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Gender pay gap in the Czech Republic: focused on management

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ABSTRACT

The existence of a gender pay gap is well known. This paper focuses on the issue of the pay gap in managerial positions. It aims to examine the development of the gender pay gap in managerial positions in the Czech Republic and to identify the unexplained part of the gender pay gap, which could be an indication of gender pay discrimination. To estimate the unexplained part of the gender pay gap data from the European Union Statistics on Income and Living Conditions (EU-SILC) was used and the Oaxaca-Blinder decomposition was applied. The results show that in the period 2005-2019, the average raw gender pay gap in management was 0.22 and the unexplained part was 0.13, using the Neumark's variant of the decomposition. Differences in women's and men's personal and firm characteristics could explain about one-third of the pay gap. The results also suggest that the situation has not changed much over the period considered and that the unexplained part of the gender pay gap has decreased only slightly between 2005 and 2019. Thus, reducing the gender pay gap remains a major challenge for both economic policy makers and companies in promoting corporate social responsibility policies.

1. Introduction

Equality between men and women, non-discrimination and the right to equal pay for equal work are fundamental rights enshrined in European Union law. In 2004 a European Union enlargement saw ten new member states join the Union. The Czech Republic were among these new member states. The accession process itself brought with it the obligation of harmonising legislation with that of the Community, including the introduction of legislation on gender pay equality.

An amendment of the Labour Code taking into consideration the requirements of the European Union in this area came into effect in 2001 in the Czech Republic. Other significant alterations to legislation governing equal treatment of women and

men were made as part of further EU amendments to the Labour Codes, which implemented new requirements set by the European Union. The amendment took effect in 2004 in the Czech Republic. The national legislation has seen further significant amendments since 2004 reflecting the development of European Union antidiscrimination legislation.

Despite the legislative anchoring of equal treatment and equal opportunities, the wage differences between men and women still exists. Data on wage differences between women and men are regularly published by the Czech Statistical Office within the framework of gender statistics and by Eurostat. The Eurostat database offers gender data for almost 30 European countries, enabling international comparisons. According to Eurostat data, women in the Czech Republic received on average about 19% lower wages compared to men in 2019 (Eurostat, 2022). In the context of the European Union member states, the Czech Republic has long ranked among the countries with the highest gender pay gap. Also for this reason, the issue of gender pay gap, detailed analysis of factors behind this phenomenon is still a topical issue deserving attention.

According to economic theory, there are several ways to explain the wage differences between women and men. One of the reason for different assessments of women and men may be the differences in human capital. Labor market segregation and the concentration of women in lower paid positions and lower paid sectors offer further explanations for the lower average earnings of women compared to men. Finally, the wage discrimination by gender may be the source of gender pay differences. (Jacobsen, 2007; Ehrenberg & Smith, 2012).

The results of empirical studies dealing with this issue suggest that the part of the existing gender pay gap could be explained by objective factors. Differences in personal characteristics of men and women, especially in education or experience represented the important factors explaining the pay gap between women and men in older studies (Oaxaca, 1973; Blinder, 1973). However, the influence of these factors weakened over time with growing of the share of university-educated women. Now, vertical and horizontal labor market segregation represent the main factors which are frequently used to explain at least part of the existing gender pay gap. However, significant part of gender wage differences remains unexplained and can be described as the upper limit of the effect of wage discrimination against women (Balcar & Hedija, 2019). The empirical studies also indicate that the gender pay gap varies within wage distribution. Differences in wages between women and men typically widened at the top (the glass ceiling effect) and at the bottom (the sticky floor effect) of the wage distribution (for example Arulampalam et al., 2007; Christofides et al., 2013).

The paper is devoted on the wage differences at the top of wage distribution. It focuses on the amount of wage differences between women and men in management and examines the development over time. Thus it helps to answer the question, whether the implementation of European Union non-discrimination legislation, new legislative changes and activities in this area, have in any way contributed to a mitigation of wage differences between leading women and men in the Czech Republic.

The study aims to examine the development of the gender pay gap in management positions in the Czech Republic in the period 2005 to 2019 and identify the

unexplained part of the gender pay gap which could be evidence of wage discrimination by gender.

