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When education and experience pay less: declining returns to schooling and experience

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Abstract

This paper analyses the impact of education and work experience on wages in Poland from 2004 to 2024. Using the Mincer equation and Polish survey data, the authors document a systematic decline in returns to education and work experience. Findings show the average return to an additional level of education fell from 17.2% to 15.5%, with a particularly sharp drop among women. Since 2018, the education premium for women has been lower than for men. A similar downward trend occurred for work experience (decreasing from 16.1% to 11.2%), attributed to automation and standardisation of tasks. The study suggests that tertiary education expansion without sufficient demand for high skills leads to wage compression. The results highlight the need to reorient educational policy toward vocational training and lifelong learning.

Keywords: Mincer equation, returns to education, work experience, gender differences, wage compression

JEL: C31, J31

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1. Introduction

This paper presents a comprehensive empirical analysis of the impact of educational level and work experience on wages, based on the Mincer equation.

The analysis of the impact of skills on wages dates to Adam Smith's seminal work, *The Wealth of Nations* (1776). Smith pointed out that, unlike unskilled work, which was accessible to all, skilled work requires apprenticeship and investment in vocational training. He thus emphasised the importance of investment in human capital. Subsequent research focused on the impact of human capital on wage levels and wage differentials, highlighting the skewness of wage distributions and the role of unmeasured factors.

Many economists analysed the role of human capital in shaping wages despite serious problems with the formal concept and its measurement methods. The pioneering attempts to measure human capital and estimate its impact on wage distribution were undertaken by Mincer (1958). Mincer's work was groundbreaking, introducing the concept of investment in human capital through formal education and work experience. His model assumes an increasing (in the case of experience, concave) relationship between education and experience and the logarithm of earnings. Despite numerous generalisations and criticisms – including for failing to account for other determinants of wages and difficulties in measuring human capital – Mincer's model remains the basis for empirical analyses of the relationships between education, experience, and wages.

Since Mincer (1958, 1974), many authors have studied the rates of return to education and work experience. The parameters of the Mincer regression are estimated using both individual and aggregated data from labour force or employer surveys for a particular country. Several reviews of empirical results can be found in the literature (e.g. Psacharopoulos, Patrinos 2018, or earlier by Psacharopoulos, Patrinos 2004). Based on estimates from 139 countries for 1950–2014, they show that the private average global return to a year of schooling is 9% per year, private returns to higher education increased, and women continue to experience higher average returns to schooling than men. The recent meta-analysis confirms previous findings that the return on education is no greater than 10% of initial income per additional year of education, or 30–35% when moving to a higher educational tier (Pipień, Roszkowska 2018).

Factors influencing the rates of return on education in recent years include the growing demand for highly skilled individuals and, conversely, the increasing supply of higher education graduates, particularly in transforming economies such as those of Central and Eastern Europe. Technological progress, particularly the development of information and communication technologies and the automation of production processes, has increased the demand for highly skilled workers. These changes foster what is known as skill-biased technological change, where new technologies complement human capital with higher levels of education. As a result, demand for specialists capable of operating advanced systems, analysing data, and working in knowledge-based sectors is growing, which can lead to an increased wage premium for higher education and, consequently, higher rates of return on investment in education.

Simultaneously, many countries in Central and Eastern Europe have seen a rapid increase in the number of people pursuing higher education following the political transformation. The liberalisation of education systems, the growth of the private sector in higher education, and aspirations for integration with the European Union economy contributed to a significant increase in the labour supply of people with higher education degrees.

These changes have several positive implications. Morawski (2025) showed that educational changes in Poland between 2005 and 2019 have significantly reduced income inequality and the risk of material poverty. On the other hand, this increase may exert downward pressure on the wage premium, especially when the economy's structure does not generate enough high-skilled jobs. Štefánik and Horvát (2015) found that, while in Austria and Germany, more recent tertiary education is associated with higher private returns, this is not the case in the Czech Republic, Poland, and Slovakia, where a declining trend in private returns for more recent tertiary education is observable.

Pipień and Roszkowska (2018) showed that, in 2010–2014, the estimated returns to education and work experience were higher in most Eastern European countries than in Western European countries. Poland was among the countries with the highest returns to education and relatively low returns to work experience. Wincenciak, Grotkowska and Gajderowicz (2022) conducted a meta-analysis of over 600 estimates of returns to education in Eastern European countries. He showed that the average return increased moderately after 1990, and that the maximum returns were attained around 2009–2010, after which they fell. However, the latest estimates included in their meta-analysis were based on 2013 data. Horie and Iwasaki's (2023) meta-analysis also confirms that, after an increase in returns to schooling during the early phase of the transition from a planned system to a market economy in Eastern European countries, returns to education have gradually decreased over time.

Strawiński, Majchrowska and Broniatowska (2018) showed that the entry of many young workers with tertiary education into the labour market has led to a decline in their relative wages. Conversely, a decrease in the number of vocational education graduates and deficits in the labour supply in some occupations have translated into an increase in relative wages for this type of worker. Herbst (2015) showed that returns to tertiary education in Poland are regionally differentiated. Interestingly, the results showed that the benefits of higher education in Poland are greater for women than for men. Drabowicz and Rynko (2015) analysed the returns to education using PIAAC and post-PIAAC data from 2011–2012 and 2014–2015, respectively. They found that a change in years of schooling of one standard deviation (nearly three years) corresponds to a 12.7–19.4% increase in earnings.[1]

Over the last 20 years, the educational structure of the workforce in most European countries has changed significantly. In 2024, almost 40% of the employed in the EU27 countries had a tertiary education. The pace of change in workers' educational structure varied across countries. One of the countries where educational changes were the strongest was Poland. From 2004 to 2024, the percentage of employed individuals with higher education increased from 20% to 43%. Among women, the changes were even more significant – by 2024, 53% of working women in Poland had a tertiary education degree. Therefore, we chose Poland as a case study for our analysis.

In this paper, we aim to analyse more recent data and examine whether the trend of falling returns to education, identified in earlier studies, persists in later periods. With a growing share of tertiary graduates in the labour force, it is also worth investigating the heterogeneity of returns to education and work experience by gender.

The paper aims to estimate the returns to an additional level of education and work experience in Poland over 2004–2024 using the Mincer equation. We use data from the Structure of Earnings Survey aggregated at the 3-digit occupational level.

[1] Since the aim of the text is to examine changes in the rates of return to education and work experience over recent years, we do not refer to the literature from earlier years.

The study contains estimates of the average rates of return on education and professional experience for the entire analysed period, 2004–2024. We analyse differences in rates of return to education and work experience between men and women, and variation in rates of return across different levels of education and job experience. Additionally, we tested the stability of return rates over time. This study is the most comprehensive analysis of changes in the rates of return to education and work experience over the last 20 years.

The research hypotheses are as follows:

H1: Average rates of return from an additional level of education were higher in the group of women than in the group of men.

H2: The changes in educational structure of the workforce, in particular, the increase in the share of employed individuals with tertiary education leads, to a decrease in the rates of returns to education, and the fall will be stronger in the group of women.

H3: Returns to work experience have declined over time, particularly among women.

