Institute of Economics • University of Lodz

Comparative Economic Research

Central and Eastern Europe

Volume 28 No. 4/2025

WYDAWNICTWO UNIWERSYTETU ŁÓDZKIEGO
Łódź 2025

WYDZIAŁ EKONOMICZNO-SOCJOLOGICZNY
Uniwersytet Łódzki

COPE
Member since 2018
JM13708

INITIATING EDITOR
Sylwia Mosińska

TECHNICAL EDITOR
Mateusz Poradecki

COVER DESIGN
Katarzyna Turkowska
efectoro.pl agencja komunikacji marketingowej

Printed directly from camera-ready materials provided to the Lodz University Press

Journal affiliated with the Faculty of Economics and Sociology of the University of Lodz

Published by Lodz University Press
First Edition. W.11980.25.0.C
Printing sheets 26.75

ISSN 1508-2008
e-ISSN 2082-6737

Lodz University Press
90-237 Łódź, 34A Matejki St.
www.wydawnictwo.uni.lodz.pl
e-mail: ksiegarnia@uni.lodz.pl
tel. +48 42 635 55 77

BOARD OF MANAGING EDITORS

Contents

Comparative Economic Research. Central and Eastern Europe
Volume 28, Number 4, 2025
https://doi.org/10.18778/1508-2008.28.26

The Role of Broadband Usage and Telecommunications Competition in Driving Economic Growth and Labour Productivity: A Comparative Regional Analysis of MENA and Europe

Mohammad Ahmad Almomani https://orcid.org/0009-0004-1416-6455
Ph.D., Director of Economics Affairs, Telecommunications Regulatory Commission, Amman, Jordan,
e-mail: m.momani@icloud.com

Bashir Khalifeh A. Al Zu'bi https://orcid.org/0009-0003-9352-8890
Ph.D., Professor, University of Jordan, Department of Business Economics, School of Business, Amman, Jordan,
e-mail: bashiralzubi@yahoo.com

Abstract

This study compares the impact of using fixed and mobile broadband services and competition in the telecommunications sector on economic growth and labour productivity across 20 countries in Europe and the MENA (Middle East and North Africa) region from 2015 to 2021. Broadband usage is measured by the amount of data consumed, while sector competition is assessed using the ICT regulatory tracker index. Two econometric models were employed and applied to two samples: Group A (European countries) and Group B (MENA countries). The results show that broadband use has positive and significant impacts on economic growth and labour productivity in the two groups, but the effect in the European countries was higher. However, the study also finds that competition in the telecommunications sector produces divergent results between the two groups. The study recommends adopting policies to enhance the deployment and affordability of fixed and mobile broadband usage and services. Additionally, since competition serves as a catalyst for broadband usage, enhancing competition in the telecommunications sector is also advised.

Funding information: M.A.A. – Telecommunications Regulatory Commission, Amman, Jordan; B.K.A.A.Z. – Department of Business Economics, School of Business, University of Jordan, Amman, Jordan.
The percentage share of the Authors in the preparation of the work is: M.A.A. – 50.00%, B.K.A.A.Z. – 50.00%.
Declaration regarding the use of GAI tools: Not used.
Conflicts of interests: None.
Ethical considerations: The Authors assure of no violations of publication ethics and take full responsibility for the content of the publication.
Received: 5.03.2025. Verified: 10.06.2025. Accepted: 30.10.2025

Keywords: economic growth, productivity, broadband, competition

JEL: O10, O18, O47

Introduction

The telecommunications sector is considered an essential sector since it provides the necessary infrastructure for key economic sectors such as education, health, trade, industry, agriculture, and various services. These sectors increasingly depend on information technology and telecommunications services to perform their functions, thereby increasing their economic value added (Kelly, Tyler, and Crawford-Brown 2016). Both individuals and institutions rely on mobile and fixed broadband services to exchange data via the Internet, contributing to overall productivity enhancement.

To facilitate technological progress, countries have adopted policies to enhance competition in broadband services and encourage the development and usage of broadband networks. As a result, around 64% of the world's population used the Internet in 2021, up from only 40% in 2015 (ITU 2023a).

Telecommunications services are vital in supporting other economic sectors. The main channel between telecommunication usage and economic growth and productivity is its effect on knowledge and technological progress, as explained by the Solow growth model, or by enhancing the efficiency of capital, as described by endogenous growth theory (Matalqah and Warad 2017a). Advances in broadband speed enable faster data transmission, supporting the creation of new services like cloud computing and artificial intelligence applications. These improvements also enhance production flexibility and efficiency, creating new markets like entertainment, online gaming, and IPTV, which in turn foster new consumption patterns in society.

Furthermore, the widespread deployment of telecommunications networks supports the development of e-commerce channels, digital commerce, and the Internet of Things. Telecommunications services impact productivity by creating new products to be used in production processes or by enhancing labour knowledge (Shaaban 2023). Investments in the telecommunication sector support the diffusion of broadband services, which is reflected in other sectors' productivity (Castaldo, Fiorini, and Maggi 2017).

Given the increase in fixed and mobile broadband usage in recent years, this study examines the impact of broadband telecommunication services and competition on economic growth and labour productivity in selected countries from the MENA (Middle East and North Africa) region and Europe.

The remainder of this paper is organised as follows: first, we present the theoretical framework and the literature review on the impact of broadband usage on economic growth and labour productivity. This is followed by the methodology and an econometrics analysis, then the empirical results and discussion. Finally, the paper concludes with policy recommendations.

Theoretical framework and literature review

Communication is a process of transmitting information (data) between two or more parties through verbal, written, or electronic means. According to the International Telecommunications Regulations (ITRs) adopted by the International Telecommunication Union (ITU), telecommunications is defined as the process of "any transmission, emission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems" (ITU 2012). The media consists of the telecommunication networks that link the communicating parties through wired – referred to as fixed telecommunications networks – or through wireless connections, known as mobile telecommunications networks.

With technological progress, fixed and mobile networks transmit data between communication parties. The main focus of this advancement is the speed of transmission, with high-speed networks known as broadband networks and the services known as either fixed or mobile broadband. According to the ITU, a service is considered broadband if the download speed exceeds 256 Kbps in either fixed or mobile networks (ITU 2020). An example of fixed broadband service is ADSL (asymmetric digital subscription line), which provides speeds up to 100 Mbps (Telecommunications Regulatory Commission 2011). Fibre optic technology provides speeds up to 1 Gbps and is expected to reach 100 Gbps by 2040 (Ofcom 2023). In the mobile domain, 3G technologies offer speeds up to 14.4 Mbps, 4G up to nearly 100 Mbps, and 5G up to 20 Gbps, are of which are considered broadband services (ETSI n.d.; GSMA n.d.).

Broadband is the main pillar of digital economy services, enhancing productivity and serving as one of the main tools to achieve sustainable economic development (Badran 2020), as well as improving labour productivity by facilitating labour communications and increasing job satisfaction (Jaumotte et al. 2023).

Many studies have assessed the economic impact of information and communication technologies (ICT) either by evaluating the direct impact on economic growth and labour productivity or by proxying these effects by using the concept of inclusive growth (Kireyev and Chen 2017). For example, Chatterjee (2020) examined 41 countries from 2004–2015 and found that mobile penetration, Internet usage, fixed telephony penetration, and ICT imports have a positive and significant impact on economic growth. Similar results were found by Behera and Narayan (2023).

Meanwhile, in an international study covering 201 countries from 2020 to 2022, Zhang (2022) found that mobile broadband penetration has a positive impact on economic growth while fixed broadband penetration does not, likely because mobile broadband is used more than fixed broadband. Mayer, Madden, and Wu's (2019) study of 29 OECD countries during the first quarter of 2008 to the fourth quarter of 2012 found that broadband speed affects economic growth, while the penetration and the years since broadband appeared in countries do not.

The impact of broadband speed on economic growth in urban and rural areas in 28 EU countries was analysed by de Clercq, D'Haese, and Buysse (2023), who found that speeds above 30 Mbps have a positive impact on economic growth. However, while speeds above 100 Mbps do not have an impact

in urban areas, they have a negative impact in rural areas. In the Arabic region, using a cointegration test from 2000–2019 (Boualaka and Kabir 2021), found that fixed and mobile broadband affected economic growth in Algeria. Menad and Zinedine (2022) found that mobile penetration and internet usage affected economic growth between 2020 and 2022 in eight Arab countries. Similar results were found in Jordan (Almajali 2023) and in the Gulf region (Pradhan et al. 2017; Kacham and Mouloud 2020; Nasreddin and Al-Bishr 2023; Shaaban 2023; Warrad 2024).

To study the impact of telecommunications services on labour productivity, Skorupińska (2017) analysed data from 21 European countries between 1993 and 2011. She found that Internet users have a positive and significant impact on labour productivity. However, when measuring this impact during the sub-periods of 1993–1999 and 2008–2011, no impact was detected. The first period reflects the starting period for the Internet, while the second period reflects the global financial crisis. Meanwhile, in a study on China from 2001 to 2018, Wu and Yu (2022) observed that industries using ICT experienced increased labour productivity. Conversely, Hsieh and Goel's (2019) study on 28 OECD countries found that internet penetration does not affect labour productivity, attributing this result to labour using the Internet primarily for browsing and entertainment. Further, Lefophane and Kalaba (2022) examined ten sectors in South Africa from 2009 to 2014. They found a mixed impact for telecommunications usage: sectors with intensive telecommunications use showed a positive impact on labour productivity, while other sectors had a negative but statistically insignificant impact.

The government's role is to adopt and implement competition policies to facilitate market transactions and ensure information symmetry through antitrust laws, market liberalisation, and mergers and acquisitions regulation (Lowe and Held 2005). In the telecommunications sector, competition reduces prices and provides better quality, diverse products, and innovation (Szczepański 2019).

Romano's (2015) study on the impact of competition enforcement on economic growth in 138 countries between 2009 and 2013 found a positive impact of competition enforcement on economic growth. Man (2015) studied the impact of competition in economic sectors on economic growth in 187 countries between 1988 and 2007 and found that competition in the financial sector contributes to growth, but competition in other sectors had no impact. Próchniak (2018) examined the impact of market competition on GDP per capita in 28 EU countries from 1997 to 2015 and found that a competitive market, measured by low levels of regulation, depends on the country's level of capitalism. He found that in advanced capitalist countries, competition has a positive impact on GDP per capita. Sekkat (2009) assessed competition levels by measuring markup on productivity in some Arab countries and found mixed results depending on the individual country context.

Methodologies and the models

To assess the economic impacts of broadband use and the level of competition in the telecommunications market, balanced panel data covering the period 2015–2021 was used. The study examined two groups of countries: ten European countries (designated as group A) and ten MENA

countries (designated as group B). The list of countries and the number of observations are presented in Table 1. The rationale for choosing these countries was to enable a comparative analysis of MENA and European countries, as both groups generally follow a similar regulatory approach to the telecommunications markets. This approach, particularly in European Union countries, emphasises policies aimed at (1) fostering competition and market liberalisation and (2) ensuring rapid and widespread broadband deployments across populations and geographic areas to minimise the digital divide.

Table 1. List of European and MENA countries used in the study sample

Group A: European countries		Group B: MENA countries	
	Country		Country
1	Albania	1	Algeria
2	Croatia	2	Bahrain
3	Greece	3	Egypt
4	Hungary	4	Jordan
5	Latvia	5	Kuwait
6	Portugal	6	Oman
7	Romania	7	Qatar
8	Serbia	8	Saudi Arabia
9	Slovakia	9	Tunis
10	Turkey	10	UAE

Source: author's elaboration.

Econometrics models were used to estimate the impacts. To enable comparison between regions, the models were estimated separately for each group. The first model, represented in Equation 1, was used to assess the impact of broadband usage and the level of competition in the telecommunications market on economic growth. This model is a modification of the Solow–Swan growth model, following the approach of (Matalqah and Warad 2017b) and other studies.

Model 1 (logarithmic form):

$$L_n Y_{it} = L_n A_{it} + \alpha_0 L_n K_{it} + \alpha_1 L_n L_{it} + \alpha_2 L_n BB_{it} + \alpha_3 L_n COMP_{it} + \mu_i \cdot \quad (1)$$

The variables are defined as follows: Y_{it} is the dependent variable reflecting real Gross Domestic Product (in US dollars) for country i at time t, K is real gross capital formation, L is the labour force, BB is broadband usage measured by data volume in exabytes, $Comp$ represents the level of telecommunications market competition, measured by the ICT regulatory tracker, $L_n \alpha$ includes other input factors, α_i denotes country-specific coefficients to be estimated, and μ is the error term.

The second model shown in equation 2 was used to assess the impact on labour productivity. The second equation will be based on equation *1* after transforming it to productivity by dividing the variables by L as follows:

Model 2 (logarithmic form):

$$L_n PROD_{it} = \gamma_0 + \gamma_1 L_n\, k_{it} / l + \gamma_2 L_n\, BB_{it} / l + \gamma_3 L_n\, Comp_{it} + \omega_{it}, \quad (2)$$

where the model variables are defined as follows: Prod: (dependent variable) reflects labour productivity measured by dividing the GDP on the labour force in country *i* in time *t*, *K*/*L*: Real gross capital formation divided by labour force in country *i* in time *t*, *Bb*/*l*: broadband usage per labour force in the country *i* in time *t*, *Comp*: level of telecom market competition measured by ICT regulatory tracker in country *i* in time *t*, γ_i: coefficients that will be estimated, ω: error term.

The data used was extracted from different sources and mainly taken from the World Bank Development database (World Bank 2023), the International Telecommunications Union Database (ITU 2023b), and ICT regulatory trackers issued by the ITU (2023).

Table 2. Variables and their data sources

Variable	Description	Data source
Y	Real Gross Domestic Product in $	World Bank development database
K	Real Gross Capital formation in $	World Bank development database
L	Gross Labour Force	World Bank development database
Bb	The volume of broadband data used in exabytes	World Telecommunication/ICT Indicators Database
comp	Countries' score in ICT regulatory trackers	International Telecommunication Union (ITU)-ICT Regulatory Tracker
k/L	Gross capital formation to labour force	Researchers' calculations
BB/L	Broadband data used per labour force	Researchers' calculations
PROD	GDP to the labour force	Researchers' calculations

Source: author's elaboration.

The method to estimate the models followed a panel data estimation approach. First, a unit root test was conducted to assess the stationarity of the data. Then, the pooled model, fixed effects model and random effects model were estimated for all models and assessed based on the Lagrange multiplier test and Hausman test for both groups to determine the best estimation method for both groups. Additionally, to ensure the most consistent estimation, the models were tested for multicollinearity, autocorrelation, heteroscedasticity, and cross-sectional dependence.

Empirical analysis

Checking the stationarity of variables is necessary before estimating the models and to avoid spurious regression. Based on the Levin, Lin, and Chu test for panel data, a unit root test was conducted. The null hypothesis is that a unit root exists, while the alternative hypothesis is that the unit root does not exist (Yousef and Warrad 2020). The result of this test for all variables in each group is shown in Table 3.

Table 3. Unit root panel data test for all variables

		Unit root test for group A (European countries)		Unit root test for Group B (MENA countries)	
		First Difference Prob	Level Prob	First Difference Prob	Level Prob
Common variable	BB	0.999	0.00	0.00	0.959
	COMP	0.973	0.00	–	0.0000
Model 1 – Economic growth	Y	0.00	–	–	0.04
	K	0.99	0.00	–	0.05
	L	0.25	0.00	0.00	0.185
Model 2 – Productivity	PROD	1	0.003	–	0.00
	k/L	0.998	0.00	0.00	0.192
	BB/L	0.99	0.004	–	0.00

Source: calculated using EViews.

The test result shows that some variables are stationary at the level I(0), while the majority are non-stationary but become stationary at the first difference I(1). To test for multicollinearity (i.e., correlation among the model's independent variables), a variance inflation factor (VIF) test was used for each model and each sample (Maddala 1992). The results indicate that multicollinearity is not present since the VIF values for all models are below 10, as shown in Table 4.

Table 4. Variance inflation factors test

Model 1 – Economic growth		
	Group A (European countries)	Group B (MENA countries)
BB	4.34	1.82
Comp	2.24	1.14
k	3.44	3.45
l	2.45	3.12
Model 2 – Productivity		
	Group A (European countries)	Group B (MENA countries)
Comp	1.8	1.48
kL	1.34	1.15
BBL	2.28	1.49

Source: calculated using EViews.

