

*Maciej Ryzkowski**, *Marek Zinecker***

GENDER UNEMPLOYMENT IN THE CZECH AND POLISH LABOUR MARKET

Making use of EU-Labour Force Survey data, the authors estimated logistic regressions with a maximum likelihood method and found that gender unemployment risk was largely explained by human capital, marital status, receiving financial support, job experience and gender discrimination in both Poland and the Czech Republic. The gender unemployment risk gap amounted to 8% and 10% in Poland and the Czech Republic, respectively. Although the impact of marital status was significant and considerable, married women in the Czech Republic benefited from their marital status on average three times less than men in the Czech Republic, and men and women in Poland. In both countries only women aged below 30 were ‘rewarded’, while women beyond 50 years of age were penalized in terms of unemployment risk. As opposed to that, men up to 60 years old have their unemployment risk reduced all else equalled. The authors argue that this form of possible discrimination in some respects is a better measure of injustice than the commonly used pay gap and it constitutes an alternative dimension of ‘gender inequality’. The results can contribute to better targeted policies against discriminatory practices by enhancing the career paths demanded in the labour market and by breaking the stereotypes rooted in the cultures of Polish and Czech societies.

Keywords: gender discrimination, unemployment risk, gender unemployment gap, Poland, Czech Republic

JEL Classifications: E24; J24; J7

DOI: 10.15611/aoe.2020.2.09

1. INTRODUCTION

Increasing the size of women’s participation in the productive sphere boosts the competitiveness and productive capacity of the economy (Cavalcanti and Tavares, 2016), mitigates rising inequality (Nayyar, 2014), increases the added worker effect (Mankart and Oikonomou, 2016) and even influences sexual health (Månsdotter and Deogan, 2014). Moreover, a more diverse staffing structure enhances the efficiency of companies and their innovative character (Kim and Starks, 2016). Meanwhile, previous studies show that women are in a more difficult situation in finding a job (Sutton *et al.*, 2016,

* Faculty of Economic Sciences and Management, Nicolaus Copernicus University; Statistical Office in Bydgoszcz, Labour Market Methodology Section.

** Faculty of Business and Management, Brno University of Technology.

Vuorinen-Lampila, 2016, Lázaro *et al.*, 2000). Thus, they are exposed to more frequent and longer periods of unemployment (Fitzenberger *et al.*, 2016).

The goal of this article is to analyse the risk of gender unemployment in Poland and the Czech Republic. The study is important for both countries as societies in transition demonstrate more hostile-sexist behaviour than liberal and developed countries do (Zawisza *et al.*, 2013). Poland and the Czech Republic have considerable labour markets within Central and Eastern Europe (CEE). They are, however, little recognized in terms of gender unemployment risk. The unemployment issues typically concern the exit rates from unemployment (Jacob and Kleinert, 2014) or the unemployment duration (Verho, 2014, Čabla and Malá, 2017). Inequality is often investigated in terms of levels of development (Ferreira *et al.*, 2015), income inequality (Corneo and Neher, 2013) and wage gaps (Liu, 2016).

The authors argue that labour market inequality is in some respects more appropriately represented by the unemployment risk than by the extensively used wage gaps. First, the adjusted¹ gender pay gap often rests on one-digit codes of the International Standard Classification of Occupations (ISCO). The groups are, however, complex and the diversity of wages is too huge to treat them as homogenous (Ryczkowski, 2015, Pryor, 2013). Moreover, Labour Force Survey (LFS)² data on earnings (a frequent data source of the empirical models) are of poor quality and completeness. Finally, earnings are affected by different social roles in the family, by early career choices and the anticipation of parenthood (Bass, 2015) or by aggression in wage negotiations (Leibbrandt and List, 2015). Due to the lack of data, a vast majority of econometric models do not take these factors into account. The study avoided this problem to a certain extent, as the authors modelled those who are willing to work.

The results seem to be particularly important for labour market institutions and labour market policies designed for the purpose of promoting employment of women and, thus, employment in general. Isolating factors responsible for gender differences in the exposure to the risk of unemployment may constitute a valuable contribution to local communities struggling with unemployment as well with gender discrimination and for those responsible for formulating macroeconomic policies. Appropriately designed labour market surveys, instruments and policies could lead to significant improvements in the labour market as a whole.

¹ The adjusted pay gap usually takes into account factors that impact the gap's existence. As opposed to it, the unadjusted pay gap is simply the raw percentage difference between men and women's earnings.

² The LFS is a household sample survey on labour participation of people aged 15 and over as well as on persons outside the labour force.

The rest of this article proceeds as follows. First, the authors review the literature on the determinants of unemployment. Section 3 provides an overview of the data collection, hypotheses and methodological approach. Section 4 presents the findings.

2. LITERATURE REVIEW

Theories that emphasize the role of labour market institutions (Lynch, 2015), for example the minimum wage laws (Peetz, 2015), link the gender differences in human capital and in unemployment rates. Blau and Kahn (2003) find that institutions which compress the distribution of wages may reduce the incentives to employ workers with a lower level of human capital. This leads to higher unemployment rates within these groups and to a greater wage inequality (Kishi, 2014). While this is mostly striking in leading managerial and supervisory positions (Fröhlich and Baudisch, 2016), the discrimination is not limited only to high-rank posts. Baert *et al.* (2016) demonstrate that women receive fewer interview invitations by one-third if they apply for jobs that imply a first promotion at functional level. Baussola *et al.* (2015) show that women are disadvantaged in Italy, although not in the United Kingdom.

Koutentakis (2015) finds that the gender unemployment gap is mostly explained by gender differences in the separation rate. The separation rate is the percentage of employees who voluntarily and involuntarily leave the organisation during the reporting period. Nevertheless, on the demand side, it is the discrimination that is emphasized as one of the key factors explaining the differences between male and female unemployment rates. The first source of discrimination refers to the discriminatory social attitudes towards gender equality (Janssen *et al.*, 2016) and prejudices that some employers or clients have against women.

