GENDER PAY GAP IN THE SLOVAK LABOUR MARKET

JAKUB HARMAN[1]

Abstract: *Inequality in remuneration and specifically the gender pay gap have been the subject of research by economists for many years. This contribution focuses on the investigation of the gender pay gap in the Slovak labour market. Structure of Earnings Survey microdata for the years 2006, 2010, 2014, and 2018 are used in the analysis. This paper aims to quantify the unadjusted and adjusted gender pay gap and verify the assumption that the observable characteristics are responsible for the gender pay gap rather than discrimination. The results show that the gender pay gap in the labour market persists in an unadjusted form at the level of 15%. The gender pay gap is positively correlated with education, in which investment yields greater returns for men than for women. In terms of age, women aged 40-49 are the most disadvantaged. In addition, the long-term presence of vertical segregation has been demonstrated, which prevents women from reaching better-paid positions even in female-dominated sectors. The adjusted form of the gender pay gap showed that women have better human capital characteristics than men, which are, however, correlated with their choice of job and field of education, which in turn leads to the support of sectoral and professional segregation.*

Keywords: *Gender pay gap, Labour market, Men, Women*

JEL Classification: J01, J31

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[1] Ing. Jakub Harman, University of Economics in Bratislava, Slovak Republic,
e-mail: jakub.harman@euba.sk, https://orcid.org/0000-0001-8622-8716

1 Introduction

Ensuring gender equality in the social, political, and economic spheres is one of the main interests of the European Union. Many economists who have contributed to the recognition of discrimination as an economic problem argue that it is necessary to ensure equal opportunities, wage equality, and to increase the employment rate of women. For sustained economic development and prosperity, it is essential that the employment rate of women increases (Becker, 1971; Arrow, 1971).

The depth of literature in the field of gender equality is extremely rich and provides a wide range of topics ready for exploration. The analysis of wages and differences in labour market behaviour between men and women is increasingly important. The people of this region began the transition from communist to democratic government thirty years ago. As a result, compared to research in "Western countries", the legacy of studies on gender wage inequality and labour market participation in Central Europe is relatively young. Many aspects of gender differences still have not been thoroughly explored. This is mostly due to the immense complexity of behaviour caused by the connections between a person's career and family choices. It is necessary to deal with the structure of the gender wage gap in Central European countries in order to assess global differences and similarities. The Structure of Earnings Survey provides very up-to-date data for this paper examining the gender pay gap. Understanding the gender pay gap and its roots can help policy makers, employers, and workers become more aware of the problem and raise society's awareness of the issue. It can also lead to initiatives that help to reduce economic inequalities and help women reach their full potential as workers, ultimately leading to economic growth.

Blau and Kahn (2003) characterized the gender pay gap as the difference in hourly wages earned by men and women in the labour market, expressed as a percentage of men's wages. The gender wage gap is studied in several forms. The unadjusted gender wage gap ignores the individual characteristics of the people being compared (e.g., education, age, or experience). The gender pay gap can therefore arise due to discrimination (e.g., because employers think women are less productive than men) as well as the fact that people have different returns on the determinants of the gender pay gap.

Exactly different returns for men and women can be caused by many factors. Women are often disadvantaged in the fact that they work fewer hours and have lower employment rates. The explanation can also be attributed to sectoral (horizontal) or professional (vertical) segregation. While one gender predominates in low-paying industries such as education or health care, where mostly women predominate, the other in high-paying such as construction or manufacturing, where mostly men predominate, then gender segregation can explain some of the difference in men's and women's earnings. Moreover, from a hierarchical point of view, managerial and control positions are largely dominated by men. An important factor is also the fact that women perform important unpaid tasks such as caring for children and elderly relatives. This often causes paid working hours to be reduced to half-time and career breaks are more frequent than for men (Cebrián and Moreno, 2015).

If observable characteristics are controlled for, the gender wage gap is called "adjusted", which means controlling for personal and labour market factors. The adjusted gender pay gap provides a much more accurate comparison by measuring the difference between men and women with the same characteristics. The aim of this paper is to verify the assumption that the adjusted gender wage gap is lower than the unadjusted one, which would indicate that it is personal and labour market characteristics that are responsible for the gender pay gap and not discrimination. Since the legislation in terms of gender equality and antidiscrimination is truly profound in the Slovak Republic, the assumption is that the gender pay gap would be significantly lower in its adjusted form suggesting that discrimination is not indeed present in the Slovak labour market or only to a very limited extent.