Ordinary least squares (OLS) estimation is not valid since all models exhibit autocorrelation, as indicated by the Breusch-Pagan Test, and heteroscedasticity, according to the Breusch-Pagan-Godfrey Test. Pooled data estimation, which analyses data without considering the effect of cross-sectional or time effects (Al-Qudah and Fasoukh 2018), was performed for all models. However, the results of the Breusch-Pagan Lagrange multiplier (LM) test,

presented in Table 5, do not support the use of pooled data estimation. Specifically, the p-values for all models are below 5%, indicating the presence of cross-sectional and time effects.

Table 5. Breusch-Pagan Lagrange multiplier test

Model	Test	Group A (European countries)			Group B (MENA countries)		
		Cross section	Time	Both	Cross section	Time	Both
Model 1 – Economic growth	Breusch-Pagan statistic	47.41	8.73	56.14	112.6	0.005	112.6
	P-value	0.000	0.003	0.000	0.000	0.939	0.000
Model 2 – Productivity	Breusch-Pagan statistic	45.4	4.07	7.64	159.48	1.517	161
	P-value	0.000	0.000	0.000	0.000	0.210	0.000

Source: calculated using EViews.

Such differences may be captured by fixed-effect models, which consider the time and cross-sectional differences in the intercept (Alsoukhni and Alshyab 2019), or by random-effects models, which also consider the difference as a random coefficient and capture it through composite error terms (Gujarati and Porter 2009).

The impact of broadband usage and market competition on economic growth was estimated using Equation 1 (Model 1) for each group. Table 6 shows the results for both fixed and random effect models, along with the Hausman test results to decide between them. The null hypothesis for the Hausman test is that the random effects model is suitable for estimation, and since the p-value is below 5%, the fixed-effects model is considered the more valid estimation method for both groups A and B.

Table 6. Estimated effects of broadband usage and market competition on economic growth

	Group A (European countries)				Group B (MENA countries)			
Model 1	Fixed effects	Prob	Random effects	Prob	Fixed effects	Prob	Random effects	Prob
Constant	14.15	0.0214	13.25	0.00	12.76	0.00	15.89	0.00
LN (K)	0.115	0.024	0.013	0.40	0.47	0.00	0.148	0.00
LN(L)	0.139	0.0209	0.819	0.00	0.08	0.00	0.428	0.00
LN(BB)	0.783	0.00	0.076	0.00	0.43	0.00	0.045	0.00
LN(COMP)	1.24	0.29	–0.189	0.506	–0.07	0.54	–0.124	0.00
R-square	0.95		0.59		0.95		0.56	
F-statistic	123.59		23.76		162.4		20	
DW	0.23		0.59		0.33		0.59	
Hausman test	chi-statistic	87.81	Prob	0.00	chi-statistic	70.96	Prob	0.00

Source: calculated using EViews.

Equation 2 (Model 2) was used to estimate the effect on labour productivity. Table 7 shows the results of both fixed-effects and random-effects models for both groups, with the Hausman test indicating that the fixed-effects estimation is valid for groups A and B.

Table 7. Estimation results of the effect of broadband usage and competition level on labour productivity

	Group A (European countries)				Group B (MENA countries)			
Model 2	Fixed effect	Prob	Random effect	Prob	Fixed effect	Prob	Random effect	Prob
Constant	11.86	0.02	11.97	0.00	9.12	0.00	8.826	0.00
LN (KL)	0.1358	0.002	0.0198	0.23	0.232	0.00	0.274	0.00
LN(BB)	0.745	0.00	0.078	0.00	0.02	0.02	0.023	0.01
LN(COMP)	1.72	0.09	−0.219	0.46	−0.154	0.00	−0.163	0.00
R-square	0.9		0.39		0.99		0.42	
F-statistic	61.6		14.37		1020		16.06	
DW	0.2169		0.505		0.75		0.62	
Hausman test	Chi -statistic	95.406	Prob	0.00	chi-statistic	12.67	Prob	0.00

Source: calculated using EViews.

Although the Hausman test helps to choose between fixed-effects and random-effects models, the selected model was further tested for residual cross-sectional dependence. The Breusch-Pagan LM test was used for this purpose, with the null hypothesis stating that there is no cross-sectional dependence (Al-Hassanein 2023). Table 8 shows the results of this test, which indicate that all the chosen models suffer from residual cross-sectional dependence, as the p-values are below 5%, leading to the rejection of the null hypotheses. Accordingly, the chosen models must be adjusted to address this issue. A common approach to handling cross-sectional dependence is to use the Generalised Least Squares (GLS) method.

Table 8. Results of the cross-sectional dependence test for Groups A and B

Residual cross-section dependence test				
Model	Group A (European countries)		Group B (MENA countries)	
	Breusch–Pagan LM statistic	P-value	Breusch–Pagan LM statistic	P-value
Model 1 – Economic growth	121.02	0	68.52	0.01
Model 2 – Productivity	119.878	0	102.4	0

Source: calculated using EViews.

Tables 9 and 10 show the estimation for the models using the GLS method. To ensure the consistency of the new estimation, Table 11 reports the residual cross-sectional dependence test results, showing that all models are free from cross-sectional dependence.

Table 9. GLS estimations for model 1 – Effect on economic growth

	Group A (European countries)		Group B (MENA countries)	
Model	GLS fixed effects	Prob	GLS fixed effects	Prob
Constant	13.66	0.00	12.41	0.00
LN (K)	0.116	0.00	0.385	0.00
LN(L)	0.215	0.00	0.252	0.00
LN(BB)	0.71	0.00	0.272	0.00
LN(COMP)	1.1	0.00	–0.06	0.19
R-square	0.93		0.91	
F-statistic	87		63	
DW	1.94		1.31	

Source: calculated using EViews.

The results in Table 11 show that broadband usage has a significant and positive impact on economic growth in each group. Specifically, a 1% increase in broadband usage leads to a 0.71% increase in economic growth in European countries and a 0.27% increase in MENA countries. These findings are consistent with several studies in this area, including global analyses such as Mayer, Madden, and Wu (2019), Chatterjee (2020), and de Clercq, D'Haese, and Buysse (2023), as well as studies of specific Arab countries, including Pradhan et al. (2017), Nasreddin and Al-Bishr (2023), Shaaban (2023), and Warrad (2024).

Table 10. GLS estimations for model 2 – Effect on labour productivity

	Group A (European countries)		Group B (MENA countries)	
Model	GLS Fixed effect	Prob	GLS fixed effect	Prob
Constant	12.05	0.00	9.3	0.00
LN (KL)	0.13	0.00	0.462	0.00
LN(BB)	0.67	0.00	0.139	0.00
LN(COMP)	1.4	0.00	–0.025	0.00
R-square	0.87		0.69	
F-statistic	47.76		15	
DW	1.95		1.75	

Source: calculated using EViews.

The effect of competition level on economic growth is positive and significant in European countries, where a 1% increase in competition, measured by improvements in the ICT regulatory tracker, leads to a 1.1% increase in economic growth. In contrast, competition level does not have an impact in MENA countries. This discrepancy may be explained by differences in the maturity of competition between the two regions, with European countries exhibiting more advanced levels. The results for European countries are consistent with Romano (2015) and Rodríguez-Castelán et al. (2022), while the results for the MENA region align with Man

(2015). Capital and labour conform to economic theory and positively and significantly impact economic growth.

Table 12 shows that labour productivity is also positively affected by broadband usage in both groups. The impact is significant, with a 1% increase in broadband usage leading to a 0.67% increase in labour productivity in European countries and a 0.139% increase in MENA countries. These results align with previous studies (Skorupińska 2017; Lefophane and Kalaba 2022; Wu and Yu 2022).

The impact of competition level in telecommunications on labour productivity differs between regions. In European countries, competition has a significant and positive impact, where a 1% increase in competition leads to a 1.4% increase in labour productivity. In contrast, in MENA countries, it has negative and significant impacts, with a 0.025% decrease in labour productivity for every 1% increase in competition. These contrasting results may reflect differences in the competitiveness and regulatory environments of the two regions. Similar contradictory findings across countries were also found by Sekkat (2009). Capital productivity aligns with economic theory and positively and significantly impacts labour productivity.

Table 11. Residual cross-section test after GLS estimation for all models

Residual cross-section dependence test for GLS Models				
Model	Group A: European countries		Group B: MENA Countries	
	Breusch–Pagan LM statistic	P-value	Breusch–Pagan LM statistic	P-value
Model 1: economic growth	28.58	0.97	43.62	0.53
Model 2: Productivity	20.054	0.96	41.94	0.6

Source: calculated using EViews.

Discussion

Based on the results, both fixed and mobile broadband usage have a significant and positive impact on economic growth. Our findings show that broadband usage in Europe has a larger impact than in MENA countries. The main implication of these findings is that governments should consider promoting broadband usage as a tool to enhance economic conditions. This could be achieved through the digital transformation of economic activities or advancing towards a digital economy by adopting upgraded mobile and fixed broadband networks that support higher speeds (Castaldo, Fiorini, and Maggi 2017).

Regarding labour productivity, the findings support the positive impact of fixed and mobile broadband usage in both groups, with a stronger effect in European countries. This suggests the need to focus on developing digital skills within the labour force.

The positive impact of competition level in the telecommunications sector on economic growth in the European countries highlights the importance of protecting competition. Although there is no impact in the MENA countries, fostering competition is still very important because it is a tool

to make fixed and broadband services affordable for all types of citizens and reduce the digital divide. The significant negative impact of telecommunications market competition on labour productivity in MENA countries suggests that the governments of these countries should facilitate the adoption of new technologies that increase labour productivity and encourage efficient market entry (Romano 2015). Additionally, it is important to maintain a balanced level of competition across all economic sectors since the expected gain from competition on economic growth and labour productivity requires an equivalent level of competition among all sectors.

Conclusions and recommendations

The study aligns with several studies that support the positive impact of using broadband on economic growth and labour productivity, comparing these results between MENA and European countries. Accordingly, the study recommends increasing broadband usage, which can be done by considering both the supply and demand side measures.

On the demand side, MENA countries should work on affordability by adopting different policies like universal service obligations, opening the market to new entrants like mobile virtual network operators (MVNOs) in mobile services, and facilitating market entry for Internet service providers based on the legacy network.

With regards to the supply side, the study recommends policies that help service providers invest in the latest technologies, such as customs exemptions on network elements, state aid to build networks in underserved areas, fostering infrastructure sharing to reduce the cost of providing service, and efficient taxation on broadband service providers.

Although the impact of competition is inconclusive and ambiguous in both regions, in general, it is a catalyst for broadband usage. Therefore, policymakers should consider boosting competition in the telecommunications sector.

References

Al-Hassanein, M.A. (2023), *Using cross-sectional time series models to measure the impact of information and communication technology on intra-COMESA trade*, "Journal of the Faculty of Economics and Political Science", 24 (2), pp. 85–110, https://doi.org/10.21608/jpsa.2023.295516

Almajali, S. (2023), *Impact of the digital transformation on the economic growth rate: Jordan case study during 2000–2020*, Unpublished Master's Thesis, University of Jordan, Amman.

Al-Qudah, N.A., Fasoukh, A.B. (2018), *The Impact of Trade Openness on Economic Growth and Poverty in Jordan*, Unpublished PhD Thesis, University of Jordan, Amman, http://search.mandumah.com/Record/1320690 (accessed: 12.02.2024).

Alsoukhni, N.Z., Alshyab, N.A. (2019), *The Impact of Credit Facilities on Unemployment: Applied Study for Non-Oil Exporting Arab Countries for the Period (2000–2017)*, Unpublished MSc. Thesis, Yamouk University, Irbid, http://search.mandumah.com/Record/982775 (accessed: 29.02.2024).

Badran, M.H.A. (2020), *The Role of Knowledge and Digital Economy in Gross Domestic Product and Sustainable Development Achievement in Egypt*, "Journal of Management Research", 38 (4), pp. 1–33, http://search.mandumah.com/Record/1289024 (accessed: 28.11.2023).

Behera, B., Haldar, A., Sethi, N. (2023), *Investigating the direct and indirect effects of Information and Communication Technology on economic growth in the emerging economies: role of financial development, foreign direct investment, innovation, and institutional quality*, "Information Technology for Development", 30 (1), pp. 33–56, https://doi.org/10.1080/02681102.2023.2233463

Boualaka, A., Kabir, M. (2021), *Measuring the impact of the digital economy on economic growth in Algeria – An econometric study for the period 2000/2019*, "Economic Studies", 15 (2), pp. 153–168, https://asjp.cerist.dz/en/article/161211 (accessed: 26.07.2023).

Castaldo, A., Fiorini, A., Maggi, B. (2017), *Measuring (in a time of crisis) the impact of broadband connections on economic growth: an OECD panel analysis*, "Applied Economics", 50 (8), pp. 838–854, https://doi.org/10.1080/00036846.2017.1343448

Chatterjee, A. (2020), *Financial inclusion, information and communication technology diffusion, and economic growth: a panel data analysis*, "Information Technology for Development", 26 (3), pp. 607–635, https://doi.org/10.1080/02681102.2020.1734770

Clercq, M. de, D'Haese, M., Buysse, J. (2023), *Economic growth and broadband access: The European urban-rural digital divide*, "Telecommunications Policy", 47 (6), 102579, https://doi.org/10.1016/j.telpol.2023.102579

ETSI (n.d.), *Fixed-line Access*, https://www.etsi.org/technologies/fixed-line-access (accessed: 25.05.2024).

GSMA (n.d.), *Our technology*, https://www.gsma.com/about-us/who-we-are/our-technology (accessed: 26.04.2024).

Gujarati, D.N., Dawn, C.P. (2009), *Basic Econometrics*, McGraw-Hill Education, New York.

Hsieh, E.W.-T., Goel, R.K. (2019), *Internet use and labour productivity growth: recent evidence from the U.S. and other OECD countries*, "NETNOMICS: Economic Research & Electronic Networking", 20 (2–3), pp. 195–210, https://doi.org/10.1007/s11066-019-09135-2

ITU (2012), *Final Acts of the World Conference on International Telecommunications (Dubai, 2012)*, https://www.itu.int/en/wcit-12/Documents/final-acts-wcit-12.pdf (accessed: 26.04.2024).

ITU (2020), *Handbook for the Collection of Administrative Data on Telecommunications/ICT, 2020 Edition*, https://www.itu.int/en/ITU-D/Statistics/Pages/publications/handbook.aspx (accessed: 25.05.2024).

ITU (2023a), *Statistics*, https://www.itu.int/en/ITU-D/Statistics/pages/stat/default.aspx (accessed: 15.02.2024).

ITU (2023b), *World Telecommunication/ICT Indicators Database onlin*e, https://www.itu.int/pub/D-IND-WTID.OL-2023 (accessed:15.02.2024).

Jaumotte, M.F., Li, L., Medici, A., Oikonomou, M., Pizzinelli, C., Shibata, M.I., Tavares, M.M. (2023), *Digitalisation During the COVID-19 Crisis: Implications for Productivity and Labour Markets in Advanced Economies*, "Staff Discussion Notes", 003, https://doi.org/10.5089/9798400232596.006

Kacham, I., Mouloud, K. (2020), *Information and communications technology and its impact on economic growth in the Organization of Arab States oil-exporting countries (OPEC). An econometrics study for the period 2000–2018*, "Journal of Economic Sciences, Management & Commercial Sciences (JESMCS)", 13 (1), pp. 460–479, https://asjp.cerist.dz/en/article/122464 (accessed: 25.03.2024).

Kelly, S., Tyler, P., Crawford-Brown, D. (2016), *Exploring Vulnerability and Interdependency of UK Infrastructure Using Key-Linkages Analysis*, "Networks and Spatial Economics", 16, pp. 865–892, https://doi.org/10.1007/s11067-015-9302-x

Kireyev, A., Chen, J. (2017), *Inclusive Growth Framework*, "Working Paper", 17 (127), https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1536286&site=eds-live (accessed: 2.08.2023).

Lefophane, M.H., Kalaba, M. (2022), *Estimating effects of ICT intensity on productivity, employment and output in South Africa: an industry-level analysis*, "Information Technology for Development", 28 (2), pp. 346–371, https://ezlibrary.ju.edu.jo:2057/10.1080/02681102.2021.1882367 (accessed: 23.04.2024).

Lowe, P., Held, A. (2005), *Modernisation and Beyond: The Role of Competition Policy in Driving Economic Growth*, "European Competition Journal", 1 (1), pp. 35–50, https://doi.org/10.5235/ecj.v1n1.35

Maddala, G.S. (1992), *Introduction to econometrics*, Vol. 2, Macmillan, New York.

