	-2.744*** (-80.02)	-2.088*** (-64.24)	-4.178*** (-81.16)	-5.063*** (-40.87)	-0.481*** (-15.30)	-1.898*** (-58.77)
Wood, cork	-2.540*** (-33.73)	-4.187*** (-45.84)	-3.618*** (-71.14)	-3.108*** (-67.04)	-4.882*** (-51.57)	-3.260*** (-41.27)	-1.376*** (-39.40)	-1.433*** (-41.96)
Paper, printing, publishing	-1.574*** (-28.81)	-2.165*** (-44.14)	-1.980*** (-53.12)	-2.082*** (-51.99)	-4.241*** (-47.86)	-5.204*** (-15.47)	0.273*** (7.78)	-2.077*** (-45.10)
Chemical industries	-1.241*** (-21.10)	-2.321*** (-41.56)	-0.979*** (-24.56)	-1.602*** (-35.85)	-2.118*** (-38.23)	-3.584*** (-17.75)	1.112*** (28.99)	-0.332*** (-8.10)
Non-metal mineral products	-2.438*** (-40.76)	-3.667*** (-60.55)	-2.855*** (-75.28)	-2.704*** (-69.69)	-5.266*** (-51.01)	-7.583*** (-13.10)	-0.496*** (-15.20)	-1.689*** (-48.98)
Metal industries	-3.188*** (-57.30)	-4.229*** (-76.87)	-3.291*** (-97.40)	-3.286*** (-92.77)	-5.486*** (-75.32)	-8.512*** (-14.71)	-1.993*** (-61.03)	-2.572*** (-77.95)
Machinery, equipment	-3.268*** (-66.91)	-3.671*** (-90.59)	-2.956*** (-95.53)	-3.362*** (-101.58)	-5.224*** (-90.42)	-6.890*** (-25.44)	-1.632*** (-51.16)	-2.788*** (-84.06)
Other manufacturing…	-2.817*** (-36.17)	-4.541*** (-44.72)	-3.338*** (-78.01)	-3.209*** (-74.79)	-5.559*** (-52.95)	-6.694*** (-22.93)	-2.333*** (-64.06)	-2.638*** (-71.70)
Electricity, gas, water	-3.553*** (-46.85)	-3.516*** (-63.80)	-2.914*** (-72.20)	-3.168*** (-72.27)	-5.938*** (-36.65)	-6.694*** (-15.26)	-2.124*** (-45.27)	-3.453*** (-50.20)
Construction	-3.337*** (-74.77)	-3.611*** (-94.54)	-3.690*** (-120.82)	-3.327*** (-107.46)	-6.114*** (-102.89)	-5.735*** (-70.85)	-2.234*** (-72.84)	-2.082*** (-70.84)
Wholesale, retail	-1.237*** (-31.78)	-2.567*** (-71.47)	-1.197*** (-42.19)	-1.220*** (-41.74)	-0.704*** (-23.62)	-3.830*** (-60.17)	-1.284*** (-41.52)	-1.351*** (-45.25)
Restaurants, hotels	0.608*** (12.06)	-2.324*** (-28.72)	-2.316*** (-45.44)	-0.600*** (-15.32)	1.875*** (53.58)	-1.294*** (-18.95)	-2.163*** (-38.67)	-0.623*** (-16.21)
Transportation …	-0.511*** (-11.77)	-2.118*** (-51.32)	-1.311*** (-41.00)	-0.370*** (-11.63)	-1.781*** (-48.71)	-4.457*** (-26.53)	1.061*** (32.77)	-1.038*** (-30.95)
Banking, insurance	1.165*** (14.16)	-0.738*** (-9.08)	1.280*** (16.74)	2.245*** (29.36)	-3.381*** (-17.55)	-26.888 (-0.00)	-1.050*** (-9.37)	0.471*** (5.60)
Services to firms	-0.923*** (-21.99)	-1.718*** (-45.81)	-1.434*** (-45.33)	-1.196*** (-36.78)	-2.450*** (-62.06)	-1.877*** (-29.91)	-1.206*** (-33.85)	-0.004 (-0.11)
Lisbon	0.121*** (7.89)	0.132*** (8.50)	0.204*** (22.47)	-0.054*** (-5.75)	0.034*** (3.17)	-0.068*** (-15.53)	-0.247*** (-29.62)	-0.021** (-2.44)
Ln firm size	0.014*** (3.71)	0.166*** (44.24)	0.103*** (47.44)	0.180*** (83.24)	0.097*** (36.67)	0.094*** (9.19)	0.112*** (58.79)	0.198*** (98.88)

Source: Computations based on Portugal, MSST (2000).
Notes: The reference category is occupation 7. Number of observations=1,016,005; log-likelihood=-1376905.5; chi-squared=1108472.51; pseudo R^2=0.287. Values in parentheses are t-statistics: *statistically significant at the 0.10 level; **at the 0.05 level; ***at the 0.01 level.