The first section of the paper is devoted on the current knowledge in the area of wage difference between women and men and their causes. The second part describes the used methods and data set. The Oaxaca-Blinder decomposition and EU-SILC data are used to estimate the gender pay gap and factors behind the wage differences in management. The third section presents the results and the final section of the paper summarizes the main conclusions. It was found that the raw gender pay gap in management did not decrease significantly in the examined period 2005-2019, but fluctuated around 22% to the detriment of women. The unexplained wage gap reached 13% on average, and he did not show a significant decline in the period under review.

This study complements the existing knowledge about the gender wage differences and its development in a specific area of management. It brings knowledge about the development in this area in the Czech Republic over a period of 15 years. It describes the evolution of the wage gap between male and female managers, provides information on the determinants of differences and bring knowledge about evolution of the unexplained part of gender pay gap, which may be the result of wage discrimination against women in the labor market. The paper also shows that significant wage differences between women and men in EU member states persist, and their decline is only very gradual. This point to the fact that the applied measures of the equal opportunities policy within the EU countries are not yet effective in post-communist countries such as the Czech Republic.

2. Wage difference between women and men and gender pay gap in leadership

According to traditional microeconomic theory, the amount of wages depends on labor productivity. An individual who shows higher labor productivity receives a higher hourly wage for objective reasons and vice versa. The resulting wage gap is natural and justified. One of the possible reasons of the wage gap between male and female employees is their different productivity. This is then closely related to the different performance characteristics of employees. However, economic theory also provides other explanations for the gender pay gap. The most commonly used arguments include differential human capital, existing labor market segregation, and wage discrimination on the labor market (Jacobsen, 2007; Ehrenberg & Smith, 2012).

From the point of view of human capital theory, the explanation of wage differences can be found in human capital and investment in human capital by individuals (Becker, 1964). In line with theory of human capital, higher levels of human capital and higher investment in human capital lead to higher labor productivity and thus higher income. Becker (1964) finds a positive correlation between investment in human capital, especially education and health, and income. Differences in human capital investment, especially education and job training, are one of the arguments used to explain the gender wage gap. Due to expected dominant role of women in caring for children and families, they are also expected to have a lower working life and a higher probability of work interruption. Thus, women can choose a lower level

of education and are also offered less job training. The findings of empirical studies confirm that special training is not provided to women as often as men (Olsen & Sexton, 1996). Women may also have fewer years of experience and therefore less experience due to maternity and childcare breaks. The fact that women are more likely to work part-time also leads to a lower accumulation of women's experiences compared to men, which may be another explanation for women's lower wages compared to men (Jacobsen, 2007).

Horizontal and vertical labor market segregation may be another reason for the gender wage differences. Women are concentrated in less profitable sectors or in lower positions with lower powers and responsibilities, and therefore lower pay and on average, they earn less than men. (Oaxaca, 1973; Blinder, 1973; European Commission, 2002). Economic theory offers several arguments explaining the existing segregation in the labor market. From the perspective of neoclassical theory, the segregation of women is the result of their deliberate and voluntary decision in order to maximize their own profit. Biological factors in the form of different physical and personal characteristics are a traditional argument for women's labor market segregation. The role of women as mothers can also play a role in selecting the profession. Due to the expected interruption of working life due to motherhood and childcare, women choose jobs and fields that are not subject to such rapid development. Other arguments used to explain existing labor market segregation include socio-cultural factors in the form of stereotypes and socialization, invisible barriers to entry and expected discrimination. (Blau et al., 2010; Jacobsen, 2007).

However, the wage differences between women and men does not have to have only objective causes. The reason may lie in wage discrimination against women. The most popular and most frequently cited discrimination models include the taste for discrimination model (Becker, 1957) and the statistical discrimination model (Phelps, 1972). In both models, the main reason for wage discrimination is personal preferences and stereotypes prevailing in society. According to the theory of statistical discrimination, when deciding which employee to hire, the employer does not have perfect information about the individual, but decides in conditions of uncertainty. It thus makes decisions based on information that can be deduced from the available data on a particular group or from the general characteristics of the group to which the employee belongs. The women are judged on the basis of average and general expectations. The role of women as mothers, the expected higher absences, the presumed different cognitive and non-cognitive skills of women and men, and finally the prevailing stereotypes in society lead the employer to offer women lower remuneration compared to men.

