

IS IT THE LABOUR MARKET THAT UNDERVALUES WOMEN OR WOMEN THEMSELVES? EVIDENCE FROM POLAND

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Abstract: This article provides a comparative analysis of gender gaps in observable and reservation wages. The analysis shows that women are able to accept lower wages than men before entering the labour market. Men's and women's differences in observable characteristics are not at all sufficient to explain the gaps both in observable and reservation wages. The article thus concludes that the prevalence of gender wage gap may be a result of women's lower self-valuation and not necessarily labour market discrimination against women.

Keywords: gender wage gap, reservation wage, decomposition, nonparametric estimation, selection, discrimination

INTRODUCTION

The existence of a gender inequality in pay has been widely examined in empirical research focusing both on developed as well as developing and transition economies.² Several factors, such as working experience, part time working schedule and occupational segregation have been found to be relevant for explaining women's lower wages. Existing scholarship proves however that the gap in wages

¹ The author would like to thank the participants of the Symposium on Gender Disparities organized within the International Colloquium on Current Economic and Social Topics CEST'2013 for their valuable comments and suggestions to improve the quality of the paper.

² The international review of gender wage gap analysis include for example Weichselbaumer and Winter-Ebmer (2005); for transition economies see for example Brainerd (2000), Pailhé (2000), Newell and Reilly (2001), for Poland - Grajek (2003).

of men and women is only partially explained by gender differences in these attributes. The advocates of gender equality in pay thus argue that there is a significant measure of discrimination against women.

Notwithstanding broad research on gender wage inequality, none of the existing studies accounts for the fact that the observable wage is a result of a hiring process and wage negotiation that are established in the setting of imperfect information with respect to the wage rate.³ This asymmetry of information reflected in the lack of transparent and *a priori* communicated wage offer may cause men and women to act differently and in consequence lead to distinct negotiated outcome. In particular, women may demand and agree to work for lower earnings than men do.

This article takes a novel approach in examining gender unequal distribution of wages and documents gender wage differentials in both observable and reservation wages. The job search model of McCall (1970) resolves that the optimal strategy for an individual searching for a job is to accept the reservation wage as it is a wage that equalizes marginal cost from an additional search with a marginal benefit from such a search. If reservation wages of women are already lower than that of men, then it is straightforward that a similar gap in observable wages should be present.

The remainder of this article is structured into three major sections. The subsequent section presents data and the research methods. Section three presents and discusses main empirical results. The last section offers concluding remarks.

RESEARCH METHOD

Data and variables description

The empirical analysis is based on 2010 wave of Polish Labour Force Survey data. Two samples are constructed. The first sample consists of individuals who: 1) are currently working, 2) are of working age (16-64) and 3) are not full time studying. Based on this sample a standard gender wage gap is estimated and decomposed. The second sample consists of unemployed individuals who are looking for a first job and are willing to undertake the job in the next two weeks. Individuals who were previously employed are not considered in the analysis as their labour market experience might have been already influenced by the reservation wage they claim. The sample, which is used for the estimation of the gender gap in reservation wages, is thus restricted to school and university graduates that are looking for the first job and report lack of any labour market experience.

³ Only recently Brown et al. (2011) have investigated the gender wage gap in the reservation wages for Great Britain. However, in this research no relation to the existing gender wage gap is made and the reservation wage is examined among all unemployed workers suggesting that already incurred labour market patterns may influence the results.

Determination of the wage equations

The analysis starts with a determination of a conditional gender wage gap. Following specifications are used to estimate the wage equations:

$$\ln(w_{obs_j}) = \mathbf{X}'_{i,j} \alpha_j + \alpha_{j+1} \text{female} + \varepsilon_j \quad (1)$$

$$\ln(w_{res_j}) = \mathbf{Z}'_{i,j} \beta_j + \beta_{j+1} \text{female} + \vartheta_j \quad (2)$$

The dependent variables are natural logarithm of observable and reservation wages (w_{obs} and w_{res} respectively). Since the dataset provides only the information on a minimum net monthly salary an unemployed individual agrees to work for, the reservation wage is defined as monthly earnings. To ensure comparability of the results for observable and reservation wages, in the observable wage equation (equation 1) the dependant variable is also expressed as the net monthly earnings and the actual hours worked are additionally controlled for. The equations are estimated by the OLS with White heteroscedasticity consistent standard errors.