2 Literature review

This chapter focuses on providing a literature review on the gender pay gap in the Slovak labour market and the explanations of its roots. Although, the gender pay gap literature is very rich on international level, in the Slovak labour market it is not discussed enough. Therefore, literature review is considered to be of a high significance.

The author Mysíková (2012) investigated the gender wage gap in the V4 countries using EU-SILC 2008 data and concluded that a small part of the observed gender pay gap can be explained by differences in individual

characteristics in the Czech and Slovak Republics, but relatively high contribution of labour market characteristics occurred. The opposite result was shown in Hungary and Poland, where working women have better characteristics on average than working men, especially in terms of individual personal characteristics.

Danielová and Lauko (2012) argue, that even though the Anti-discriminating law from the year 2004, which aims to prevent the gender discrimination in the labour market, has been approved, the gender inequality still persists. They state that the main reasons for inequality in the Slovak labour market are historical development of employment or gender stereotypes. Traditionally, woman's function is to raise children and take care of the household while man is considered to be a breadwinner. The authors argue that this situation can be resolved only by adequate wage policy and the eradication of persisting gender stereotypes.

Goraus et al. (2017) estimates the adjusted pay gap in Poland using different methods. Their results show that the unadjusted pay gap is nearly 10%. After the correction for the observable characteristics, the adjusted pay gap estimates range between 15% and 25%, depending on the used method. The differences in estimates, however, do not exceed more than 3 percentage points. In general, methods accounting for sample selection bias yielded higher values of the estimates.

The National Labour Inspectorate of the Slovak Republic (2014) claims in its study that despite a very good level of education, women do not achieve comparable earnings to men, as education in the so-called typically female areas is valued less. The gender pay gap in Slovakia has been above the EU average for a long time. It is highest among university-educated people, which points to the fact that the investment in education - human capital is better paid and has higher returns for men than for women.

Research by the authors Danielová and Lauko (2015) indicates that, although the gender pay gap has recently decreased, Slovakia is still a country with one of the highest pay gaps between men and women in the European Union. Men work in occupations that are better paid and often get higher job positions even in feminized sectors of the economy. From a geographical point of view, the differences in remuneration between women and men are highest in the richest regions (Bratislava) and, conversely, remuneration is fairer in poorer regions (Prešov).

According to Rizman (2017), adequate wage evaluation improves the performance of the economy, but income differences between the genders are above average in our country, even after considering the objective characteristics of workers. Women's wages are pushed down by more frequent work in lower-paying industries. Longer careers and better education do not lead to higher incomes for women to the same extent as for men.

Mitková and Kotulová (2017) analyse the gender related pay differences in Slovakia in the context of the Slovak membership in the European Union. Using the data from the Slovak Statistical Office and Eurostat, the authors analyse the wage distribution according to the region, working time, age, or economic activity. Their results show that the Slovak labour market still exhibits a high gender pay gap, which is a reflection of the severe gender segregation. This applies particularly to the rapidly expanding and highly prioritized industries like the automotive or IT industries as they are strongly connected to the educational system and might have crucial impact on the gender pay gap in the long run.

Rievajová and Klimko (2018) claim that despite the fact that women study longer than men, their earnings are lower, and they are less frequently represented in higher management positions. Differences also arise as a result of differences in the employment of better and worse paid jobs by men and women. In the private sector with better job positions, women make up only about 40%. On the contrary, women make up more than 80% of all employees in jobs with lower wages (for example, education, healthcare, and social services). Thanks to this fact, gender inequalities still persist in the labour market.

Mazúrová et al. (2018) argue that the situation on the Slovak labour market is improving, but the changes are very slow. Their results confirmed that men spend more time at paid work as well as travelling to work compared to women. The authors also confirmed the assumption that the average net monthly salary of men is higher than that of women, or that the differences in the remuneration of men and women are influenced by the average weekly length of time spent in the main job, the level of education, or the place of performance of the main job. Even on the basis of these results, it becomes clear that the current state of gender equality on the labour market in Slovakia is not satisfactory.