Man, G. (2015), *Competition and the growth of nations: International evidence from Bayesian model averaging*, "Economic Modelling", 51, pp. 491–501, https://doi.org/10.1016/j.econmod.2015.08.012

Matalqah, M.M., Warad, T.M. (2017a), *The impact of telecommunications infrastructure on economic growth in Arab countries*, Unpublished doctoral dissertation, University of Jordan, Amman, https://search.mandumah.com/Record/1223864 (accessed: 29.10.2025).

Matalqah, M.M., Warad, T.M. (2017b), *The Impact of Telecom Infrastructure on the Economic Growth: The Case of Oil-Producing and Non-Oil Producing Arab Countries*, "International Journal of Economics and Financial Issues", 7 (3), pp. 423–428, https://dergipark.org.tr/en/download/article-file/365402 (accessed:18.04.2024).

Mayer, W., Madden, G., Wu, C. (2019), *Broadband and economic growth: a reassessment*, "Information Technology for Development", 26 (1), pp. 128–145, https://doi.org/10.1080/02681102.2019.1586631

Menad, M., Zinedine, Q. (2022), *Measuring the impact of electronic communications technology on economic growth: A case study of Algeria and some of the Eastern countries during the period (2000–2020)*, "Creativity Journal", 12 (1), pp. 63–79, https://asjp.cerist.dz/en/article/189536 (accessed: 26.07.2023).

Nasreddin, V., Al-Bishr, S.A.R. (2023), *The Reality of Digital Economy and Its Impact on Economic Growth in a Group of Arab Countries (2000–2020): An Econometrics Study Using a Panel Data Model*, "International Journal on Humanities & Social Sciences", 46, pp. 107–133, https://doi.org/10.33193/IJoHSS.46.2023.583

Ofcom (2023), *Evolution of fixed access networks*, https://www.ofcom.org.uk/__data/assets/pdf_file/0023/268025/Evolution-of-Fixed-Access.pdf (accessed: 25.05.2024).

Pradhan, R.P., Arvin, M.B., Bahmani, S., Bennett, S.E. (2017), *Broadband penetration, financial development, and economic growth nexus: evidence from the Arab League countries*, "Macroeconomics and Finance in Emerging Market Economies", 10 (2), pp. 151–171, https://doi.org/10.1080/17520843.2016.1250800

Próchniak, M. (2018), *The impact of product market competition on GDP per capita growth in the EU countries: does the model of capitalism matter?*, "Post-Communist Economies", 30 (2), pp. 131–155, https://doi.org/10.1080/14631377.2017.1362098

Rodríguez-Castelán, C., Araar, A., Malásquez, E.A., Granguillhome Ochoa, R. (2022), *Competition reform and household welfare: A microsimulation analysis of the telecommunication sector in Ethiopia*, "Telecommunications Policy", 46 (2), 102243, https://doi.org/10.1016/j.telpol.2021.102243

Romano, O. (2015), *Assessing the Macroeconomic Effects of Competition Policy – the Impact on Economic Growth*, "Economic Insights – Trends & Challenges", IV (LXVII), 3, pp. 81–88, https://upg-bulletin-se.ro/old_site/archive/2015-3/9.Romano.pdf (accessed: 29.04.2024).

Sekkat, K. (2009), *Does competition improve productivity in developing countries?*, "Journal of Economic Policy Reform", 12 (2), pp. 145–162, https://doi.org/10.1080/17487870902872946

Shaaban, A. (2023), *The effect of ICT infrastructure development on the economic growth in the Arab Countries during the period (2005–2017)*, "Journal of Financial and Commercial Research", 24, pp. 1–45, https://doi.org/10.21608/jsst.2022.172553.1514

Skorupińska, A.A. (2017), *The role of information and telecommunication technologies in the productivity of Central and Eastern European countries*, Universitat Oberta de Catalunya, Barcelona, https://openaccess.uoc.edu/handle/10609/72489 (accessed: 5.03.2025).

Szczepański, M. (2019), *EU competition policy: Key to a fair single market*, https://www.europarl.europa.eu/RegData/etudes/IDAN/2019/642209/EPRS_IDA(2019)642209_EN.pdf (accessed: 5.03.2025).

Telecommunications Regulatory Commission (2011), *Public Consultation: Review of Fixed Markets in Jordan*, https://trc.gov.jo/EchoBusV3.0/SystemAssets/PDF/AR/%D8%A7%D8%B3%D8%AA%D8%B4%D8%A7%D8%B1%D8%A7%D8%AA/8088e027-61b7-4411-b5ef-8894808a0e2b_Fixed%20Markets%20Consultation%20PUBLIC%20VERSION%20.pdf (accessed: 10.04.2024).

Warrad, T.A. (2024), *The Impact of Digital Development on Economic Growth: Empirical Evidence from Selected Arab Countries*, "Jordan Journal of Economic Sciences", 11 (1), pp. 16–23.

World Bank (2023), *Data Bank*, https://databank.worldbank.org/home.aspx (accessed: 15.02.2024).

Wu, H.X., Yu, C. (2022), *The impact of the digital economy on China's economic growth and productivity performance*, "China Economic Journal", 15 (2), pp. 153–170, https://doi.org/10.1080/17538963.2022.2067689

Yousef, E.A., Warrad, T. (2020), *The determinants of economic growth in selected Arab countries over the period 1998–2017*, "Jordan Journal of Economic Sciences", 7 (1), https://doi.org/10.21608/aja.2021.49502.1010

Zhang, X. (2022), *Broadband, effective labor, and economic growth during the COVID-19 pandemic: evidence from a cross-country study*, "Online Media & Global Communication", 1 (4), pp. 749–770, https://doi.org/10.1515/omgc-2022-0056

Rola wykorzystania łączy szerokopasmowych i konkurencji w sektorze telekomunikacyjnym w stymulowaniu wzrostu gospodarczego i wydajności pracy: analiza porównawcza krajów MENA i Europy

W artykule porównano wpływ wykorzystania usług szerokopasmowego internetu stacjonarnego i mobilnego oraz konkurencji w sektorze telekomunikacyjnym na wzrost gospodarczy i wydajność pracy w 20 krajach Europy i regionu MENA (Bliski Wschód i Afryka Północna) w latach 2015–2021. Wykorzystanie łączy szerokopasmowych mierzy się ilością zużytych danych, natomiast konkurencję sektora ocenia się za pomocą wskaźnika regulacyjnego ICT. Użyto dwóch modeli ekonometrycznych i zastosowano je do dwóch grup badawczych: grupy A (kraje europejskie) i grupy B (kraje regionu MENA). Wyniki pokazują, że korzystanie z usług internetu szerokopasmowego ma pozytywny i znaczący wpływ na wzrost gospodarczy i wydajność pracy w obu grupach, ale wpływ ten był większy w krajach europejskich. Jednak w badaniu stwierdzono również, że konkurencja w sektorze telekomunikacyjnym w obu grupach jest różna. Opracowanie wskazuje na konieczność przyjęcia polityki mającej na celu zwiększenie dostępności i przystępności cenowej usług szerokopasmowego internetu stacjonarnego i mobilnego. Ponadto, ponieważ konkurencja stanowi katalizator wykorzystania szerokopasmowego internetu, zaleca się również zwiększenie jej w sektorze telekomunikacyjnym.

Słowa kluczowe: wzrost gospodarczy, wydajność pracy, szerokopasmowy internet, konkurencja

Comparative Economic Research. Central and Eastern Europe
Volume 28, Number 4, 2025
https://doi.org/10.18778/1508-2008.28.27

Common and Unique Features in the Development of Startup Ecosystems in Latvia, Ukraine, and Georgia

Vladimir Menshikov https://orcid.org/0000-0003-4280-427x
Dr. sc. soc., Professor, Daugavpils University, Daugavpils, Latvia, e-mail: vladimirs.mensikovs@du.lv

Oksana Ruza https://orcid.org/0000-0002-6194-3841
Dr. oec., Docent, Researcher, Daugavpils University, Institute of Humanities and Social Sciences, Daugavpils, Latvia, e-mail: oksana.ruza@du.lv

Anastasiia Simakhova https://orcid.org/0000-0001-7553-4531
Doctor of Economic Sciences, Professor, State University "Kyiv Aviation Institute", Kyiv, Ukraine, e-mail: anastasiia.simakhova@npp.nau.edu.ua (corresponding author)

Givi Bedianashvili https://orcid.org/0000-0003-4521-737X
Doctor of economic sciences, Professor, Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia, e-mail: givi.bedianashvili@tsu.ge

Abstract

This research presents a comprehensive analysis and comparison of the startup ecosystems in Latvia, Ukraine, and Georgia. It identifies the key factors that foster their development and growth, and highlights the primary obstacles and challenges that confront startups in these countries. The authors used the following methods to achieve these objectives: correlation and regression analysis to examine funding trends and success factors, comparative analysis of key ecosystem parameters, as well as methods of analysis and synthesis. The novelty of the study lies in its identification of the most important factors that influence startup development in the three countries, the construction of a correlation and regression model of startup financing, and the comparative analysis of startup ecosystems. Comparing the startup ecosystems of the three countries revealed both common and unique features of each country, emphasizing how differences in political, economic, and cultural conditions shape startup development.

Funding information: V.M. – Daugavpils University, Daugavpils, Latvia; O.R. – Daugavpils University, Institute of Humanities and Social Sciences, Daugavpils, Latvia; A.S. – State University "Kyiv Aviation Institute", Kyiv, Ukraine; G.B. – Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia.
The percentage share of the Authors in the preparation of the work is: V.M. – 25.00%, O.R. – 25.00%, A.S. – 25.00%, G.B. – 25.00%.
Declaration regarding the use of GAI tools: Not used.
Conflicts of interests: None.
Ethical considerations: The Authors assure of no violations of publication ethics and take full responsibility for the content of the publication.
Received: 22.01.2025. Verified: 10.06.2025. Accepted: 30.09.2025

Keywords: startup, startup ecosystem, economic development, Ukraine, Georgia, Latvia

JEL: M13, O11

Introduction

A startup is a newly established, innovation-driven commercial venture that utilizes diverse financial structures such as angel investment, venture capital, and government grants. It operates within a regulatory and policy framework shaped by government incentives and support, and thrives through dynamic relationships among stakeholders, including founders, investors, employees, customers, and public institutions, to rapidly scale and disrupt markets. Many developed countries offer programs to attract talented entrepreneurs by granting residency permits. Typically, startup founders benefit from favorable conditions for conducting commercial activities and obtain long-term residency permits for themselves and their family members (Kim, Kim, and Jeon 2018).

The startup ecosystem is a dynamic network of interacting actors (entrepreneurs, companies, investors), organizations (incubators, accelerators, research institutions, universities), and processes (innovation, education, entrepreneurial support), all supported by political, economic, social, and cultural conditions that foster the birth, growth, and development of startups. This ecosystem includes not only access to capital and customers but also supporting infrastructure, qualified talent, knowledge, and technology, as well as legislative and regulatory frameworks that promote innovation and entrepreneurship (Fritsch 2019).

This definition takes into account a broad spectrum of elements necessary for startups to flourish and is sufficiently universal to be applicable to any country, regardless of its political regime and economic conditions. It emphasizes a systemic approach to understanding the startup ecosystem, focusing on the importance of balanced development of all system components to stimulate innovation and entrepreneurial activity (Bedianashvili 2017; 2018; Menshikov et al. 2022).

The theoretical framework of the study provides a basis for analyzing and interpreting the collected data and contributes to a deeper understanding of the area under investigation. From a practical point of view, there are currently no models capable of accurately predicting the development of startups. Therefore, the novelty of this article lies in the development of a correlation and regression model of startup financing, which can be used to predict the indicator.

The remainder of this paper is structured as follows. Part 2 presents a comprehensive literature review, situating the study within existing research and theoretical frameworks on startup ecosystems. Part 3 outlines the methodology, including the research design and case selection criteria. Part 4 reports the results of the analyses conducted. Part 5 offers an in-depth examination of the development of startup ecosystems in Latvia, Ukraine, and Georgia. Part 6 discusses the limitations of the study, while Part 7 concludes.

Literature review

A literature review reveals that the concept of ecosystems in the context of business and innovation was first popularized by Moore (1993) in his article "Predators and Prey: A New Ecology of Competition," published in the Harvard Business Review. Moore drew an analogy between natural ecosystems and business environments. This idea was later adapted and extended to analyze startup ecosystems encompassing entrepreneurs, investors, research institutions, universities, and government agencies.

Researchers' interest in startup ecosystems has significantly increased in recent years. To illustrate this trend, we can examine the representation of startup ecosystems in the Scopus database.

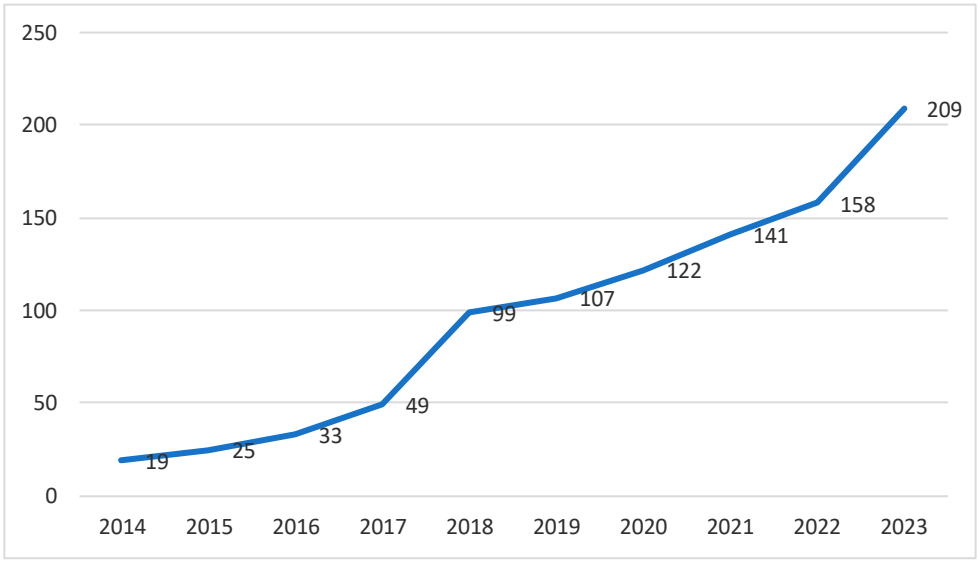


Figure 1. Number of papers (by year) that contain the words "Startup Ecosystems" in the title, abstract, or keywords in the Scopus database, 2014–2023

Source: authors' elaboration based on the Scopus database.

The results presented in Figures 1 and 2 confirm the significant and growing interest of researchers across various scientific fields in "Startup Ecosystems". Publications indexed in the Scopus database particularly surged in 2023, with the number increasing elevenfold compared to 2014, reaching 209. The majority of these publications are associated with business, management, and accounting (525), computer science (300), economics, econometrics, and finance (243), engineering (241), and social sciences (137).

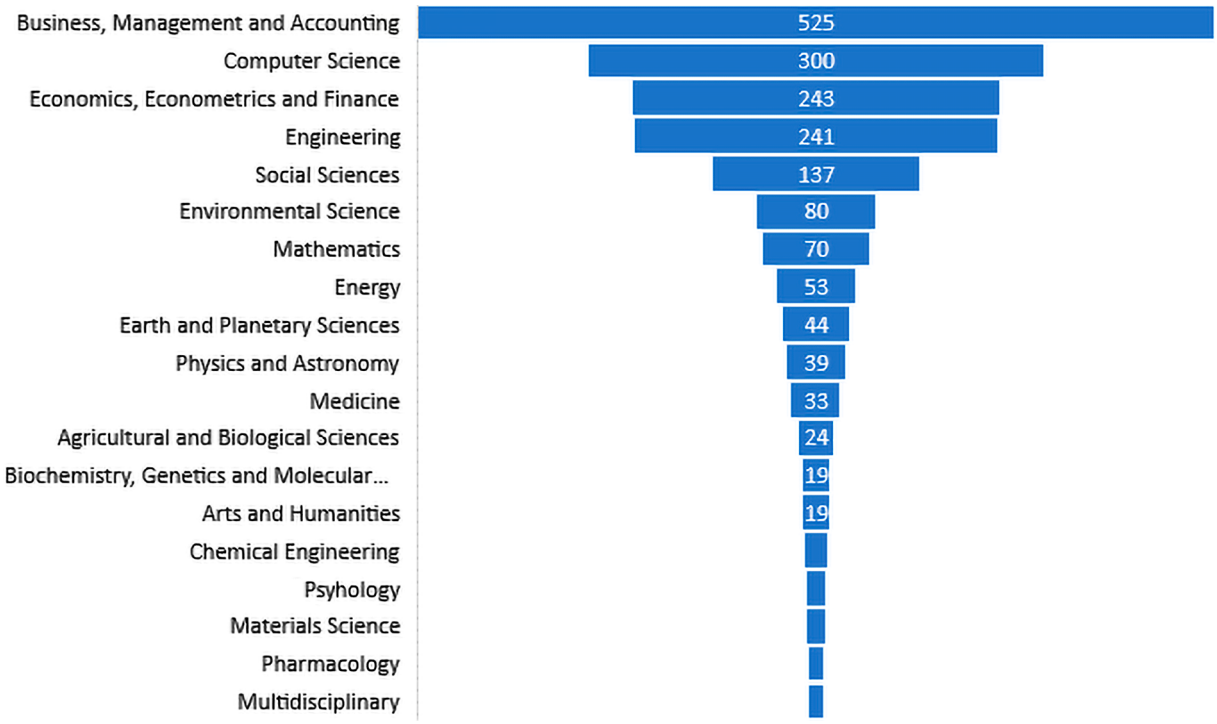


Figure 2. Number of papers (by field of science) that contain the words "Startup Ecosystems" in the title, abstract or keywords in the Scopus database

Source: authors' analysis based on the Scopus database.