2. Model and data

The estimates of the rates of returns to educational level and experience are made based on the following Mincer-type equation:

$$\log(wage_{ijt}) = \alpha_0 + \alpha_1 edu_{it} + \alpha_2 exp_{ijt} + \alpha_3 exp_{ijt}^2 + d_t + \varepsilon_{it}$$

where:

$wage_{ijt}$ – average gross monthly salary of an employee belonging to the i-th occupational group with j-th level of work experience in year t,

edu_{it} – implied educational level of an employee belonging to the i-th occupational group in year t (edu = 1 – incomplete primary and elementary education, 2 – lower secondary school and basic vocational education, 3 – general secondary school, 4 – technical secondary school and postgraduate education, 5 – higher education),

exp_{ijt} – work experience of an employee belonging to the i-th occupational group in year t with j-th level of work experience (j = 1 – up to 1.9 years, 2 – from 2 to 4.9 years, 3 – from 5 to 9.9 years, 4 – from 10 to 14.9 years, 5 – from 15 to 19.9 years, 6 – 20 years or more),

α_1 – rate of returns to additional level of education,

α_2 and α_3 – parameters describing returns to additional level of work experience,

d_t – time dummies absorb common macroeconomic and institutional shifts,

ε_{it} – error term.

The study used publicly available data on average wages for three-digit occupational groups, according to the Classification of Occupations and Specialities. According to the classification, occupations are divided into nine major (1-digit-coded) groups of broad occupations, then into sub-major (2-digit-coded) groups, and finally into minor (3-digit-coded) occupational groups. Each major occupational group is assigned a corresponding level of formal education, defined according to

the International Standard Classification of Education.[2] We slightly modified the assigned levels of education, taking into account the specific nature of the Polish education system and the Polish labour market: the third major occupational group was assigned to secondary vocational education. In contrast, the fourth and fifth major occupational groups were assigned to general secondary education.[3] Table 1 shows the levels of education assigned to each occupational group.

The authors do not include the first major professional group in their analyses because, according to the Classification of Occupations and Specialities, it is not assigned a single level of education but both secondary and higher education.

The data used in this study comes from the biennial survey of the *Structure of wages and salaries by occupations* conducted by Statistics Poland (GUS 2025). The study is conducted on a representative sample of enterprises employing 10 or more people.

The data used in the study concerns the average wages of individuals working in each three-digit occupational group. A major advantage of the above data is their reliability regarding wages. Unlike data from labour force surveys and national censuses, the data do not concern the level of wages declared by employees, which may be underestimated, and the extent of this underestimation increases with an individual's earnings (see, e.g. Strawiński 2015), but the actual wages received by employees.

The data contain information on wage levels for each occupational group across different work experience periods. This information allows us to estimate both the rates of return to educational level (assigned to each occupational group) and to different levels of work experience.

The survey of the *Structure of wages and salaries by occupations* is conducted every two years. The data used in this study include survey results from 2004 to 2024, yielding 11 time periods and 13,914 observations.

Since the data we use are aggregated by occupational group, it is impossible to incorporate individual employee characteristics into the model. The available data also does not allow for the inclusion of NACE sections or ownership sectors. To verify the impact of macroeconomic variables on wages, we included the unemployment rate in the Mincer equation. However, including the unemployment rate did not affect the estimated rates of return. Additionally, year effects capture common macroeconomic shocks and broader institutional changes affecting the labour market. Table 1 compares the results of the models with and without the unemployment rate across specifications.

3. Results

We started by estimating the average rates of returns in the whole period 2004–2024. The average rate of return on education was 16% (see Figure 1 and Table 2). This means that each additional level of education increased average wages by approximately 16%. The average rate of return on work

[2] More information on the classification is available at: https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/#structure.

[3] In Poland, after completing eight years of primary school, students can enrol in a three-year vocational school, a four-year general secondary school, or a five-year vocational-technical school. Secondary education is assigned to the latter two. A high school graduate has a general secondary education, while a technical school graduate has a specific profession. This influences their employment opportunities and, consequently, their salary. Therefore, in the analyses, the distinction was proposed between general secondary and general vocational education.

experience was 13.5%. Increasing work experience by one level was associated with approximately 14% higher wages. The parameter by experience squared is statistically significant and negative. The statistically significant value of the experience-squared parameter indicates that, consistent with the theoretical assumptions of Mincer's model, average wages increase with increasing work experience, but only up to a point. Toward the end of a person's working life, lower investments in human capital translate into a (slight) decline in average wages. All estimated signs of the parameters are consistent with economic theory, and the estimated values are similar to those obtained in earlier research on Poland (see, e.g. Roszkowska, Majchrowska 2014; Majchrowska, Roszkowska 2013).

We calculated average returns separately for men and women over 2004–2024. The average returns to education do not differ significantly by gender (see Figure 1). However, we can observe differences in the returns to experience: one additional level of work experience was associated with 16% higher average wages for men and 11% higher average wages for women. The parameter by experience squared was also lower among women.

In the next step, we try to verify whether the estimated rates of return to education and work experience were constant over time. Figure 2 shows that the returns to an additional level of education decreased from 17.2% in 2004 to 15.5% in 2024 in the whole sample. For men, the decline in the rates of return to education was significant but relatively small (from 16.3% to 15.7%). For women, the rates of return to education declined sharply – from 18.2% to 15.4%.

What is worth noting and emphasising is that, for most of the period under review, the returns to education for women were higher than for men. This situation has changed since 2018. The continued decline in women's rates of return has led to lower returns on education for women than for men. These results demonstrate significant changes in the Polish labour market over recent years. The results of previous research on Poland (e.g. Herbst 2015; Roszkowska, Majchrowska 2014) indicated that returns to education were higher for women, and this was indeed the case. In recent years, however, there has been a significant change.

We also observed the changes in the returns to work experience over time (see Figure 3). In 2004–2024, the average returns to work experience decreased from 16.1% to 11.2%. Similarly, as with the returns to education, the changes were greater for women. The average returns to work experience fell in the group of women from approximately 13.6% to 9.0%, while for men, the decline was from 18.6% to 13.3%.

It is worth emphasising that the decline in rates of return on work experience for women has been particularly pronounced in recent years. Initially, rates of return on work experience remained in the double-digit range. However, over the last 10 years, they have halved. In 2024, the premium for additional work experience was almost half as high for women as for men.

The parameter by experience squared for women also decreased and in the last years became statistically insignificant. This shows that women's wage growth is more linear, with wages rising throughout their working lives. This may be due to the significantly larger proportion of women than men working in the public sector, where seniority bonuses drive wage increases.

So far, the rate of return to education has been treated as independent of educational level. This assumption is not necessarily true; the wage increase from completing a subsequent level of education may differ between transitions from primary to vocational education and those from secondary to higher education. We verify the assumption by allowing the returns to education to vary between educational levels.

The results show that in 2004, the rate of return to basic vocational education (edu = 2) was 0.209. Workers with basic vocational education earn approximately 20.9% more than workers with at most primary education (see Figure 4 and Table 3). In recent years, the average returns to basic vocational education decreased to 14.1% in 2024, mainly due to a sharp decline in the parameter for women (from 16.8% to 8.6%; see Figure 5).

