THE GENDER PAY GAP IN THE CZECH REPUBLIC

LEA NEDOMOVA, MILOS MARYSKA, PETR DOUCEK
Prague University of Economics and Business, Faculty of Informatics and Statistics, Prague, Czechia
nedomova@vse.cz, milos.maryska@ vse.cz, doucek@vse.cz

DOI
https://doi.org/10.18690/um.fov.2.2025.52

ISBN
978-961-286-963-2

The paper deals primarily with the issue of the Gender Pay Gap in the Czech economy. The issue of equal pay for workers in both the business and non-business sectors is one of the important priorities of the EU's 2030 strategy. Europe-wide, it can be said that it has been declining in the long term. Our paper, which analyses data on this for the period from 2013 to 2024, reports on the situation and developments over the past twelve years in the Czech Republic. In this article we examine the Gender pay gap and its relation to the education of workers in the following educational categories: elementary, secondary vocational, general secondary, bachelor, master and doctorate (Ph.D.). The second research question is then formulated as follows. Here we have done the analysis for three age categories: under 30, 30-50 and over 50. The data sources for the analysis were the annual database Average Earnings Information System (ISPV), which is prepared for the Ministry of Labour and Social Affairs of the Czech Republic and is updated regularly once a year in the second quarter of the year. Some basic time series analyses were performed in MS Excel using its standard functions. More complex analyses were then performed in Python, in particular in the NumPy and stats models modules. For graphical displays we used MS Excel functions. Our results suggest that the gender pay gap in percentage terms has been decreasing very slowly over the long term.

Keywords:
gender pay gap, czech economy, gender pay gap by age, gender pay gap by education category

University of Maribor Press

1 Introduction

The gender pay gap (GPG) is a long-standing and complex problem that persists across different sectors and countries and exacerbates social injustice.

Despite significant progress in gender equality, GPG continues to manifest itself in many forms, influenced by a complex interplay of factors including discrimination, occupational segregation and different expectations of work and family roles. This pay gap is defined as the difference between the average earnings of men and women, often expressed as a percentage of men's earnings. Despite legislative efforts and increasing awareness of this issue, the gender pay gap still persists, as will be seen in our analyses conducted in the Czech Republic. The GPG is not simply a reflection of differences in education or experience; rather, it is compounded by systemic biases and workplace cultures that undervalue women's contributions (Khoreva, 2011; Bishu and Alkadry, 2016).

Perceptions of the gender pay gap play a significant role in shaping women's work experiences and career trajectories. Khoreva points out that perceived differences can lead to negative psychological outcomes such as lowered self-esteem and increased stress, which can further exacerbate the gap by discouraging women from negotiating salaries or promotions (Khoreva, 2011). Similarly, Dawson discusses how pessimistic expectations among women may contribute to their complacency about unequal pay, making them less likely to seek better opportunities or advocate for fair compensation (Dawson, 2017).

According to a study (Litman et al., 2020), women in the anonymous online labour market earn on average 10.5% less than men, even when factors such as experience, education and other human capital are taken into account.
This study shows that gender pay gaps can arise even in the absence of overt discrimination, job segregation or inflexible working conditions.

Cha and Weeden (2014) argue that the increasing wage returns associated with overwork have prevented the gender pay gap from converging, suggesting that women often face barriers to accessing the same overtime and advancement opportunities as their male counterparts. Further, research by Sasso et al. (2021) shows that while GPG has narrowed in certain sectors, it remains persistent,

particularly in challenging environments such as healthcare, where newly trained male physicians earn significantly more than their female counterparts (Chen et al., 2021).

Other research conducted by the Pew Research Center shows that U.S. women in 2022 will earn an average of 82 cents for every dollar earned by men, a slight improvement over 2002 when it was 80 cents (Kochhar, 2023). This slow progress suggests that despite women's increasing educational attainment and entry into the labour market, structural and individual factors persist that perpetuate this gap.

GPG is the result of a combination of factors, including human capital, work assignment, time flexibility and discrimination. Reducing GPG requires not only legislative measures, but also changes in social and organisational attitudes towards women's pay and employment. The gender pay gap is a multidimensional problem that requires a comprehensive understanding of both its economic and psychological dimensions. (Chen et al., 2021; Lyons and Zhang, 2023; Blevins et al., 2019).