The second step followed in order to estimate the Brown *et al.* wage decomposition is the estimation of wage equations for each occupation and gender category.[6] The controls included in the wage equations to explain the variations in the logarithm of hourly wages of employees are the same explanatory variables included in the multinomial logit model of occupational attainment.

The estimates obtained in the preceding stages are used to calculate the total gender wage differential. Table 3 summarizes the *Brown et al.* decomposition results. These results indicate that the difference in the log average hourly wages between male and female employees is approximately 0.24. The table displays the decomposition of the observed wage gap into intra-occupational and inter-occupational components. It is evident that the intra-occupational effect dominates the explanation of the total wage differential. Approximately 88% of the differential can be attributed to within-occupation wage differences, whereas the remaining 12% is due to across-occupation differences.

Table 3. Results of the Brown *et al.* Wage Differential Decomposition Method, 2000

Total gender wage differential		0.24
Intra-occupational differential		0.21
Explained	0.05	
Unexplained	0.16	
Inter-occupational differential		0.03
Explained	-0.70	
Unexplained	0.73	

Source: Computations based on Portugal, MSST (2000).

Examining the two components of the intra-occupational differential, it is clear that the unexplained component dominates. Approximately 76% of the gender wage differential due to within-occupation wage differences is potentially attributable to the unequal treatment of male and female productivity-related characteristics, while 12% is explained by differences in the level of those characteristics. In relation to the inter-occupational effect, the large negative value in the explained component is totally offset by the unexplained component, which implies that the unexplained across-occupation

[6] The results of the wage regressions are not reported but are available upon request.

wage differential in Portugal does not favour women. These results indicate that much of the differences in the overall gender wage gap in Portugal cannot be explained by the differences in the workers productivity-related characteristics. A substantial portion is unexplained and potentially due to labor market discrimination.

5. Conclusion

This paper investigates the role of occupational segregation in explaining wage disparities between male and female workers in the Portuguese economy. The Brown *et al.* wage differential decomposition method is applied to micro data of the year 2000, gathered by the Portuguese Ministry of Social Security and Employment.

The main results of this investigation are similar to those reported by Brown *et al.* (1980), Dolton and Kidd (1994), Kidd (1993), and Miller (1987). The findings indicate that intra-occupational effects dominate occupational segregation effects. A substantial portion of the gender wage gap in the Portuguese labor market is explained by within-occupation wage differences. On the other hand, the results indicate that a large portion of both within-occupation and across-occupation wage differences are unexplained and may be attributable to labor market discrimination.

An important conclusion based on these findings is that policies aimed to change female occupational distribution are not likely to have the desired impact on gender wage differentials. Policies targeted at decreasing the observed gender wage gap may have more effective results if focused on reducing wage disparities within occupations rather than attempting to reallocate female labor.

References

Blau, Francine D. and Marianne Ferber (1986) *The Economics of Women, Men, and Work.* New Jersey: Prentice-Hall.

Blinder, Alan S. (1973) "Wage discrimination: reduced form and structural estimates." *Journal of Human Resources,* 8(4): 436-455.

Boraas, Stephanie and William M. Rodgers (2003) "How does gender play a role in the earnings gap?" *Monthly Labor Review*, 126(3): 9-15.

Brown, Randall S., Marilyn Moon and Barbara S. Zoloth (1980) "Incorporating occupational attainment in studies of male-female earnings differentials." *Journal of Human Resources*, 15(1): 3-28.

Dolton, Peter J. and Michael P. Kidd (1994) "Occupational access and wage discrimination." *Oxford Bulletin of Economics and Statistics,* 56(4): 457-474.

Kidd, Michael P. (1993) "Sex discrimination and occupational segregation in the Australian labour market." *Economic Record*, 69(204): 44-55.