In 2004, the returns to secondary general education (edu = 3) were 0.259, indicating that those with general secondary education earned, on average, approximately 26% more than those with primary education, and more than those with basic vocational education. However, the returns to general secondary education have been steadily declining, reaching 9.6% in 2024. The decline was stronger among women (from 27.1% to 7.4%).

The returns to secondary vocational education (edu = 4) are higher than those to general secondary education, indicating that it is more profitable for workers to have specific vocational education than general secondary education. Again, the trend was decreasing – from 51.2% in 2004 to 36.2% in 2024.

The returns to tertiary education (edu = 5) were 0.726 in 2004, meaning that workers with tertiary education in Poland earned on average 73% more than workers with primary education. However, the trend has also been decreasing (see Figure 4). In 2024, the average wage of a tertiary-educated person was only 58.7% higher than that of a primary-educated worker. The returns fell more strongly in the group of women – in 2004 the rates of returns to education for men and women were similar (74% and 71% respectively), in 2024 the differences grew – men with tertiary education earned 63% more than men with primary education, women with tertiary education earned 55% more than women with primary education (see Figures 5 and 6).

We also relaxed the assumption that returns to work experience are constant across different levels of work experience. Table 3 shows that wages increase with each level of professional experience, but the rate of wage growth is decreasing. Additionally, we can observe significant changes in the returns to work experience over time.

Only the initial returns to professional experience remained around 10% throughout the analysed period. Returns from subsequent years of professional experience showed a declining trend. Between 2004 and 2024, the premium for 20 years of professional experience fell from 43% to 24% (see Figure 7). The decline was observed for both women and men, although it was more pronounced among women (see Figures 8 and 9).

4. Conclusions

To the best of our knowledge, this paper is the first to jointly document the long-term decline in returns to both education and work experience in Poland over 2004–2024, and to show that the historically higher returns to education for women have recently reversed. The results contribute to the literature on human capital by documenting a decline in the returns to both schooling and experience over a long time horizon.

In the paper, we show that the well-established pattern of higher returns to education for women widely documented in earlier studies, particularly for Poland and other CEE countries, has reversed in recent years. While women experienced higher returns to education for most of the analysed period,

since around 2018 their returns have fallen below those of men. This result challenges the prevailing consensus in the literature and suggests that gender differences in returns to education are not stable but evolve with structural changes in labour supply. In particular, the rapid expansion of tertiary education among women has reduced their relative wage premium.

Additionally, the article provides some evidence that the expansion of higher education has been accompanied by a systematic decline in returns to education across all levels. That evidence supports the hypothesis that increasing the supply of highly educated employees, in the absence of sufficient demand for high-skilled jobs, leads to a compression of wage differentials. Importantly, our results indicate that this process is not uniform – the decline is more pronounced for women and varies across educational levels. Our results add nuance to the debate on overeducation and skill mismatch by showing that the consequences of educational expansion are both gender-specific and heterogeneous across levels of schooling.

The estimated substantial and persistent decline in the returns to professional experience, observed to a greater extent among women, suggests a weakening of traditional mechanisms of human capital accumulation based on occupation and seniority. The results are consistent with the hypothesis that technological change and the standardisation of tasks reduce the value of accumulated experience relative to more transferable skills. Our study provides empirical support for the view that labour markets are increasingly rewarding flexibility and skill relevance rather than experience per se.

Moreover, the declining importance of both education and experience suggests that standard Mincer variables may no longer fully capture the determinants of earnings. Some unobserved factors, such as skills, field of study, and task content, are becoming increasingly important in wage setting.

From a policy perspective, the results carry several important implications. Our findings question policies focused on expanding tertiary education. While increasing educational attainment may have some social benefits, its private returns appear to be diminishing, suggesting that further higher education expansion without corresponding labour demand may lead to greater skill mismatch. The findings also highlight the need to rebalance education systems toward vocational and technical tracks, which may better align with labour market needs. At the same time, the declining returns to experience point to the growing importance of lifelong learning in the context of rapid technological change. Emerging gender differences in returns to education further suggest that equal access to education does not automatically translate into equal labour market outcomes, likely due to structural factors such as occupational segregation. Finally, the results indicate the need to move beyond traditional human capital measures in future research, incorporating information on skills, job tasks, and individual-level heterogeneity.

To sum up, this paper provides robust evidence that the relationship between human capital and wages in Poland is undergoing a significant transformation. The results call for a rethinking of both education policy and empirical approaches to analysing wage determination in modern labour markets.

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Information

The authors declare that no generative artificial intelligence tools were used in the writing, analysis, or preparation of this manuscript.

Appendix

Table 1
Major occupational groups according to ISCO-08 classification and the assigned level of education

		Assigned level of education
2	Professionals	5
3	Technicians and associate professionals	4
4	Clerical support workers	3
5	Service and sales workers	3
6	Skilled agricultural, forestry and fishery workers	2
7	Craft and related trades workers	2
8	Plant and machine operators and assemblers	2
9	Elementary occupations	1

Source: own elaboration based on https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/.

Table 2
The results of the basic model without and with the unemployment rate for the whole sample, and separately for men and women in 2004–2024

	Without unemployment rate			With unemployment rate		
	total	men	women	total	men	women
edu	0.160***	0.159***	0.162***	0.160***	0.159***	0.162***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
exp	0.135***	0.163***	0.107***	0.135***	0.163***	0.107***
	(0.006)	(0.009)	(0.008)	(0.006)	(0.009)	(0.008)
exp^2	-0.011***	-0.014***	-0.007***	-0.011***	-0.014***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
year	0.034***	0.033***	0.036***	0.027***	0.025***	0.030***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
ur				-0.010***	-0.012***	-0.008***
				(0.001)	(0.001)	(0.001)
Constant	-61.755***	-58.783***	-64.867***	-47.507***	-42.012***	-53.097***
	(0.687)	(0.970)	(0.881)	(1.578)	(2.227)	(2.026)
Observations	13,914	6,993	6,921	13,914	6,993	6,921
R-squared	0.637	0.630	0.690	0.640	0.634	0.692