The second one is based on the assumption that women have a lower level of human capital because of family duties or pregnancy. Indeed, differences in human capital, the institutional framework and personal traits of character influence a person's labour market situation (O'Reilly *et al.*, 2015). Differences in human capital affect in turn the occupational distribution. The distribution determines the gender unemployment rates according to the study by Rives and Sosin (2002). Similarly, Azmat *et al.* (2006) show that a large gender gap in the unemployment rate results often from the differences in human capital accumulation interacting with labour market institutions. The literature on the unemployment gap is, however, inconclusive. Albanesi and Şahin (2018) show that growth in women's education relative to men's education and

changes in the occupational distribution by gender have only minor effects on the evolution of the gap. They attribute the developments of the unemployment gap to the changing labour force activity rates of males and females. In turn, Ortega (2008) argues that marital status plays the dominant role in creating the gender gap in unemployment rates.

Gender unemployment gaps for Poland and the Czech Republic have been hardly explored after 2000. Ham *et al.* (1999) point to the differences in the behaviour of men and woman, employers and institutions. Lauerová and Terrell (2007) find that women's lower probability of exiting unemployment for a job explains the key share of the gender unemployment gap in the Czech Republic and some other post-communist countries. Flek and Mysíková (2015) indicate the relatively weak net flow of individuals from unemployment to employment in the Czech Republic. The authors base their hypothesis on the human capital theory and assume that education is more responsible for the differences in the gender unemployment risks than marital status or discrimination.

3. DATA AND METHODOLOGY

The authors applied logistic regression to evaluate the gender unemployment risk, and estimated separate models for both genders similarly to the study by Landmesser (2013) for the exit rates from unemployment using Poland's and the Czech Republic's LFS databases for 2014. The datasets were limited only to a population from 15 to 74 years old to meet the EU-LFS unemployment definition.

Let us denote by U the binary variable with two possible values $U = \{(u_i = 1) \vee (u_i = 0)\}$, where $p_i = P(u_i = 1)$ is the probability that the person is unemployed. The study used the binary logistic model as it has a dependent variable with two possible values. The authors modelled the probability p_i by a function F of explanatory variables X , which constitute a vector x_i : $p_i = F(x_i' \delta)$, where δ is a vector of coefficients' estimates and

$F(x_i' \delta) = \frac{1}{1 + \exp(-x_i' \delta)}$, and estimated the unknown parameters in δ with

the standard Maximum Likelihood Method by finding values for δ that maximize the likelihood function: $\prod_{i=1}^N p_i^{u_i} (1 - p_i)^{1-u_i}$. Since only a relatively small fraction of the population aged over 14 is unemployed, the dataset is unbalanced in this respect. Therefore, it is assumed that:

$$\begin{cases} P(u_i = 0) \Leftrightarrow \frac{1}{1 + e^{-\hat{z}_i}} \leq c^*, \\ P(u_i = 1) = \frac{1}{1 + e^{-\hat{z}_i}} > c^*, \end{cases}$$

where c^* is the cut-off value. The cut-off value is determined by the Youden index (Kumar and Indrayan, 2011) and the Receiver Operating Characteristic curve (King and Langche, 2001) to maximize the sum of sensitivity and specificity (DeLong et al., 1988). The true-positive rate is sensitivity, while the false-positive rate is specificity for different cut-off points of a parameter. In a Receiver Operating Characteristic (ROC) curve, sensitivity is plotted in function of the (100-Specificity) for different cut-off points. Therefore, the closer the ROC curve is to the upper left corner, the higher the overall accuracy of the model.

Vector x_i contains: NUTS2 place of residence – reference variable: PL42 (models for Poland), CZ81 (models for the Czech Republic); age brackets (reference variable: persons above 30 and below 41 years old); marital status (reference variable: married persons); the highest completed level of education – reference variable (PL): secondary vocational school with a high school certificate, reference variable (CZ): secondary school with a high school certificate; ISCED 3-digit field of completed education (reference variable: ISCED 200, Humanities and Arts); population density of place of residence – ref.: city with more than 100 thousands inhabitants, CZ: ref.: mid density of a population; the remaining dummy variables (value 1 was given for the presence of the categorical effect): receiving a disabled pension, receiving a retirement pension, being financially supported by other person, owning a farm, studying, being partly disabled or disadvantaged due to health conditions, having personal or family responsibilities, and attending non-formal education within the last four weeks.

To assess the gender employment gap U_{gap} , the authors calculated the difference between the female unemployment rate that resulted from the estimates of the parameters for the women's subsample: $\hat{\delta}_{0(w)}, \hat{\delta}_{1(w)}, \hat{\delta}_{2(w)}, \dots, \hat{\delta}_{k(w)}$ and the female unemployment rate obtained using the estimates of the parameters for the men's subsample $\hat{\delta}_{(m)}$:

$$U_{gap} = \frac{\sum_{i=1}^N \frac{1}{1 + \exp(-x'_{i(w)} \hat{\delta}_{(w)})} \Big| c^* - \sum_{i=1}^N \frac{1}{1 + \exp(-x'_{i(w)} \hat{\delta}_{(m)})} \Big| c^*}{\sum_{i=1}^N \frac{1}{1 + \exp(-x'_{i(w)} \hat{\delta}_{(w)})} \Big| c^* + E_w - \sum_{i=1}^N \frac{1}{1 + \exp(-x'_{i(w)} \hat{\delta}_{(m)})} \Big| c^* + E_w},$$

where E_w is the number of employed women in the sample, N is the population of women less women economically inactive. After controlling for explanatory variables, the greater the value of $|U_{gap}|$, the greater the average discrimination.