The aim of the paper is to analyse the evolution of the Gender Pay Gap in the Czech economy over the past nine years, i.e., from 2016 to 2024. In our analysis, we focus specifically on the relationship between the evolution of the gender pay gap and the age categories of Czech employees, as well as the relationship between the gender pay gap and the level of education. We summarized these analysed dimensions of the problem in the following two research questions:

- **RQ1: The Gender Pay Gap Decreases with Increasing Education.**
- **RQ2: The Gender Pay Gap Increases or Decreases with the Older Age of the Working Person.**

2 Methodology

For the preparation of this paper, we needed to address two questions from a methodological point of view:

- What data do we process and how did we get it?
- What methods do we use for data analysis and interpretation?

2.1 What data do we process and how did we get it?

We have been obtaining data for our research since 2000 from Trexima, a. s., which conducts a regular statistical survey among Czech economic entities called the "Average Earnings Information System" for the needs of the Ministry of Labour and Social Affairs of the Czech Republic. It is based on the annual responses of more than 2,000,000 workers operating in approximately 25,000 economic entities in the Czech Republic and the data are always collected for the second quarter of the respective year (ISPV, 2024).

2.2 What methods do we use for data analysis and interpretation?

Basic data analysis and presentation is performed using tools and basic statistical functions for time series analysis in MS Excel. The subsequent data analysis was then performed in Python, especially in the NumPy and statsmodels modules. For the purpose of RQ1, we performed the analysis for the three age categories under 30, 30-50 and over 50. For the analysis to obtain answers for RQ2, we analyse the data according to the following education categories: elementary, secondary vocational, general secondary, bachelor, master and doctorate (Ph.D.).

To calculate the eigenvalue of the gender pay gap, we used the methodology of the "Gender pay gap in unadjusted form" database (Eurostat, 2024). The calculation is based on this methodology:

Gender Pay Gap (percentage) = (Male wages - Female wages)/Male wages x 100

For each year and for calculating the gender pay gap, we used the median wage for each category.

3 Results and Discussion

For the evaluation of individual research questions, we processed a set of data from the database "Average Earnings Information System". This is approximately a batch of 2,000,000 data records per year (there are just under 5,000,000 employees in the Czech Republic) from approximately 25,000 economic entities in the Czech

Republic. Thus, for the time period from 2016 to 2024, we have analysed more than 18,000,000 records on wages and salaries of workers in the Czech Republic. As mentioned in the methodology, we used median income to characterize the year, which provides a better view of wages and salaries than the average, which takes into account the higher number of high-income groups in the statistical sample.

The evolution of the gender pay gap in the Czech economy in the period under review is shown in Figure 1.

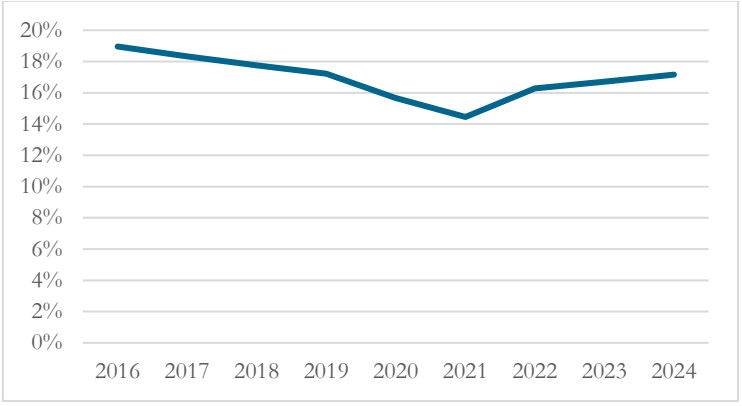

Figure 1: Gender Pay Gap in the Czech Economy
Source: Own, data: (ISPV, 2024)

The graph shows a steady decline in the indicator between 2016-2021. Here we are dealing with a period of relative stability, which was ended by the epidemic of covid 19. On the other hand, the post-epidemic period reversed this positive trend. In particular, the jump between 2021 and 2022 was quite large. The current trend between 2023 and 2024 suggests a slight unravelling of the income gap between the sexes. Overall, however, the gender pay gap in percentage terms has fallen from 19% at the beginning of the period to 17% in 2024.

The Covid tooth in the decline of the gender pay gap made us wonder if there is a link between this variable and inflation, which has increased significantly in 2022 (15.1%) and 2023 (10.7%) compared to previous years when it never exceeded 4%. Therefore, we examined the correlation between these two variables and arrived at a very weak negative correlation with a value of 0.35. Thus, we do not consider this

dependence to be significant. We therefore looked at another possibility, namely the dependence on the unemployment rate, where we obtained a very similar result in the correlation calculation, but with the opposite sign - a correlation coefficient of 0.39 - i.e., a very weak correlation.