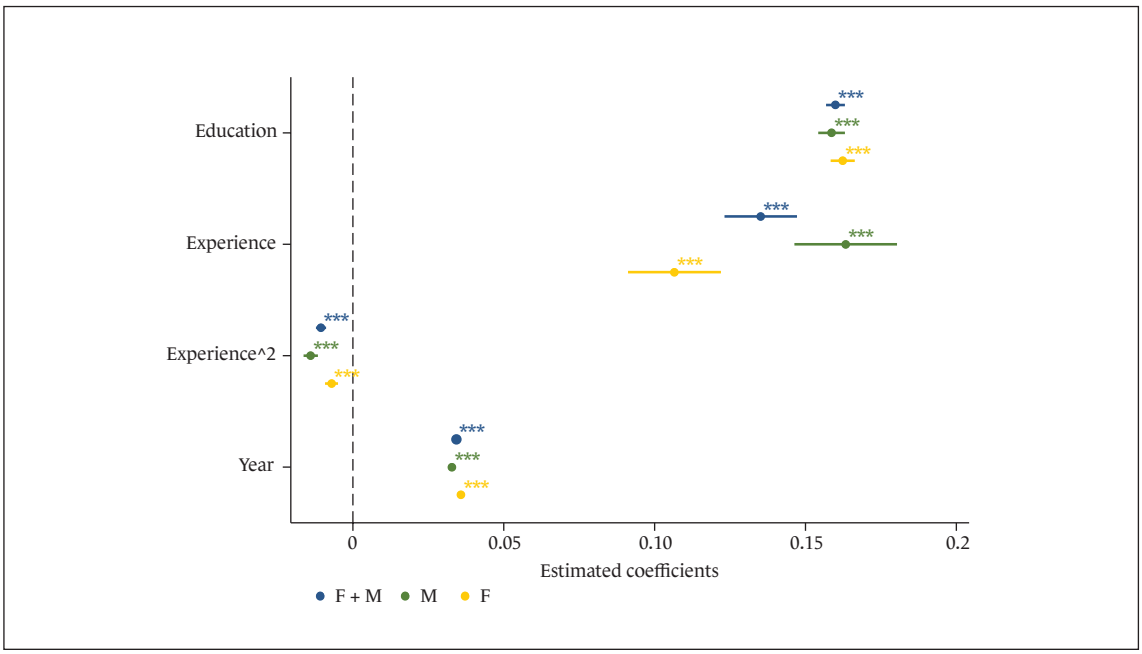
Note: standard errors in parentheses.
Source: own estimations.

Table 3
Estimated average returns to different levels of education and different levels of work experience for the whole sample and by gender in 2004–2024

	Education as categorical variable			Experience as categorical variable		
	total	**men**	**women**	**total**	**men**	**women**
edu				0.160***	0.159***	0.162***
				(0.002)	(0.002)	(0.002)
edu_2	0.183***	0.226***	0.135***			
	(0.008)	(0.011)	(0.010)			
edu_3	0.152***	0.158***	0.146***			
	(0.009)	(0.012)	(0.011)			
edu_4	0.444***	0.482***	0.407***			
	(0.009)	(0.012)	(0.011)			
edu_5	0.656***	0.677***	0.636***			
	(0.008)	(0.011)	(0.010)			
exp	0.135***	0.163***	0.107***			
	(0.006)	(0.008)	(0.008)			
exp_2				0.102***	0.110***	0.094***
				(0.007)	(0.010)	(0.010)
exp_3				0.192***	0.217***	0.168***
				(0.007)	(0.010)	(0.009)
exp_4				0.247***	0.279***	0.215***
				(0.007)	(0.010)	(0.010)
exp_5				0.282***	0.313***	0.251***
				(0.007)	(0.010)	(0.009)
exp_6				0.310***	0.325***	0.296***
				(0.007)	(0.010)	(0.009)
exp^2	-0.011***	-0.014***	-0.007***			
	(0.001)	(0.001)	(0.001)			
year	0.035***	0.033***	0.036***	0.034***	0.033***	0.036***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-62.507***	-59.902***	-65.221***	-61.630***	-58.630***	-64.773***
	(0.662)	(0.925)	(0.851)	(0.687)	(0.970)	(0.881)
Observations	13,914	6,993	6,921	13,914	6,993	6,921
R-squared	0.664	0.666	0.713	0.637	0.630	0.691

Source: own estimations.

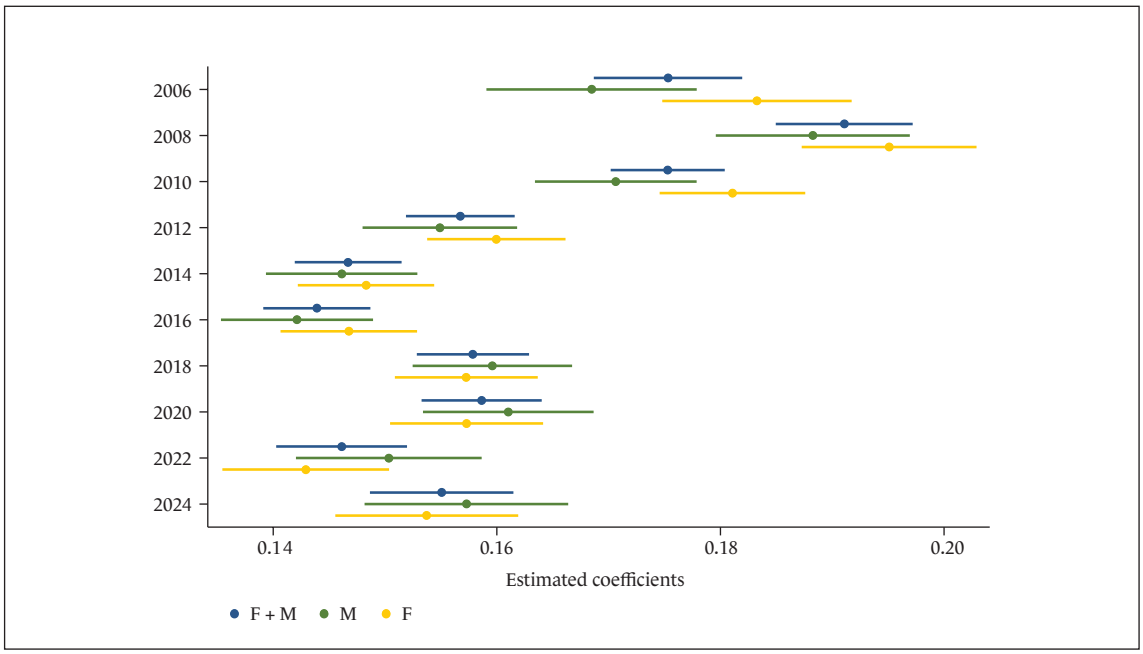
Figure 1
Estimated returns to educational level and work experience level in Poland in the whole sample and by gender on average in 2004–2024



Notes:
F + M – total sample (males and females), M – only males, F – only females; horizontal lines represent 95% confidence intervals.

Source: own calculations.

