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Gender Wage Gaps in Slovakia and Europe

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Slovakia exhibits one of the highest gender wage gaps in Europe, with Slovak women earning, on average, approximately 20% less per hour than their male counterparts between 2010 and 2019.

Analysis of Slovak individual-level data indicates that employer characteristics, specific professions and sectors, job tenure, age, and education significantly contribute to explaining the gender wage gap.

In addition, our findings highlight that both European countries and Slovakia share several common factors contributing to the gender wage gap.

Thus, targeted policies addressing education, family support, and workplace practices are essential to reduce gender wage disparities in Slovakia. This would enable a more inclusive and efficient allocation of talent, leading to higher labour productivity.

Gender wage gap is still an issue in Slovakia, particularly in large private firms, industrial sectors, and medium-skilled blue-collar jobs.

Longer job tenure of Slovak women widens the gap, while higher education narrows it.

Slovak women aged 30 to 49, with childcare duties, face the highest wage inequality.

In a European context, higher education and lower workforce participation of women are related to smaller gender wage gaps.

More accessible childcare policies and stronger collective bargaining tend to lower gender gaps in Europe.

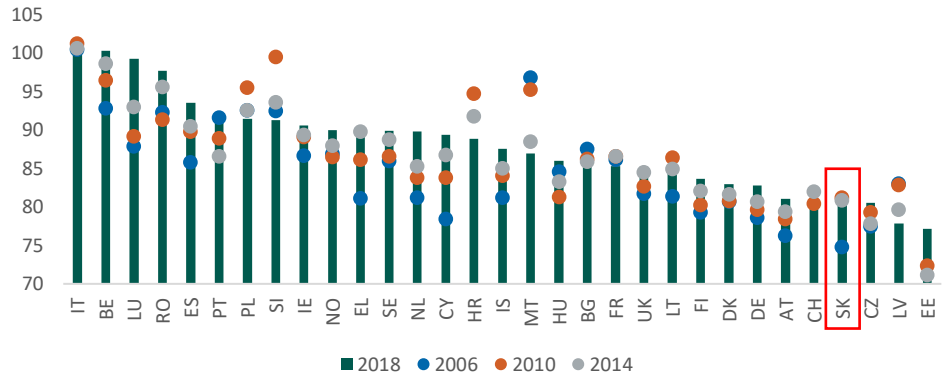
Introduction

Gender wage inequality remains a persistent issue across Europe, with significant socio-economic implications. This policy brief examines the gender wage gap in Slovakia within the broader European context, highlighting structural barriers and systemic disparities that shape wage differentials. While wage inequality has narrowed since the mid-20th century, substantial gaps still exist throughout Europe, and progress varies widely among countries (Blau & Kahn, 2017). Structural factors such as occupational segregation and differences in work experience continue to contribute to the wage gap despite educational advances (Olivetti & Petrongolo, 2016).

Gender wage gaps in Europe

Western nations typically exhibiting narrower gaps due to more inclusive labour policies (see Chart 1)**.** In countries like Italy, Belgium and Luxembourg, the gender wage gap (GWG) is almost non-existent, attributed to strong gender-equality frameworks that support women in the workplace. In contrast, many Central and Eastern European countries, including Slovakia, have larger wage gaps, with Slovakia's GWG standing at approximately 20% in 2018, considerably above the EU average of approximately 13%, underscoring structural barriers to gender wage equality.[1]

Chart 1
The ratio of women's average hourly wage to men's average hourly wage by EU country (percentages)



Source: Structure of Earnings Survey (2006, 2010, 2014, 2018), Eurostat.

[1] We focus on pre-covid era to document long-term trends in GWG. During the pandemic, as in other countries, there was a slight improvement, and now we are observing a return to pre-pandemic levels of wage inequality.

Using regression analysis, we examined the most relevant measurable factors that may be related to GWG.[2] Our analysis was based on a panel of 31 countries observed over four waves of the European Commission's Structure of Earnings Survey (SES waves in 2006, 2010, 2014 and 2018).[3] The regression results are presented in Table 1.

Our findings confirm the critical importance of commonly cited factors in narrowing the GWG. In particular:

- **Educated women secure better-paying jobs and negotiate higher salaries**, reinforcing education's key role in wage equality (Blau & Kahn, 2017).
- **Public maternity and childcare policies are vital for reducing gender wage disparities.** These policies enable women to return to work sooner, lessening wage penalties from career breaks (Olivetti & Petrongolo, 2017).
- **Collective agreements protect against gender wage discrimination**. Countries with over 16% collective agreement coverage have lower wage gaps, as unions enforce equal pay standards.
- **Our regression models confirm a gradual reduction in Europe's GWG over time**. Positive coefficients indicate consistent progress across various sectors.
- **Higher female labour participation correlates with higher pay gaps.** This may be due to more lower-skilled women entering lower-paying jobs with greater wage disparities.
- **Extended maternity leave may unintentionally affect women's earnings.** Although longer leaves are associated with higher wage gaps (though not statistically significant), higher nursery attendance slightly lowers gaps, highlighting the importance of early childcare services.