In the observable wage equation a set of control variables represented by a vector \mathbf{X} involves labour market experience, educational dummies and a dummy for individual marital status. In addition, dummy variables representing a sector of work (i.e. private/public), a size of the company and regional disparities, i.e. the size of the place of living, the region of the country and whether an individual is living in the province, in which the capital is located, are also controlled for.

When determining the factors that influence reservation wage (denoted by a vector \mathbf{Z}) one needs to refer to the job search theory, which defines the concept of a reservation wage.⁴ Drawing on the theory and existing empirical literature the determinants of the reservation wage include: age, marital status and education as well as regional macroeconomic determinants. Moreover, a dummy variable indicating whether an individual is registered as unemployed and average duration of unemployment are also included.⁵ Additionally control variables describing the field of a study are added. By including these variables the possibility of occupational segregation is accounted for.⁶

The coefficients of interest in equations (1) and (2) are α_{j+1} for the gender wage gap and β_{j+1} for the gap in the reservation wages. They indicate an impact of being a woman on a wage rates assuming that all other control variables are kept

⁴ For a brief literature review on determinants of a reservation wages see [Christensen 2001]. Empirical analyses include [Jones 1989; Hogan 1999].

⁵ Examples of the research on the relation between unemployment duration and the reservation wage include [Lancaster and Chesher 1984; Jones 1988].

⁶ It is assumed that the field of the study determines the occupational choice of the individuals. The assumption is based on the empirical evidence showing that the field of the studies is found to be a key factor contributing to occupational sex segregation at the labour market [Borghans and Groot 1999].

fixed. In these equations it is therefore assumed that men and women have equal returns to their characteristics. As the returns to men's and women's characteristics are likely to vary, in the second step of the analysis, this rather restrictive assumption is eased and wage equations are estimated separately for the subsamples of men and women.

The above wage equations are likely to suffer from the problem of a sample selection, i.e. a selection into being working and a selection into being unemployed in the case of a first and second sample respectively. To correct for the problem of a sample selection, Heckman selection model [Heckman 1979] is used. Variables indicating a total number of people living in the household, a dummy variable whether the spouse is employed, a total number of kids an individual has and the main source of income are used as exclusion restrictions for the identification of the model.

Decomposition of the gender gaps in wages

Once the wage equations are estimated, the focus is placed on the determination of the gender wage gap and its decomposition. Two methods that are broadly applied in the empirical research on the gender wage inequality are also adapted in this article. These include: Oaxaca-Blinder (1973) and Ñopo (2008) decomposition methods.

The method due to Oaxaca and Blinder calculates and decomposes the gap in the average wages of men and women based and the estimated wage equations:

$$\Delta = \ln(\overline{w_{obs_m}}) - \ln(\overline{w_{obs_f}}) = (X_m - X_f)\alpha + [(\hat{\alpha}_m - \alpha)\bar{X}_m + (\alpha - \hat{\alpha}_f)\bar{X}_f] \quad (3)$$

where subscripts m and f stand for male and female and α represents non-discriminatory wage structure that is usually assigned to men's wage coefficients ([Oaxaca 1973], [Cotton 1988], [Fortin et al. 2011]). If the men's wage coefficients are chosen then the expression may be rewritten as:

$$\Delta = \ln(\overline{w_{obs_m}}) - \ln(\overline{w_{obs_f}}) = (\bar{X}_m - \bar{X}_f)\hat{\alpha}_m + (\hat{\alpha}_m - \hat{\alpha}_f)\bar{X}_f \quad (4)$$

The first component on the right hand side represents the 'explained' part of the gender wage gap, i.e. the part that is explained by the differences in the distribution of the characteristics of men and women; the second component in turn represents the 'unexplained' part that cannot be explained by these differences and is mostly attributed to the difference in the labour market valuation of men & women.