A number of empirical studies address the analysis and decomposition of gender pay gap and the estimation of the degree of potential wage discrimination in the Czech labor market. Recent studies that analyzed relatively long time series include the studies of Křížková et al. (2018) and Zajíčková and Zajíček (2021). Křížková et al. (2018) used the data from Average Earnings Information System in the period 2002 − 2016 and identified the relative stable raw gender pay gap throughout the period under review, hovering around 25% to the detriment of women. The unexplained part reached 15% on average. Zajíčková and Zajíček (2021) used another data source, namely EU-SILC data for the period 2006-2017. The estimated raw gender

pay was around 35% on average, and the unexplained part represented about 50% of the gap. Balcar and Hedija (2019) used data from own survey including also wide range of cognitive and non-cognitive skills and personal preferences of employees in the Czech Republic. Even with the inclusion and consideration of a wide range of characteristics of men and women they found out that the unexplained part of gender pay gap was 13% to the detriment of women.

Some studies are narrower and examine pay gaps in management, for example, the studies by Eriksson et al. (2000), Eriksson (2005), Stupnytskyy (2007), Jurajda and Paligorova (2009). The study by Eriksson et al. (2000) is the first that quantify the potential wage discrimination among managers in the Czech Republic. The authors used data from the Information System on Average Earnings from 1998 and estimated the unexplained gender wage gap around 17.5%. The wage gap differed significantly between the public and private sectors. In the private sector, women in managerial positions received approximately 20% lower wages compared to men without objective reasons; in the public sector, the unexplained pay gap was significantly lower at approximately 10.8%. Jurajda and Paligorova (2009) used the same data source and examined the potential wage discrimination of women in management in the period 2000–2004. The raw gender pay gap in management was approximately 55% in top management and 43% in lower management to the detriment of women. Personal characteristics (education and age) played an important role and explained about one third of gender wage differences. After taking into account selected personal and corporate characteristics, the unexplained pay gap in management was around 17-18%. Stupnytskyy (2007) also examined the pay gap between men and women in management using the data from the Information System on Average Earnings. He decomposed the gender wage differences in management separately for public and private sector in the years 2000 and 2005. The results indicated that the unexplained gender pay gap differed significantly in both sectors. It reached around 20% to the detriment of women in the private and around 5% in the public sector in both examined years. This study uses a different source of data and examines developments of gender pay gap in management during 15-year period.

3. Data and methods

The study used data from European Union Statistics on Income and Living Conditions (EU-SILC). The dataset covers among others micro-data on income and living conditions for all the EU countries, Iceland, Norway and Switzerland and some other countries participated on the voluntary basis. Cross-sectional EU-SILC data for the year 2006 (which contain data on the amount of income in 2005) and for 2020 (which contain data on the amount of income in 2019) are used to estimate and decompose the wage differences between women and men in the Czech Republic. The sample was narrowed to persons who were employees in the reference period, worked all twelve months in a full-time job, had no other jobs and earned an income. The self-employed were excluded as we are interested in wages and the potential differences in evaluation of male and female employees by the employer. The hourly gross wage was calculated as the employee's cash and non-cash incomes per year

divided by the number of hours usually worked per year (including overtime). The final sample contains the data of more than 5,000 employees including more than 1,000 employees having managerial position.

Several methods can be used to decompose the wage differences between women and men and estimate the unexplained part of gender pay gap (Beblo et al., 2003). However, the Oaxaca-Blinder decomposition ranks among the most widely used methods. It is also known as the Oaxaca decomposition or Blinder-Oaxaca decomposition. The Oaxaca-Blinder decomposition and its modifications is applied to estimate and decompose the wage differences between men and women. The method is based on the work of Oaxaca (1973) and Blinder (1973), who independently decompose the gender pay gap and divided it into two parts. The part that can be explained by the different characteristics of women and men (for example differences in human capital or the work position) and a part that cannot be explained by these differences and is often referred to unexplained, discriminatory or the effect of discrimination.