The findings of this study align with prominent global frameworks of startup ecosystem development. For instance:

- Isenberg's (2011) model of entrepreneurship ecosystems emphasizes the interdependence of domains such as policy, finance, culture, support, human capital, and markets. Our study confirms the relevance of these dimensions, particularly in highlighting the role of government policy (e.g., GITA in Georgia, the Ukraine Startup Fund, and Latvia's innovation programs). However, unlike Isenberg's focus on organic and bottom-up development, some of the ecosystems studied (notably Georgia) show a heavier reliance on top-down government initiatives, reflecting a more centralized adaptation.
- Autio et al. (2014) highlight the dynamic capabilities of ecosystems and emphasize knowledge spillovers and entrepreneurial agency. In this respect, Ukraine's ecosystem, especially its wartime pivots toward defense and cybersecurity innovation, illustrates Autio's notion of adaptive ecosystems that respond to environmental shocks. However, the limited commercialization and weak university–industry links in Georgia suggest slower ecosystem evolution, diverging from Autio's framework of self-reinforcing capabilities.
- Stam's (2015) Entrepreneurial Ecosystem Theory focuses on ten core elements, including formal institutions, leadership, connectedness, talent, and demand. Latvia aligns closely with Stam's emphasis on "systemic conditions" (e.g., regulatory frameworks, finance, support services), and exhibits a relatively higher level of ecosystem maturity. In contrast, Georgia lacks critical elements such as experienced entrepreneurs and deep

funding networks, highlighting the importance of interconnectedness and entrepreneurial recycling that Stam deems vital.

Overall, while our regional case studies reflect the broad applicability of global theories, they also point to unique hybrid dynamics shaped by post-socialist transitions, EU accession trajectories, and geopolitical risks. The ecosystems in Latvia, Ukraine, and Georgia combine elements from global models but evolve under constraints that require context-specific strategies.

For a high-quality analysis of startup ecosystems in different countries, there exist numerous research papers, articles, and books that can serve as excellent examples. The most frequently cited book, Brad Feld's (2012) "Startup Communities: Building an Entrepreneurial Ecosystem in Your City," considers startup communities as a blueprint for what it takes to build a supportive entrepreneurial community.

One of the most cited articles is by Lee and Shin (2018), entitled "Fintech: Ecosystem, business models, investment decisions, and challenges". It examines how Fintech brings about a new paradigm in which information technology is driving innovation in the financial industry.

There are various models for developing startup ecosystems, each with its own specifics and approaches to stimulating innovation and entrepreneurship. A model's effectiveness depends on multiple factors, including economic conditions, political environment, cultural aspects, and resource availability. Some of the most well-known and commonly used models for developing startup ecosystems are presented below (Ziakis, Vlachopoulou, and Petridis 2022):

1. Silicon Valley Model (Open Innovation Model). This model is characterized by a high level of network interaction among startups, investors, research institutions, and technology companies. It fosters a culture of open innovation, where knowledge and ideas are freely shared and combined. Advantages: It facilitates the rapid development and commercialization of innovations. Disadvantages: It requires strong infrastructure and access to capital.
2. Israeli Model (Startup Nation). Characterized by a high level of entrepreneurial activity, strong government support, and active utilization of military research and development in civilian innovations. Advantages: Strong integration of science and business, government support. Disadvantages: High competition, dependence on exports.
3. Scandinavian Model (Social Innovations). Focused on social entrepreneurship and innovations aimed at addressing social issues. Characterized by a high level of government support and collaboration between the private and public sectors. Advantages: Development of sustainable and socially oriented businesses. Disadvantages: May be less oriented towards the global market.
4. Bangalore Model (Focus on Outsourcing and IT). Based on the development of the IT sector and outsourcing, strong technical education and availability of skilled IT professionals. Advantages: Attracts international investments and promotes the development of the IT industry. Disadvantages: May lead to a one-sided development of the economy.

5. Chinese Model (State Governance and Investments). Characterized by a strong government role in stimulating and financing innovations and entrepreneurship, as well as active support for high-tech sectors. Advantages: Rapid scaling and development of key technologies. Disadvantages: May restrict entrepreneurial freedom and innovation due to strong government control.

Methodology

This study employs a comparative case study design, utilizing both qualitative and quantitative methods to analyze the startup ecosystems of Latvia, Ukraine, and Georgia. The case study method was used due to the respective countries' contrasting development trajectories and the opportunity to explore an under-researched group of countries.

Case selection

Latvia, as an EU member, benefits from access to European funding and focuses on niche technologies such as fintech and Greentech. Ukraine represents a large economy with a strong IT sector that is currently facing the challenges of war and institutional instability. Georgia, by contrast, is a small economy that has implemented liberal reforms, with strengths in tourism and agrotechnology but constrained by a limited domestic market.

The novelty of this comparison lies in identifying the role of geopolitics, economic scale, and EU integration in shaping startup ecosystems. While most research concentrates on established hubs in the U.S., the EU core, or Asia, this study examines "peripheral" European economies with different levels of stability to uncover both universal and unique barriers to innovation. Furthermore, it builds on the authors' previous research on startup development in these countries, continuing the line of inquiry established in earlier publications (Menshikov et al. 2024; Simakhova et al. 2024; Menshikov, Ruza, and Simakhova 2025).

Analytical approach

A comparative method was used to analyze the common and unique features of startup ecosystems in the selected countries. Key parameters for qualitative and quantitative comparisons include access to financing, level of government support, cultural characteristics, and innovation activity. This approach helps to understand which factors contribute to success or pose challenges in the development of startups in each country.

Results

To analyze the dynamics of startup funding in Latvia and Ukraine, a correlation and regression analysis was conducted for 2014–2024 (In the regression analysis, the years: 2014, 2015, 2016, ..., 2024 are replaced by the corresponding numbers: 1, 2, 3, ..., 11). The underlying dataset is presented in Tables 1–4 and Figures 3–6. Georgia was omitted from the analysis because its economic structure and contextual conditions differ markedly from those of Latvia and Ukraine.

In Latvia, the impact of the time factor on startup financing cannot be statistically confirmed, while factors such as inflation (INF) and unemployment rate (UN) have a more significant effect. In Ukraine, these factors play a statistically insignificant role in terms of financing startups.

Table 1. Funding for Latvian startups, 2014–2024

Indicator	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Funding for Latvian startups, € millions	50	63.6	41.9	59.2	7	15.5	22.7	247.3	90.8	50.0	34.3
Funding per 1,000 inhabitants, €	25,078.0	32,161.4	21,382.6	30,480.1	3,632.3	8,099.0	11,944.5	131,229.1	48,313.7	26,631.9	18,416.7

Note: In 2021, a spike of €247.3 million was observed during the COVID-19 period. This value is visually identifiable as an outlier; however, its robustness has not been tested.

Source: authors' elaboration based on Startin.lv 2023; 2024.

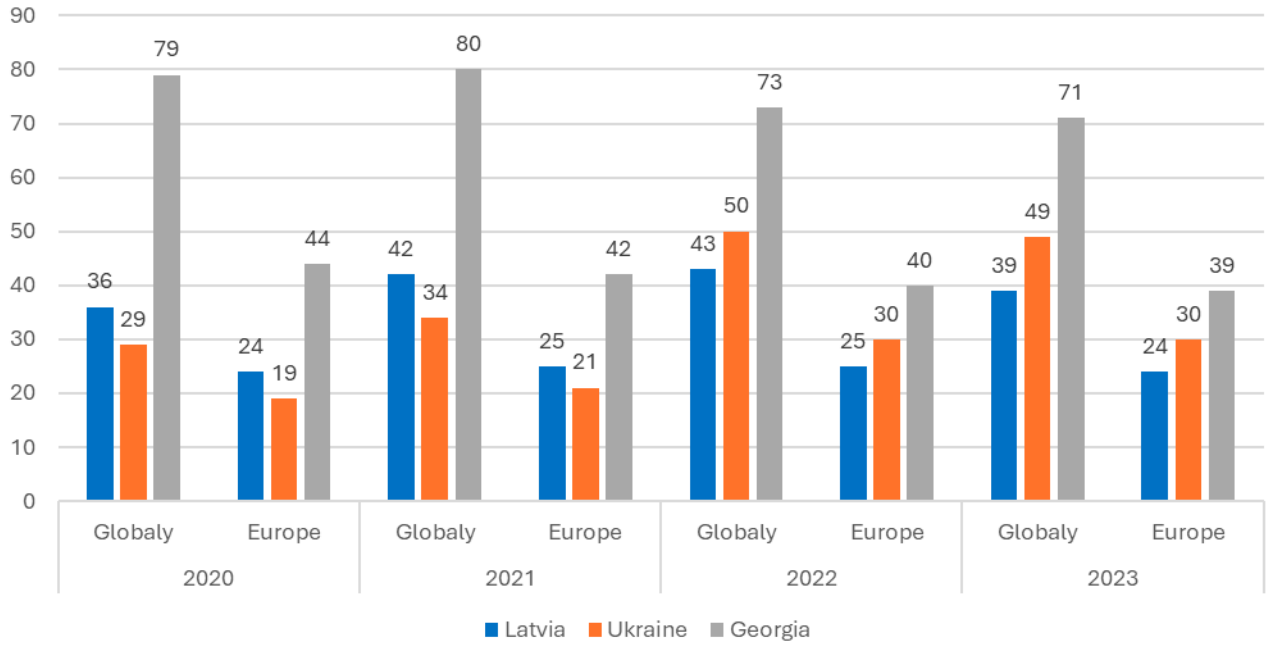


Figure 3. The dynamics of financing Latvian startups per 1,000 inhabitants, 2014–2024.

Source: authors' elaboration based on Startin.lv 2023; 2024.

Table 2. The dynamics of inflation and the unemployment rate in Latvia, 2014–2024

Indicator	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Average inflation rate (annual %)	0.62	0.17	0.14	2.93	2.53	2.81	0.22	3.28	17.31	8.94	1.27
Unemployment rate (% of total labor force)	10.85	9.87	9.64	8.72	7.41	6.31	8.1	7.51	6.82	6.47	6.72

Source: World Bank Group n.d.

Table 3. Regression results: dynamics of financing Latvian startups

Regression Statistics	
Multiple R	0.831226
R Square	0.690937
Adjusted R Square	0.613671
Standard Error	8,470.199
Observations	11

Variable	Coef.	Std. Err.	T	P > |t|	[95% Conf. Interval]	
Intercept	−36,524.5	17,699.61	−2.06357	0.072954	−77,339.8	4,290.918
INF	2,469.046	601.5466	4.104497	0.003416	1,081.877	3,856.215
UN	6,022.767	2,026.412	2.972134	0.017813	1,349.854	10,695.68

Source: authors' elaboration based on Startin.lv 2023; 2024.

The estimated regression equation is:

$$Y^{\wedge} = -36{,}524.45 + 2{,}469.05 \cdot \mathrm{INF} + 6{,}022.77 \cdot \mathrm{UN}.$$

The model is statistically significant at the 5% level and explains approximately 69% of the variation in startup financing. Adjusted R^2 indicates moderate explanatory power. Both inflation and unemployment exert a positive and statistically significant influence:

A one-unit increase in inflation is associated with an average rise of ~2,469 units in startup financing (holding unemployment constant).

A one-unit increase in unemployment is associated with an average rise of ~6,023 units (holding inflation constant).

The intercept is not statistically significant, which is common, as a value of zero for both predictors does not necessarily hold economic meaning.

From an economic perspective, higher unemployment may encourage individuals to pursue entrepreneurial activity out of necessity, thereby driving startup creation. Similarly, inflationary pressures can redirect capital toward more profitable sectors, stimulating demand for innovative and resource-saving solutions.

However, given the small sample size, these findings should be interpreted with caution. For predictive or policymaking purposes, additional data and more comprehensive models would be necessary.

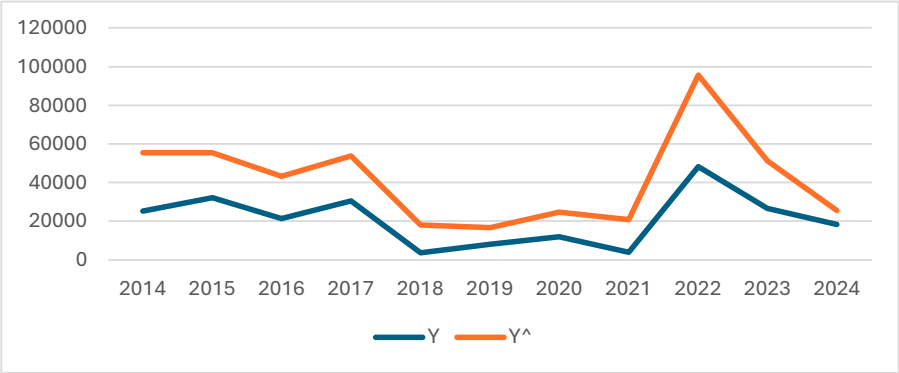


Figure 4. The dynamics of financing Latvian startups per 1,000 inhabitants, 2014–2024 (predicted Y^ and fact Y)

Source: authors' elaboration based on Startin.lv 2023; 2024.

Table 4. Investments in Ukrainian startups, 2014–2024

Indicator	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Investments in Ukrainian startups, € millions	32	132	72	235	274	484	501	705	208	194	428
Per 1,000 inhabitants, €	687	2,873	1,580	5,161	6,055	10,764	11,210	15,917	5,058	5,129	11,299

Source: authors' elaboration based on Forbes Ukraine 2023; 2025.

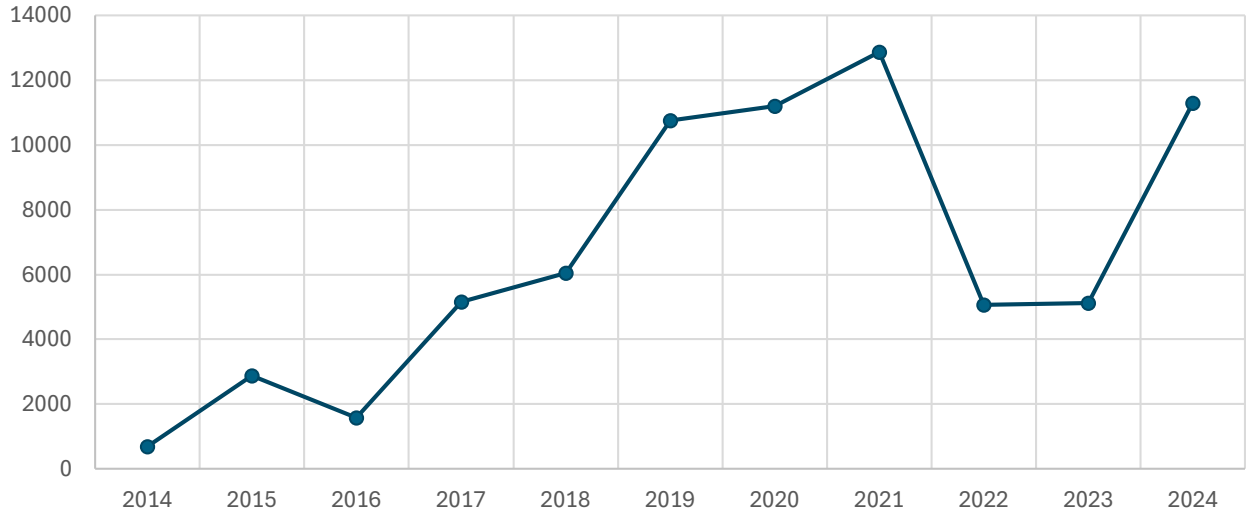


Figure 5. The dynamics of financing Ukrainian startups per 1,000 inhabitants, 2014–2024

Source: authors' elaboration based on Forbes Ukraine 2023; 2025.

