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GENDER PAY GAP IN POLAND – BLINDER-OAXACA DECOMPOSITION

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Abstract: Providing equal opportunities to both men and women has become an important policy issue to most developed countries' governments. One of it's main dimensions is gender equality on the labor market. That includes: market participation, employment and wages. In a workplace equal treatment can be observed through wages.
The aim of this paper is to investigate determinants of wage differentials between women and men of equal productivity on Polish labor market. Using Blinder-Oaxaca decomposition allows to: measure wage differences, return on individual characteristics and gender pay discrimination.

Keywords: Blinder-Oaxaca Decomposition, gender pay gap, Polish labor market, gender wage differential, outcome differential

INTRODUCTION

In the last 20 years structure of Polish labor market changed substantially. Labor supply started to be evaluated by market and given a price (wage). Heterogeneous individuals became rewarded with wage for their productivity dependent on education level and other individual characteristics. Soon it was observed by researchers, that like in most labor markets over the world, female earnings on average differ from male earnings [Polachek 2009]. Broad survey study of reasons discussed in the literature on gender pay gap is described in detail by Weichselbaumer and Winter–Ebner [2005]. Assuming that wage structure reflects productivity and value of market factors, the question which follows is whether this differences can be explained with objective factors or are an effect of uneven treatment with respect to gender.

The aim of this study is to verify the hypothesis that there exists a gender pay gap between full time employed men and women and that these differences are not entirely driven by productivity characteristics.

DATA

Data used in this study is based on International Social Survey Programme 2002: Family and Changing Gender Roles III, which is a representative study covering several 'household-related' topics. For the purpose of this study, sample is limited to full-time employed individuals from Poland aged 18-60. It consists of 219 males and 217 females (n=436). Individuals working part-time were excluded from the sample to avoid cases where hourly wage is affected by smaller total of hours worked, that is individuals with additional constraints in the labor supply function or strong preferences of leisure over consumption. Variable describing wage is constructed on the basis of question: "Taking into consideration the last 12 months, please tell me what was your average monthly income/ earnings from your job or business after taxes in PLN?"
Potential experience is defined as difference between age and years of schooling. Higher or much higher income are dummy variables based on self-reported comparison of own and spouse's earnings.

Table 1. Descriptive statistics of males in the sample (n=219)

Variable	Number of responses	Mean	Standard Deviation	Median
wage (net) [PLN]	219	1388,24	89,3429	1100
master degree [binary]	219	0,1142	0,3187	0
secondary education [binary]	219	0,3425	0,4756	0
years of education [years]	219	11,4429	2,5932	10
potential experience [years]	219	20,6849	9,5344	21
trade union [binary]	219	0,1370	0,3446	0
household production [hours]	167	13,9102	16,7511	10
age [years]	219	39,8995	9,0877	41
much higher income than spouse [binary]	219	0,3927	0,4895	0
higher income than spouse [binary]	219	0,5616	0,4973	1
more household chores than spouse [binary]	219	0,1324	0,3397	0
private employer [binary]	219	0,4292	0,4961	0

Source: own calculations

Table 2. Descriptive statistics of females in the sample (n=217)

Variable	Number of responses	Mean	Standard Deviation	Median
wage (net) [PLN]	217	1127,48	57,6742	1000
master degree [binary]	217	0,2350	0,4250	0,0000
secondary education [binary]	217	0,4793	0,5007	0,0000
years of education [years]	217	12,6590	2,9113	12,0000
potential experience [years]	217	20,8940	10,2231	22,0000
trade union [binary]	217	0,2120	0,4097	0,0000
household production [hours]	149	18,2013	13,4275	15,0000
age [years]	217	41,0691	9,5801	41,0000
much higher income than spouse [binary]	217	0,1475	0,3554	0,0000
higher income than spouse [binary]	217	0,2350	0,4250	0,0000
more household chores than spouse [binary]	217	0,4147	0,4938	0,0000
private employer [binary]	217	0,2811	0,4506	0,0000