4. RESEARCH FINDINGS AND DISCUSSION

In the annex, the study presents models with statistically significant variables at 0.1 significance level³. In Poland, the value of the unemployment gap (8.6) was close to the value in the Czech Republic (10.6). Surprisingly, the outcome is largely similar to the estimates of the gender pay gap in the subject literature. The resulting gap is close to the pay gaps obtained in a quantile regression by Perugini and Selezneva (2015), the gender pay gap reported by Mysíková (2012) and similar to the estimates of other authors (Rokicka and Ruzik, 2010). This suggests that the gender unemployment gap may constitute yet another, besides the pay gap, important aspect of gender equality.

The disadvantageous situation of women in the Czech labour market is reflected in the unemployment probabilities estimated on the whole Czech database (not presented due to the limited space). Being a man in the Czech Republic decreased the risk of unemployment by around 22%. In turn, in both countries only women below 30 years old had an unemployment risk rent, while women above 50 years old were penalized, while men up to 60 years old were never penalized due to their age (Tables: 1-4).

It was also found that unmarried individuals face a considerably greater risk of unemployment. Nevertheless, both countries differ in this respect. Women in the Czech Republic benefit from their marriage on average three times less than a) men in this country, b) men and women in Poland. Moreover, the unemployment risk increased by over one hundred percent for a) divorced men and women in Poland and men (but not women) in the Czech Republic, b) single women in Poland and single men in the Czech Republic.

However, the variances of the odds ratios for the major groups of factors constituted only a small fraction of the analogous variance for education (Table 5). This means that human capital in the form of education and the achievements of an individual within this field gave a broader range of returns

³ The *LR* tests indicate statistical significance of the regressions. The adjusted *R*-squared and McFadden *R*-squared are typical for models estimated on individual data. The percentages of correctly predicted cases varied from 83% to 88% for men and women in Poland, respectively, and from 71% to 72% in the Czech Republic. The sensitivity is close to 80%. The specificity for Poland ranges from 83% to 89% for men and women, respectively. For the Czech Republic, it ranges from 71% to 72%.

and penalties than any other group of factors. Thus the authors failed to reject the assumed hypothesis.

In particular, women in Poland with a Master level of education had their unemployment risk lowered by 37% (men: 27%) and in the Czech Republic by 44% (men: 33%). Moreover, secondary education completed with the final 'matura' exam in Poland reduced the risk of female unemployment more than male. It was also found that men in both countries should attach greater importance to the choice of their highest level of education completed, while women to the proper selection of the field of education. Hall (2016) suggests that the expansion of education may not always reduce the unemployment risk. One needs to be aware of the possible mismatch which may appear between academic teaching and job market requirements (Wright, 2014). Despite this, the study's results did not confirm it, and the authors found in line with Zimmer (2016) that less educated people of both genders face a greater risk of being unemployed (Jurajda and Terrell, 2009).

This study supports the thesis that women's situation may be relieved by policies and actions that attract women to the most-in-demand occupations. Indeed, the volatility of the odds ratios for the ISCED codes of education in both countries was largest in comparison to other groups of factors. Therefore, actions aimed at breaking the stereotypes that were found relevant in both economies (Scharle, 2015; Kostera, 2003) could encourage women to more promising career paths. Indeed, Cech (2016) showed that occupational segregation results from culture and not necessarily from the family plans of young people. As a consequence, besides solutions associated with investment in childcare facilities proved to be efficient in promoting female employment (Fehr and Ujhelyiova, 2012), the government should encourage proper educational choices. Both genders may considerably decrease their risk of becoming unemployed through a careful selection of the level and field of education. The widely advocated alternative, namely wage subsidies may be an inefficient measure of active labour market policies (Schünemann *et al.*, 2015).

The results indicated that social transfers may increase the unemployment risk or encourage inactivity. This was true both for the persons receiving the retirement pension and the dependants. Receiving financial support contributed to a tremendous increase of the risk to be unemployed (Tables 1-2: data available only for Poland). The authors suspect that those dependent possibly do not have a high motivation to accept any kind of job. In turn, the fact of possessing a retirement pension decreased the unemployment risk in both countries. It corresponds to the general expectations that people after getting retired usually leave the labour market or that unemployment late in workers' careers may affect the decision to retire.

The reforms decreasing the size of the low-wage sector in former transition countries could also be beneficial in terms of reducing the unemployment risk. The reason is that according to the evidence of Ryczkowski and Maksim (2018), women are largely exposed to a greater risk of becoming a low-wage earner. This may discourage them from being economically active, and therefore they may have difficulties with a future return to the labour market.

The study also provided some other interesting insights. Firstly, women were worse off in regard of unemployment risk particularly in predominantly rural regions. However, the disadvantage also appeared in some regions of Central Poland which had a significant industrial base. A lower unemployment probability for both genders was typical for the urban regions. The matching process between unemployment and vacant jobs is more efficient in these areas. The results matching the general expectations also concern persons who are studying. The risk of being unemployed when studying at a university decreased by almost one hundred percent with no significant gender gaps.

Secondly, despite the fact that in some regions of the world gender disparities in youth employment exist, the findings do not support it for the age group of 25-30 years old. The unfavourable situation of the young may stem neither from their age nor gender, but rather from their limited professional experience.

Similarly, no gender differences appeared in the case of farmers and those with family responsibilities. This is contrary to the results of Kulik (2000), who found that women are more likely to reject jobs in the case of conflict with family duties. Indeed, both genders who described their situation as having family responsibilities were mostly economically inactive (Poland: 86%, the Czech Republic: 99%). The same was found in the case of the handicapped. This implies that persons with a handicap in Poland and in the Czech Republic may feel excluded from the labour market and may be discouraged from searching for a job. This finding complements the high unemployment rates of the disabled in economically advanced countries (Girma, 2014).

In summary, the importance of education for the unemployment risk (both in terms of the highest completed level of education and the field of education completed) was greater than the relevance of regional factors, gender discrimination, marital status, age and any other group of factors. Thus, human capital theories assuming that less educated people face a greater risk to be unemployed seem to be relevant in Poland and the Czech Republic. The fact of being financially supported influenced the unemployment risk more than

the education factor. Finally, only in the case of men in the Czech Republic, the impact of being married on the unemployment risk on average exceeds that of education.