The Oaxaca-Blinder decomposition could be written as follows:

$$\ln\left(\overline{W}_m\right) - \ln\left(\overline{W}_f\right) = \left(\overline{X}_m - \overline{X}_f\right)\beta^* + \left(\hat{\beta}_m - \beta^*\right)\overline{X}_m + \left(\beta^* - \hat{\beta}_f\right)\overline{X}_f, \tag{1}$$

where $\overline{W}_m$ is the hourly wage of men, $\overline{W}_f$ is the hourly wage of women, $\overline{X}_m$ is a vector of average characteristics of men, $\overline{X}_f$ is a vector of average characteristics of women, $\hat{\beta}_m$ is the vector of the coefficients of wage function of men, $\hat{\beta}_f$ is the vector of the coefficients of wage function of women, β^* is the vector of wage functions coefficients in the absence of discrimination (equilibrium wage).

The left side of the equation $\ln\left(\overline{W}_m\right) - \ln\left(\overline{W}_f\right)$ represents the raw gender pay gap, which is defined as the difference in logarithm of mean wages of men and women. The term $(\overline{X}_m - \overline{X}_f)\beta^*$ is the part of the gender pay gap, which is explained by different characteristics of men and women and is referred to explained part of the gender pay gap or the endowment effect. The phrase $(\hat{\beta}_m - \beta^*)\overline{X}_m + (\beta^* - \hat{\beta}_f)\overline{X}_f$ represents the unexplained part of the gender pay gap and it is known as unexplained part, the remuneration effect or the effect of discrimination.

The first step in Oaxaca-Blinder decomposition is an estimation of wage functions for men and women:

$$\ln\left(W_i\right)_f = \beta_f(X_i')_f + (u_i)_f, \; i = 1, \; ..., l, \tag{2}$$

$$\ln\left(W_i\right)_m = \beta_m(X_i')_m + (u_i)_m, \; i = 1, \; ..., k, \tag{3}$$

where $(W_i)_f$ is the hourly wage of the i-th woman, $(X_i)_f'$ is a vector of selected characteristics of the i-th woman, $(W_i)_m$ is the hourly wage of the i-th man, $(X_i)_m'$ is a vector of selected characteristics of the i-th man, β_m, β_f are vectors of wage functions coefficients for men and women and u_i is a disturbance term, l is the number of women and k is the number of men.

The other step of the Oaxaca-Blinder decomposition is the selection of the equilibrium wage (β^*). There are different alternatives to the equilibrium wage. Blinder (1973) worked with the wage of men as the equilibrium wage ($\beta^* = \hat{\beta}_m$). Oaxaca (1973) applied two variants of equilibrium wage, wage of men and wage of women ($\beta^* = \hat{\beta}_m$) and ($\beta^* = \hat{\beta}_f$). Reimers (1983) used as equilibrium wage the average of regression coefficients of male and female wage functions ($\beta^* = \frac{\hat{\beta}_m + \hat{\beta}_f}{2}$). Cotton (1988) worked with the weighted average of regression coefficients of wage functions and as weights the proportion of men and women in the total working population was used ($\beta^* = \frac{m}{m+f} \cdot \hat{\beta}_m + \frac{f}{m+f} \cdot \hat{\beta}_f$,). Neumark (1988) chose a different approach and estimated the equilibrium wage as a vector of coefficients of the wage function for the total sample of men and women. The same procedure was applied by Oaxaca and Ransom (1994).

The last mentioned variant of decomposition working with the regression coefficients of total sample is very often used and is also referred to as Oaxaca-Ransom decomposition. The equilibrium wage is estimated as follows:

$$\ln W_i = \alpha + \beta * .X_i \acute{+} u_i, \tag{4}$$

where W_i is the hourly wage rate of the i-th employee, $X_i\acute{}$ is the vector of selected characteristics of i-th employee, $\alpha, \beta*$ is the vector of coefficients of wage function, u_i is the disturbance terms.

We applied the Oaxaca-Blinder decomposition to decompose the gender pay gap in this paper. As an equilibrium wage, the Neumarḱs variant also known as the Oaxaca-Ransom decomposition is applied.

The first step is the estimation of wage functions (Eqs. 2, 3 and 4). The logarithm of the hourly gross wage is used as dependent variable. As explanatory variables, the following characteristics of employees are used: age (in years), age squared, work experience (number of year spent in paid work), work experience squared, level of education (category according to highest attained level of education according to ISCED), sickness (dummy variable, temporary inability to work due to sickness in the income reference year), partnership (dummy variable, having a partner in a common household), occupation (category according to the classification ISCO), sector (category according to economic activity using classification NACE Rev.2), firm size (dummy variable, less than 11 employees and 11+ employees), contract (dummy variable, having a work contract of limited duration), managerial position (dummy variable, having formal responsibility for supervising a group of other employees). Selected characteristics belong to the traditional factors that can explain the existing wage differences between individuals and are available from EU-SILC data. Data on individual variables is shown in Table 1. Due to the examined time series length, only data for 2005 and 2019 are shown here. The data will allow us a better picture of the development of selected indicators over time. The table shows the data separately for women and men. Data on the level of education, partnership, sickness occupation, sector, firm size, managerial position and contract are expressed in the table as a share of the given category in a whole.