According to the Ministry of Labour, Social Affairs and Family of the Slovak Republic (2019), the gender pay gap begins to manifest itself around the age of 25 and persists until retirement. It is therefore obvious that absence of women due to maternity and parental leave represents a disadvantage for women, which affects their income throughout their career and may also be reflected in retirement. Inequalities in responsibility for running the household and family are clearly visible here - women spend disproportionately more time in unpaid work focused on caring for children, family members, and the household.

Obermann et al. (2020) investigate the extent of the gender pay gap between women and men with identical characteristics in Vietnam using propensity score matching method. According to the results of their study, the gender pay gap in Vietnam appears to be significantly influenced by both observable and unobservable factors, including personal and labour market characteristics. Furthermore, significant decline in the gender pay gap has been confirmed. However, the gap still persists.

Strittmatter and Wunsch (2021) estimate gender pay gap in Switzerland using multiple econometrical approaches. Their results show that the estimates are sensitive to the availability of observationally comparable men and women, model flexibility, and the choice of estimator. They found that the gender pay gap declined sharply when comparability of men and women is enforced and wage equation specification is more flexible. Also, the gender pay gap has fallen if semi-parametric matching estimator was used.

Boll et al. (2022) bring new perspective on the gender pay gap as their research focuses on the gender pay gap among working university students instead of workers with already finished studies. In their study, they used wage decomposition techniques and found that, in an unadjusted form, female students earn on average 6% less than their counterparts. After controlling for a set of explanatory variables, the gender pay gap was reduced to 4.1%. The authors argue that the type of jobs that students choose is the main contributor to the gender pay gap.

The research of Bennedsen et al. (2022) examines a legislation change in Denmark on the gender pay gap. Since 2006 the firms in Denmark are obliged to provide gender-disaggregated wage statistics, which created a space for difference-in-difference method to investigate the gender pay gap changes. The results show that the gender pay gap declined by 2 percentage points after

the legislation changes, however, the main reason is that male wage growth lost the pace. Authors further argue that the legislation change did not affect firm profitability despite the overall wage bill reduction which is very likely the offset effect of lower firm productivity.

3 Data and methodology

The gender pay gap is the difference between the hourly wages earned by men and women in the labour market, expressed as a percentage of men's wages (Blau and Kahn, 2003). In its unadjusted for it is measured as follows:

$$U\_GPG = \frac{Average\ hourly\ wage\ of\ men - Average\ hourly\ wage\ of\ women}{Average\ hourly\ wage\ of\ men} * 100 \quad (1)$$

Econometrically, it can be calculated as follows:

$$\ln(W_t) = \beta_0 + \beta_1 Women_i + \varepsilon_i \quad\quad (2)$$

where: W_t is the average hourly wage, β_1 is the estimated coefficient representing the unadjusted gender pay gap, $Women_i$ is a dummy variable equal to 1 for women and 0 for men, and ε_i is the error term. The estimation technique is widely used Ordinary Least Squares method with robust standard errors because the present research assumes that the data would show heteroscedasticity from its nature. This estimation technique is applied because it is often used in the gender pay gap literature, although many other techniques have been invented. The authors consider this estimation technique to be sufficient for the purposes of this article, despite its setbacks. The unadjusted gender pay gap is often used in the inequality literature, but it is not a perfect indicator of the gender pay gap as it does not consider differences in observable characteristics. For example, it does not account for age, education, sector, or occupation. Estimated unadjusted gender pay gap therefore suffers from omitted variable bias and its values reflect only the inequality in economy as a whole and should be taken with caution. On the other hand, its uniqueness and simplicity are very useful in international comparisons and provide a good information about the state of economies. Conversely, the adjusted gender pay gap proves to be a better indicator of inequality in remuneration as it takes into account the differences in individual characteristics (e.g., age, education, experience, etc.) and the labour market characteristics (e.g., occupation, sector, firm size, etc.). The adjusted gender pay gap is calculated as follows:

$$\ln(W_t) = \beta_0 + \beta_1 Women_i + \beta_2 X_i + \varepsilon_i \qquad (3)$$

where: W_t is the average hourly wage, β_1 is the estimated coefficient representing the adjusted gender pay gap, $Women_i$ is a dummy variable equal to 1 for women and 0 for men, β_2 is the estimated coefficient representing returns on individual and labour market characteristics, X_i is a vector of regressors and ε_i is the error term. Since the adjusted gender pay gap controls for observable characteristics, the size of omitted variable bias should be minimized. However, the presented data are still missing some variables that are considered as predictors of the gender pay gap in the literature such as number of children or marital status.