In addition to Oaxaca-Blinder decomposition, this article uses Ñopo decomposition that has certain advantages over the former method. Ñopo's method is a nonparametric matching method and does not depend on the structural form of the wage equations. It also accounts for the curse of insufficient 'common-support' in terms of the distribution of observable characteristics. The lack of a 'common-support' refers to the situation when the probability of observing an individual, who shares comparable observable characteristics is close to zero.

The decomposition brings down to four major steps. In the first step, one female is selected from the sample. In step two all men that have the same characteristics as a woman from the step one are also selected. In step three, an artificial man that has an average of characteristics of all the selected men is constructed and matched with a woman from the step one. In step four, matched pair is restored and the procedure is repeated for the next women. In the end the matched sample is constructed and their average wages are compared.⁷ Eventually, the gap in the average wages between two groups of individuals is decomposed into four components that consider the distribution of the characteristics:

$$\Delta = \Delta_X + \Delta_M + \Delta_F + \Delta_O \quad (5)$$

Where Δ_X is an explained gap over the common support (the part of the gap that can be explained by the differences in the distribution of the characteristics of a matched sample); Δ_M is an explained part that can be explained by the differences in the distribution of characteristics of males that are in and out of the common support; Δ_F is an explained part that can be explained by the differences in the distribution of the characteristics of females that are in and out of the common support; Δ_O is an unexplained part (the part that cannot be explained by the differences in the observable characteristics). The ‘explained’ and ‘unexplained’ parts are interpreted in the similar manner as in the standard mean decomposition due to Oaxaca and Blinder (1973).

RESULTS

This section begins with a discussion of the key sample characteristics. Table 1 presents means of the main variables involved in the analysis.

Table 1. Sample means on the main variables involved in the analysis

Variable	Sample of working individuals		Sample of first time job seekers	
	Men	Women	Men	Women
Net monthly salary	1872.62	1589.21		
Minimum monthly salary for unemployed			1442.39	1297.29
Education ISCED1	0.09	0.06	0.14	0.08
Education ISCED2	0.45	0.25	0.23	0.12
Education ISCED3	0.06	0.10	0.18	0.28
Education ISCED4	0.27	0.32	0.29	0.25
Education ISCED5	0.13	0.27	0.17	0.27
Number of observations	23 929	20 318	1 082	1 006

Source: Own calculation based on LFS 2010.

⁷ For a mathematical notation of Ñopo decomposition see Ñopo (2008).

The reported net monthly salary for men and women differs: women in Poland receive on average a net monthly wage of 1589 PLN, whereas men 1872 PLN (app. 373.3 EUR and 439.57 EUR).⁸ The resulting gender wage gap is equal to approximately 15% in favour of men. Men on average tend to work by three hours per week more than women. In consequence, long working hours cause the gender wage gap calculated based on the hourly wages to be lower - around 6%. On the other hand, the average minimum net monthly wage unemployed women that are looking for the first job would agree to work for is equal to 1297.3 PLN (app. 304.7 EUR). For men the respective value is around 1442.4 PLN (app. 338.8 EUR). The resulting gender gap in reservation wages amounts to 10%.

The results from the estimation of the observable wage equations are presented in Table 2 and respective results from the estimation of the reservation wage equations are presented in Table 3. In the case of observable wage equation the results from the Heckman model are reported since the selection takes place, which is shown by the significance of non-selection hazards rates. In the case of reservation wage equations the selection does not take place and the OLS results are presented.

Table 2. Regression results from Heckman model – sample of not studying and working individuals aged 16-65

Variable	Selectivity corrected		
	$\ln w_{obs}$	$\ln w_{obs_w}$	$\ln w_{obs_m}$
Experience	0.011 ***	0.011 ***	0.008 ***
Experience squared	-0.017 ***	-0.010 ***	-0.014 ***
Female	-0.218 ***		
Married	0.039 ***	0.005	0.074 ***
Divorced	-0.015 **	-0.038 ***	0.003
Education ISCED2	0.033 ***	0.021 **	0.034 ***
Education ISCED3	0.180 ***	0.167 ***	0.172 ***
Education ISCED4	0.180 ***	0.191 ***	0.153 ***
Education ISCED5	0.520 ***	0.546 ***	0.459 ***
Private sector	-0.039 ***	-0.034 ***	-0.033 ***
Firm size 10 - 100	0.056 ***	0.047 ***	0.067 ***
Firm size >100	0.160 ***	0.120 ***	0.200 ***
Hours worked	0.010 ***	0.008 ***	0.011 ***
Non-selection hazard	-0.095 ***	-0.070 ***	-0.119 ***
N	44 245	20 316	23 929