Table 1. Means of the used variables – full sample.

	2005		2019	
Variable	Men	Women	Men	Women
Ln hourly wage	1.254	1.029	2.138	1.915
	(0.394)	(0.392)	(0.379)	(0.371)
Age (in years)	40.316	41.270	43.927	45.621
	(11.682)	(10.682)	(11.590)	(10.422)
Work experience (in years)	20.722	20.443	23.911	23.307
	(11.809)	(11.041)	(11.777)	(11.111)
Education (ISCED) [1]				
Less than primary, primary, lower secondary	0.041	0.075	0.031	0.042
Upper secondary, post-secondary non tertiary	0.819	0.789	0.744	0.702
Tertiary education	0.140	0.136	0.225	0.256
Occupation (ISCO) [1]				
Armed forces	0.006	0.001	0.012	0.002
Managers	0.045	0.020	0.062	0.035
Professionals	0.078	0.103	0.128	0.221
Tech. and associate professionals	0.185	0.295	0.175	0.154
Clerical support workers	0.041	0.169	0.041	0.180
Service and sales workers	0.081	0.160	0.083	0.189
Skilled agricultural, forestry and fish. workers	0.013	0.015	0.008	0.007
Craft and related trades workers	0.324	0.090	0.237	0.043
Plant and machine operators and assemblers	0.190	0.062	0.214	0.088
Elementary occupations	0.036	0.085	0.040	0.081
Sickness [1]	0.103	0.157	0.094	0.170
Partnership (having partner) [1]	0.707	0.689	0.711	0.687
Sector (NACE Rev. 2) [1]				
Agriculture, forestry and fishing (A)	0.060	0.031	0.033	0.015
Mining, manufacturing, electricity, water … (B-E)	0.420	0.272	0.427	0.258
Construction (F)	0.116	0.020	0.089	0.012
Wholesale and retail trade … (G)	0.081	0.122	0.085	0.137
Transportation and storage, information and communication (H + J)	0.098	0.049	0.131	0.056
Accommodation and food service … (I)	0.022	0.042	0.016	0.039

Table 1. Continued.

	2005		2019	
Variable	Men	Women	Men	Women
Financial and insurance activities (K)	0.009	0.029	0.014	0.031
Real estate, prof. and admin. activities (L-N)	0.041	0.030	0.055	0.053
Public admin., defence, social security (O)	0.014	0.143	0.078	0.080
Education (P)	0.074	0.085	0.030	0.146
Human health and social work activities (Q)	0.029	0.142	0.022	0.149
Arts, other services … (R-U)	0.038	0.035	0.018	0.025
Firm size [1]				
0-10 employees	0.856	0.783	0.869	0.814
11 + employees	0.144	0.217	0.131	0.186
Contract (limited duration) [1]	0.100	0.109	0.053	0.069
Managerial position [1]	0.229	0.136	0.219	0.146
N	3,046	2,412	2,992	2,759

Note: 1) proportion of the individual groups to the whole (mean of dummy variables), standard deviation in parentheses.
Source: EU-SILC 2006 and EU-SILC 2020, authoŕs computations.

In the sector and education, some categories are merged. This is due to the different variants of NACE and ISCED classifications used in EU-SILC for individual years. The merging of categories thus makes it possible to obtain comparable results in individual years.(Table 1)

The gender pay gap is estimated and decomposed for sample of employees on managerial positions and also for total sample of men and women for comparison.