[2] The regression analysis included the following explanatory variables: the gender gap in labour market participation; the gender gap in tertiary education; a dummy variable with a value of 1 if the length of paid maternity and parental leave exceeds the median value of 120 days; the nursery attendance rate for children aged 0–3; and a dummy variable with a value of 1 if the collective agreement coverage of employees is higher than 16% (the first quartile in the sample). As part of the sensitivity analysis, we included additional potential explanatory variables in the model, such as the age of women at the birth of their first child, the average age of women at marriage, the fertility rate, the difference in life expectancy between women and men, and the gender unemployment gap. However, once the model accounted for the gender gap in labour market participation, the other indicators were not statistically significant. Furthermore, when selecting different cut-off values for the dummy variables related to the length of paid maternity and parental leave and the collective agreement coverage rate, the results were not as robust across model specifications. We applied similar considerations when selecting the age group of children attending formal education and childcare facilities. For older age groups, no statistical relationship between attending educational facilities and GWG was confirmed.

[3] Aggregate average wage data comes from the SES survey, while other variables were taken from other publicly available sources (e.g. the OECD database).

Table 1
Socio-economic and institutional factors of GWG by subsectors and occupations

Dependent variable: hourly wages of women/men	(1)	(2)	(3)	(4)	(5)
Sample of average wages:	Whole economy	Industrial sectors	Services	Non-manual occupations	Manual occupations
Year dummies (base: 2006)					
2010	1.906**	2.072***	5.598***	3.368***	0.574
2014	3.316***	3.719***	7.050***	4.899***	2.318**
2018	4.424**	5.081***	8.486***	6.082***	3.327**
% of participation W-M	-0.630***	-0.165	-0.263**	-0.599***	-0.295**
% of tertiary education W-M	0.313*	0.089	0.220	0.373**	0.028
Paid maternity leave >120 days	-0.829	-2.102	0.419	-0.951	-0.347
% of children aged 0-3 years visiting childcare facilities	0.116	0.181***	0.030	0.140***	0.144***
Collective bargaining coverage >16%	4.276**	3.526*	3.163	4.318**	2.475
R^2	0.376	0.397	0.289	0.474	0.336
Observations	116	115	115	116	112
Number of countries	31	31	31	31	31

Sources: Aggregate-level data from the Structure of Earnings Survey (2006, 2010, 2014, 2018), Eurostat, OECD and own calculations.
Note: OLS estimates, intercept was always included. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels based on standard errors clustered by countries. Industrial sectors: NACE B-F; services: NACE G-O, S; non-manual occupations: ISCO 1-4; manual occupations: ISCO 7-9.

Gender wage gaps in Slovakia

In Slovakia, women earn less than men, especially in larger, more productive firms and in industrial and public service sectors. Our empirical analysis, based upon the Blinder-Oaxaca decomposition (see Box 1 and results in Table 2), indicates that gender wage disparities are more pronounced in companies with at least 250 employees and in private sector firms. These organizations tend to offer higher average wages, which are predominantly earned by men, highlighting systemic issues in wage distribution.

Women with lower educational attainment face greater pay disadvantages. The wage gap is significant among women with no higher than secondary vocational education, suggesting that educational attainment plays a crucial role in mitigating gender wage disparities. This aligns with findings that higher education levels can reduce wage gaps by providing better employment opportunities (OECD, 2017). Women with tertiary education face smaller wage gaps compared to those with lower educational levels, emphasizing the importance of promoting higher education among women. Enhancing access to education can be a vital strategy in reducing wage inequality.

Gender stereotypes in medium-skilled blue-collar occupations contribute to wage disparities. Women in these roles face significant pay gaps, highlighting the impact of occupational segregation on earnings. Addressing societal perceptions and encouraging gender diversity in traditionally male-dominated fields may help reduce these gaps.

Length of employment exacerbates the GWG, with women earning less the longer they stay in the same job. Men in the same positions experience faster wage growth over time, indicating potential biases in promotion and salary increase practices. This could reflect a "glass ceiling" effect where women's career progression is hindered compared to men's.