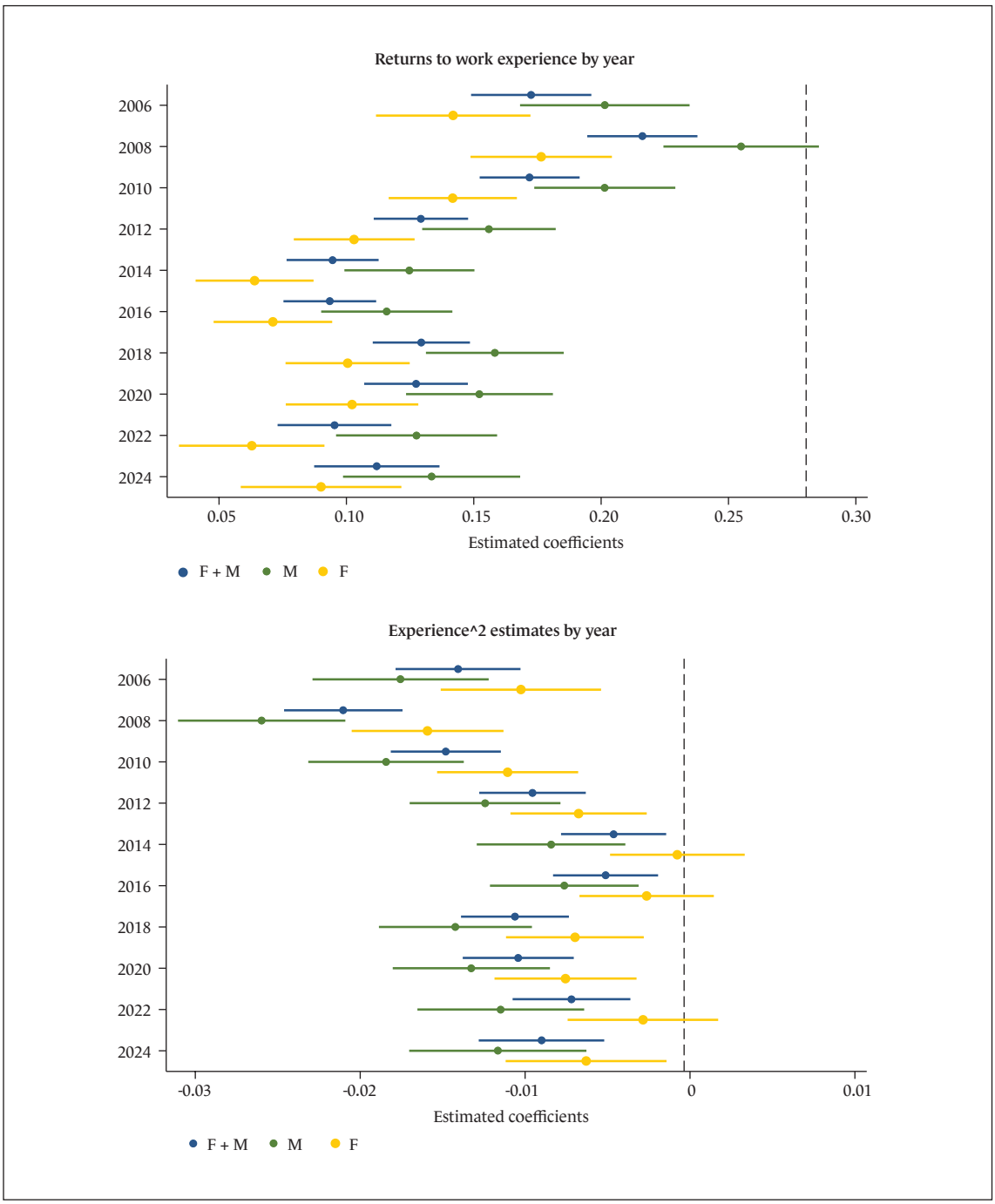
Figure 2
Estimated returns to additional educational level in Poland by year and gender in 2004–2024



Note: horizontal lines represent 95% confidence intervals.

Source: own calculations.

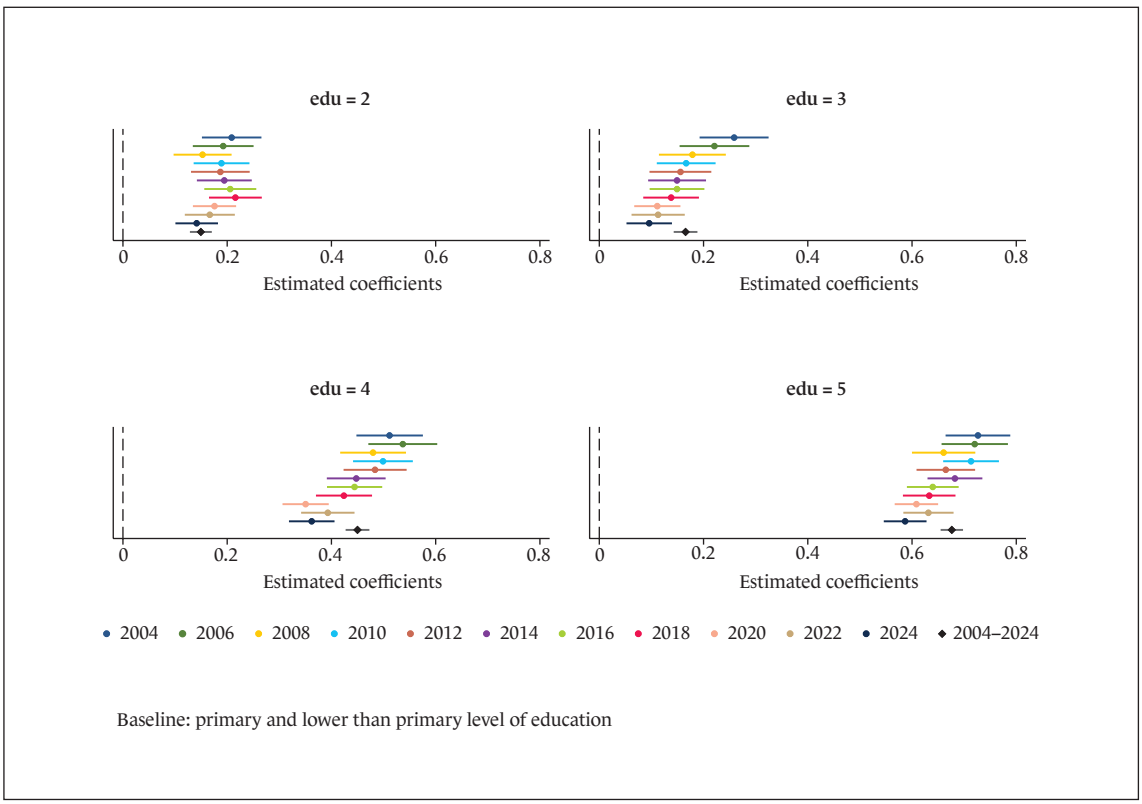
Figure 3
Estimated returns to work experience in Poland by year and gender in 2004–2024



Note: horizontal lines represent 95% confidence intervals.

Source: own calculations.