Kidd, Michael P. and Michael Shannon (1996) "Does the level of occupation aggregation affect the estimates of the gender wage gap?" *Industrial and Labor Relations Review*, 49(2): 317-329.

Kunze, Astrid (2000) "The determination of wages and the gender wage gap: a survey." IZA discussion paper n.º 193.

Meng, Xin and Paul Miller (1995) "Occupational segregation and its impact on gender wage discrimination in China's rural industrial sector." *Oxford Economic Papers*, 47(1): 136-155.

Miller, Paul W. (1987) "The wage effect of the occupational segregation of women in Britain." *Economic Journal*, 97(388): 885-896.

Mincer, Jacob and Solomon Polachek (1974) "Family investments in human capital: earnings of women." *Journal of Political Economy,* 82(2): S76-S108.

Oaxaca, Ronald (1973) "Male-female wage differentials in urban labor markets." *International Economic Review*, 14(3): 693-709.

Portugal, Ministério da Segurança Social e do Trabalho (2000) *Quadros de Pessoal*. Data in magnetic media.

Preston, Jo Anne (1999) “Occupational gender segregation: trends and explanations.” *Quarterly Review of Economics and Finance*, 39(Special Issue): 611-624.

Santos, Maria Clementina e Maria do Pilar Gonzalez (2003) “Gender wage differentials in the Portuguese labor market.” Universidade do Porto, Faculdade de Economia, Working paper n.º 3.

Appendix

Table A1. Mean Values of Variables for Male Employees across Occupations, 2000

Variable	Occupation								
	1	2	3	4	5	6	7	8	9
Log hourly real wage (PTE)	2.054	1.870	1.452	1.182	0.748	0.699	0.815	0.920	0.667
Age (years)	42.386	36.522	38.163	36.971	34.837	41.450	37.033	39.266	35.487
Education (years)	12.777	14.534	10.171	9.141	7.233	4.935	5.613	5.662	5.898
Experience (years)	23.609	15.989	21.993	21.831	21.605	30.516	25.420	27.604	23.589
Experience squared (years)	691.317	371.706	631.568	646.937	637.393	1133.4	797.825	918.489	746.490
Tenure (years)	8.557	6.745	9.122	9.717	6.526	5.914	7.505	9.029	4.794
Tenure squared (years)	155.316	113.173	179.331	195.361	112.259	83.379	131.301	171.994	69.536
Economic sector									
Food, beverages, tobacco	0.030	0.017	0.029	0.028	0.013	0.105	0.039	0.046	0.033
Textiles, clothing, footwear	0.035	0.014	0.024	0.047	0.007	0.023	0.065	0.135	0.054
Wood, cork	0.010	0.005	0.005	0.007	0.002	0.070	0.033	0.025	0.036
Paper, printing, publishing	0.028	0.039	0.025	0.016	0.002	0.003	0.014	0.052	0.008
Chemical industries	0.026	0.024	0.034	0.013	0.007	0.008	0.007	0.062	0.024
Non-metal mineral products	0.020	0.015	0.016	0.015	0.001	0.001	0. 034	0.065	0.031
Metal industries	0.023	0.018	0.026	0.020	0.003	0.001	0. 095	0.038	0.036
Machinery, equipment	0.037	0.081	0.065	0.035	0.005	0.004	0.093	0.061	0.036
Other manufacturing industries	0.009	0.003	0.009	0.009	0.001	0.003	0.054	0.016	0.018
Electricity, gas, water	0.009	0.035	0.022	0.012	0.001	0.003	0.013	0.006	0.002
Construction	0.059	0.118	0.051	0.055	0.005	0.063	0.347	0.113	0.248
Wholesale, retail	0.224	0.127	0.323	0.230	0.478	0.133	0.141	0.107	0.174
Restaurants, hotels	0.053	0.005	0.005	0.022	0.371	0.120	0.010	0.003	0.026
Transportation, communication	0.119	0.086	0.085	0.174	0.037	0.012	0.024	0.229	0.053
Banking, insurance	0.103	0.062	0.119	0.195	0.000	0.000	0.001	0.001	0.007
Services to firms	0.159	0.221	0.099	0.079	0.021	0.154	0.024	0.023	0.181
Social, personal services	0.056	0.130	0.063	0.043	0.046	0.297	0.006	0.018	0.033
Region									
Lisbon	0.582	0.629	0.558	0.532	0.427	0.261	0.271	0.309	0.382
Other Regions	0.418	0.371	0.442	0.468	0.573	0.739	0.729	0.691	0.618
Ln firm size	4.374	4.946	4.615	5.268	3.159	3.397	3.329	4.202	3.993
Number of observations	32861	41257	134648	122087	82035	3302	307381	171363	121071