CONCLUDING REMARKS

Political measures intended for eliminating discrimination depend on the knowledge of sources of the gender gap in unemployment rates. Meanwhile, in Poland and the Czech Republic the problem is sizable. The gender gaps in unemployment risk discovered in both countries correspond to the discrimination in wages in the subject literature. Consequently, women's unfavourable situation in the labour market concerns not only the gap in wages but also the risk of unemployment. The authors found that advances in human capital accumulation are crucial for the improvement of the situation of women. The choice of the field and level of education brought a broader range of returns and penalties than any other group of factors, while the level of education was more important for men and the field of education for women. Understanding the reasons of the gender unemployment gap may contribute to better targeted strategies on the level of national and regional policy making. The actions should enhance and promote the career paths mostly demanded in the labour market and break the gender stereotypes rooted in the culture of both countries. Lack of knowledge on the gender unemployment gap might be one of the main internal obstacles to the development of efficient CEE labour markets. Therefore, the study emphasizes the importance of the government strategy for attracting women to the most-in-demand occupations by encouraging proper educational choices of both genders. These actions should complement investment in childcare facilities and the reforms which aim to decrease the size of the low-wage sector. The results suggest that the widely used alternative, namely wage subsidies may be an inefficient measure of active labour market policies. The results suggest that social transfers may increase the unemployment risk or encourage inactivity. Finally, governmental support (for instance, in the form of government-funded internships) should be mainly focused on those with limited professional experience. The authors found that the impact of the brief job experience on the unemployment risk for both genders is sizeable, significant and positive. The limitations of the research stem from the fact that we were not able to evaluate the determination of an individual in searching for a job. These limits also rely on ignoring the cognitive and non-cognitive skills that are required by employers (Hurrell, 2016). The authors believe that it would be a key future contribution to extend our analysis by taking these factors into account while assessing the equality in the labour market.

REFERENCES

- Albanesi, S., Şahin, A., *The Gender Unemployment Gap*, “Review of Economic Dynamics”, 30, pp. 47-67, 2018.
- Azmat, G., Güell, M., Manning, A., *Gender Gaps in Unemployment Rates in OECD Countries*, “Journal of Labor Economics”, 24(1), pp. 1-37, 2006.
- Baert, S., De Pauw, A.-S., Deschacht, N., *Do Employer Preferences Contribute to Sticky Floors?* “ILR Review”, 69(3), pp. 714-736, 2016.
- Bass, B. C. *Preparing for Parenthood?* “Gender & Society”, 29(3), pp. 362-385, 2015.
- Baussola, M., Mussida, C., Jenkins, J., Penfold, M., *Determinants of the Gender Unemployment Gap in Italy and the United Kingdom: A Comparative Investigation*, “International Labour Review”, 154(4), pp. 537-562, 2015.
- Blau, F. D., Kahn, L. M., *Understanding International Differences in the Gender Pay Gap*, “Journal of Labor Economics”, 21(1), pp. 106-144, 2003.
- Čabla, A., Malá, I., *Modelling of Unemployment Duration in the Czech Republic*, “Prague Economic Papers”, 26(4), pp. 438-449, 2017.
- Cavalcanti, T., Tavares, J., *The Output Cost of Gender Discrimination: A Model-based Macroeconomics Estimate*, “The Economic Journal”, 126(590), pp. 109-134, 2016.
- Cech, E. A., *Mechanism or Myth?* “Gender & Society”, 30(2), pp. 265-288, 2016.
- Corneo, G., Neher, F., *Income Inequality and Self-Reported Values*, “The Journal of Economic Inequality”, 12(1), pp. 49-71, 2013.
- DeLong, E. R., DeLong, D. M., Clarke-Pearson, D. L., *Comparing the Areas under Two or More Correlated Receiver Operating Characteristic Curves: A Nonparametric Approach*, “Biometrics”, 44(3), pp. 837-845, 1988.
- Fehr, H., Ujhelyiova, D., *Fertility, Female Labor Supply, and Family Policy*, “German Economic Review”, 14(2), pp. 138-165, 2012.
- Ferreira, F. H. G., Lustig, N., Teles, D., *Appraising Cross-National Income Inequality Databases: An Introduction*, “The Journal of Economic Inequality”, 13(4), pp. 497-526, 2015.
- Fitzenberger, B., Steffes, S., Strittmatter, A., *Return-To-Job During and after Parental Leave*, “International Journal of Human Resource Management”, 27(8), pp. 803-831, 2016.
- Flek, V., Mysíková, M., *Unemployment Dynamics in Central Europe: A Labour Flow Approach*, “Prague Economic Papers”, 24(1), pp. 73-87, 2015.
- Fröhlich, R., Baudisch, S., *Far from Fifty-Fifty: Legal Measures and the Relative Lack of Women in Powerful Decision-Making Positions in Germany's Broadcasting Sector*, “Journal of Broadcasting & Electronic Media”, 60(2), pp. 305-330, 2016.
- Girma, H., *Fighting Fate: A Seventy Percent Unemployment Rate*, “Work”, 48(3), pp. 299-301, 2014.
- Hall, C., *Does More General Education Reduce the Risk of Future Unemployment? Evidence from an Expansion of Vocational Upper Secondary Education*, “Economics of Education Review”, 52, pp. 251-271, 2016.
- Ham, J. C., Svejnar, J., Terrell, K., *Women's Unemployment During Transition*, “Economics of Transition”, 7(1), pp. 47-78, 1999.