3.1 The Gender Pay Gap Decreases with Increasing Education

We also analyse the gender pay gap for individual groups of workers according to their level of education. The evolution of the gender pay gap in this area is shown in Figure 2.

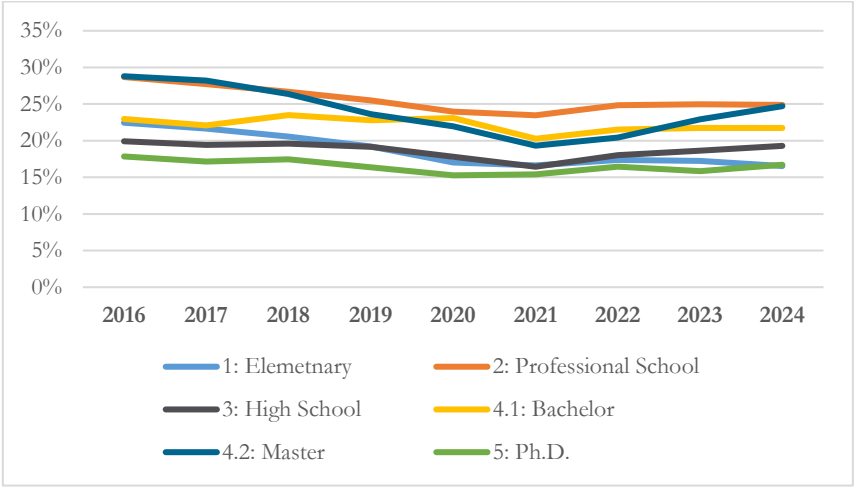

Figure 2: Gender Pay Gap According to Education Category
Source: Own, data: (ISPV, 2024)

If we assess the development of the gender pay gap from a long-term perspective, in all categories this indicator has either declined or stagnated. For the elementary education category, the decline is 5 percentage points, reaching a low of 17%. The professional school's education category has the highest gender pay gap, but still fell by three percentage points from 28% to 25%. The High School category has seen a stagnation of the indicator at 20% in the period under review, with a decline until 2021 and a subsequent increase in the period of economic recovery after the covid epidemic.19 The Bachelor's education category has then seen a decline of one percentage point over the period under review from 23% to 22%. The Master

education category, however, experienced the most dynamic development during the period under review, with the gender pay gap falling by 4 percentage points from 29% percent to 25% in 2024. However, it reached a minimum value of 19% in 2021. The most interesting situation is for doctoral education, where the value of the gender pay gap remained the same over the period under review and where it is de facto the lowest in the whole economy (17%).

3.2 The Gender Pay Gap Increases or Decreases with the Older Age of the Working Person

Another dimension that we address in our research is the analysis of the gender pay gap in relation to the age categories of employees. The development of the situation in the Czech Republic in the period under review is shown in Figure 3 below.

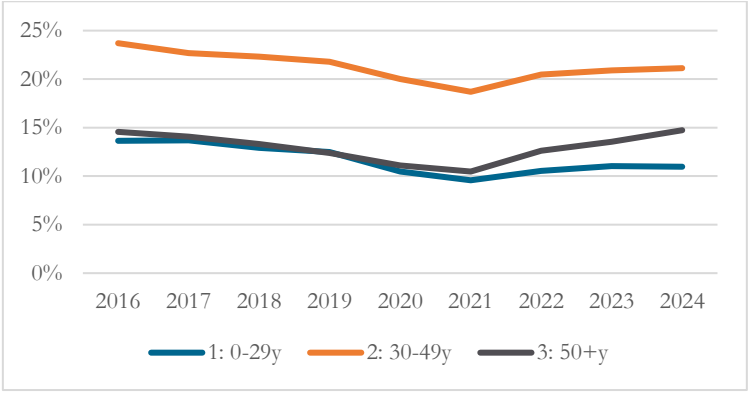

Figure 3: Gender Pay Gap According to Age
Source: Own, data: (ISPV, 2024)

All observed categories successfully follow the tooth covid model. However, there are large differences in the different age categories studied. A consistently high gender pay gap is shown by the results for the generation 30-49, i.e., de facto for generation Y. This is the best performing generation in the economy. The evolution of the gender pay gap for the other two age categories studied was very similar until the economic recovery after the covid epidemic (10% in 2021). After that, however, the trend for the 50+ category diverges markedly and rises sharply. In contrast, the gender pay gap for the youngest category increases by only one percentage point to

11% in 2024. This development is very positive. Our further analyses, e.g., by occupation, show that the gender pay gap is significantly lower for the youngest generation of employees (Generation Z) than for the other age categories studied. For ICT specialists in 2022, the gender pay gap for this age category was negative (Nedomova, Maryska and Doucek, 2024).