The data source for this article are non-public microdata for 4 waves (2006, 2010, 2014, 2018) of the Structure of Earnings Survey (SES). The SES is a large sample survey that is conducted every 4 years and offers precise information on the links between an employee's wage and his/her personal attributes (such as gender, age, education, occupation, function, etc.) and information about his/her employer (such as the size of the companies or economic activity). Enterprises surveyed in the SES have at least 10 employees, which means that very micro enterprises are excluded. The enterprises are from sections B-S of the NACE rev.2 classification.

The regressors used are described in the following lines. In SES, the exact age of each individual is not available, but different age groups are available. The youngest group consists of people aged 14-19. The oldest are people aged 60+. Education is divided into 4 groups according to the level of education finished - primary (ISCED 0-2), secondary (ISCED 3-4) and university divided into two groups according to degree (Bc. - ISCED 5-6 and MSc - ISCED 7-8). Regarding the labour market and work-related characteristics, working hours, type of contract, length of service in the company (tenure), size of the company, profession (according to ISCO-08 classification), as well as company classification according to NACE are considered. Exact hours worked are not available, so this variable is categorical and divides employees into two groups – those working <60% full-time and those working 60-99% full-time. Type of contract is represented by a dummy variable with "1" for a temporary contract and "0" otherwise. The duration of working in the company is divided into four time periods (0-1 year, 2-4 years, 5-14 years, >14 years). Company size is divided into groups according to the number of employees (1-49, 50-249, 249+). Occupational groups are identified based on the ISCO-

08 classification at the one-digit level, distinguishing 9 different groups. The business sector is assigned based on the NACE-Rev.2 classification, distinguishing 18 different sectors. The data are adjusted for outliers in the form of the 1st and 99th percentiles of the logarithm of the hourly wage being deleted.

It is important to state that data in the Structure of Earnings Survey are collected only for employed workers, meaning that unemployed people are omitted from this analysis. Since there are no data for unemployed people and also some important predictors of the employment are missing, the sample correction is not possible with the SES data. Consequently, our research suffers from sample selection bias and the results should be interpreted with caution as referring to the employed people.

The aim of the contribution is to identify the development and trends of the gender wage gap in the Slovak labour market in unadjusted and adjusted form. The research also focuses on identifying the influence of personal characteristics and characteristics of the labour market on the size of the gender pay gap.

4 Results

In the results chapter, we deal with the interpretation of the results of the empirical part of this paper. Figure 1 shows the distribution of hourly wages of women and men in logarithmic form. When examining the distributions over time, we observe that the curves shift to the right, which means that wages increase over time. At the same time, however, we also observe that the distribution of men's wages is shifted more to the right in every observed year compared to the distribution of women. This means that men have higher wages on average than women, indicating a gender pay gap. From the graph, we also observe that the distribution of women's wages is more skewed to the left, which indicates that the majority of employed women work in lower paid positions. A finding that supports the assumption of the presence of vertical gender segregation, according to which women are more often employed in positions at lower positions in the hierarchy and therefore also with lower wages. The graphic representation of the distribution of hourly wages confirmed the presence of a gender pay gap on the Slovak labour market.

Figure 1: Distribution of hourly wages (log) by gender

Source: SES 2006, 2010, 2014, 2018; own calculations

Since, based on the graphic display, we can only say whether the gender pay gap is present, but we cannot quantify it precisely, we decided to use regression analysis to estimate the gender pay gap and thereby quantify it. Table 1 provides us with the estimated coefficients of the gender pay gap in an unadjusted form. From the table we can see that the gender pay gap reached 19.4% in 2006, but it decreased over time. According to our estimates, it decreased to 14.8% in 2010 and remained at this level until 2018, therefore throughout the whole 10s of the 21st century. These estimates may indicate that this is a natural level of the gender pay gap, below which it might be very difficult to fall, because the segregation in the labour market caused by the free choice of occupations of men and women comes into play. This subsequently prevents the wages of men and women to get on equal level, as each sector and profession do not provide the same wage evaluation.

Table 1: Unadjusted gender pay gap

Variable\Year	2006	2010	2014	2018
Women	-0.194***	-0.148***	-0.149***	-0.149***
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	1.202***	1.470***	1.581***	1.822***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	637.704	767.787	877.908	949.488
R2	0.048	0.026	0.026	0.031

Note: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: SES 2006, 2010, 2014, 2018; own calculations.