The GWG peaks among women aged 30–49, coinciding with prime childbearing and child-rearing years. Family responsibilities significantly impact women's earnings, potentially due to career interruptions or reduced working hours. This phenomenon, often referred to as the "motherhood penalty," has been documented in various contexts (Budig & England, 2001; Bertrand, Goldin & Katz, 2010).

While Slovakia's overall GWG decreased significantly after 2010, progress has stagnated in recent years owing mainly to unobservable factors. The most significant contributor to the persistent gap is the unexplained component from different regression coefficients between genders, indicating that factors beyond measurable characteristics are at play. This unexplained portion may include discrimination or unobserved variables affecting wages.

The protective impact of collective agreements on reducing GWG has diminished over time. Although collective bargaining once mitigated wage disparities, its effectiveness has waned by 2018.

We can make substantial progress toward closing the gender wage gap by implementing targeted policies that:

- **promote women's education and career opportunities**, such as increasing access to higher education and encouraging women to enter diverse, better-paying fields;
- **enhance family support and work-life balance**, such as implementing supportive maternity and parental leave policies, providing affordable childcare services, and offering flexible working arrangements;
- **strengthen equal pay enforcement**;
- **address occupational segregation**, such as supporting women in underrepresented sectors and promoting gender diversity across all occupations;
- **reduce wage disparities in key sectors and firms**, focusing on larger firms and sectors like industry and public services where wage gaps are significant.

Box 1 The Blinder-Oaxaca decomposition

A commonly used method to analyze wage differentials by groups, such as gender and race, is the Blinder-Oaxaca (B-O) decomposition. This technique uses linear regression models to decompose mean differences in log wages into two parts. The first, or explained part represents differences in individual characteristics like education and experience for the respective subsamples. The second, or unexplained, part is often interpreted as a measure of discrimination. This interpretation needs some caution, as the second part may also contain effects of unobserved characteristics that cannot be easily measured by data. As shown below, the unexplained part is expressed as the difference in regression coefficients estimated for the two groups (gender in our case) multiplied by the vector of observable characteristics. The latter differences in coefficients therefore imply, for example, unequal returns to education or work experience for the two groups. Following Jann (2008), a simplified version of the B-O decomposition can be defined as follows.

Suppose two linear regression equations for each of groups $g \in$ {F=female, M= male}, where the logarithm of wages W_g is a function of observable individual characteristics in vector X_g, and coefficients β_g including the intercept:

$$W_g = X_g'\beta_g + \varepsilon_g, \;\; E(\varepsilon_g) = 0$$

The difference between mean log wages for the two groups can be expressed as:

$$D = E(W_F) - E(W_M) = E(X_F)'\beta_F - E(X_M)'\beta_M = \bar{X}_F'\hat{\beta}_F - \bar{X}_M'\hat{\beta}_M,$$

where $\bar{X}_g$ are group means and $\hat{\beta}_g$ are group-wise coefficient estimates. By adding and subtracting the term $\bar{X}_M'\beta_F$ we can further decompose D as:

$$D = E + U = (\bar{X}_F - \bar{X}_M)'\hat{\beta}_F + \bar{X}_M'(\hat{\beta}_F - \hat{\beta}_M)$$

yielding the explained component $E = (\bar{X}_F - \bar{X}_M)'\hat{\beta}_F$ and the unexplained component $U = \bar{X}_M'(\hat{\beta}_F - \hat{\beta}_M)$. E reflects differences in group mean characteristics $\bar{X}_g$ and U captures differences in the group-wise coefficient estimates $\hat{\beta}_g$. Both E and U can be further decomposed to the contributions of each of the explanatory variables and their group-wise coefficient estimates.

When dealing with categorical explanatory variables, separate dummy variables are typically created for each category. Choosing the base category is not always straightforward, such as in case of sectoral dummies. The impact of particular dummies within U is sensitive to this choice of the base category. However, this sensitivity does not affect the decomposition of E (see Jann, 2008, for details). A common solution to this issue is to restrict the coefficients of the category dummies to sum up to one, eliminating the need for a base category (Jann, 2008). This way, the estimates are interpreted as deviations from the grand mean or intercept. We apply this scaling approach to some of our categorical explanatory variables.