Notes: 1. *** denoted $p < 0.01$, ** $\rightarrow p < 0.05$, * $\rightarrow p < 0.1$; 2. Regional fixed effects included in the regressions; 3. Reference category for education is ISCED 1 and lower, for the size of the firm it is less than 11 employees and for the marital status it is single.

Source: Own calculation.

⁸ The values are recalculated based on the official exchange rate of National Bank of Poland as on June 2013.

The estimation results of the observable wage equations show that when the labour market experience and education are controlled for women receive on average by 22% lower wages than men. When interpreting these results it has to be acknowledged that the returns to education and experience are kept fixed for men and women. The estimation outputs for the subsamples of men and women show that this is not necessarily true and the returns to education and experience for women fairly differ from those of men.

Once the reservation wage is considered women are found to claim by 12.6% lower wages than men (Table 3). The comparison of the derived results suggests that the gender gap in observable wages is wider than that which prevails in the reservation wages. Once again, when the assumption of equal returns to education is relaxed, some differences between men and women are present.

Table 3. OLS regression results - sample of not studying not working individuals age 16-65 who are looking for a first job

Variable	Not corrected estimates		
	$\ln w_{res}$	$\ln w_{res_w}$	$\ln w_{res_m}$
Age	0.085 ***	0.087 **	0.093 **
Age squared	-0.152 ***	-0.151 **	-0.172 **
Female	-0.126 ***		
Married	0.034 *	0.018	0.088 **
Education ISCED3	0.079 ***	0.059	0.115 ***
Education ISCED4	0.039 **	0.000	0.067 ***
Education ISCED5	0.166 ***	0.138 ***	0.172 ***
Educ. - social sciences	0.005	0.026	0.008
Educ. - math, technology, science	0.048 *	0.070	0.040
Educ. - other (agriculture, health)	0.037	0.097	-0.022
Educ. - services	0.043	0.081	0.014
U (1-3 m)	0.030	0.015	0.039
U (3-6 m)	0.041 *	0.032	0.055 *
U (6-12 m)	0.043 **	0.039	0.045
U (>12 m)	0.048 **	0.029	0.069 **
U registered	-0.026 **	-0.030 *	-0.015
N	2 088	1 006	1 082
R2	0.198	0.203	0.160

- Notes: 1. *** p<0.01, ** p<0.05, * p<0.1;
2. Regional fixed effects included in the regressions;
3. *U* (.) represents dummy variables for the duration of unemployment (in months), *U registered* is a dummy variable indicating whether an individual is registered as unemployed, *Educ. - social sciences, math, technology, science, services and other* represent dummy variables for the field of education.
4. Reference category for education is ISCED 2 and lower (i.e. lower secondary education or lower), for the marital status it is single, for the field of education it is

Source: Own calculation.

no specialization (general education), for the duration of unemployment it is less than a month.

The results from the decomposition of a gender gap in observable wages are reported in Table 4. Based on Oaxaca-Blinder methodology the estimated wage gap adjusted for the sample selection is equal to 17.6%.⁹ The gap is entirely unexplained by the observable characteristics. The explained part is negative and constitutes 33% of a total gap. Detailed decomposition results show that most of the explained part is due to the gender differences in education. As a result, this negative explained part shows that women in Poland have on average higher education than men and if men in Poland succeeded to obtain such a level of education then the gender gap in wages would increase.¹⁰ $\tilde{\text{Nopo}}$ decomposition results are similar to the one obtained from Oaxaca-Blinder method. The results show however that the problem of comparability of women's and men's characteristics is relevant as only 61% of men and 59% of women are found to be in the common support.