Table 2 shows the unadjusted gender wage gap by education. As expected, the gender wage gap increases with the level of education achieved. This means that the return on investment in education is higher for men than for women. The highest inequality is observed in the case of tertiary education at the first level, where in the past it reached almost 23%. However, a positive finding is that the gender wage gap is decreasing over time, especially at this level of education. This is true mainly due to the fact that more and more women are enrolling in tertiary education. Currently, the ratio of women to men in tertiary education is higher than 1 (Rievajová and Harman, 2022). We also observe a significant decrease at the primary level, which indicates that women and men with a lower level of education have become almost perfect substitutes. On the contrary, we observe a slight increase (by 1.4 p.p.) at the secondary level of education.

Table 2: Unadjusted gender pay gap by education (%)

Education\Year	2006	2010	2014	2018
Primary	-17.8***	-11.4***	-9.3***	-6.6***
Secondary	-18.6***	-16.4***	-18.4***	-20.0***
Tertiary (Bc.)	-22.9***	-19.1***	-16.4***	-13.0***
Tertiary (MSc./PhD.)	-16.6***	-7.5***	-16.1***	-15.8***

Note: *** $p<0,01$, ** $p<0,05$, * $p<0,1$ significance of the T-test of a means difference.

Source: SES 2006, 2010, 2014, 2018; own calculations.

In Table 3, we observe the gender pay gap by age groups. The results showed the inverted U-shape of the values of the gender pay gap. It is this shape that tells us that women of reproductive age often suffer interruptions from the labour market caused by maternity leave and starting a family. Subsequently, women's wages cannot compete and catch up with men's wages, as a result of which the gender pay gap arises. In our sample, it is clearly observable that until 2010 the most disadvantaged group of women aged 30-39 years and subsequently in the next decade women aged 40-49 years, therefore it is strongly assumed that the group of women born in the 1970s suffers from the greatest disadvantage in the labour market.

Table 3: Unadjusted gender pay gap by age (%)

Age group\Year	2006	2010	2014	2018
14-19	-10.8***	-5.2***	-11.0***	-10.9***
20-29	-12.9***	-6.6***	-7.8***	-11.5***
30-39	-26.3***	-20.1***	-17.4***	-17.3***
40-49	-22.5***	-19.2***	-19.4***	-18.0***
50-59	-16.2***	-13.1***	-14.0***	-13.4***
60+	-7.5***	-7.2***	-8.6***	-8.5***

Note: *** $p<0,01$, ** $p<0,05$, * $p<0,1$ significance of the T-test of a means difference.
Source: SES 2006, 2010, 2014, 2018; own calculations.

When looking at the unadjusted gender pay gap by sector (Table 4), we observe great heterogeneity. This means that in some sectors the gender pay gap is close to zero, meaning wage equality, or even positive, meaning a wage advantage for women, and on the contrary, in some sectors it is very high (negative), indicating significantly higher wages for men. Among the sectors with the highest disadvantage for women there are Manufacturing (C), Financial and insurance activities (K) or, as expected, Information and Communication (J). Conversely, in the Other service activities (S) sector, wages are on average 11.7% higher for women than for men. However, this is highly likely due to the fact that there is a shortage of men in this sector. An interesting finding is that in feminized sectors, such as Education (P) or Health (Q), the gender pay gap shows values close to the average. The data shows that although few men work in the sector, those who are employed in it work in higher positions with higher wages, which supports vertical segregation. However, an important finding is that in most sectors the gender pay gap has narrowed over time.

Table 4: Unadjusted gender pay gap by sector (%)