To minimize potential bias from too different samples of women and men, the matching procedure is applied as suggested by Ho et al. (2007). This pre-processing procedure enable to obtain a more homogenous sample of women and men and to estimate the wage difference between comparable subjects. The literature offers several matching methods. The exact matching is the most accurate in terms of sample homogeneity and is also a very simple method. Using the exact matching method, from the sample are excluded individuals who do not have exactly the same observable characteristics as the opposite sex. However, the disadvantage of this method is that it could lead to a large reduction of final sample. An alternative is offered by a method called coarsened exact matching (CEM). It coarsens variables into groups and then exclude individuals, whose coarsened characteristics do not match with opposite sex. Finally, the uncoarsened data that were matched are returned. (Blackwell et al., 2009) The sample is matched using CEM procedure. The key personal and firm characteristics are used for matching purpose: age, education, occupation and sector. Variable age was coarsened into ten conventional groups (<20, 20-24, 25-29, 30-34, 35-39, 40-44, 45-50, 50-54, 55-60 and 60+), education into three groups (ISCED 2011categories 0-2, 3-4, 5-8) and occupation into ten groups

according one digit ISCO, sector into twelve groups according NACE Rev.2. Subsequently, Oaxaca-Blinder decomposition is applied.

4. Results

The Neumark variant of the Oaxaca-Blinder decomposition (Eqs. 1 and 4) is used to decompose the gender pay gap and to estimate the explained and unexplained part in the Czech Republic. The results are shown in Table 2.

The estimated raw gender pay gap in management reached 0.244 in 2005. This means that women were paid about 24.4% less than men. The results of the decomposition show that part of the gender pay gap could be explained by differences in the average characteristics of men and women. These characteristics could be divided into two groups: personal characteristics (age, work experience, educational level, illness, partnership) and firm characteristics (occupation, sector, firm size, contract, managerial position - only for the full sample). The explained part of the gender pay gap was 0.095 in 2005. This means that differences in the average characteristics of men and women can explain the wage differences of 9.5% to the detriment of women. Differences in the personal characteristics of men and women could explain 4 percentage points of the gender pay gap. Differences in firm characteristics had a similar explanatory power, explaining around 5 percentage points of the gender pay gap. The unexplained part of the gender pay gap was 0.148, indicating that the 15% pay gap could be the result of pay discrimination against women in 2005. It accounted for about 61% of the raw gender pay gap.

In 2019, the situation looked very similar, raw gender pay gap achieved value 0.216. The explained part was 0.082 and differences in firm and personal characteristics of men and women had very similar explanatory power. The unexplained part was 0.135. This means that the gap of 14% between men and women cannot be explained by differences in men's and women's characteristics. It represented approximately 62% of raw gender pay gap.

The raw gender wage gap thus fell by less than 3 percentage points between the years 2005 and 2019 (in 15 years). The unexplained wage gap then by 1.4 percentage points. The results thus suggest that the situation has not changed much and the unexplained gender pay gap has decreased only slightly in examined period.

The decline in the raw gender pay gap in 2019 may have been caused by labor market tensions in the Czech Republic from 2017. Unemployment was only 2% in 2019

Table 2. Oaxaca-Blinder decomposition: Sample without matching.

	Full sample				Managerial position			
	2005		2019		2005		2019	
Raw GPG	0.2251***	(0.0107)	0.2224***	(0.0099)	0.2436***	(0.0262)	0.2162***	(0.0229)
Explained part	0.0806***	(0.0082)	0.0874***	(0.0079)	0.0952***	(0.0190)	0.0816***	(0.0170)
Personal characteristics[1]	0.0243***	(0.0039)	0.0242***	(0.0042)	0.0437***	(0.0110)	0.0455***	(0.0114)
Firm characteristics[1]	0.0563***	(0.0068)	0.0632***	(0.0065)	0.0516***	(0.0141)	0.0361***	(0.0123)
Unexplained part	0.1445***	(0.0072)	0.1350***	(0.0067)	0.1483***	(0.0192)	0.1345***	(0.0172)
N	5,458		5,751		1,025		1,056	

Note: Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, 1) personal characteristics: age, work experience, level of education, sickness, partnership. Firm characteristics: occupation, sector, company size, contract, managerial position (for full sample).
Source: Author's computations.

(males 1.7, females 2.4%), and the economy faced labor shortages and strong wage pressures (Eurostat, 2022a). This has led to the hiring of women, who traditionally have higher unemployment rates. Thanks to the pressure on wages, newly employed women received a higher wage. This could lead to a narrowing of the pay gap between women and men. Pressures on women's wage growth may have been stronger in managerial positions, where employers may have feared that women would switch to another employer that offered better pay conditions, thus increasing women's wages. Alternatively, women took advantage of better offers and changed employers.