- Hurrell, S. A., *Rethinking the Soft Skills Deficit Blame Game: Employers, Skills Withdrawal and the Reporting of Soft Skills Gaps*, "Human Relations", 69(3), pp. 605-628, 2016.
- Jacob, M., Kleinert, C., *Marriage, Gender, and Class: The Effects of Partner Resources on Unemployment Exit in Germany*, "Social Forces", 92(3), pp. 839-871, 2014.
- Janssen, S., Tuor Sartore, S. N., Backes-Gellner, U., *Discriminatory Social Attitudes And Varying Gender Pay Gaps Within Firms*, "Industrial & Labor Relations Review", 69(1), pp. 253-279, 2016.
- Jurajda, S., Terrell, K., *Regional Unemployment and Human Capital in Transition Economies*, "Economics of Transition", 17(2), pp. 241-274, 2009.
- Kim, D., Starks, L. T., *Gender Diversity on Corporate Boards: Do Women Contribute Unique Skills?*, "American Economic Review", 106(5), pp. 267-271, 2016.
- King G., Langche, Z., *Logistic Regression in Rare Events Data*, "Political Analysis", 9(2), pp. 137-163, 2001.
- Kishi, K., *Dynamic analysis of Wage Inequality and Creative Destruction*, "Journal of Economics", 115(1), pp. 1-23, 2014.
- Kostera, M., *Reflections of the Other: Images of Women in the Polish Business Press*, "Human Resource Development International", 6(3), pp. 325-342, 2003.
- Koutentakis, F., *Gender Unemployment Dynamics: Evidence from Ten Advanced Economies*, "Labour: Review of Labour Economics & Industrial Relations", 29(1), pp. 15-31, 2015.
- Kulik, L., *Jobless Men and Women: A Comparative Analysis of Job Search Intensity, Attitudes toward Unemployment, and Related Responses*, "Journal of Occupational & Organizational Psychology", 73(4), pp. 487-500, 2000.
- Kumar, R., Indrayan, A., *Receiver Operating Characteristic (ROC) Curve for Medical Researchers*, "Indian Paediatrics", 48(4), pp. 277-287, 2011.
- Landmesser, J. M., *Decomposing the Gender Gap in Average Exit Rate from Unemployment*, "Dynamic Econometric Models", 13, pp. 163-174, 2013.
- Lauerová, J. S., Terrell, K., *What Drives Gender Differences in Unemployment?* "Comparative Economic Studies", 49(1), pp. 128-155, 2007.
- Lázaro, N., Moltó, M., L., Sánchez, R., *Unemployment Determinants for Women in Spain*, "Labour", 14(1), pp. 53-78, 2000.
- Leibbrandt A., List, J. A., *Do Women Avoid Salary Negotiations? Evidence from a Large Scale Natural Field Experiment*, Management Science, 61(9), pp. 2016-2024, 2015.
- Liu, K., *Explaining the Gender Wage Gap: Estimates from a Dynamic Model of Job Changes and Hours Changes*, "Quantitative Economics", 7(2), pp. 411-447, 2016.
- Lynch, K. J., *Sex-Plus-Age Discrimination: State Law Saves the Day For Older Women*, "ABA Journal of Labor & Employment Law", 31(1), pp. 149-168, 2015.
- Mankart, J., Oikonomou, R., *The Rise of the Added Worker Effect*, "Economics Letters", 143, pp. 48-51, 2016.
- Månsdotter, A., Deogan, C., *Further Gender Equality – Is It Good or Bad for Sexual Health?*, "Journal of Gender Studies", 25(3), pp. 294-302, 2014.
- Mysíková, M., *Gender Wage Gap in the Czech Republic and Central European Countries*, "Prague Economic Papers", 21(3), pp. 328-346, 2012.

- Nayyar, D., *Why Employment Matters: Reviving Growth and Reducing Inequality*, "International Labour Review", 153(3), pp. 351-364, 2014.
- O'Reilly, J., Smith, M., Deakin, S., Burchell, B., *Equal Pay as a Moving Target: International Perspectives on Forty Years of Addressing the Gender Pay Gap*, "Cambridge Journal of Economics", 39(2), 299-317, 2015.
- Ortega, C., *Gender Gaps in Unemployment Rates in Argentina*, "Económica", 54(1-2), pp. 161-202, 2008.
- Peetz, D., *Regulation Distance, Labour Segmentation and Gender Gaps*, "Cambridge Journal of Economics", 39(2), pp. 345-362, 2015.
- Perugini, C., Selezneva, E., *Labour Market Institutions, Crisis and Gender Earnings Gap in Eastern Europe*, "Economics of Transition", 23(3), pp. 517-564, 2015.
- Pryor, F. L., *Intraoccupational Wage Dispersion*, "WorkingUSA", 16(3), pp. 389-394, 2013.
- Rokicka, M., Ruzik, A., *The Gender Pay Gap in Informal Employment in Poland*, "CASE Network Studies & Analyses", 406, pp. 1-48, 2010.
- Rives, J. M., Sosin, K., *Occupations and the Cyclical Behavior of Gender Unemployment Rates*, "The Journal of Socio-Economics", 31(3), pp. 287-299, 2002.
- Ryczkowski, M., *Effects of Being in an Occupation – Is ISCO 1 Digit Classification Enough to Model Wages in Poland?* Przegląd Statystyczny, 62(3), pp. 321-344, 2015.
- Ryczkowski, M., Maksim, M., *Low Wages – Coincidence or a Result?*, "Acta Oeconomica", 68(3), pp. 549-572, 2018.
- Schünemann, B., Lechner, M., Wunsch, C., *Do Long-Term Unemployed Workers Benefit from Targeted Wage Subsidies?*, "German Economic Review", 16(1), pp. 43-64, 2015.
- Scharle, A., *Attitudes to gender roles in the Czech Republic, Hungary and Poland*, "Working Paper Series CRINCOH", 5.09, pp. 1-18, 2015.
- Sutton, A., Bosky, A., Muller, C. *Manufacturing Gender Inequality in the New Economy*, "American Sociological Review", 81(4), pp. 720-748, 2016.
- Verho, J., *Unemployment Duration and the Role of Compositional Variation: Evidence from a Period of Economic Crisis in Finland*, "Empirical Economics", 47(1), pp. 35-56, 2014.
- Vuorinen-Lampila, P., *Gender Segregation in the Employment of Higher Education Graduates*, "Journal of Education & Work", 29(3), pp. 284-308, 2016.
- Wright, T., *Whatever Happened to the F Word in Higher Education?*, "Journal of Gender Studies", 25(2), pp. 215-227, 2014.
- Zawisza, M., Luyt, R., Zawadzka, A. M., *Societies in Transition: Are They More Sexist? A Comparison between Polish, South African and British Samples*, "Journal of Gender Studies", 24(1), pp. 38-55, 2013.
- Zimmer, T., *The Importance of Education for the Unemployed*, "Indiana Business Review", 91(1), pp. 9-16, 2016