Sector\Year	2006	2010	2014	2018
Mining and quarrying – B		-11.8***	-21.7***	-22.7***
Manufacturing – C	-14.6***	-27.4***	-27.8***	-24.9***
Electricity, gas, steam and air conditioning – D	-29.4***	-13.4***	-11.8***	-14.5***
Water supply – E	-2.5***	8.0***	4.6***	-2.0*
Construction – F	-6.1***	-6.1***	-3.7***	-10.9***
Wholesale and retail trade – G	-24.3***	-21.0***	-19.5***	-16.6***
Transportation and storage – H	-13.4***	1.2***	1.6***	-3.7***
Accommodation and food service activities – I	-9.1***	-10.5***	-8.6***	-7.8***
Information and communication – J	-26.5***	-22.8***	-23.7***	-20.1***
Financial and insurance activities – K	-15.5***	-24.4***	-26.4***	-23.6***
Real estate activities – L	-20.0***	-9.0***	-12.1***	-10.9***
Prof., scientific and technical activities – M	-9.1***	-9.5***	-15.2***	-12.3***
Administr. and support service activities – N	-12.9***	-2.5***	-4.4***	-2.2***
Public administration and defence – O	-9.7***	-23.6***	-23.8***	-19.5***
Education – P		-13.8***	-12.2***	-10.4***
Human health and social work activities – Q		-15.1***	-13.3***	-13.6***
Arts, entertainment and recreation – R		-9.1***	-13.2***	-14.8***
Other service activities – S		6.4***	4.0***	11.7***

Note: *** p<0,01, ** p<0,05, * p<0,1 significance of the T-test of a means difference.

Source: SES 2006, 2010, 2014, 2018; own calculations.

Table 5 provides an overview of the unadjusted gender pay gap by occupation. It is interesting to look at the development of the gender pay gap according to

the skill demands of individual occupation. In occupations that do not require a high level of education (4-9), the wages of men and women were equalized to a greater extent than in professions where a higher education is required (1-3), even though the education attainment in Slovakia has long been higher for women than men (Infostat, 2012). It follows that the glass ceiling effect has persisted on the Slovak labour market for a long time, which prevents women from advancing to positions in, for example, higher management or management positions. What is interesting, however, is the significant decrease in the difference in group 1 – Legislators, managers, which is mainly because the number of women in politics or the judiciary system has increased significantly in Slovakia. Group 7 – Skilled workers and craftsmen shows the highest values of the gender pay gap for a long time. We attribute this to the fact that there is a very low representation of women in this group, as it is mostly physically demanding work in the field of construction or metal work. Women in these fields preferably work as administrative workers. However, the future direction of policies in the field of gender equality should also focus on these job positions and ensure greater equality, especially in the field of craftsmanship.

Table 5: Unadjusted gender pay gap by occupation (%)

Occupation\Year	2006	2010	2014	2018
Managers – 1	-23.5***	-17.1***	-8.5***	-6.9***
Professionals – 2	-19.6***	-19.5***	-20.2***	-18.2***
Technicians and Associate Professionals – 3	-25.8***	-18.5***	-15.9***	-18.6***
Clerical Support Workers – 4	-15.3***	-11.9***	-6.9***	-10.5***
Services and Sales Workers – 5	-21.5***	-21.9***	-20.9***	-16.3***
Skilled Agric., Forestry and Fishery Wor. – 6	-17.3***	-18.3***	-28.0***	-6.6***
Craft and Related Trades Workers – 7	-30.3***	-29.4***	-31.7***	-23.3***
Plant, Machine Operators and Assemblers – 8	-23.0***	-20.0***	-16.6***	-13.3***
Elementary Occupations - 9	-15.0***	-16.2***	-19.7***	-17.3***

Note: *** $p<0{,}01$, ** $p<0{,}05$, * $p<0{,}1$ significance of the T-test of a means difference.
Source: SES 2006, 2010, 2014, 2018; own calculations.

The last part of our analysis focuses on the adjusted gender wage gap and its evolution over time. Table 6 shows the results of this indicator. The first column shows the gender pay gap in an unadjusted form, which coincides with the results in Table 1. In the second column, we observe the gender pay gap adjusted for personal characteristics such as education, age, or work experience in the given company. An important finding is that until 2006, when controlling for individual factors, the gender pay gap almost did not change at all, but in the following years it increased significantly (in 2018 by 0.2 p.p.). An increase in the value of the indicator means an advantage for women, because when controlling for personal characteristics, the estimate tells us what the gender pay gap would be if men and women had the same characteristics. This means that women have higher values of human capital than men (especially the aforementioned higher education). However, the still high values of the indicator indicate that sectoral and occupational segregation play an important role in the labour market. We check the impact of segregation into different sectors and occupations in the third column. When controlling for sector and occupation, the gender pay gap again decreased in all years, but most significantly in 2006 and least in 2018. This means that the level of segregation is decreasing over time, but it is still present in the labour market. The inclusion of both characteristics in the econometric model is shown in the last column of table no. 6. We observe that in 2010 and 2014 the estimated difference decreased, which indicates that there is a certain connection between personal characteristics and labour market characteristics. We assume that the correlation is mainly between the education and the job position of the employee. Women very often choose a job position according to the field of study they completed, but also vice versa, they choose their education according to what they would like to do in the future. However, to a large extent, the gender pay gap remained unchanged, for example in 2018, when it maintained an almost identical value. To a certain extent, this indicates the presence of discrimination in the labour market, but also other unobserved factors that this analysis missed or the imperfection of observable characteristics.