Table 2
Blinder-Oaxaca decomposition of hourly wage gaps of Slovak women and men

	(1)	(2)	(3)	(4)	(5)
Survey year:	2002	2006	2010	2014	2018
Gap in log wages of women vs. men	-0.315***	-0.292***	-0.211***	-0.215***	-0.222***
Explained gap (*E*)	-0.074***	-0.041***	0.003***	-0.007***	-0.023***
Unexplained gap (*U*)	-0.241***	-0.251***	-0.214***	-0.208***	-0.199***
Decomposition of the unexplained gap (*U*):					
Employer's charcteristics:					
Firm size (base: <50 employees)					
Nuber of employees: >49, <250	-0.003**	-0.003***	-0.010***	-0.012***	-0.011***
Nuber of employees: >249	-0.089***	-0.036***	-0.057***	-0.046***	-0.037***
Privately owned firm =1	0.038***	-0.009***	-0.032***	-0.047***	-0.040***
Sector (no base)					
Industrial sectors (NACE B-F)	-0.043***	-0.018***	-0.003***	0.005***	-0.004***
Labour intensive sect. (NACE G-I,S)	-0.002***	-0.012***	0.004***	0.009***	0.004***
Professional services (NACE J-N)	0.009***	-0.014***	0.008***	0.007***	0.004***
Public services (NACE O)	0.001***	0.004***	-0.026***	-0.044***	-0.017***
Sectoral collective agreement =1	0.024***	0.011***	0.010***	0.022***	-0.003***
Firm-level collective agreement =1	0.067***	-0.011***	0.004***	-0.017***	-0.023***
Type of occupation (no base):					
High skilled (ISCO 1-3)	0.021***	0.001	0.012***	0.010***	0.001
Medium sk. white collar (ISCO 4-5)	0.004***	0.014***	0.007***	0.011***	0.009***
Medium sk. blue collar (ISCO 6-8)	-0.024***	-0.021***	-0.014***	-0.008***	-0.005***
Low skilled (ISCO 9-10)	0.003***	0.002***	0.001***	-0.001***	-0.000*
Job characteristics:					
Job tenure in years	-0.018***	-0.030***	-0.035***	-0.044***	-0.035***
Part time job =1	0.006***	0.006***	0.005***	0.005***	0.004***
Finite term contract =1	-0.002***	0.003***	-0.002***	-0.004***	-0.001***
Individual characteristics:					
Age (base: <20 years)					
20-29 years	-0.017***	-0.011***	-0.012***	-0.013***	-0.007***
30-39 years	-0.039***	-0.042***	-0.042***	-0.037***	-0.022***
40-49 years	-0.036***	-0.037***	-0.039***	-0.041***	-0.028***
50-59 years	-0.011***	-0.011***	-0.017***	-0.019***	-0.008***
>59 years	-0.000**	-0.000	0.001***	0.001	0.003***
Education (no base):					
Basic (ISCED 0-2)	-0.001	0.001***	0.004***	0.005***	0.005***
Secondary (ISCED 3-4)	-0.004**	0.002	-0.012***	-0.023***	-0.025***
Bachelor's degree (ISCED 5-6)	0.003***	-0.001***	-0.000*	-0.002***	-0.000***
Master's or PhD (ISCED 7-8)	-0.007***	0.006***	-0.005***	-0.002***	-0.003***
Constant	-0.119***	-0.044***	0.036***	0.075***	0.041***
Number of observations	419715	674408	773860	887052	964342

Source: Structure of Earnings Survey, Eurostat, own calculations
Note: *, **, and *** denote statistical significance at 10%, 5%, and 1% levels based on robust standard errors. The scaling approach was applied when no base category was selected for some of the categorical explanatory variables (see Box 1 for more details).

References

Arulampalam, W., Booth, A. L., & Bryan, M. L. (2007). Is there a glass ceiling over Europe? Exploring the gender pay gap across the wage distribution. *Industrial and Labor Relations Review*, 60(2), 163-186.

Bertrand, M., Goldin, C., & Katz, L. F. (2010). Dynamics of the gender gap for young professionals in the financial and corporate sectors. *American Economic Journal: Applied Economics*, 2(3), 228-255.

Blau, F. D., & Kahn, L. M. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of Economic Literature*, 55(3), 789-865.

Budig, M. J., & England, P. (2001). The wage penalty for motherhood. *American Sociological Review*, 66(2), 204-225.

Jann, B. (2008). The Blinder–Oaxaca decomposition for linear regression models. *The Stata Journal*, 8(4), 453-479.

OECD. (2017). The Pursuit of Gender Equality-An Uphill Battle. OECD publishing.

Olivetti, C., & Petrongolo, B. (2016). The evolution of gender gaps in industrialized countries. *Annual Review of Economics*, 8(1), 405-434.

Olivetti, C., & Petrongolo, B. (2017). The economic consequences of family policies: lessons from a century of legislation in high-income countries. *Journal of Economic Perspectives*, 31(1), 205-230.