Table 4. Decomposition results of the gender gap in observable wages

OB decomposition selectivity corrected			$\tilde{\text{Nopo}}$ decomposition		
	Estimate	% of GWG		Estimate	% of GWG
Δ (GWG)	0.176		Δ (GWG)	0.178	
Explained	-0.046	-26%	Δ_X	-0.065	-37%
Unexplained	0.222	126%	Δ_O	0.256	144%
			$\Delta_M + \Delta_F$	-0.012	-7%
<i>Explained by</i>					
Experience and hours worked	0.031		% women in the CS	59%	
Education	-0.072		% men in the CS	61%	
Job characteristics	-0.001				
Rest	-0.004				

Notes: 1. OB decomposition selectivity corrected refers to Oaxaca-Blinder decomposition adjusted for the selection into being observed working;
 2. $\tilde{\text{Nopo}}$ decomposition refers to $\tilde{\text{Nopo}}$ nonparametric decomposition;
 3. GWG stands for the 'gender wage gap', CS stands for the 'common-support'.

Source: Own calculation.

The results from the decomposition of the gender gap in the reservation wages are presented in Table 5. The decomposition is performed based on the following variables: age, level and type of education and regional characteristics.

⁹ The gender wage gap adjusted for the selection is the gender wage gap adjusted for the part of the gap that is due to the selection. More on selectivity adjusted wage gaps see Nueman and Oaxaca (2004).

¹⁰ This finding is in line with the estimates of Mysíková (2012) and Grajek (2003).

At this stage of the analysis the average duration of unemployment and unemployment official registration are not accounted for. This is because of a very low common support that is present when these variables are included among the matching variables. When the variables are excluded from the analysis, there are 62% of women and 59% of men in the common support. Based on Oaxaca-Blinder methodology the gender gap in the reservation wages is equal to 10.3% of men's average reservation wage. The corresponding estimate from the $\tilde{\text{Nopo}}$'s method is 11.2%. The gap is lower by about one third when compared with the gap in actually realized wages. On the other hand, the features of the gap in the minimum wages men and women would agree to work for are similar to those present in the actually prevailing wage gap.

The findings show that there exist some other complex structural factors besides age, level and type of education that may cause women's lower reservation wages. In particular, this unobservable factors that lead to difference in men's and women's average reservation wages may refer to unobserved individual self-valuation and self-assessment. If women of the same education as men claim lower reservation wage then it might be a signal that they value their skills lower. The high unexplained part may be however already a sign of differences in the labour market treatment of men and women as women may undervalue their skills in response to the future – potential – labour market prospects. This means that they may value their skills lower to be as competitive at the labour market as men are.

Table 5. Decomposition results of the gender gap in reservation wages among individuals first time looking for a job

OB decomposition			$\tilde{\text{Nopo}}$ decomposition		
	Estimate	% of GWG		Estimate	% of GWG
Δ (GWG)	0.103		Δ (GWG)	0.112	
Explained	-0.029	-28%	Δ_X	-0.025	-22%
Unexplained	0.132	128%	Δ_O	0.159	142%
			$\Delta_M + \Delta_F$	-0.022	-20%
<i>Explained by</i>					
Age	-0.005		% women in the CS	62%	
Education	-0.024		% men in the CS	59%	
Education type	0.009				
Rest	-0.009				

Notes: 1. OB decomposition refers to Oaxaca-Blinder decomposition;
 2. $\tilde{\text{Nopo}}$ decomposition refers to $\tilde{\text{Nopo}}$ nonparametric decomposition.
 3. GWG stands for the 'gender wage gap', CS stands for the 'common-support'.

Source: Own calculation.

CONCLUSION

This article documents gender based differences in the observable and reservation wages, i.e. the minimum wages unemployed individuals would agree to work for. In general, the research shows that the gender gap in reservation wages is smaller than the gender gap in actually prevailing wages. The nature of the gaps is however comparable as both the gaps remain unexplained by the observable factors. The decomposition results show that the differences in observable characteristics of men and women are not at all sufficient to explain the inequalities. Women have on average higher acquired skills, particularly education, than men but still are rewarded worse by the labour market. Similarly in terms of reservation wages – women are equipped with higher levels of education but still demand lower wages.