Table 5. Regression results: dynamics of Ukrainian startup financing

Regression Statistics	
Multiple R	0.626906
R Square	0.393012
Adjusted R Square	0.325568
Standard Error	3,917.481
Observations	11

Financing of startups	Coef.	Std. Err.	t	P > |t|	[95% Conf. Interval]	
Intercept	−1,813,572.71	754,132.1	−2.40487	0.0396	−3,519,537	−107,607
T	901.663	373.517	2.414	0.039	56.708	1,746.618

Source: authors' elaboration based on Forbes Ukraine 2023; 2025.

The regression equation for Ukraine is:

$$Y^{\wedge} = -1{,}813{,}572.71 + 901.66 \cdot T.$$

A one-unit increase in the predictor variable T is associated with an average increase of about 902 units in the dependent variable. The effect of T is both positive and statistically significant.

The model explains about 39.3% of the variability in the dependent variable, which is considered a moderate explanatory power. The overall regression model is statistically significant at the 5% level

Since the intercept is large and its value when T = 0 may lack a meaningful real-world context, the focus should remain on the slope. The regression findings are associational, as further diagnostic checks like autocorrelation were not performed.

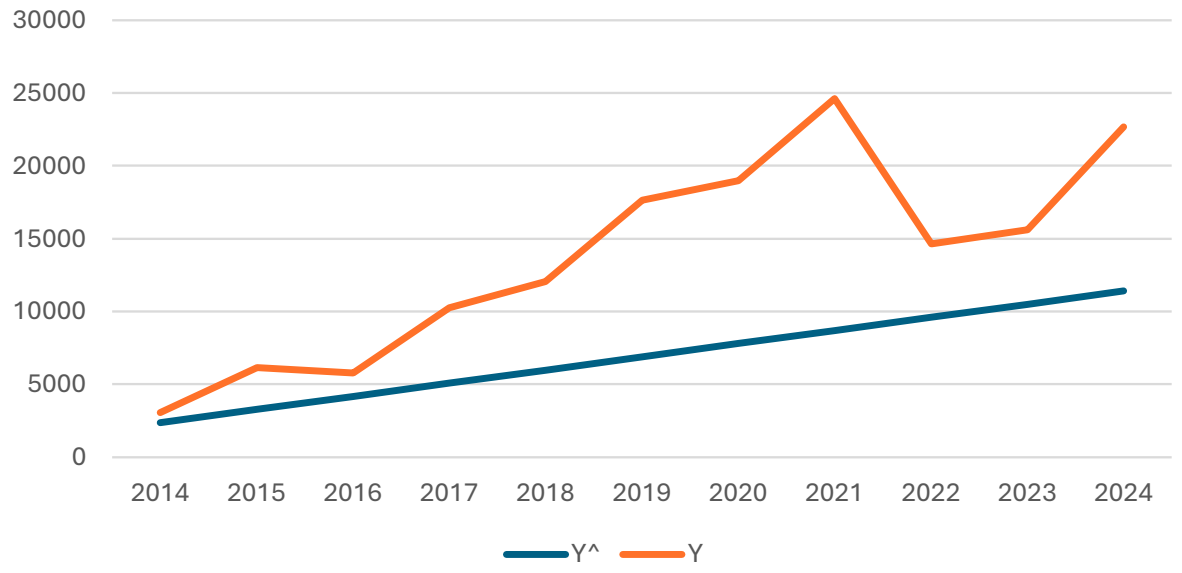


Figure 6. The dynamics of financing Ukrainian startups per 1,000 inhabitants, 2014–2024 (predicted Y^ and fact Y)

Source: authors' elaboration based on Forbes Ukraine 2023; 2025.

The trend lines indicate a positive trajectory in the financing and development of startups in Latvia and Ukraine. However, using a regression model to predict startup funding in these countries has important limitations that should be considered to avoid drawing erroneous conclusions. The main limitations include ignoring external factors, as the models are built only on the time axis, without taking into account influences such as the political situation (especially in Ukraine due to the war) and changes in international funding or donor initiatives to implement new startup funds. Additionally, the model assumes that past trends will continue into the future, automatically extrapolating past trends even if they are no longer relevant.

Development of startup ecosystems in Latvia, Ukraine, and Georgia

Comprehensive, well-thought-out, and long-term support for the development of innovative startups based on an ecosystem approach has proven its effectiveness worldwide. The success of ecosystem development depends on a whole range of factors. Startup Genome, one of the world's leading consulting companies specializing in innovative entrepreneurship, identifies the following key factors based on for evaluating startup ecosystems:

- Efficiency: Measured by indicators such as exit value (startup sales) over the past two and a half years, the number of successful startup launches, the number of startups reaching a valuation of 1 billion U.S. dollars, as well as the speed at which companies reach IPO/SPAC level or sell their business.
- Funding: Determined not only by the amounts invested in startups but also by the number of investors operating within the ecosystem and the accessibility of funding for startups at early stages of development.
- Market reach: Determined by a combination of factors, including the contribution of startups to the country's GDP, the ratio of major business sales to the volume of investments in the ecosystem, and national policies regarding the commercialization of intellectual property.
- Talent: Evaluated based on the number of students and postgraduates, the number of higher education institutions, and their international ranking (Startup Genome 2021).

The Startup Blink Research Center published the Global Startup Ecosystem Index for 2023 (Figure 7). Since 2017, the project has been tracking the state of the startup economy, describing growth dynamics and the main trends (Startup Blink 2025). Among the countries featured in the report are the startup ecosystems of Latvia, Ukraine, and Georgia, with all three countries ranking within the top 100 ecosystems in the world.

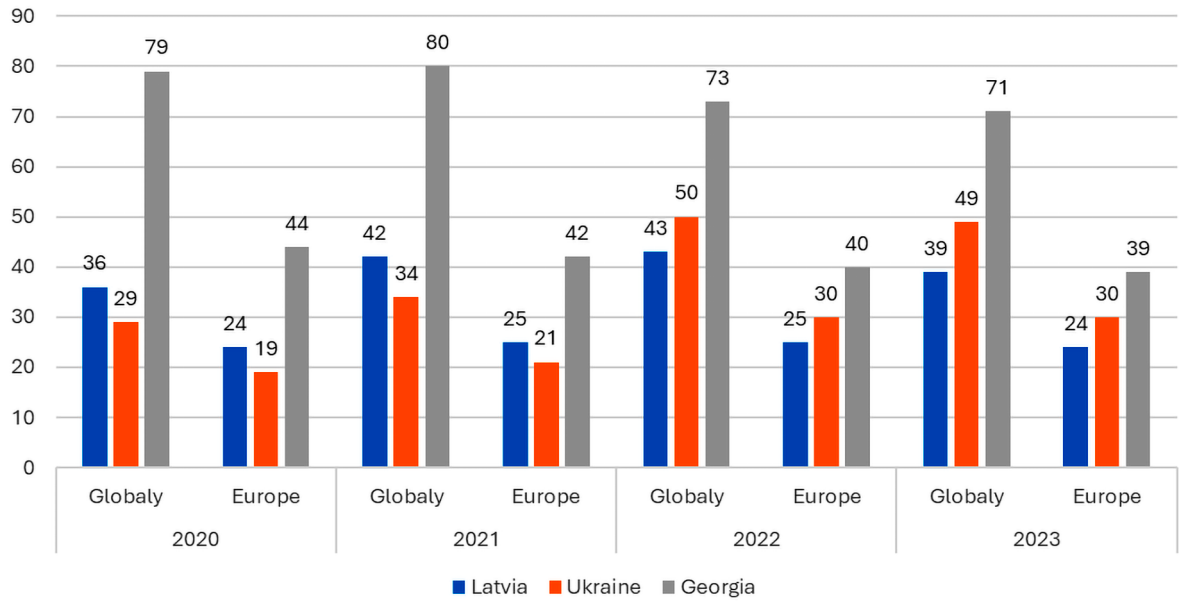


Figure 7. Global Startup Ecosystem Index 2023

Source: authors' elaboration on Startup Blink 2025.

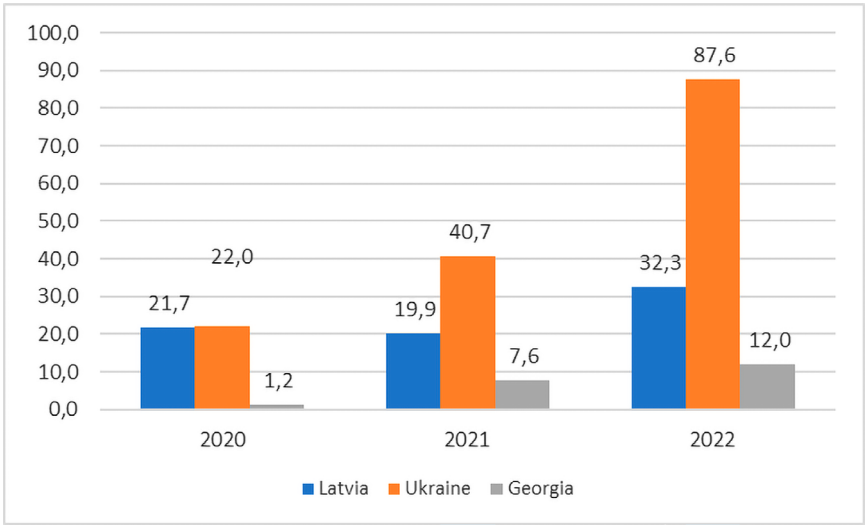


Figure 8. Funding in U.S. dollars (millions)

Source: authors' elaboration based on Startup Blink 2025.

Funding is crucial for launching startup ecosystems. In 2022, there was a significant increase in funding compared to 2021 and 2020. Funding in Ukraine in 2022 exceeds that in Latvia by 63% and in Georgia by 87%.

The Latvian startup ecosystem

The Latvian startup ecosystem comprises over 500 startup enterprises, with over half operating in the information and communication services sector and over 20% in manufacturing and professional, scientific, and technical services. In recent years, the number of people employed in startup enterprises has grown; between 2016 and 2020, the number of employees increased

by 12%, totaling 6,000 employees. Additionally, salaries in startup enterprises are nearly twice as high as the national average.

In 2022, Latvian enterprises attracted €61 million in funding, with the largest sources being "Juro", "Giraffe360", "Aerones", "Colizeum", and "SaltoX". According to the "Global Startup Ecosystem Index 2023" by StartupBlink, the Latvian startup ecosystem ranks 39th out of 150 countries worldwide. It has the potential to become a technological hub with access to the European market, as reported by the Public Relations Department of the Ministry of Economics.

To accelerate the growth of startups, the government offers extensive support, such as innovation vouchers, favorable regulations for startups, and startup visas, which are also positively evaluated by the industry. In the fall of 2022, the Strategy for the Development of the Startup Ecosystem for 2022–2025 was approved with the aim of developing a strong and unified startup ecosystem, implementing initiatives, and attracting talent to startups. In turn, the Law on Supporting Startup Activities was developed to promote the development of research projects and the commercialization of research products, while a fast-track residence permit for startup founders is being introduced. This permit allows third-country nationals to obtain the right to reside in Latvia for the purpose of establishing a startup enterprise and carrying out work to develop their own product and attract investments from qualified venture investors.

Startups play an important role in Latvia's economy by introducing innovative ideas and new technologies, facilitating the transition to a knowledge-based economy, and creating new industries. Additionally, startups cultivate a new entrepreneurial culture, focusing on long-term business models, as well as the circular and digital economies. Nevertheless, Latvia needs more startups, more employees working in them, and significantly more funding inflows.

To support the development of entrepreneurial activity and the implementation of business projects, including in the startup sector, a range of support instruments is planned for the next five years within the programs of the European Union's Structural Funds and Recovery Fund, with a total financing volume of over €500 million. This includes €183.5 million for digitization projects, €109 million to support small and medium-sized enterprises, including incentives for incubation, export, and business motivation, and over €228 million allocated for various financial instruments (including acceleration, loans, and guarantees).

In 2022, €60,000 was allocated from the state budget to support startups, specifically for organizing events. Four contracts were concluded with the Latvian Startup Association, the Latvian Business Angel Network, TechChill, and TechHub. Under these agreements, initiatives included developing and maintaining the startin.lv database, while the Latvian Business Angel Network organized 10 investment sessions for investors, presenting 62 startup companies.

The Ukrainian startup ecosystem

Despite facing economic difficulties for several years, Ukraine had managed to create an outstanding startup ecosystem, simultaneously scalable and global, even before the onset of the military conflict. This testifies to the talent and resilience of its workforce. Notable Ukrainian startups with large global user bases include People.ai, Grammarly, GitLab, Ahrefs, and Preply, all

of which are linked to a strong educational component. The main reason for Ukraine's success is the talent of its developers, sought after by many foreign companies both remotely and in local development centers.

One of the main challenges that the Ukrainian startup ecosystem will likely face is related to the unprecedented support it currently receives from other European countries, which allows Ukrainians to live and work in other countries for extended periods without returning to Ukraine. While this assistance is much needed during the war, there is no guarantee that Ukrainian technology and IT talents will return home after the war ends; yet their return will be essential to help restore the startup ecosystem to its former strength and vibrancy.

Several key aspects characterize the current state and challenges of the Ukrainian startup ecosystem:

- Ukrainian startups and technology companies demonstrate a high degree of resilience and adaptability, developing solutions that assist both in wartime and peacetime. Examples include the development of software for cybersecurity, drones, and robotics.
- Ukraine has strong positions in cybersecurity and artificial intelligence.
- The war has affected the growth of security-related industries, but the Ukrainian startup fund supports projects that could be used during the war and for post-war modernization.
- The international business community shows strong support for Ukrainian startups: Google established the Support Fund for Ukraine, the EU has included targeted support for Ukraine in its Horizon Europe research and innovation program, and Network VC in the USA created a Special Venture Fund and a program to support Ukrainian startups.
- In 2019, the Ukraine Startup Fund was created, and a Strategic Vision for 2025 was developed to support early-stage startups through funding, expand access to support services, and strengthen globally competitive incubation and acceleration programs. Over 200 startups have benefited from this fund.
- The IT sector has always been a key priority for the Ministry of Digital Transformation. Ukraine offers the best platform for the latest technologies, especially for the development of defense-related solutions.

The Georgian startup ecosystem

The Georgian ecosystem is an example of successful economic modernization. The Ministry of Economy and Sustainable Development, through Georgia's Innovation and Technology Agency (GITA), and the Startup Bureau, are major government and private sector supporters. They collaborate to organize events like hackathons, training, and acceleration programs to develop skills and capacity nationwide (Startup Büro 2024). A variety of innovation centers and laboratories, including over twenty Fab-Labs, have been opened throughout the country. Other crucial platforms include the Spark platform, the Startup Factory at the University of Georgia, the Batumi Business Incubator (Batumi being the administrative center of the Autonomous Republic of Adjara, a Georgian autonomy), and Startup Grind Tbilisi. Additional hubs like the new Entrepreneurship Center of the International Chamber of Commerce and coworking

spaces such as Impact Hub in Tbilisi also play a vital role. The country also benefits from international programs like FasterCapital and the 500 Startups acceleration program, launched with the support of the World Bank.

Georgia is an attractive location for startups due to its business-friendly climate. The country features streamlined business registration, startup-friendly tax legislation, and low labor costs, all of which provide access to the European market. Over 60% of the population speaks English, and Georgia is becoming increasingly popular among expatriates and digital nomads, which will contribute to its knowledge base and talent pool in the future. Major startups include the crypto-biometric network Humanode, the e-commerce payment platform PAYZE, and the gaming platform BitSport (Startup Blink 2023).

Nonetheless, challenges remain. There is a lack of experienced entrepreneurs and a small domestic consumer market, which reflects the country's small population. This pushes local entrepreneurs toward the global market. There is also limited access to financial capital, both from foreign and domestic investors. As a result, startups mainly receive funding through government programs, competitions, and investment programs from various banks.

Despite these challenges, Georgia's startup ecosystem is actively implementing supportive initiatives, helping young entrepreneurs to develop and implement their innovative business ideas (Dempwolf, Auer, and D'ippolito 2014, p. 6; Cukier, Kon 2018; Cohen et al. 2019; Hottenrott and Richstein 2020; Crișan et al. 2021; Debets-kredīts 2023).