Received: March 2018, revised: November 2018

Acknowledgements: *This work was supported by the Brno University of Technology, the Faculty of Business and Management, the Czech Republic, and the Institute for Economic Research, Toruń, Poland [grant number 2016/2].*

ANNEX

Table 1
The coefficient estimates of being an unemployed woman in Poland in 2014

PL (Woman)	Coefficient	Std. error	z	Slope	Odds ratio	Δ unemployment risk
$\hat{\delta}_0$	-4.723	0.1269	-37.22			
PL51 (02)	0.253	0.0858	2.95	0.0013	1.288	28.769
PL61 (04)	0.333	0.0830	4.02	0.0018	1.396	39.574
PL31 (06)	0.566	0.0813	6.95	0.0033	1.760	76.036
PL11 (10)	0.390	0.0798	4.88	0.0021	1.477	47.657
PL12 (14)	0.340	0.0761	4.46	0.0018	1.404	40.429
PL32 (18)	0.640	0.0787	8.13	0.0039	1.896	89.604
PL34 (20)	0.424	0.0879	4.82	0.0023	1.528	52.765
PL33 (26)	0.377	0.0865	4.36	0.0020	1.457	45.741
PL41 (30)	0.153	0.0819	1.87	0.0007	1.165	16.544
age25_30	0.350	0.0572	6.11	0.0018	1.419	41.852
age51_60	-0.748	0.0554	-13.51	-0.0027	0.473	-52.685
age61_70	-3.154	0.2525	-12.49	-0.0071	0.043	-95.732
age71_74	-6.160	0.7406	-8.32	-0.0117	0.002	-99.789
Single	0.693	0.0497	13.96	0.0039	2.000	100.009
Widowed	1.026	0.1042	9.84	0.0067	2.789	178.938
Divorced	1.258	0.0726	17.33	0.0105	3.518	251.817
Master's grade	-0.463	0.0691	-6.70	-0.0018	0.630	-37.043
Post-secondary level	0.271	0.0959	2.82	0.0014	1.311	31.089
Vocational (without matura*)	0.240	0.1068	2.25	0.0012	1.271	27.139
Secondary level (with matura*)	-1.918	0.3779	-5.08	-0.0047	0.147	-85.315
Secondary level (without matura*)	-1.519	0.3912	-3.88	-0.0036	0.219	-78.112
Basic vocational level	0.171	0.0603	2.84	0.0008	1.187	18.672
Lower secondary level ('gimnazjum')	-2.973	0.3998	-7.44	-0.0049	0.051	-94.884
Primary level	-1.819	0.3802	-4.79	-0.0053	0.162	-83.787
Disabled pension	0.633	0.2644	2.40	0.0039	1.884	88.408
A dependant	3.292	0.0462	71.21	0.0629	26.904	2590.440
Farmer	-4.588	0.7098	-6.46	-0.0057	0.010	-98.983
Student	-4.222	0.1118	-37.77	-0.0063	0.015	-98.532
Handicapped	-2.953	0.2308	-12.79	-0.0049	0.052	-94.781
Family duties	-2.448	0.0692	-35.36	-0.0050	0.086	-91.353
ISCED100	0.912	0.1439	6.34	0.0063	2.489	148.946
ISCED300	1.068	0.1195	8.94	0.0070	2.909	190.883
ISCED420	0.960	0.2719	3.53	0.0072	2.613	161.275
ISCED440	1.107	0.2365	4.68	0.0090	3.026	202.569
ISCED481	1.140	0.2829	4.03	0.0095	3.127	212.689
ISCED500	1.039	0.1265	8.22	0.0071	2.827	182.732
ISCED600	0.955	0.1478	6.47	0.0068	2.600	159.995
ISCED700	0.512	0.1526	3.36	0.0029	1.669	66.936
ISCED800	1.118	0.1292	8.65	0.0086	3.057	205.745
ISCED000	2.910	0.3781	7.70	0.0274	18.363	1736.304
ISCED900	1.639	0.4937	3.32	0.0183	5.152	415.192
Urban1 area	0.187	0.0710	2.63	0.0009	1.205	20.542
Urban2 area	0.145	0.0664	2.18	0.0007	1.156	15.571
Urban4 area	0.201	0.0999	2.02	0.0010	1.223	22.302
Rural area	-0.088	0.0478	-1.85	-0.0004	0.915	-8.460

Note: Number of cases correctly classified:82.5%, sensitivity:80.8%, specificity:82.6%, Odds ratio: 19.94, McFadden R-squared:0.38, Adjusted R-sq:0.38, Likelihood ratio test: Chi-square(46)=12289 [p-value 0.00 < 0.1], N=96932. All the variables statistically significant at 10%.

NUTS 2013 codes, ISCED fields of education 2011codes, *high-school certificate.

Source: own calculation on LFS data.