The results of this article shed an additional light on the foregoing gender gap research. The gender gap in wages is found to be present even in ‘potential’ minimum wages, i.e. it is present even before entering the labour market. The article concludes that there exist unobservable factors, which may include individual self-valuation of skills, which lead to the existence of the gender gap in reservation wages. Consequently, the fact that women are able to accept lower wages is associated with women’s lower self-valuation and self-esteem or alternatively men’s higher self-valuation. Women’s lower valuation may however result from their disadvantaged position since if they demanded more they might have been unable to find a job.

REFERENCES

- Blinder A.S. (1973) Wage Discrimination: Reduced Form and Structural Estimates, *Journal of Human Resources* 8: 436-455.
- Borghans L., Groot L. (1999) Educational presorting and occupational segregation, *Labour Economics* 6(3): 375-395.
- Brainerd E. (2000) Women in transition: changes in gender wage differentials in Eastern Europe and the Former Soviet Union, *Industrial and Labor Relations Review* 54(1): 138-162.
- Brown S., Roberts J., Taylor K. (2011) The Gender Reservation Wage Gap: Evidence from British Panel Data, IZA Discussion Papers 5457, Institute for the Study of Labor (IZA).
- Christensen B. (2001) The Determinants of Reservation Wages in Germany Does a Motivation Gap Exist?, Kiel Working Papers 1024, Kiel Institute for the World Economy.
- Cotton J. (1988) On the Decomposition of Wage Differentials, *The Review of Economics and Statistics* 70: 236–243.
- Fortin N., Lemieux T., Firpo S. (2011) Chapter 1 - Decomposition Methods in Economics. In: Ashenfelter O., Card D. (eds.), *Handbook of Labor Economics: Elsevier, Volume 4, Part A*, 1-102.
- Grajek M (2003) Gender Pay Gap in Poland, *Economic Change and Restructuring* 36(1): 23-44.

- Heckman J. (1979) Sample selection bias as a specification error, *Econometrica* 47 (1): 153 - 161.
- Hogan V. (1999) The Determinants of the Reservation Wage. Working Paper WP99/16, University College Dublin, Department of Economics, Dublin.
- Jones S.R.G. (1988) The Relationship Between Unemployment Spells and Reservation Wages as a Test of Search Theory, *Quarterly Journal of Economics* 103 (4): 741-765.
- Jones S.R.G. (1989) Reservation Wages and the Cost of Unemployment, *Economica* 56: 225-246.
- Lancaster T., Chesher A. (1983) An Econometric Analysis of Reservation Wages, *Econometrica* 51(6): 1661-76.
- McCall J.J. (1970) Economics of information and job search, *Quarterly Journal of Economics* 84 (1): 113-126.
- Mysíková M. (2012) Gender Wage Gap In The Czech Republic And Central European Countries, *Prague Economic Papers, University of Economics, Prague* 2012(3): 328-346.
- Neuman S., Oaxaca R.L. (2004) Wage Differentials in the 1990s in Israel: Endowments, Discrimination and Selectivity, *CEPR Discussion Papers* 4709.
- Newell A., Reilly B. (2001) The gender pay gap in the transition from communism: some empirical evidence, *Economic Systems* 25(4): 287-304.
- Ňopo H. (2008) Matching as a Tool to Decompose Wage Gaps, *The Review for Economics and Statistics* 90(2): 290-299.
- Oaxaca R.L. (1973) Male-Female Wage Differentials in Urban Labor Markets, *International Economic Review* 14: 693-709.
- Pailhé A. (2000) Gender Discrimination in Central Europe During the Systemic Transition, *Economics of Transition* 8(2): 505-535.
- Prasad E. (2003) What Determines the Reservation Wages of Unemployed Workers? New Evidence from German Micro Data, *IMF Working Papers* 03/4, International Monetary Fund.
- Weichselbaumer D., Winter-Ebmer R. (2005) A Meta-Analysis of the International Gender Wage Gap, *Journal of Economic Surveys* 19: 479-511.