Common features of startup ecosystems in Latvia, Ukraine, and Georgia

Despite differences in economic development, culture, and market conditions, Latvia, Ukraine, and Georgia share several common trends typical of the development of startup ecosystems in these countries (Menshikov et al. 2024). These features reflect global trends in the world of startups and innovation:

1. All three countries demonstrate a strong orientation towards the development of technological and IT startups (Simakhova et al. 2024). This is related to the global demand for technological innovations and the availability of technically educated specialists.
2. Governments actively stimulate the development of startup ecosystems through tax incentives, grants, and financing for innovative projects.
3. These countries have active and mutually supportive startup communities that facilitate the exchange of knowledge, experience, and best practices through events, conferences, and networking meetings.
4. Startups aim to go global and attract foreign investments by participating in international acceleration programs, exhibitions, and pitch events.
5. Entrepreneurs and startups actively integrate into the global ecosystem, utilizing international crowdfunding platforms, communication channels, and sales platforms, allowing them to expand their presence and attract customers from around the world.

6. Educational programs and initiatives aimed at preparing professionals in the fields of entrepreneurship, innovation, and technology, including programs at universities and private academies, play an important role in ecosystem development.

These common features underscore that despite the diversity and uniqueness of each country, there is a shared aspiration to develop innovative entrepreneurship and create favorable conditions for the growth and advancement of startups. Comparing the opportunities for startup financing in Latvia, Georgia, and Ukraine reveals both similarities and differences in the investment landscapes of these countries. These differences are often driven by economic development, political stability, and the presence of developed innovation and entrepreneurship support infrastructure.

Latvia, as a member of the European Union, has access to various European support programs, including grants, funds, and investment initiatives. Latvian startups can receive support through EU funds: Latvia actively utilizes EU structural funds to support small and medium-sized businesses, local venture funds, and angel investors. The developing venture capital sector is supported by state initiatives to stimulate investments in innovative companies.

Ukraine is also striving to stimulate the development of startups. There is a growing number of venture funds and angel investors interested in technology and innovative startups. State support and international cooperation are evident through entrepreneurship support programs, including grants and loans, often implemented in partnership with international financial institutions.

Georgia has taken significant steps in recent years to attract investors, support its startups, and improve its investment climate. State support programs, such as the "Produce in Georgia" program, and other initiatives aimed at supporting startups and innovative projects, are in place. Additionally, international organizations actively participate in entrepreneurship support programs.

Common trends and challenges

All three countries face common challenges, such as the need to improve the legislative framework to protect investments, streamline business procedures, and strengthen institutional support for innovation. However, they also build on their unique advantages and resources to attract venture capital and develop startup ecosystems. The effectiveness of startup financing in these countries largely depends on their ability to continue integrating with global markets, improving the business climate, and creating favorable conditions for entrepreneurs and investors.

Latvia exhibits elements characteristic of the **Scandinavian model**, with strong government support for innovation and active development of infrastructure for startups, such as technology parks, incubators, and accelerators. The country also focuses on developing human capital and attracting foreign investments, making its startup ecosystem appealing to international partners.

Latvia is known for its strong innovation culture and active technology scene, particularly in sectors such as fintech, deep tech, and green innovations. The Latvian government offers

various support programs for startups, including tax incentives and funding, making the country attractive for entrepreneurs. Due to its geographical location, Latvia serves as a "bridge" between the markets of Eastern and Western Europe, creating additional opportunities for business scaling.

Ukraine's ecosystem can be partially compared to the **Bangalore model** due to its strong development in the IT sector and a significant volume of outsourcing services. The country boasts a large number of technically educated specialists and successful tech startups. It also demonstrates elements of the **Israeli model** through efforts to create innovative infrastructure and attract investments, positioning itself as both an outsourcing and product hub for many international companies. Ukraine is known for its strong IT competencies, highly skilled developers, and engineers. There are also numerous initiatives and events for startups. Many Ukrainian startups are oriented towards international development and collaboration, which enables them to successfully attract foreign investments.

In the current conditions, the key for the Ukrainian startup ecosystem is the support of the international community, attracting investments into high-tech and defense startups, as well as preserving and developing human capital. Ukraine continues to demonstrate significant potential in the high-tech field, making it attractive to international investors interested in technological innovations.

Georgia, with its actively developing entrepreneurial sector and efforts to create a favorable business environment, partially corresponds to the **Scandinavian model**, with an emphasis on supporting social entrepreneurship and innovation. State support programs for startups and initiatives to attract investments also contribute to shaping a favorable environment for startup growth. Georgia is actively working on creating favorable conditions for startups, including simplifying the tax system and providing grants and funding for aspiring entrepreneurs. Some of the most promising directions for startups in Georgia are tourism and agrotechnology, reflecting the country's natural and cultural characteristics. Georgia also attracts foreign investors and entrepreneurs interested in developing local innovative projects and expanding into new markets.

Access to international markets is a critical factor for all three countries, enabling startups to scale up, attract investment, and find new customers, while sector-specific dynamics (e.g., the development of IT, agtech, or fintech) shape competitive advantages and areas of innovation in these countries. A clear understanding of global trends and local industry specifics helps startups to adapt their products more effectively and carve out niches in the international arena.

Limitations of the study

This article examines the development of startups in Ukraine, Latvia, and Georgia, considering factors such as economic, political, and military instability, data limitations, and the reliability of forecasts. The analysis relies on startup funding data and the Global Startup Ecosystem Index, but several constraints should be acknowledged:

1. Data Limitations: For Latvia and Ukraine, funding trends were analyzed from 2014 to 2024, but data availability and accuracy may vary due to reporting inconsistencies. Georgia's startup funding data was particularly limited, restricting the depth of analysis compared to the other two countries.
2. Economic and Political Instability: Ukraine has been significantly affected by the full-scale war since 2022, disrupting economic activity, investment flows, and startup growth. Consequently, pre-war trends may not accurately reflect current conditions. Meanwhile, Georgia's political volatility and economic dependency on external factors may influence startup ecosystem dynamics unpredictably.
3. Military Conflicts: The war in Ukraine has led to capital flight, talent migration, and the destruction of infrastructure, making long-term projections highly uncertain. Georgia's unresolved territorial conflicts and regional tensions add another layer of risk for investors and entrepreneurs.
4. Reliability of Forecasts: The startup ecosystems in these countries are influenced by external shocks, making trend extrapolation unreliable.

While this study provides an overview of startup trends in Latvia, Ukraine, and Georgia, the findings should be interpreted with caution due to data gaps, geopolitical risks, and the inherent unpredictability of crisis-affected economies. Future research would benefit from more frequent and detailed data collection, as well as scenario-based modeling to account for instability.

Conclusion and recommendations

This study explores the development of startup ecosystems in Latvia, Ukraine, and Georgia using comparative, statistical, and contextual methods. The analysis reveals both structural similarities, such as the dominance of the IT sector, government support mechanisms, and a strong drive for internationalization, as well as significant differences, particularly regarding investment flow stability, data transparency, and the maturity of institutions.

Our findings partially align with the existing literature but diverge in several key areas. Like Feld (2012) and Cohen et al. (2019), we observed the pivotal role of government in shaping ecosystems. Initiatives like the Ukrainian Startup Fund, Latvia's startup visas, and GITA in Georgia are essential in early-stage development.

The dominance of IT-related startups across all three countries supports the conclusions of Simakhova et al. (2024), which emphasize digital technologies as a primary innovation driver in post-socialist economies. However, our analysis affirms the concern raised by Crisan et al. (2021) about the risks of sectoral overconcentration, especially in Georgia, where a small internal market and narrow specialization may limit long-term scalability.

The comparative perspective suggests that the scale of the economy, geopolitical conditions, and level of integration into international markets influence the resilience and growth trajectories of startup ecosystems. Ukraine's stronger statistical trend may reflect high pre-war

momentum in financing growth, while Latvia's moderate trend indicates other unmeasured drivers of ecosystem performance. Georgia's case illustrates how small-market constraints and data gaps can obscure underlying dynamics.

Rather than prescribing specific interventions, our findings point to several broad implications that merit further exploration. First, the concentration of the IT sector, while consistent with patterns in other post-socialist economies, raises questions about long-term diversification and resilience. Second, the early internationalization of startups appears to be both a growth strategy and a potential source of domestic ecosystem vulnerability, especially in contexts with significant talent outflow. Finally, strengthening the availability and quality of standardized startup and investment data is a cross-cutting priority, particularly in countries where ecosystem monitoring remains fragmented.

These insights are not definitive, but rather a starting point for policymakers, investors, and ecosystem actors to consider in light of local contexts and additional evidence. Future research could extend this work by incorporating longitudinal data, comparative analyses with other "peripheral" European economies, and qualitative interviews with founders and policymakers to deepen the link between empirical patterns and actionable strategies.

References

Autio, E., Kenney, M., Mustar, P., Siegel, D., Wright, M. (2014), *Entrepreneurial innovation: The importance of context*, "Research Policy", 43 (7), pp. 1097–1108, https://doi.org/10.1016/j.respol.2014.01.015

Bedianashvili, G. (2017), *Formation of Knowledge Economy and Innovative Entrepreneurial Policy: Institutional Aspects*, "Globalization and Business", 2 (3), pp. 10–16, https://eugb.ge/index.php/111/issue/view/2/52 (accessed: 9.03.2025).

Bedianashvili, G. (2018), *Culture as a Factor of Knowledge Economics with Paradigmatic Changes in Systemic Institutional Context*, "Globalization and Business", 3 (6), pp. 58–66, https://doi.org/10.35945/gb.2018.06.007

Cohen, S., Fehder, D.C., Hochberg, Y.V., Murray, F. (2019), *The design of startup accelerators*, "Research Policy", 48 (7), pp. 1781–1797, https://doi.org/10.1016/j.respol.2019.04.003

Crișan, E.L., Salanță, I.I., Beleiu, I.N., Bordean, O.N., Bunduchi, R. (2021), *A systematic literature review on accelerators*, "The Journal of Technology Transfer", 46, pp. 62–89, https://doi.org/10.1007/s10961-019-09754-9

Cukier, D., Kon, F. (2018), *A maturity model for software startup ecosystems*, "Journal of Innovation and Entrepreneurship", 7, 14, https://doi.org/10.1186/s13731-018-0091-6

Debets-kredīts (2023), *Wide range of support opportunities will be available for the development of startups in Latvia in the coming years*, https://www.d-k.lv/rus/news/32195/ (accessed: 9.03.2025).

Dempwolf, C.S., Auer, J., D'ippolito, M. (2014), *Innovation Accelerators: Defining Characteristics Among Startup Assistance Organizations*, https://advocacy.sba.gov/2014/10/01/innovation-accelerators-defining-characteristics-among-startup-assistance-organization/ (accessed: 9.03.2025).

Feld, B. (2012), *Startup communities: Building an Entrepreneurial Ecosystem in Your City*, Wiley, Hoboken, https://doi.org/10.1002/9781119204459

Forbes Ukraine (2023), *Investments in Ukrainian startups are at a seven-year low. There have been no big rounds for almost six months. When will Ukrainian venture capital come out of its coma?*, https://forbes.ua/innovations/investitsii-v-ukrainski-startapi-na-semirichnomu-minimumi-velikikh-raundiv-nemae-mayzhe-piv-roku-to-ukrainskiy-venchur-u-komi-23052023-13807 (accessed: 8.08.2025).

Forbes Ukraine (2025), *The tech sector is returning to the level of 2021 – AVentures Capital. How much investment have Ukrainian startups attracted*, https://forbes.ua/news/tekhnologichniy-sektor-povertaetsya-na-riven-2021-go-aventures-capital-skilki-investitsiy-zaluchili-ukrainski-startapi-03032025-27673 (accessed: 8.08.2025).

Fritsch, M. (2019), *Entrepreneurship: Theorie, Empirie, Politik*, Springer-Verlag GmbH Deutschland, Berlin, https://doi.org/10.1007/978-3-662-57984-8

Hottenrott, H., Richstein, R. (2020), *Start-up subsidies: Does the policy instrument matter?*, "Research Policy", 49 (1), 103888, https://doi.org/10.1016/j.respol.2019.103888

Isenberg, D.J. (2011), *The entrepreneurship ecosystem strategy as a new paradigm for economic policy: Principles for cultivating entrepreneurship*, Institute of International and European Affairs, Dublin.

Kim, B., Kim, H., Jeon, Y. (2018), *Critical Success Factors of a Design Startup Business*, "Sustainability", 10 (9), 2981, https://doi.org/10.3390/su10092981

Lee, I., Shin, Y.J. (2018), *Fintech: Ecosystem, business models, investment decisions, and challenges*, "Business Horizons", 61 (1), pp. 35–46, https://doi.org/10.1016/j.bushor.2017.09.003

Menshikov, V., Ruza, O., Kokina, I., Arbidane, I. (2022), *Entrepreneurial university: topicality of creation, international experience, situation in Latvia*, "Entrepreneurship and Sustainability Issues", 9 (4), pp. 156–177, http://doi.org/10.9770/jesi.2022.9.4(8)

Menshikov, V., Ruza, O., Simakhova, A. (2025), *Role of Startups in Promoting Innovations and Sustainable Economic Growth*, "European Journal of Sustainable Development", 14 (2), 26, https://doi.org/10.14207/ejsd.2025.v14n2p26

Menshikov, V., Ruza, O., Simakhova, A., Semeneca, J. (2024), *Development of start-up ecosystems in selected countries with a focus on the cases*, "Entrepreneurship and Sustainability Issues", 12 (1), pp. 437–449, https://doi.org/10.9770/jesi.2024.12.1(27)

Moore, J.F. (1993), *Predators and Prey: A New Ecology of Competition*, https://hbr.org/1993/05/predators-and-prey-a-new-ecology-of-competition (accessed: 9.03.2025).

Simakhova, A., Menshikov, V., Ruza, O., Nikolaiev, K. (2024), *Trends in the development of startup infrastructures in Ukraine, Latvia and Georgia*, "Journal of Infrastructure, Policy and Development", 8 (9), 7000, https://doi.org/10.24294/jipd.v8i9.7000

Stam, E. (2015), *Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique*, "European Planning Studies", 23 (9), pp. 1759–1769, https://doi.org/10.1080/09654313.2015.1061484

Startin.lv (2023), *Latvian Startup Report 2023*, https://startin.lv/wp-content/uploads/2024/02/Latvian_Startup_Report_2023.pdf (accessed: 8.08.2025).

Startin.lv (2024), *Latvian Startup Report 2024*, https://www.latvia.eu/uploads/2025/02/latvian_startup_report2024.pdf (accessed: 8.08.2025).

Startup Blink (2023), *Global Startup Ecosystem Index 2023*, https://www.startupblink.com/blog/global-startup-ecosystem-index (accessed: 9.03.2025).

Startup Blink (2025), *Global Startup Ecosystem Index 2025*, https://www.startupblink.com/startupecosystemreport (accessed: 5.09.2025).

Startup Büro (2024), https://startupburo.org/ (accessed: 13.04.2024).

Startup Genome (2021), *The Global Startup Ecosystem Report GSER 2021*, https://cdn.startupgenome.com/sites/62c58b4d00b3f50043b92724/content_entry62c58c4b00b3f50043b92770/62c59d2e61a37b003ec28d70/files/Global_Startup_Ecosystem_Report_GSER_2021.pdf?1657121756 (accessed: 9.03.2025).

World Bank Group (n.d.), *Inflation, consumer prices (annual %)*, https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG (accessed: 1.09.2025).

Ziakis, C., Vlachopoulou, M., Petridis, K. (2022), *Start-Up Ecosystem (StUpEco): A Conceptual Framework and Empirical Research*, "Journal of Open Innovation: Technology, Market, and Complexity", 8 (1), 35, https://doi.org/10.3390/joitmc8010035

Wspólne i specyficzne cechy rozwoju ekosystemów start-upowych na Łotwie, w Ukrainie i Gruzji

W artykule przedstawiono kompleksową analizę i porównanie ekosystemów start-upowych na Łotwie, w Ukrainie i Gruzji. Zidentyfikowano kluczowe czynniki sprzyjające ich rozwojowi i wzrostowi oraz wskazano główne przeszkody i wyzwania, przed którymi stoją start-upy w tych krajach. W tym celu zastosowano następujące metody: analizę korelacji i regresji w celu zbadania trendów finansowania i czynników sukcesu, analizę porównawczą kluczowych parametrów ekosystemu oraz syntezę. Nowatorski charakter badania polega na zidentyfikowaniu najważniejszych czynników wpływających na rozwój start-upów w trzech badanych krajach, skonstruowaniu modelu korelacji i regresji finansowania start-upów oraz przeprowadzeniu analizy porównawczej ekosystemów start-upowych. Porównanie ekosystemów start-upowych tych trzech krajów ujawniło zarówno wspólne, jak i specyficzne cechy każdego z nich, podkreślając, w jaki sposób różnice w warunkach politycznych, gospodarczych i kulturowych kształtują rozwój start-upów.