However, the estimate of the gender pay gap could be subject to some degree of bias. Differences in the composition of the sample of men and women could be one of the reasons. The matching procedure is applied to minimalize potential bias from too different samples of women and men. Coarsened exact matching (CEM) is used to obtain a more comparable sample of men and women. Key personal and business characteristics are used to match the sample: age, education, occupation (1digit) and sector. After matching procedure, the sample is narrowed but more homogenous. It is referred to as CEM sample. The gender pay gap is then estimated and decomposed. The results are presented in the Table 3.

The results after matching show that the gender pay gap in management did not decrease between 2005 and 2019, on the contrary it increased by about 2 percentage points. Unexplained part remains nearly unchanged at about 0.17. Compared to the estimates for the whole sample of employees (full CEM sample), the reported gender pay gap and its unexplained part are then higher.

The results therefore suggest that there has been little change in the gender pay gap and its unexplained part between the years 2005 and 2019. However, the years selected may be specific and may not reflect developments over time. To confirm the conclusions, the wage gap for the entire period under review is therefore estimated and decomposed. The conclusions are shown in Table 4 and the development is also illustrated in Figure 1.

The trend in Figure 1 shows that the gender pay gap and its unexplained part did not decrease steadily over the period under review. Rather, it fluctuated around the average. The average raw gender wage gap was 0.22 and the unexplained part 0.13 in examined period.

The conclusions regarding the existence of a relatively high unexplained gender pay gap in the Czech Republic are consistent with the findings of previous empirical

Table 3. Oaxaca-Blinder decomposition: CEM sample.

	Full CEM sample				Managerial position			
	2005		2019		2005		2019	
Raw GPG	0.2240***	(0.0122)	0.2332***	(0.0114)	0.2354***	(0.0350)	0.2574***	(0.0321)
Explained part	0.0590***	(0.0089)	0.0785***	(0.0087)	0.0637***	(0.0236)	0.0830***	(0.0230)
Personal characteristics[1]	0.0219***	(0.0043)	0.0234***	(0.0047)	0.0257*	(0.0134)	0.0517***	(0.0172)
Firm characteristics[1]	0.0372***	(0.0072)	0.0551***	(0.0069)	0.0380**	(0.0175)	0.0313**	(0.0140)
Unexplained part	0.1649***	(0.0088)	0.1547***	(0.0081)	0.1717***	(0.0272)	0.1743***	(0.0246)
N	4,014		4,298		520		588	

Note: Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, 1) personal characteristics: age, work experience, level of education, sickness, partnership. Firm characteristics: occupation, sector, company size, contract, managerial position (for full sample).
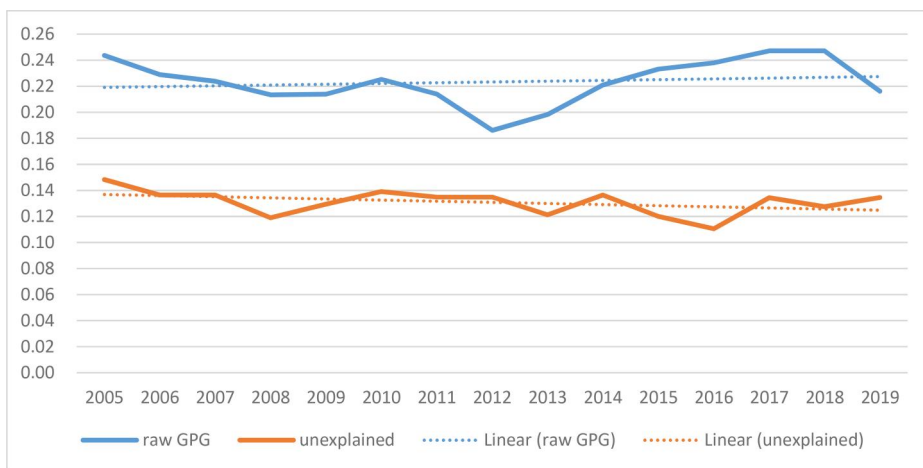Source: Author's computations.

Table 4. Oaxaca-Blinder decomposition on managerial position in the period 2005–2019.