Table 6: Adjusted gender pay gap

Year\ GPG	Unadjusted	Adjusted for personal characteristics	Adjusted for labour market characteristics	Adjusted for both characteristics
2006	-0.194***	-0.196***	-0.212***	-0.193***
	(0.001)	(0.001)	(0.001)	(0.001)
2010	-0.148***	-0.166***	-0.191***	-0.177***
	(0.001)	(0.001)	(0.001)	(0.001)
2014	-0.149***	-0.167***	-0.171***	-0.161***
	(0.001)	(0.001)	(0.001)	(0.001)
2018	-0.149***	-0.169***	-0.153***	-0.146***
	(0.001)	(0.001)	(0.001)	(0.001)

Note: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: SES 2006, 2010, 2014, 2018; own calculations.

5 Conclusion

The gender pay gap is a long-standing problem in labour markets around the world. Women are significantly disadvantaged in this aspect compared to men. This paper deals with the gender pay gap in the Slovak labour market and its aim is to highlight the ongoing problem of lower wages for women compared to men. The paper uses non-public Eurostat microdata from the Structure of Earnings Survey for the years 2006, 2010, 2014, and 2018. The results indicate that the gender pay gap in unadjusted form has been at a long-term level of around 15% in favor of men. This means that for every 1 euro earned by a man, a woman earns only 85 eurocents. Educational attainment is positively correlated with the gender pay gap, meaning that men have higher returns on investment in education than women. In terms of age, the group of women born in the 1970s is in the worst situation, for whom a gender wage gap of 17-26% was estimated. However, a positive finding is that the gap in hourly wages is decreasing over time for all age groups. The results further demonstrated that vertical gender segregation has been present for a long time in the Slovak labour market, which prevents women from getting into better-paid positions, even in sectors that are strongly represented by women. The gender pay gap in these sectors significantly favours men, but its value slowly approaches zero over time, indicating an approach to gender equality. A similar trend is

also observed in the case of the values of the gender pay gap from the point of view of the occupation groups, where its values decrease more significantly in professions that require only lower levels of education than in those that mainly require higher education. Adjusting the gender pay gap for personal characteristics increased the value of the indicator, which means that women have better personal characteristics representing the level of human capital compared to men. This is mainly a higher level of education. However, the problem is that despite higher education, the gender pay gap persists, which indicates that the education is achieved in fields that subsequently secure lower paid positions, such as social work. Exploring the characteristics of the labour market, it was confirmed that there is gender segregation in the labour market, and a more equal distribution of women in sectors and professions would reduce wage inequalities. However, the close connection between the free choice of profession and the field of education prevents the complete achievement of gender equality in remuneration.

Despite the interesting results of our study, important limitations need to be mentioned. Firstly, the SES data is published every four years, so the latest available data from 2018 may not fully reflect today's reality, especially due to the ongoing corona crisis. Unfortunately, more up-to-date data is not available at the time of writing this article. Secondly, SES data do not include variables that might significantly affect the size of the gender pay gap, such as marital status, number of children, or absence from the labour market due to birth or childcare. Thirdly, the data used in this study do not include enterprises with fewer than 10 employees, so a significant part of the labour market is omitted.

Despite the abovementioned limitations, the results of this study can help policymakers understand the roots and causes of the gender pay gap and lead to useful guidelines for policymakers. However, solving this problem definitely requires further research. For example, using different labour market datasets (e.g., European Union Statistics on Income and Living Conditions, Labour Force Survey, or datasets of Statistical Office of the Slovak Republic) should provide verification of our results and bring further insights into this issue. Furthermore, different statistical and econometrical methods need to be used to estimate the effect of the contribution of different variables, e.g., Heckman sample correction to control for selection bias and inclusion of unemployed part of the labour market into the dataset or Regression Discontinuity Design to test the wage and anti-discrimination policy changes.

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