Słowa kluczowe: start-up, ekosystem start-upów, rozwój gospodarczy, Ukraina, Gruzja, Łotwa

Comparative Economic Research. Central and Eastern Europe
Volume 28, Number 4, 2025
https://doi.org/10.18778/1508-2008.28.28

Social Justice in the Countries of Central and Eastern Europe

Katarzyna Skorupińska-Cieślak https://orcid.org/0000-0002-8939-7360
Associate Professor, University of Lodz, Faculty of Economics and Sociology, Department of Institutional Economics and Microeconomics, Lodz, Poland, e-mail: katarzyna.skorupinska@uni.lodz.pl

Abstract

The article aims to compare the level of social justice in the countries of Central and Eastern Europe (CEE) in terms of the individual indicators that constitute the Social Justice Index and to determine their level of convergence with the European Union average. The paper also describes changes in this area of social justice in recent years and examines the relationship between social justice and industrial democracy. The analysis was based on statistical data from Eurostat and the results of a study conducted by the European Foundation for the Improvement of Living and Working Conditions, the European Institute for Gender Equality, and the Legatum Institute. The findings show that Romania achieves the worst results in most indicators in the Social Justice Index, but many of them have improved significantly in recent years. Slovenia, Czechia and Slovakia are the most successful in preventing poverty and equalising income. The degree of gender equality in all CEE countries was lower than the EU27 average. Finally, CEE countries that promote social dialogue and employee participation rights also have higher levels of social justice.

Keywords: social justice, poverty, industrial relations, Central and Eastern Europe

JEL: D63, I24, J53

Funding information: University of Lodz, Faculty of Economics and Sociology, Department of Institutional Economics and Microeconomics, Lodz, Poland
Declaration regarding the use of GAI tools: Not used.
Conflicts of interests: None.
Ethical considerations: The Author assures of no violations of publication ethics and takes full responsibility for the content of the publication.
Received: 11.03.2025. Verified: 11.04.2025. Accepted: 30.09.2025

Introduction

Justice is one of the most important ethical and moral values. Sociologists, economists, psychologists, lawyers, and politicians have participated in discussions around this concept (Rosner 2022). While justice and social justice are areas of academic research and subjects of theoretical work, they are ambiguous and vague concepts (Wilkin 2023). Some studies have focused on general aspects, such as equality and freedom (Sen 2000; Rawls 2009); others have dealt with specific aspects, such as happiness (Di Martino and Prilleltensky 2019), while still others have discussed the relationship between efficiency and justice (Okun 1975; Stiglitz 2004). As Rosner (2022, pp. 17–20) points out, apart from social justice, the typology based on the distinction of the sphere of reality that justice concerns also points to historical justice, international justice, and territorial justice.

Research in the area of social justice has also been conducted by Bertelsmann Stiftung, which developed the Social Justice Index (SJI) and has been publishing rankings of EU countries since 2009. In the latest report (Hellmann, Schmidt, and Heller 2019), the index includes not only the EU but also OECD member states. The index groups 46 indicators into six subdimensions: poverty prevention, access to education, labour market inclusion, social cohesion and non-discrimination, health, and intergenerational justice. In this paper, another SJI is analysed, which is a component of the Industrial Relations Index (IRI) developed by the European Foundation for the Improvement of Living and Working Conditions (Eurofound). The other components (dimensions) of the IRI are industrial democracy, industrial competitiveness, and quality of work and employment.

Eurofound's 2023 report presents only aggregate results of the SJI and its three subdimensions in EU countries for 2018–2021[1]. Therefore, the main aim of this paper is to compare the level of social justice in the countries of Central and Eastern Europe (CEE) in terms of the individual indicators that constitute the SJI and to determine their level of convergence with the EU average. The paper also details changes in this area in recent years and examines the relationship between social justice and industrial democracy, which is the author's main research area. The CEE countries share a common past, including post-communist transformation and accession to the European Union (EU). After joining the EU, these countries recorded dynamic economic growth and significant improvement in labour standards, supported by institutional reforms and the development of forms of employee participation. However, differences between the CEE countries in terms of industrial relations and the level of social justice – including poverty rates and income inequality – remain significant. This is mainly due to differences in the pace of economic development, the effectiveness of implementing social policies and institutional reforms, and political factors (Kohl 2015; Skorupińska-Cieślak 2018; Görkey 2022; Nae, Florescu, and Bălăsoiu 2024).

To achieve the research purpose, the paper analyses the subject literature, data collected by the European Statistical Office (Eurostat), and results of studies conducted by the European Institute for Gender Equality and Legatum Institute. The paper is divided into five sections.

1 The Eurofound report (2023) also shows four clusters of EU Member States based on an updated typology of industrial democracy and presents analyses of trends and patterns of change in industrial democracy.

Following the introduction, Section 2 presents a short review of the literature on the subject of justice and social justice. Section 3 analyses the scores for the IRI and its four dimensions in CEE countries. Section 4 compares the countries in individual indicators in the areas of poverty and income inequality, social cohesion and non-discrimination, as well as equality of opportunities in education. Finally, Section 5 provides the conclusions.

Social justice – literature review

The idea of justice occupies a key place in both ethics and legal philosophy, with people applying it to their individual actions, public policies, and the law (Miller 2017). In Christianity, justice is considered to be one of the four fundamental moral virtues (the "cardinal virtues"), alongside prudence, moderation, and fortitude. Smith (2004, pp. 93, 351) argued that justice, defined as discreet and prudent behaviour towards others, is the most important of all virtues, and a violation of justice is an injury. Moreover, he pointed out that "beneficence, therefore, is less essential to the existence of society than justice. Society may subsist, though not in the most comfortable state, without beneficence; but the prevalence of injustice must utterly destroy it" (Smith 2004, p. 101).

According to Sztumski (2010, p. 67), social justice is an attempt to concretise the idea of justice. It focuses on three important issues for individuals and for collective life, i.e. 1) equal opportunities in socio-economic and political life, 2) the fair distribution of goods, and 3) equality before the law. Social justice is often presented as a justification for changes in social policy, pointing to the need to reduce excessive social and economic inequalities (Rosner 2022, p. 18). The term *social justice* is related to other values such as equality, freedom, social welfare, and collective values (Goleński 2013).

In *A Theory of Justice*, Rawls (2009, p. 34) claims that "the fundamental subject of social justice is the basic structure of society, and more precisely the way in which the main social institutions distribute basic rights and duties and determine the distribution of benefits arising from social cooperation". The main social institutions include a political constitution, basic economic arrangements, a competitive market, freedom of conscience, and a monogamous family. Rawls's theory of justice is based on two basic principles. The first principle concerns the primacy of fundamental freedoms, while the second formulates the conditions under which socio-economic inequalities are permissible and fair (Przybyła 2006, p. 17).

The concept of justice developed by Sen and Nussbaum, by promoting the capability approach, challenges Rawls' theory for failing to consider the needs of individuals and social groups, as well as the influences of social mentality (Miklaszewska 2014). This new vision of social justice is closely related to the promotion of happiness and well-being, proclaiming that capabilities are a means to an end. Capabilities represent a form of freedom that allows individuals to achieve valuable states of being and doing (Di Martino and Prilleltensky 2020, p. 1999).

Wilkin (2023, p. 28) considers social justice to be the most important type of justice, explaining that "what is fair and what is not is most often decided by the society or social group concerned…". Meanwhile, Sztumski (2010, p. 66) points out the ambiguity and indeterminacy of both components of the term *social justice*. In contrast, Friedrich von Hayek, a prominent figure of the Austrian

school of economics, completely rejected this concept. He argued that the term *social justice* does not introduce any new values beyond those included in the traditional understanding of the concept of justice, and adding the term *social* undermines the values encapsulated in the conventional understanding of justice (Kaczmarczyk 2010).

The concept of social justice is also a key value on which social economics is based. Other important values in this field include the common good, solidarity, participation, social responsibility, dignity, social cohesion, and subsidiarity. Social economics and social entrepreneurship are terms for business activities that combine both social and economic goals. To operate in the market, social enterprises conduct basic economic activities and must have at least a few paid employees. Their social dimension is characterised by prioritising individual and social goals over profit. Profits should be used to maximise social benefits, such as community development or creating jobs for people at risk of social exclusion (Kielesińska 2015). Social economics entities often include entities that operate in the area of public benefit, such as associations and foundations, cooperatives that pursue social goals, and reintegration units whose main goal is the social and professional reintegration of people at risk of social exclusion.

Social justice as a key dimension of industrial relations

The Eurofound report entitled *Industrial relations' influence on convergence: A literature review* defines industrial relations as "the joint (tri/bi)-partite governance of the collective and individual employment relationship" (Eurofound 2022, p. 2). According to Salamon (1987), the term *industrial relations* can be interpreted in two ways. In a very narrow sense, it comprises only the formal collective relations between management and workers, implemented through trade unions. However, in a broader sense, it includes all relationships associated with employment, both informal agreements between the employee and the employer and formal institutional arrangements.

Based on the conceptual framework of the Eurofound report (2016), the Industrial Relations Index (IRI) was developed. The IRI assesses the quality of industrial relations systems in EU countries, identifying key features, as well as strengths and weaknesses. It comprises four main dimension indices[2] (industrial democracy, industrial competitiveness, quality of work and employment, and social justice), eleven sub-dimension indices and 53 indicators, each scored from 0 to 100, with higher scores indicating better performance[3].

Industrial democracy is based on the autonomy of social partners and employees' rights to participate in and be represented in the management of employment relations. This dimension

2 These four dimensions have been weighted equally (0.25 for each). In terms of aggregation, the indicators were grouped, and the arithmetic mean created an index for each sub-dimension.

3 Compared to Eurofound's report *Measuring varieties of industrial relations in Europe: A quantitative analysis* (2018), the IRI has been updated with new indicators that aim to better capture key aspects of industrial relations and industrial democracy. The dimension that has changed the most in terms of indicators is quality of work and employment. In two dimensions, i.e. industrial competitiveness and social justice, changes in structure are insignificant.

comprises three subdimensions: (1) associational governance measured, among others, by the level of trade union density, employer organisation density, and collective bargaining coverage; (2) representation and participation rights at the company level; and (3) social dialogue at the company level.

The second dimension, i.e. industrial competitiveness, is associated with an economy characterised by sustained productivity growth. This dimension comprises four subdimensions: (1) productivity and growth, (2) market stability and efficiency, (3) sophistication of resources, (4) innovation and entrepreneurship.

The third dimension (job quality and employment) defines a set of employment and working conditions, which consists of four subdimensions: (1) career prospects and well-being, (2) employment security and skills development, and (3) work-life balance (Eurofound 2023).

Finally, social justice is a key dimension of industrial relations and a clear goal of industrial relations policy. It comprises three subdimensions: (1) poverty and income inequality, (2) social cohesion and non-discrimination, and (3) equality of opportunities in education. Social justice serves as a crucial ingredient for effective cooperation between capital and labour, thereby helping to prevent industrial conflict and social unrest.

A well-functioning and effective industrial relations system provides a balance between social justice (equality), industrial democracy (voice) and industrial competitiveness (efficiency). Social justice is also a central theme of many international organisations and research institutes that deal with industrial relations and social dialogue (Eurofound 2016).

Table 1. Industrial Relations Index scores in CEE countries, 2018–2021

	Industrial relations	Industrial democracy	Industrial competitiveness	Social justice	Quality of work and employment
Slovenia	56.6	61.4	48.2	62.3	55.6
Czechia	51.9	58.0	48.2	59.4	43.7
EU27	**49.9**	**53.6**	**49.9**	**50.5**	**48.1**
Estonia	48.9	33.4	49.4	54.9	63.1
Lithuania	43.8	41.0	39.2	46.8	48.9
Croatia	40.0	54.9	33.6	45.6	30.5
Latvia	39.1	33.1	33.2	44.6	47.8
Poland	38.8	36.0	34.5	53.5	33.9
Slovakia	38.6	48.2	34.6	48.3	27.5
Hungary	36.7	29.9	35.3	37.0	46.5
Bulgaria	29.5	35.6	18.7	30.0	37.5
Romania	29.2	39.3	20.8	28.4	31.2

Source: Eurofound 2023, p. 42.

Table 1 presents the scores for the IRI and its four dimensions for CEE countries between 2018 and 2021. It shows that only two CEE countries, Slovenia and Czechia, scored above

the EU27 average. Bulgaria and Romania ranked lowest (with scores below 30). Slovenia's top position may be partly due to the neocorporatist industrial relations regime there. According to Bohle and Greskovits'[4] typology of industrial relations for CEE countries, only Slovenia belongs to the neocorporatist regime, characterised by generous forms of the welfare state, very high rates of union density and high bargaining coverage, and limited dependence on foreign direct investment. Bulgaria and Romania, in turn, are countries that have been included (together with Estonia, Latvia and Lithuania) in the neoliberal industrial relations regime with a limited role of the state, fragmented forms of the welfare state, and a strong dependence on foreign direct investment. There are also internal differences within the cluster of countries, and the reforms and austerity measures carried out throughout Europe during the financial crisis caused the differences between the three regimes of industrial relations to decrease (Glassner 2013). Analysing the individual IRI dimensions reveals that in the industrial competitiveness dimension, no CEE country scored above the EU27 average. Estonia was ranked highest, with a score of just over 49. However, in the social justice dimension, four countries – Slovenia, Czechia, Estonia, and Poland – outperformed the EU27.

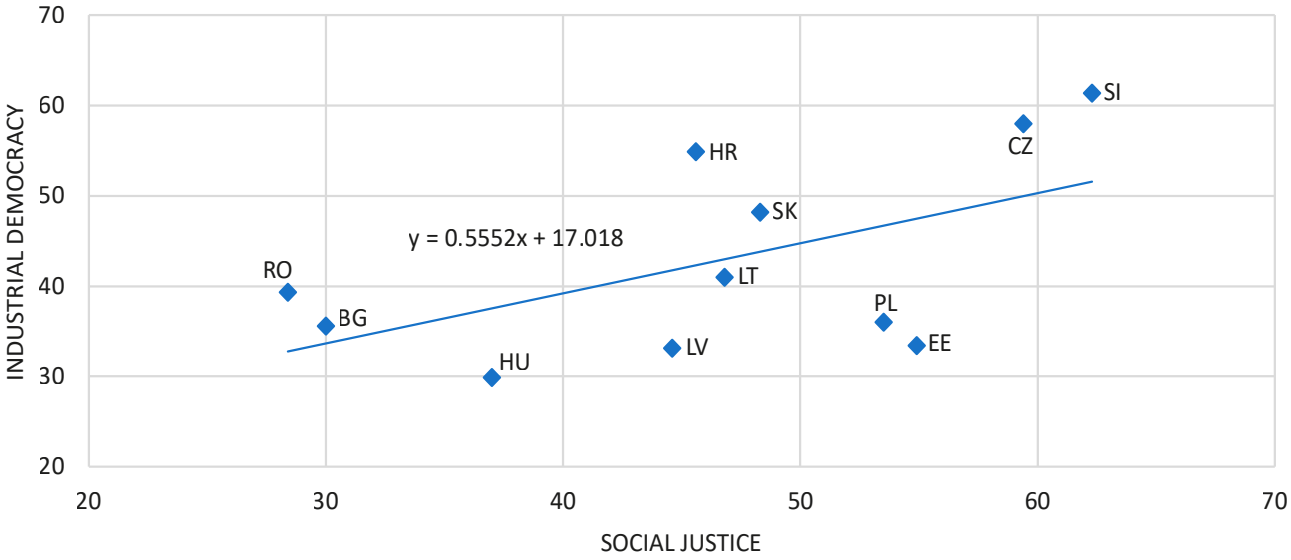


Figure 1. The relationship between social justice and industrial democracy in CEE countries

Source: own elaboration based on Table 1.

Figure 1 shows a positive relationship between the SJI and the industrial democracy index (r = 0.56). It indicates that higher levels of social justice are associated with higher levels of industrial democracy, which is achieved through social dialogue, workers' rights, and the organisational strength of workers and employers. Slovenia has the strongest workers' rights among CEE countries in the areas of board-level representation, works councils, strikes, and ratification of ILO core labour standards. This country also has the highest coverage of collective bargaining and the highest employer organisation density, as well as almost the highest trade union

4 Bohle and Greskovits emphasize two main elements in their typology, i.e. the key role of the state in creating welfare and industrial relations institutions, and the international influence of both the markets of other countries, the EU, and multinational corporations. They distinguished three industrial relations regimes: neoliberal, embedded neoliberal, and neocorporatist (Bohle and Greskovits 2012).

density. Simultaneously, Slovenia is a leader among CEE countries in the area of social justice, in particular achieving the best results in the subdimension of poverty and income inequality. Czechia also has a very high industrial democracy index, achieved primarily thanks to a high level of social dialogue at the company level. This corresponds to a very high level of social justice, achieved mainly thanks to educational opportunities.