Source: own calculations

As can be seen from the tables above full-time working males earn on average substantially more than full-time working females (1388,24 and 1127,48 PLN of net wage). Although women are ones better educated (larger fraction in subpopulation of both master degree and secondary education attained, on the other hand average number of years of completed education differ less than 1,5 year). Also more females are members of trade unions. Both of these factors should work in favour of female work valuation on the labor market. On the other hand, self-reported involvement in household production measured in hours spent on domestic chores is substantially higher for females (on average 18,2 hours per week) than males (13,91 hours per week). Also men are more often employed in private than public sector. What is more only 1 in 4 women reports earnings higher than earnings of their partners. This is consistent with intuition of higher involvement in intra household activities is correlated with relative smaller wage of a spouse. But this is also contradiction with human capital wage explanation. Therefore in the further part of this research differences in wages are decomposed.

METHODOLOGY

In labor economics fundamental for analysis of differences in wages is Mincer wage equation is defined as follows:

$$Y = \alpha_0 + \rho_s s + \beta_0 x + \beta_1 x^2 + \varepsilon \tag{1}$$

where wage logarithm (Y) is a stochastic function of schooling s (measured with completed years of education), experience x and experience squared x^2. It uses formulated in the 70. theory claiming that human capital influencing productivity is reflected in wages [Mincer 1974]. If required data on labour market experience is unavailable in the dataset, potential experience (years of education and age of school enrollment are subtracted from current age of individual) is estimated and used as proxy. If differences in rewarding human capital factors of two groups or any other kind of discrimination is expected, two Mincer equation are estimated. To analyze the underlying reasons of expected differences method proposed by Oaxaca (Oaxaca 1973, 1977) is applied. Than expected values (means) are compared:

$$R = E(Y_{male}) - E(Y_{female}) \tag{2}$$

If the difference is statistically significant, the decomposition is performed. The difference is assumed to consist of 3 factors defined as follows:

$$R = E + C + I \tag{3}$$

Endowments factor (E), that is what would be the mean increase (or decrease) if the discriminated group (females) had the same characteristic as favoured group (males):

$$E = [E(Y_{male}) - E(Y_{female})]'\beta_{female} \tag{4}$$

Coefficient factor (C) which quantifies the change in discriminated groups' (females') wages if favoured group (male) coefficients were applied to them (that is if the labor market rewarded them as men are rewarded):

$$C = E(X_{female})'(\beta_{male} - \beta_{female}) \tag{5}$$

Interaction factor (I) measures simultaneous effect of previous two factors:

$$I = [E(X_{male}) - E(X_{female})]'(\beta_{male} - \beta_{female}) \tag{6}$$

Equivalently β* -parameter of Mincer function over population can be introduced. It describes 'true value' of productivity factors. It is based on assumption that discrimination can be both negative (against one group) or positive (in favour of other group). After some simple algebra it can be shown decomposition into explained and unexplained part of the wage difference:

$$R = P + U \tag{7}$$

$$P = [E(X_{male}) - E(X_{female})]'\beta^* \tag{8}$$

$$U = E(X_{male})'(\beta_{male} - \beta^*) + E(X_{female})'(\beta^* - \beta_{female}) \tag{9}$$

where the first part of the formula (P) describes productivity differences between two analyzed groups, second part (U) describes: average „discrimination in favour" of group in relatively better situation ($E(X_{male})'(\beta_{male} - \beta^*)$), that is males in this study and average „discrimination against" group in relatively worse situation ($E(X_{female})'(\beta^* - \beta_{female})$) [Oaxaca and Ransom 1994].