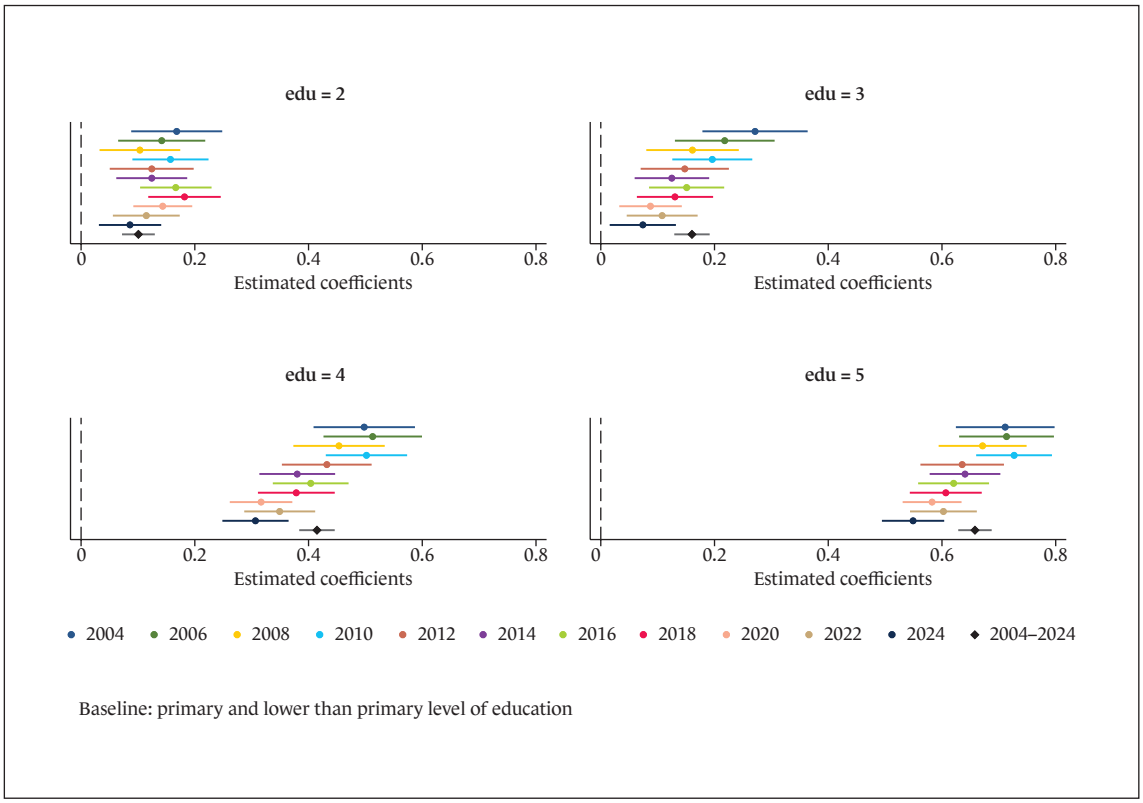
Figure 4
Estimated returns to different educational levels by year in the total sample



Notes:
edu = 1 – primary and lower than primary level of education, edu = 2 – basic vocational, edu = 3 – general secondary, edu = 4 – vocational secondary, edu = 5 – tertiary education.
The values of estimated parameters are presented on the horizontal axis; horizontal lines represent 95% confidence intervals.

Source: own calculations.

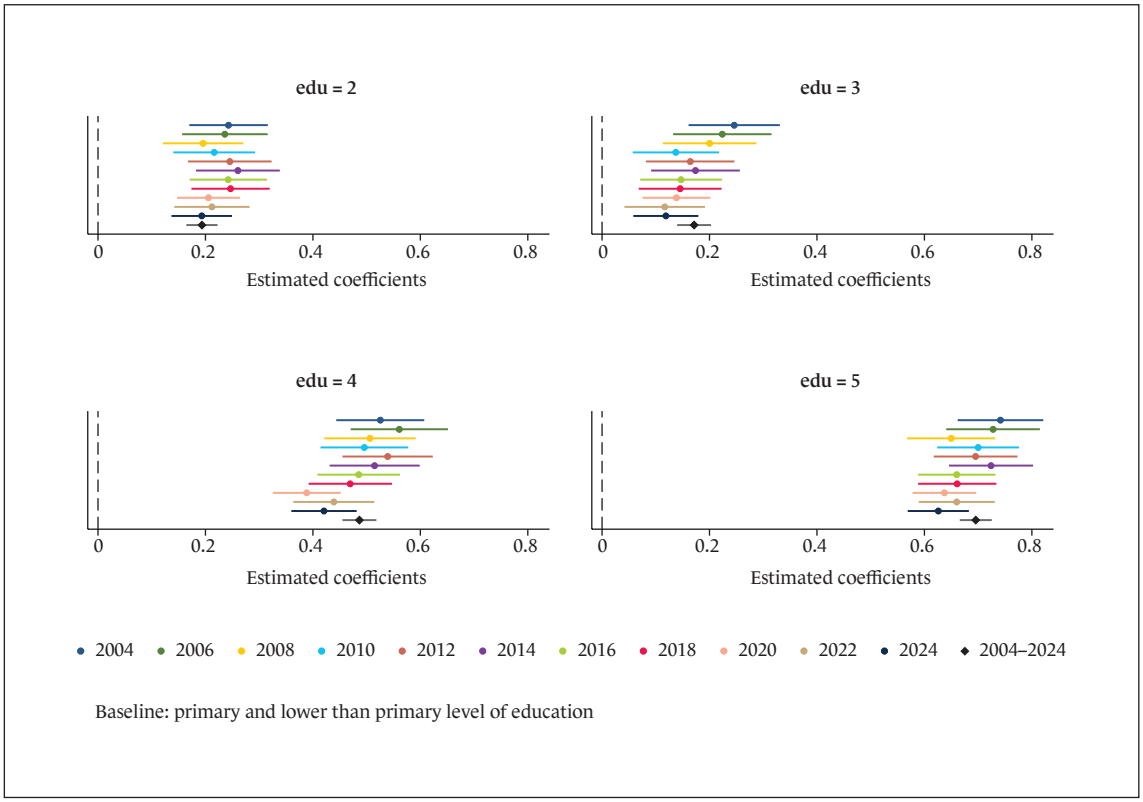
Figure 5
Estimated returns by level of education and year in the group of women in 2004–2024



Note: horizontal lines represent 95% confidence intervals.

Source: own calculations.

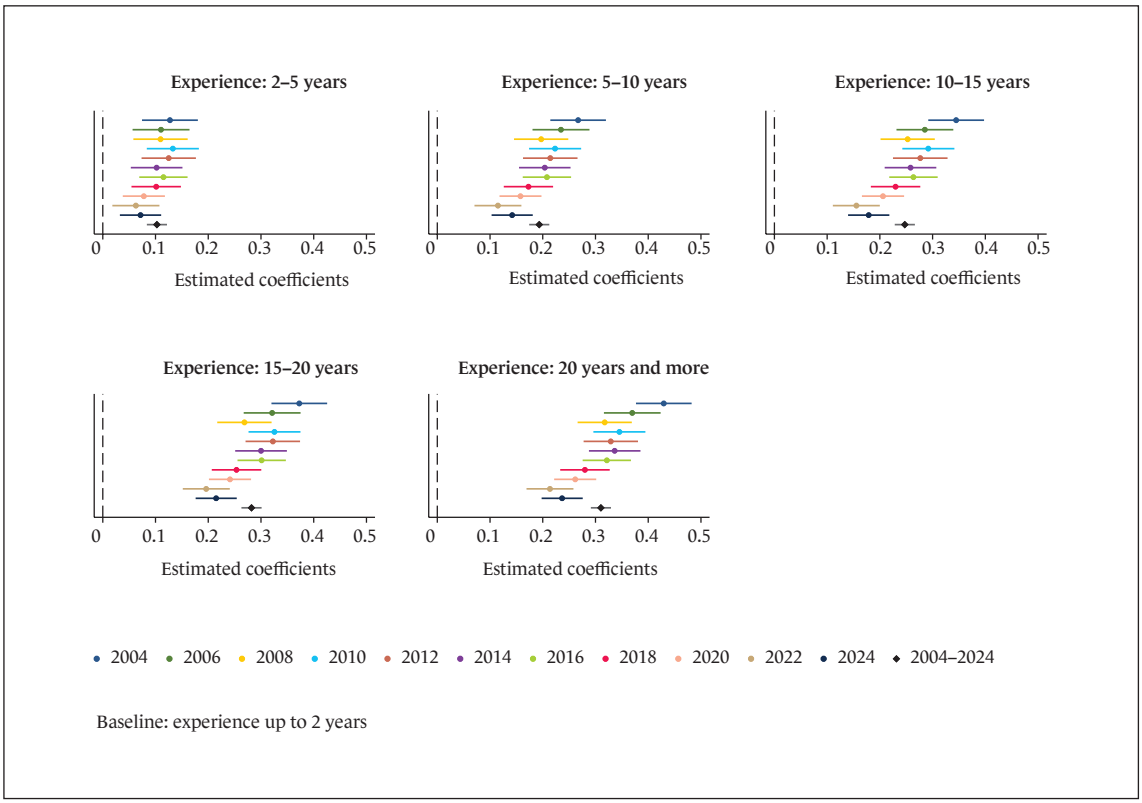
Figure 6
Estimated returns by level of education and year in the group of men in 2004–2024