Source: Computations based on Portugal, MSST (2000).
Notes: Average hourly regular wages are computed as *(bw+ts+rs)/nh*: *bw* stands for the base wage, *ts* is the payment indexed to tenure, *rs* are regular subsidies and *nh* is the number of normal hours worked. Experience is computed as *(age-school-6)*. The equivalent of 200.482 PTE is 1 Euro. Firm size is defined as number of employees in the firm.

Table A2. Mean Values of Variables for Female Employees across Occupations, 2000

Variable	Occupation								
	1	2	3	4	5	6	7	8	9
Log hourly real wage (PTE)	1.734	1.669	1.320	0.972	0.576	0.497	0.495	0.654	0.541
Age (years)	38.497	33.966	35.196	34.343	34.306	39.881	33.655	35.921	38.073
Education (years)	12.983	14.601	11.853	10.145	7.256	5.079	5.474	5.846	5.433
Experience (years)	19.515	13.365	17.344	18.199	21.051	28.803	22.181	24.076	26.640
Experience squared (years)	518.237	279.641	427.057	462.732	602.246	1009.062	604.981	727.361	870.307
Tenure (years)	7.083	5.966	7.542	7.443	4.986	4.667	7.597	10.733	6.214
Tenure squared (years)	110.238	92.782	132.660	129.031	67.573	62.240	115.273	230.856	100.573
Economic sector									
Food, beverages, tobacco	0.018	0.012	0.021	0.019	0.032	0.273	0.077	0.048	0.042
Textiles, clothing, footwear	0.041	0.013	0.052	0.073	0.009	0.004	0.709	0.376	0.132
Wood, cork	0.005	0.003	0.004	0.007	0.001	0.007	0.009	0.007	0.040
Paper, printing, publishing	0.028	0.040	0.027	0.019	0.001	0.000	0.012	0.051	0.008
Chemical industries	0.016	0.017	0.033	0.014	0.001	0.010	0.005	0.076	0.029
Non-metal mineral products	0.013	0.009	0.009	0.013	0.001	0.001	0.038	0.030	0.031
Metal industries	0.012	0.007	0.010	0.018	0.001	0.002	0.011	0.030	0.037
Machinery, equipment	0.018	0.026	0.029	0.029	0.002	0.001	0.050	0.279	0.050
Other manufacturing industries	0.006	0.003	0.006	0.010	0.002	0.000	0.022	0.021	0.030
Electricity, gas, water	0.003	0.013	0.010	0.006	0.000	0.001	0.000	0.000	0.001
Construction	0.029	0.035	0.024	0.051	0.004	0.033	0.004	0.002	0.015
Wholesale, retail	0.219	0.113	0.208	0.248	0.431	0.224	0.044	0.025	0.108
Restaurants, hotels	0.065	0.007	0.016	0.023	0.257	0.040	0.007	0.005	0.165
Transportation, communication	0.134	0.073	0.069	0.088	0.008	0.001	0.001	0.010	0.017
Banking, insurance	0.067	0.055	0.093	0.114	0.000	0.000	0.000	0.000	0.006
Services to firms	0.202	0.230	0.114	0.153	0.017	0.133	0.006	0.025	0.136
Social, personal services	0.124	0.344	0.275	0.115	0.233	0.270	0.005	0.015	0.153
Region									
Lisbon	0.598	0.597	0.565	0.497	0.438	0.257	0.103	0.190	0.359
Other Regions	0.402	0.403	0.435	0.503	0.562	0.743	0.897	0.810	0.641
Ln firm size	3.985	4.465	4.114	3.984	3.278	3.472	3.878	5.141	3.925
Number of observations	11343	29885	61472	175453	162176	1348	132775	44135	107579

Source: Computations based on Portugal, MSST (2000).
Notes: Average hourly regular wages are computed as *(bw+ts+rs)/nh*: *bw* stands for the base wage, *ts* is the payment indexed to tenure, *rs* are regular subsidies and *nh* is the number of normal hours worked. Experience is computed as *(age-school-6)*. The equivalent of 200.482 PTE is 1 Euro. Firm size is defined as number of employees in the firm.