4 Conclusions and Discussion

The analysis provides a comprehensive view of the evolution of the gender pay gap in the Czech economy between 2016 and 2024, across various dimensions. The methodology used, in particular the use of median income as a central indicator, has proved crucial to more accurately capture pay inequalities compared to the average, which tends to be influenced by high income groups.

The long-term trend in GPG suggests a general decline from 19% at the start of the period to 17% in 2024, albeit with significant fluctuations. The stability observed between 2016 and 2020 corresponds to a period of macroeconomic equilibrium, while the COVID-19 pandemic has significantly accelerated this decline in GPG, probably due to structural changes in the labour market, such as shifts between sectors and the expansion of flexible forms of work. After 2021, however, the trend reversed, with the most significant increase in GPG occurring between 2021 and 2022, corresponding to the period of economic recovery after the pandemic. The dependence of GPG on macroeconomic factors such as inflation or unemployment was found to be weak (correlations of -0.35 and 0.39), suggesting the need to look at other possible factors influencing this trend.

A key factor influencing GPG is education. Higher levels of education are generally associated with lower GPG, with the largest decline observed for workers with a master's degree, where GPG fell from 29% to 25%. Interestingly, workers with a doctorate consistently have the lowest GPG (17%) across the economy, suggesting that higher qualifications may contribute to greater pay equity. On the other hand, the stagnation of GPG in some categories, such as secondary education, highlights the need for a deeper examination of the barriers that prevent a more significant reduction in inequalities in these groups.

Analysis of GPG by age reveals generational differences. The highest GPG persists among workers aged 30-49, i.e., Generation Y, which is a key executive component of the labour market. In contrast, younger workers (Generation Z) have a significantly lower GPG, which is a positive trend. This trend is supported by data from specific occupations such as ICT specialists, where even a negative GPG value was recorded for the younger generation in 2022. This suggests the potential for greater pay equity among the youngest working generation.

Although only weak correlations have been found between GPG and macroeconomic indicators, broader labour market dynamics such as sectoral shifts or occupational segregation are likely to play a more significant role. Positive trends among young workers and in promising sectors such as ICT may reflect changing attitudes towards pay equity.

Overall, the results underline the importance of targeted policies to address persistent inequalities. Prioritising interventions for specific groups, such as middle generation workers or high GPG sectors, together with promoting higher education and promoting equal working conditions, is key. Further research should focus on the impact of legislative measures, sectoral trends and other factors such as caring responsibilities or cultural norms to better understand and address the complex issue of GPG in the Czech labour market.

5 Limits and Open Issues

The topic of the Gender Pay Gap is one of the "evergreen" topics in economics, especially in Western countries. Although our research analyses a time series with a relatively large number of records, there are some limits to be aware of when looking deeper into the data.

5.1 Research Limits

The basic limitations of this paper are that we evaluate the gender pay gap data in time series for the second quarter of each year. This means that minimum wage and salary compensation (vacation, etc.) is included in workers' wages and salaries in this period, and also that workers' minimum compensation is included in this period

compared to other parts of the year. Thus, the data we have analysed are closest to the basic wage and salary rates.

Other limitations are the potential for cross-analyses across multiple dimensions of research simultaneously. In such cases, we very often end up with a situation where we do not have a sufficiently representative sample of data to analyse the relationship between some variables. Therefore, we cannot perform this analysis at an acceptable level of significance.

Some distortion of the research is also caused by the fact that economic entities are registered according to the place of registration of the company, not according to the actual place of operation. Here, it is mainly the branches of large companies that are included in the data collection at headquarters. For the purposes of this article, this limit does not apply.

5.2 Open Issues

To extend our research on the gender pay gap, there is a wide range of research directions that could contribute to a deeper understanding of this issue. One key area is a sectoral gap analysis that would focus on specific sectors with high or low GPG, such as health, education or ICT. It would also be important to distinguish between the private and public sectors, where there may be significant differences in wage policies.