	2005	2006	2007	2008	2009	2010	2011	2012
Raw GPG	0.2436***	0.2289***	0.2238***	0.2134***	0.2139***	0.2253***	0.2140***	0.1861***
	(0.0262)	(0.0219)	(0.0207)	(0.0209)	(0.0213)	(0.0227)	(0.0225)	(0.0244)
Unexplained GPG	0.1483***	0.1365***	0.1364***	0.1189***	0.1295***	0.1391***	0.1349***	0.1348***
	(0.0192)	(0.0165)	(0.0155)	(0.0159)	(0.0164)	(0.0169)	(0.0167)	(0.0187)
N	1,025	1,398	1,627	1,424	1,294	1,203	1,161	1,128
	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2005-2019 (average)**
Raw GPG	0.1983***	0.2209***	0.2331***	0.2379***	0.2471***	0.2303***	0.2162***	0.223
	(0.0239)	(0.0256)	(0.0242)	(0.0229)	(0.0229)	(0.0229)	(0.0229)	
Unexplained GPG	0.1212***	0.1365***	0.1200***	0.1105***	0.1344***	0.1275***	0.1345***	0.131
	(0.0176)	(0.0188)	(0.0177)	(0.0170)	(0.0167)	(0.0163)	(0.0172)	
N	1,140	1,116	1,213	1,249	1,164	1,119	1,056	1,223

Note: Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authoŕs computations.

Figure 1. Development of gender pay pap in leadership in the period 2005–2019.
Source: Authoŕs computations

studies, including Zajíčková and Zajíček (2021) and Křížková et al. (2018). Only older studies address the wage gap in management. Jurajda and Paligorova (2009) using data from 2000-2004 estimated unexplained pay gap in management of 17-18% to the detriment of women. Stupnytskyy (2007) found that the unexplained gender pay gap for managers in the private sector was about 20 per cent in 2000 and 2005 and in the public sector it was about 5 per cent.

The findings of the study do not differ much from the conclusions of the studies mentioned above. The gender pay gap in management was estimated to be around 15 per cent in 2005 and 17 per cent after the matching process. However, this study adds to the existing knowledge. It provides data on the evolution of the gender pay gap in management since 2005.

5. Conclusion

The issue of gender pay gap in managerial positions is addressed in this article. The aim of the study was to examine the development of the gender pay gap in

managerial positions in the Czech Republic in the period from 2005 to 2019. The study also aimed to identify the unexplained part of the gender pay gap, which could be an indication of gender pay discrimination. To estimate the unexplained part of the gender pay gap, data from the European Union Statistics on Income and Living Conditions (EU-SILC) was used and the Oaxaca-Blinder decomposition was applied.

The results showed that the gender pay gap in managerial positions reached 0.244 and the unexplained part was 0.150 in 2006, using the Neumark's variant of decomposition. This means that women in managerial positions in the Czech Republic were paid about 24% less than their male counterparts. The pay gap of 15% can be seen as the upper limit of the effect of discrimination, as it cannot be explained by differences in the characteristics of men and women. In 2019, the situation was very similar, gender pay gap achieved value 0.216 and the unexplained part reached 0.135. The results thus suggest that the situation has not changed much and the unexplained gender pay gap has decreased only slightly in examined period.

It was also found that the raw gender pay gap fluctuated around 22% over the period 2006-2019 and did not show a decreasing trend. A similar trend was observed for the unexplained part of the gender pay gap, which fluctuated around 13% and showed only a very slight decrease over the period. The fact that the gender pay gap and its unexplained part did not decrease significantly over the period under consideration is also confirmed by the results obtained with the coarse exact matching sample of employees.

This study provides interesting information for both companies and economic policy makers and shows that in the Czech Republic there is no reduction in the gender pay gap in top positions or in the unexplained part, which in many cases is attributed to pay discrimination against women in the labor market. As a result, the reduction of the gender pay gap is still a major challenge both for economic policy makers and for companies in terms of the promotion of corporate social responsibility policies.

In conclusion it is necessary to mention that there are some limitations to the results. The data sample used has some limitations. The EU-SILC data only provide information on selected characteristics of men and women. It does not cover all relevant cognitive and non-cognitive skills of individuals, the management level and the direct link to the enterprise. The unexplained part of the pay gap may be overestimated due to the absence of these data.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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