RESULTS

Results of group-specific regressions are shown below (Table 3 for males and Table 4 for females). Initially model for group 1 (males), n=219:

Quality of the model can be described with following characteristics:

Table 3. Estimates of wage equation for males (n=219, R-squared = 0.1966)

ln total wage	Coefficient	Standard Error	t	P>|z|	95% Conf. Interval	
years of education	0,1292	0,0184	7,0200	0,00	0,0929	0,1655
potential experience	0,0432	0,0202	2,1500	0,033	0,0035	0,0830
potential experience squared	-0,0010	0,0005	-2,0900	0,038	-0,0020	-0,0001
constant	5,1403	0,3296	15,5900	0,00	4,4905	5,7900

Source: own calculations

Further model for group 2 (females) was estimated, n=217:

Table 3. Estimates of wage equation for females (n=217, R-squared = 0.3118)

ln total wage	Coefficient	Standard Error	t	P>|z|	95% Conf. Interval	
years of education	0,1125	0,0123	9,13	0,000	0,0882	0,1368
potential experience	0,0301	0,0124	2,43	0,016	0,0057	0,0546
potential experience squared	-0,0006	0,0003	-1,19	0,048	-0,0012	-4.37e-06
constant	5,1364	0,2128	24,13	0,000	4,7169	5,5560

Source: own calculations

As can be seen from group-specific regressions, men are rewarded higher by the labor market than women. They have higher return of each additional year of education- 0,13 versus 0,11 coefficient respectively. Probable reason might be that female choose less remunerate educational paths (so called valuative discrimination). This is also consistent with crowding hypothesis. Notice: the coefficients describe differences in logarithms of net wages and don't have exact economic interpretation, they just stress differences. Also potential experience on the labor market is paid better for men than for women (0,043 and 0,30). This last

phenomenon might be explained by existence maternity leave which is impossible to capture within most datasets- women are not asked how much time they spent out of the labor force due to children (but existence of children in the household turned out to be statistically insignificant variable). Long term unemployment is an omitted factor in this analysis.

Finally results of Blinder-Oaxaca decomposition is presented (Table 5).

Table 5. Blinder-Oaxaca decomposition estimates (n=436)

ln total wage	Coef.	Std. Err	z	P>|z|	95% Conf. Interval	
Overall:						
Group 1	6,9875	0,0486	143,71	0,000	6,8922	7,0828
Group 2	6,8560	0,0387	177,24	0,000	6,7839	6,9356
Difference	0,1278	0,0621	2,06	0,040	0,0060	0,2496
Endowments	-0,1295	0,0326	-3,98	0,000	-0,1934	-0,0657
Coefficients	0,2715	0,0588	4,62	0,000	0,1562	0,3866
Explained	-0,1344	0,0339	-3,97	0,000	-0,2008	-0,0680
Unexplained	0,2622	0,0551	4,75	0,000	0,1541	0,3703

Source: own calculations

Blinder-Oaxaca decomposition shows that in analyzed sample the difference in wages between groups is statistically significant. That implies uneven situation of males and females on the labor market. The endowment factor implies that if women had the same productivity characteristics (in Mincer sense), their wage would be lower- the wage logarithm would be on average 0,13 lower. Further, if the labor market rewarded women like it rewards men, their wages would be on average substantially higher- the increase in logarithm of wage would be 0,27. But the most warning estimates are those describing explained and unexplained part of the wage gap- the unexplained coefficient is in absolute values twice as high as coefficient of explained part of the equation.

CONCLUSIONS

Blinder-Oaxaca decomposition performed on full-time working polish individuals aged 18-60 shows that there is statistically significant difference in wages per month of men and women. Productivity factors are rewarded differently- men have higher return to both schooling and potential labor market experience. But even if standard Mincer factors influencing wages are controlled, there still exists unexplained gender pay gap which can be explained as discrimination, cultural stereotypes, different family roles or preferences. The decomposition of wage differences into explained show that gender pay gap is important but

unsolved problem. Therefore more detailed researcher is needed in order to obtain the reasons why does the market undervalue female labor in comparison to men and to address the policies adequately to reasons of inequalities, not just the consequences.

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