Table 2
Coefficient estimates of being an unemployed man in Poland in 2014

PL (Man)	Coefficient	Std. error	z	Slope	Odds ratio	Δ unemployment risk
$\hat{\delta}_0$	-5.519	0.1571	-35.12			
PL 31	0.175	0.0881	1.98	0.0013	1.191	19.071
PL 43	-0.464	0.1115	-4.16	-0.0027	0.629	-37.120
PL 11	0.194	0.0845	2.29	0.0015	1.214	21.397
PL 52	-0.355	0.0909	-3.90	-0.0022	0.701	-29.865
PL 32	0.226	0.0825	2.74	0.0018	1.253	25.339
PL 34	0.355	0.0925	3.83	0.0029	1.426	42.568
PL 63	-0.168	0.0914	-1.84	-0.0011	0.845	-15.489
PL 33	0.215	0.0868	2.48	0.0017	1.240	23.955
PL 41	-0.197	0.0959	-2.05	-0.0013	0.821	-17.861
age15_24	0.135	0.0722	1.87	0.0010	1.144	14.420
age25_30	0.336	0.0668	5.04	0.0027	1.400	40.004
age61_70	-0.690	0.1045	-6.60	-0.0039	0.501	-49.854
age71_74	-3.559	0.7299	-4.88	-0.0103	0.028	-97.154
Single	0.458	0.0549	8.34	0.0036	1.580	58.018
Widowed	0.458	0.2169	2.11	0.0040	1.582	58.151
Divorced	1.014	0.0958	10.59	0.0119	2.756	175.641
Master's grade	-0.321	0.0916	-3.51	-0.0020	0.725	-27.478
High school (without matura*)	-0.563	0.1019	-5.52	-0.0032	0.570	-43.026
Basic Vocational	0.326	0.0575	5.67	0.0025	1.386	38.583
Gymnasium	-0.676	0.1142	-5.92	-0.0036	0.509	-49.122
Disabled pension	0.747	0.1787	4.18	0.0075	2.111	111.051
Dependant	3.780	0.0471	80.33	0.1560	43.807	4280.684
Farmer	-5.022	0.7097	-7.08	-0.0108	0.007	-99.341
Student	-4.927	0.1275	-38.63	-0.0109	0.007	-99.275
Handicapped	-2.404	0.1592	-15.11	-0.0075	0.090	-90.969
Family duties	-2.403	0.2329	-10.32	-0.0066	0.090	-90.958
ISCED100	1.675	0.2536	6.60	0.0291	5.338	433.805
ISCED300	1.837	0.1723	10.67	0.0325	6.281	528.069
ISCED420	1.219	0.4681	2.60	0.0166	3.383	238.275
ISCED440	1.619	0.3362	4.82	0.0276	5.049	404.885
ISCED481	1.842	0.1992	9.25	0.0352	6.309	530.940
ISCED482	2.310	0.8713	2.65	0.0604	10.073	907.251
ISCED500	1.753	0.1542	11.37	0.0154	5.774	477.403
ISCED600	1.752	0.1893	9.25	0.0299	5.764	476.353
ISCED700	1.785	0.2608	6.84	0.0334	5.959	495.898
ISCED800	1.840	0.1800	10.22	0.0343	6.295	529.547
ISCED000	2.146	0.1627	13.18	0.0296	8.547	754.691
ISCED900	1.046	0.5688	1.84	0.0129	2.846	184.556
Urban2 area	0.117	0.0689	1.70	0.0009	1.124	12.399
Urban6 area	0.708	0.3689	1.92	0.0072	2.029	102.901
Rural area	-0.148	0.0470	-3.15	-0.0010	0.862	-13.761

Note: Number of cases correctly classified: 88.4%, sensitivity: 78.4%, specificity: 88.9%, Odds ratio: 28.97, McFadden R-squared: 0.45, Adjusted R-sq: 0.44, Likelihood ratio test: Chi-square(42)=14392.4 [p-value 0.00 < 0.1], N=86829. All variables statistically significant at 10%.

NUTS 2013 codes, ISCED fields of education 2011 codes, *high-school certificate.

Source: own calculations based on LFS data.

Table 3

The coefficient estimates of being an unemployed woman in the Czech Republic in 2014

CZ (Woman)	Coefficient	Std. error	z	Slope	Odds ratio	Δ unemployment risk
$\hat{\delta}_0$	-2.581	0.0554	-46.57			
CZ11	-1.073	0.1117	-9.61	-0.0058	0.342	-65.808
CZ21	-0.386	0.0630	-6.14	-0.0027	0.679	-32.057
CZ31	-0.218	0.0696	-3.13	-0.0016	0.805	-19.549
CZ32	-0.311	0.0747	-4.16	-0.0022	0.733	-26.732
CZ42	-0.122	0.0717	-1.70	-0.0009	0.885	-11.452
CZ51	-0.150	0.0803	-1.87	-0.0011	0.860	-13.967
CZ52	-0.252	0.0858	-2.94	-0.0018	0.777	-22.274
CZ61	-0.215	0.0813	-2.64	-0.0016	0.807	-19.322
CZ62	-0.244	0.0640	-3.82	-0.0018	0.783	-21.669
CZ72	-0.205	0.0801	-2.56	-0.0015	0.815	-18.538
Age15_24	0.308	0.0644	4.78	0.0028	1.360	36.034
Age51_60	-0.180	0.0467	-3.86	-0.0014	0.835	-16.481
Age61_70	-1.091	0.2236	-4.88	-0.0067	0.336	-66.398
Age71_74	-3.089	0.5034	-6.14	-0.0133	0.046	-95.446
Single	0.490	0.0482	10.18	0.0046	1.632	63.242
Widowed	0.517	0.0956	5.41	0.0050	1.677	67.739
Divorced	0.460	0.0489	9.41	0.0045	1.584	58.376
Secondary school	1.230	0.0854	14.39	0.0154	3.420	241.979
High school (without matura*)	0.323	0.0449	7.19	0.0028	1.381	38.104
Master's grade	-0.586	0.0801	-7.31	-0.0038	0.557	-44.319
Study	-3.332	0.1618	-20.59	-0.0101	0.036	-96.427
ISCED100	-0.591	0.0822	-7.19	-0.0044	0.554	-44.611
ISCED300	-0.271	0.0479	-5.65	-0.0021	0.763	-23.724
ISCED400	-1.761	0.5827	-3.02	-0.0069	0.172	-82.806
ISCED440	1.576	0.6355	2.48	0.0300	4.836	383.611
ISCED460	2.639	0.7072	3.73	0.0953	14.004	1300.382
ISCED481	1.947	0.7215	2.70	0.0465	7.011	601.065
ISCED482	1.478	0.7789	1.90	0.0268	4.386	338.614
ISCED700	-0.946	0.0934	-10.13	-0.0054	0.388	-61.178
ISCED800	-0.192	0.0586	-3.28	-0.0014	0.825	-17.502
Non-formal Education	-0.167	0.0745	-2.24	-0.0013	0.846	-15.396

Note: Number of cases correctly classified: 70.8%, sensitivity: 79.4%, specificity: 70.5%, Odds ratio: 9.24, McFadden R-squared: 0.17, Adjusted R-sq: 0.17, Likelihood ratio test: Chi-square(32)=5039.72 [p-value 0.00 < 0.1], N=99425. All the variables statistically significant at 10%.