Note: horizontal lines represent 95% confidence intervals.

Source: own calculations.

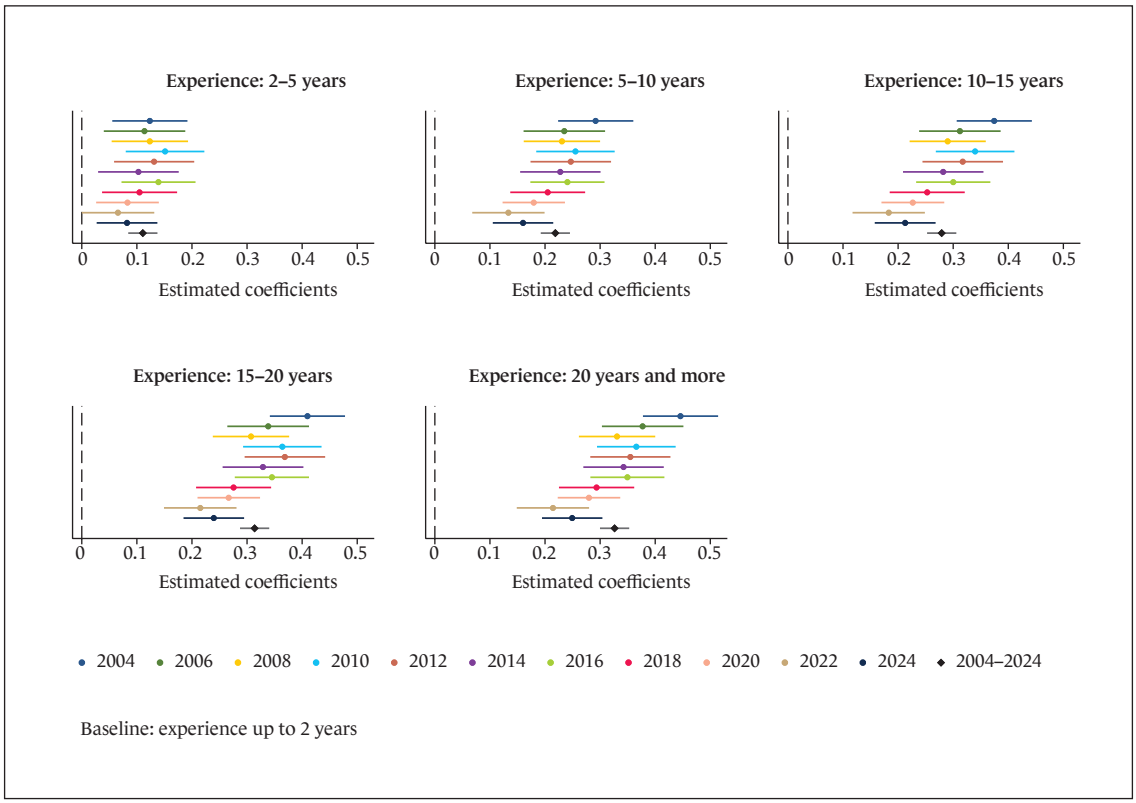
Figure 7
Estimated returns to work experience by level of education and year in the total sample



Note: horizontal lines represent 95% confidence intervals.

Source: own calculations.

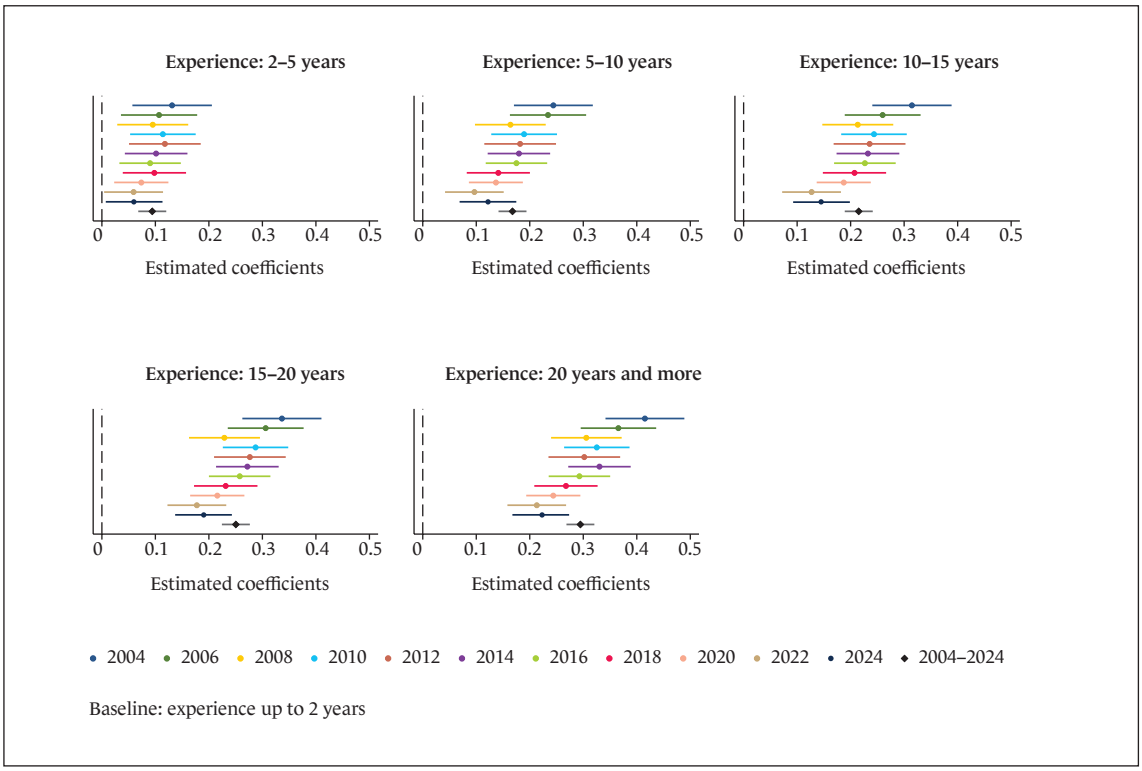
Figure 8
Estimated returns by level of work experience and year in the group of men in 2004–2024



Note: horizontal lines represent 95% confidence intervals.