It is also open to explore the impact of working time and flexible forms of work. Factors such as part-time, teleworking or flexible working hours can significantly influence the gender pay gap, and studying them in detail could reveal new links. A regional analysis would in turn allow a comparison of GPG between different regions of the Czech Republic, taking into account different levels of economic development, regional policies or unemployment rates.

Further extension of the research could include long-term trends and exploring the impact of legislative measures such as mandatory reporting of gender pay gaps or the introduction of quotas for senior positions. At the same time, it would be useful to compare the development of GPG in the Czech Republic with international

trends, especially within the European Union, where different cultural, economic and legislative factors may play a significant role.

In the context of technological change, it would be useful to examine how digitisation and automation are affecting the gender pay gap, for example through the emergence of new occupations or changes in labour requirements.

Finally, it would be interesting to focus on the experiences and attitudes of employers. Qualitative research could reveal how organisations perceive the issue of GPG, what strategies they apply to reduce it and what barriers they see in these measures. All these lines of research could contribute to a deeper understanding of the causes of persistent inequalities and to the formulation of effective policies and measures to address them.

Acknowledgment

Paper was processed with support from institutional-support fund for long-term conceptual development of science and research at the Faculty of Informatics and Statistics of the Prague University of Economics and Business (IP400040).

References

Bishu, S. G. and Alkadry, M. G. (2016). A systematic review of the gender pay gap and factors that predict it. *Administration & Society, 49(1)*, 65-104. https://doi.org/10.1177/0095399716636928

Blevins, D. P., Sauerwald, S., Hoobler, J. M. and Robertson, C. J. (2019). Gender differences in pay levels: an examination of the compensation of university presidents. *Organization Science, 30(3),* 600-616. https://doi.org/10.1287/orsc.2018.1266

Cha, Y. and Weeden, K. A. (2014). Overwork and the slow convergence in the gender gap in wages. *American Sociological Review, 79(3)*, 457-484. https://doi.org/10.1177/0003122414528936

Chen, Z., Zhang, Y., Luo, H., Zhang, D., Rajbhandari-Thapa, J., Wang, Y., Wang, R. and Bagwell-Adams, G. (2021). Narrowing but persisting gender pay gap among employees of the US Department of Health and Human Services during 2010–2018. *Human Resources for Health, 19(65)*. https://doi.org/10.1186/s12960-021-00608-w

Dawson, C. (2017). The upside of pessimism − biased beliefs and the paradox of the contented female worker. *Journal of Economic Behavior & Organization, 135,* 215-228. https://doi.org/10.1016/ j.jebo.2017.02.004

Eurostat. (2024). *Data Browser. Gender pay gap in unadjusted form.* https://ec.europa.eu/eurostat/ databrowser/view/sdg_05_20/default/table?lang=en

ISPV. (2024). ISPV average earnings information system. https://www.ispv.cz/en/homepage.aspx

Khoreva, V. (2011). Gender pay gap and its perceptions. *Equality, Diversity and Inclusion*, *30(3),* 233-248. https://doi.org/10.1108/02610151111124969

Kochhar, R. (2023). The Gender Wage Gap Endures in the U.S.|Pew Research Center. The Ashland Chronicle-Oregon. https://www.pewresearch.org/social-trends/2023/03/01/the-enduring-grip-of-the-gender-pay-gap/

Litman, L., Robinson, J., Rosen, Z., Rosenzweig, C., Waxman, J. and Bates, L. M. (2020). The persistence of pay inequality: The gender pay gap in an anonymous online labor market. *PLoS ONE 15(2): e0229383*. https://doi.org/10.1371/journal.pone.022938310.31234/osf.io/59bze

Lyons, E. and Zhang, L. (2023). Salary transparency and gender pay inequality: evidence from canadian universities. *Strategic Management Journal, 44(8),* 2005-2034. https://doi.org/10.1002/smj.3483

Nedomová, L., Maryska, M. and Doucek, P. (2024). Young women motivation for ICT professional jobs. In: *Proceedings of the International Scientific Conference „Regional Higher Education in the Context of V4 Cooperation"*. pp. 54–61. https://sites.google.com/view/regvvv4/proceedings?authuser=0.

Sasso, A. T. L., Richards, M. R., Chou, C. F., and Gerber, S. E. (2011). The $16,819 pay gap for newly trained physicians: the unexplained trend of men earning more than women. *Health Affairs, 30(2)*, 193-201. https://doi.org/10.1377/hlthaff.2010.0597