NUTS 2013 codes, ISCED fields of education 2011codes, *high-school certificate.

Source: own calculations based on LFS data.

Table 4

The coefficient estimates of being an unemployed man in Czech Republic in 2014

CZ (Man)	Coefficient	Std. error	z	Slope	Odds ratio	Δ unemployment risk
$\hat{\delta}_0$	-3.900	0.0628	-62.08			
CZ11	-0.908	0.1168	-7.78	-0.0060	0.403	-59.677
CZ21	-0.347	0.0653	-5.31	-0.0029	0.707	-29.330
CZ31	-0.497	0.0819	-6.07	-0.0039	0.608	-39.181
CZ32	-0.633	0.0885	-7.16	-0.0047	0.531	-46.919
CZ51	-0.380	0.0934	-4.07	-0.0031	0.684	-31.590
CZ52	-0.218	0.0918	-2.37	-0.0019	0.804	-19.572
CZ53	-0.231	0.0838	-2.76	-0.0020	0.794	-20.612
CZ61	-0.469	0.0907	-5.17	-0.0037	0.626	-37.423
CZ72	-0.342	0.0886	-3.87	-0.0028	0.710	-28.995
Age15_24	0.647	0.0618	10.48	0.0079	1.911	91.063
Age25_30	0.141	0.0650	2.18	0.0014	1.152	15.192
Age51_60	0.357	0.0533	6.70	0.0038	1.429	42.867
Age71_74	-1.908	0.6117	-3.12	-0.0105	0.148	-85.159
Single	1.060	0.0545	19.45	0.0130	2.887	188.663
Divorced	0.893	0.0642	13.92	0.0125	2.443	144.276
Primary school	-1.791	1.0134	-1.77	-0.0081	0.167	-83.327
Secondary school	1.297	0.1231	10.53	0.0217	3.659	265.871
High school (without matura*)	0.553	0.0520	10.64	0.0055	1.739	73.926
Master's grade	-0.398	0.0916	-4.34	-0.0033	0.672	-32.814
PhD+	-2.000	1.0081	-1.98	-0.0084	0.135	-86.468
Student	-3.514	0.1510	-23.28	-0.0122	0.030	-97.024
Handicapped	0.359	0.1336	2.69	0.0041	1.432	43.200
ISCED100	0.256	0.1209	2.11	0.0027	1.291	29.114
ISCED300	0.425	0.0855	4.97	0.0049	1.530	53.028
ISCED460	1.523	0.4062	3.75	0.0328	4.584	358.413
ISCED481	0.509	0.1990	2.56	0.0062	1.664	66.402
ISCED600	0.437	0.0953	4.59	0.0051	1.548	54.787
ISCED800	0.159	0.0761	2.09	0.0016	1.172	17.227
Non-formal Education	-0.637	0.1016	-6.27	-0.0047	0.529	-47.096

Note: Number of cases correctly classified: 72.4%, sensitivity: 76.3%, specificity: 72.2%, Odds ratio: 8.39, McFadden R-squared: 0.17, Adjusted R-sq: 0.17, Likelihood ratio test: Chi-square(30)=4274.16 [p-value 0.00 < 0.1], N=87828. All the variables statistically significant at 10%.

NUTS 2013 codes, ISCED fields of education 2011 codes.

Source: own calculations based on LFS data.

Table 5

The variances of the odds ratios for the selected groups of variables (% of the respective variance for the field of education and the highest level of education completed)

Poland				
Groups of statistically significant variables representing:	Variance (men)		Variance (women)	
	% of var(FOE)	% of var(FOE&HCLE)	% of var(FOE)	% of var(FOE&HCLE)
Region	3.9%	1.8%	0.3%	0.4%
Age	8.4%	3.8%	1.6%	2.1%
Marital status	8.9%	4.0%	1.9%	2.5%
Other factors* (without dependants)	16.6%	7.5%	2.2%	3.0%
Czech Republic				
Region	1.0%	0.9%	0.1%	0.1%
Age	29.6%	24.7%	1.3%	1.7%
Marital status	3.5%	2.9%	0.0%	0.0%
Other factors**	23.1%	19.2%	0.8%	0.9%

Note: FEO stands for the group of the odds ratios estimated for all statistically significant variables within the category: Field of Education, HCLE stands for the group of the odds ratios estimated for all the statistically significant variables within the category the Highest Level of Education Completed; * Retired, disabled pension, owning a farm, studying, being handicapped, having family responsibilities; ** Retired, child who is studying, disabled, attendance to non-formal education.

Source: own calculation.

Table 6

The arithmetical averages of the Δ unemployment probabilities for the groups of statistically significant variables

Group of variables	Czech Republic		Poland	
	Woman	Man	Woman	Man
Region	-25.1	-34.8	37.5	111.1
Age	-35.6	16.0	-51.6	76.9
Marital status	63.1	166.5	176.9	197.3
Education level & field of education	219.1	65.1	177.9	467.5
Field of education	266.0	96.5	334.8	596.8
Other variables*	-68.8	-48.9	-58.8	41.9

Note: * see Table 5.

Source: own calculation.