Source: own calculations.

Figure 9
Estimated returns by level of work experience and year in the group of women in 2004–2024



Note: horizontal lines represent 95% confidence intervals.

Source: own calculations.

Kiedy wykształcenie i doświadczenie opłacają się mniej: malejące stopy zwrotu z edukacji i doświadczenia zawodowego

Streszczenie

Artykuł wpisuje się w bogatą literaturę dotyczącą wpływu kapitału ludzkiego na wynagrodzenia. Zagadnienie to ma początek w klasycznych już rozważaniach Adama Smitha, a następnie zostało rozwinięte w modelu Mincera, będącym standardem w analizach empirycznych. Dotychczasowe badania wskazywały na relatywnie stabilne i dodatnie stopy zwrotu z edukacji oraz wyższe korzyści pieniężne z wykształcenia dla kobiet niż dla mężczyzn. Jednocześnie w literaturze dotyczącej krajów Europy Środkowo-Wschodniej pojawiały się sygnały o stopniowym spadku tych stóp po okresie transformacji. Na tym tle artykuł wnosi istotny wkład, prezentując kompleksową analizę obejmującą lata 2004–2024, uwzględniającą poziom edukacji i doświadczenia zawodowego oraz pokazującą zarówno spadek stóp zwrotu z edukacji, jak i odwrócenie relacji płciowych w zakresie zwrotów z edukacji.

Główne pytanie badawcze postawione w artykule dotyczy tego, czy i w jaki sposób zmieniały się stopy zwrotu z edukacji oraz doświadczenia zawodowego w Polsce w ostatnich 20 latach, a także czy zmiany te różnią się w zależności od płci, poziomu wykształcenia i stażu pracy. Autorki dążą do ustalenia, czy tradycyjne czynniki kapitału ludzkiego nadal odgrywają kluczową rolę w kształtowaniu wynagrodzeń, czy też ich znaczenie osłabia się w warunkach zmian strukturalnych i technologicznych gospodarki.

W artykule sformułowano trzy główne hipotezy badawcze. Zgodnie z pierwszą hipotezą stopy zwrotu z edukacji są wyższe dla kobiet niż dla mężczyzn, co wynika z wcześniejszych ustaleń empirycznych. Po drugie, przyjmuje się, że dynamiczny wzrost liczby osób z wykształceniem wyższym prowadzi do spadku premii płacowej za edukację, przy czym efekt ten powinien być silniejszy wśród kobiet. Po trzecie, autorki zakładają, że postęp technologiczny i standaryzacja pracy ograniczają znaczenie doświadczenia zawodowego, co prowadzi do spadku jego stóp zwrotu. Hipotezy te opierają się na obserwowanych zmianach w strukturze podaży pracy oraz rosnącym znaczeniu technologii w procesach produkcyjnych.

Analiza empiryczna została przeprowadzona z wykorzystaniem rozszerzonego równania Mincera. Parametry oszacowano z użyciem danych z badania *Struktura wynagrodzeń według zawodów* prowadzonego przez Główny Urząd Statystyczny w latach 2004–2024. Dane mają charakter zagregowany na poziomie trzycyfrowych grup zawodowych i obejmują 13 914 obserwacji. Zmiennymi objaśniającymi są poziom wykształcenia oraz doświadczenie zawodowe mierzone w przedziałach, natomiast zmienną objaśnianą jest przeciętne wynagrodzenie. Zastosowana metoda umożliwia estymację krańcowych efektów edukacji i doświadczenia oraz analizę ich zmian w czasie. Dodatkową zaletą wykorzystanych danych jest ich wysoka wiarygodność dzięki uwzględnieniu informacji o rzeczywistych wynagrodzeniach, a nie deklaracji respondentów.

Uzyskane wyniki wskazują na systematyczny spadek stóp zwrotu zarówno z edukacji, jak i z doświadczenia zawodowego. Średnia stopa zwrotu z edukacji obniżyła się z 17,2% w 2004 r. do 15,5% w 2024 r., przy czym spadek ten był szczególnie wyraźny wśród kobiet. Co istotne, w 2018 r. nastąpiło odwrócenie relacji płciowych. Od 2018 r. kobiety zaczęły osiągać niższe zwroty z edukacji niż mężczyźni. Podobny trend spadkowy dotyczy doświadczenia zawodowego – premia z tego tytułu

zmniejszyła się z 16,1% do 11,2%, a w przypadku kobiet spadek był jeszcze silniejszy. Analiza według poziomów wykształcenia pokazuje, że choć największe premie za wykształcenie nadal dotyczą wykształcenia wyższego, to obserwowany jest ich spadek. Jednocześnie relatywnie wyższe pozostają zwroty z edukacji zawodowej w porównaniu z edukacją ogólną na poziomie średnim. Wyniki wskazują również na malejące znaczenie długiego stażu pracy.

Wnioski płynące z badania wskazują na istotną transformację mechanizmów kształtujących wynagrodzenia. Malejące znaczenie edukacji i doświadczenia sugeruje, że tradycyjne miary kapitału ludzkiego tracą na znaczeniu, a coraz ważniejszą rolę odgrywają inne czynniki, takie jak konkretne umiejętności czy charakter wykonywanych zadań. Wyniki wspierają hipotezę, że ekspansja edukacji wyższej prowadzi do kompresji rozkładu wynagrodzeń. Z perspektywy polityki gospodarczej oznacza to potrzebę większego zrównoważenia systemu edukacji, w szczególności rozwoju uczenia się przez całe życie oraz promowania szkolnictwa technicznego. Jednocześnie w przypadku kobiet i mężczyzn zmiany w równym dostępie do edukacji nie przekładają się automatycznie na równość wyników na rynku pracy.

Interpretując wyniki, należy jednak wziąć pod uwagę ograniczenia badania. Przede wszystkim wykorzystanie danych zagregowanych uniemożliwia kontrolę w odniesieniu do indywidualnych cech pracowników, takich jak zdolności, kierunek studiów czy konkretne umiejętności. Model nie uwzględnia też sektorowego zróżnicowania rynku pracy. Ponadto edukacja i doświadczenie stanowią przybliżenia poziomu kapitału ludzkiego i nie oddają jego jakościowego wymiaru. Wpływ zmian technologicznych również jest identyfikowany pośrednio, co ogranicza możliwość interpretacji mechanizmów stojących za obserwowanymi trendami.

Słowa kluczowe: równanie Mincera, zwrot z edukacji, doświadczenie zawodowe, różnice płciowe, kompresja płac