At the other end of the spectrum, we have Romania and Bulgaria, with the lowest standards of industrial relations in the area of social justice and where industrial democracy is significantly low. In both countries, there is no employee representation at the board level, and there is no universal structure for employee representation in the workplace. Employees' rights to consultation and information are ensured either through a representative trade union organisation or through elected employee representatives. Moreover, Bulgaria has one of the lowest levels of trade union participation (see more: Skorupińska-Cieślak 2021). This may indicate that a lower level of workplace democracy and lower labour standards contribute to a lower level of social justice. Lissowska (2017) noted the relationship between a higher employment protection legislation (EPL) index, more frequent collective bargaining practices, and lower income inequality (and thus higher social justice) in post-transition countries. Meanwhile, Skorupińska-Cieślak (2018) pointed to the relationship between the greater strength of 'employee voice' expressed by the employee participation index and lower income inequality expressed by the Gini coefficient in CEE countries.

Subdimensions of the social justice index

The SJI comprises three subdimensions: poverty and income inequality, social cohesion and non-discrimination, and equality of opportunities in education. As Figure 2 shows, Slovenia and Czechia show balanced results in all subdimensions, ranking first in poverty and income inequality, with Czechia also excelling in equality in opportunities in education. In contrast, Estonia and Lithuania exhibit imbalances, performing well in equality in opportunities in education but significantly lower in poverty and income inequality. Slovakia scored high in poverty and income inequality but has room for improvement in social cohesion and non-discrimination. Bulgaria and Romania lag behind in all dimensions, highlighting significant challenges in achieving social justice. Poland has very high performance in equality of opportunities in education but relatively low scores in social cohesion and non-discrimination.

These results reflect the diverse outcomes in social justice policies among CEE countries, with some achieving notable successes while others face significant challenges. Below, we take a closer look at these three sub-dimensions of social justice, analysing their individual indicators in detail.

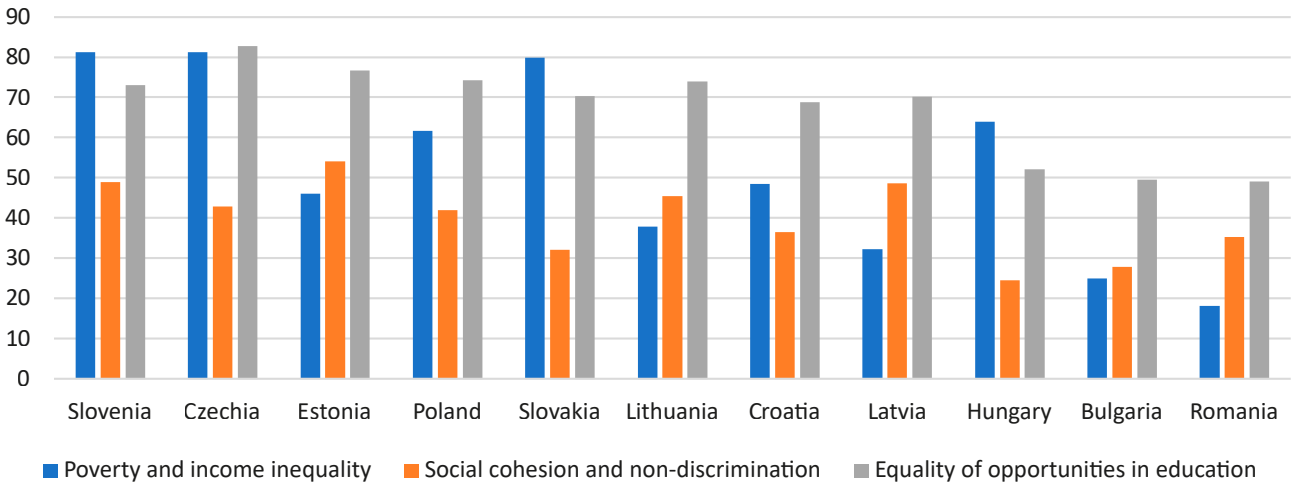


Figure 2. Subdimensions of the Social Justice Index in CEE countries, 2018–2021

Source: own elaboration based on Eurofound 2023, p. 45.

Poverty and income inequality

According to Eurofound's initial concept, the sub-dimension *poverty and income inequality* comprised the following indicators (Eurofound 2018, p. 24):

- The at-risk-of-poverty or social exclusion rate.
- The in-work poverty rate.
- The impact of social transfers (other than pensions) on poverty reduction.
- The income inequality (quintile share ratio S80/S20).

Each definition of poverty or social exclusion highlights different aspects of these two phenomena, emphasising their multifaceted nature, complexity, and the various dimensions they encompass. Initially, poverty was defined as the inability to meet basic human needs, which meant the inability to survive (Panek and Zwierzchowski 2016, p. 182). Over time, poverty was no longer identified only with income poverty, and the definition was significantly expanded. In *Poverty in the United Kingdom* from 1979, Townsend underlined the relative nature of poverty, defining it as the lack of resources necessary to participate in ordinary activities that constitute a normal life at an average level in a given community (Miłaszewicz et al. 2018, p. 138). Meanwhile, Sen's definition shifts the focus from low incomes to a broader view of the individual's capabilities to fully function in society. According to Sen, poverty is synonymous with a lack of freedom, where lack of income leads to the inability to achieve the same fundamental functions as others (Beyer 2014).

Poverty researchers agree that narrowly defining poverty only as the inability to meet needs due to financial problems does not encompass the concept of social exclusion, which is much broader (Kruszka 2008). According to Golinowska (2012, p. 99), the category of social exclusion shows the problems of human life in several dimensions, indicating both material deprivation and non-participation. It is the inability to participate in important aspects of social and economic life, political and cultural of a given society.

At the EU level, poverty is measured using indicators such as the rate of persons at risk of poverty or social exclusion. This indicator corresponds to the sum of individuals who are either at risk of poverty after social transfers, severely materially and socially deprived, or living in households with very low work intensity. People are counted only once, even if they fall into multiple categories (Eurostat 2024a).

As Table 2 shows, from 2015 to 2023, there was a general downward trend in the rates of people at risk of poverty or social exclusion. However, in Czechia, Slovenia, Estonia, and Slovakia, this rate increased slightly between 2021 and 2023. Despite clear improvement in this area (about 13 p.p. in eight years), this indicator remains very high in Bulgaria and Romania (30 and 32%, respectively, in 2023), about ten percentage points above the EU27 average. As Stanchev, Popova, and Brusis (2022) note, social policy in Bulgaria did not sufficiently take into account and integrate minorities, people with less than secondary education, and foreigners (especially refugees).

Regarding people at risk of poverty and social exclusion, in Romania, it is mainly children, youth (16 to 24 years old), the elderly (aged 65 plus), people with disabilities, and Roma who are at a heightened risk. The Romanian government has tried to mitigate the effects of social exclusion through social transfers, but as Figure 4 shows, the impact has been slight (Wagner, Stan, and Brusis 2022). Conversely, Czechia (12%) and Slovenia (13.7%) recorded the lowest rates. In Czechia, social exclusion is particularly common among the Roma population, who often fall into a spiral of debt (Guasti et al. 2021; Krašovec et al. 2024). Meanwhile, in Slovenia, although the overall risk of poverty is among the lowest in the EU, some groups, such as children from less educated backgrounds and single-person households, are exposed to a higher than EU average risk. Poland ranked third, at 16.3%; compared to 2015, it had decreased by 6.2. p.p.

Table 2. Persons at risk of poverty or social exclusion in CEE countries (% of population)

	2015	2017	2019	2021	2023
UE27	24.0	22.4	21.1	21.7	21.4
Slovenia	17.7	16.6	13.7	13.2	13.7 (2*)
Czechia	13.0	12.1	12.1	10.7	12.0 (1)
Estonia	23.6	23.3	23.7	22.2	24.2 (7)
Lithuania	29.4	29.8	25.5	23.5	24.3 (8)
Croatia	24.4	23.7	22.1	20.9	20.7 (6)
Latvia	30.0	28.5	26.7	26.1	25.6 (9)
Poland	22.5	18.7	17.9	16.8	16.3 (3)
Slovakia	17.3	15.8	14.8	15.6	17.6 (4)
Hungary	30.6	25.9	20.0	19.4	19.7 (5)
Bulgaria	43.3	38.0	33.2	31.7	30.0 (10)
Romania	44.5	42.5	36.1	34.4	32.0 (11)

* Position in the ranking

Source: Eurostat 2024b.

Considering the in-work poverty rate, the highest risk of poverty among employed people in 2023 was again recorded in Romania (15.3%). This country clearly stands out from the other countries in the region, where the differences are less pronounced (see Figure 3). In Romania, the at-risk rate was 7 p.p. higher than the EU27 average. Conversely, in Czechia, Slovenia, Croatia and Hungary, fewer than 7% of employed people were at risk of poverty. Across the entire group of CEE countries, there is a clear difference in the risk of poverty among employed people, amounting to 12.2 percentage points. According to Eurostat data, this indicator unfortunately increased in four out of the eleven CEE countries compared to 2015. The largest increases were recorded in Bulgaria and Slovakia, with rises of 3.7 and 3.1 p.p., respectively.

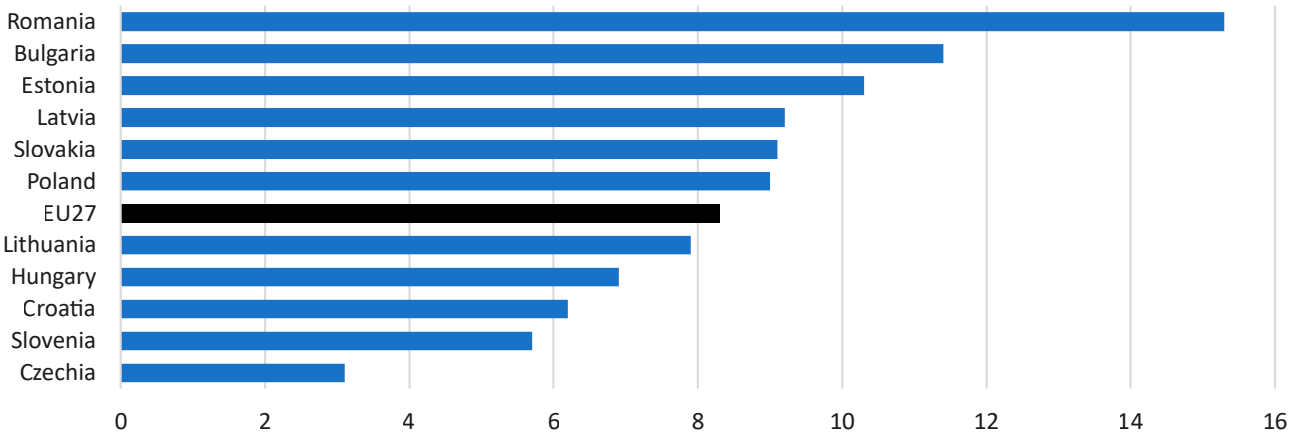


Figure 3. In-work poverty rate in CEE countries, 2023, (%)

Source: Eurostat 2024c.

Another indicator evaluates the effectiveness of social transfers in reducing poverty. In 2023, social transfers (excluding pensions) resulted in a reduction of just over one-third (34.7%) in the number of people classified as "at risk of poverty or social exclusion" within the EU. As Figure 4 shows, the extent to which social transfers reduce poverty among people varies slightly across the CEE countries. In four countries, the percentage reduction of people at risk of poverty was not much higher than the EU27 average. Notably, in several old EU countries, this reduction was approximately half or even more, such as 57.75% in Ireland. The smallest reduction took place in Romania, at only 15.6%, which is the lowest rate for the whole EU.

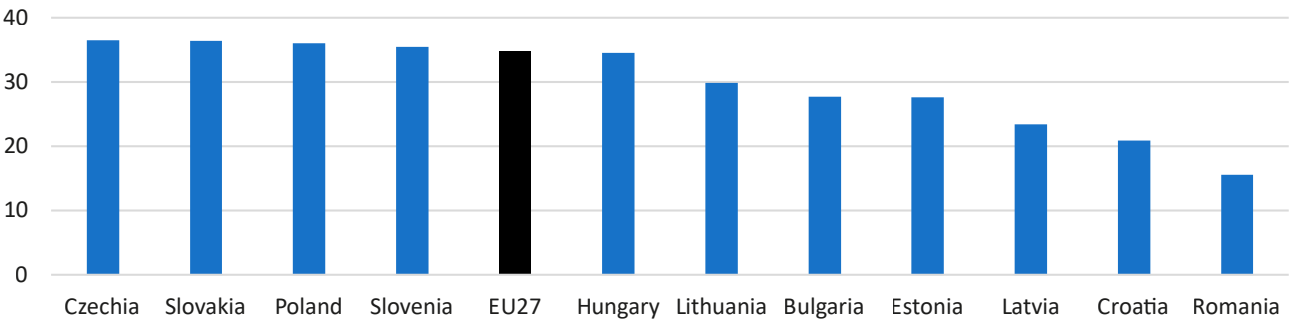


Figure 4. Impact of social transfers (excluding pensions) on poverty reduction in CEE countries, 2023 (%)

Source: Eurostat 2024d.

The last indicator in the sub-dimension of *poverty and income inequality* is the income quintile share ratio (S80/S20 ratio), which is one of the basic indicators of social inclusion. It is calculated as the ratio of disposable income received by the 20% of the population with the highest income to that received by the 20% with the lowest income. As Table 3 shows, between 2015 and 2023, the inequality of income distribution decreased both in relation to the EU27 average and within CEE countries (apart from a slight increase in Slovakia and Hungary). The largest drop was recorded in Romania, which had the highest inequality in 2015 in the entire EU, with the ratio dropping from 8.32 to 5.83.

Meanwhile, in 2023, in Slovenia and Czechia, the disposable income of the top 20% of the population was less than 3.5 times higher than that of the bottom 20%. These two countries had the lowest income inequality indicators among all EU countries. In Slovenia, this achievement is mainly attributed to low wage inequality, solid redistribution through social transfers, and progressive income taxation. Meanwhile, Czechia's good result partly reflects the country's economic structure, which is characterised by high levels of employment, a relatively small number of wealthy entrepreneurs, and the fact that high-wage sectors such as finance and banking do not account for a large share of economic activity (Guasti et al. 2021; Krašovec et al. 2024).

The largest income inequalities occur in Bulgaria. Dobreva (2023) indicates that the main factors determining this increase in inequality in the last 30 years include an ineffective education system, an unemployed and ageing population, high dependence on social transfers, uneven distribution of investments, and a low-skilled labour force. Additionally, the effect is reinforced by the unstable macroeconomic environment shaped by the global economic crisis from 2008 and the COVID-19 crisis and its aftermath.

Table 3. Income quintile share ratio S80/S20 for disposable income in CEE countries

	2015	2017	2019	2021	2023
EU27	5.22	5.03	4.99	4.99	4.72
Slovenia	3.60	3.42	3.39	3.24	3.34 (1*)
Czechia	3.51	3.40	3.34	3.43	3.42 (2)
Estonia	6.21	5.42	5.08	5.03	5.37 (7)
Lithuania	7.46	7.28	6.44	6.14	6.32 (10)
Croatia	5.16	5.03	4.76	4.78	4.91 (6)
Latvia	6.51	6.30	6.54	6.63	6.20 (9)
Poland	4.92	4.56	4.37	4.03	4.06 (4)
Slovakia	3.54	3.49	3.34	3.20	3.63 (3)
Hungary	4.30	4.27	4.23	4.15	4.47 (5)
Bulgaria	7.11	8.23	8.10	7.45	6.61 (11)
Romania	8.32	6.45	7.08	7.10	5.83 (8)

* Position in the ranking

Source: Eurostat 2024e.

Social cohesion and non-discrimination

According to Eurofound's initial concept, the sub-dimension of *social cohesion and non--discrimination* comprised the following indicators (Eurofound 2018, p. 24):

- The social exclusion index.
- The ratio of young people to non-young people employment rate.
- The gender equality index.
- The long-term unemployment rate.
- The share of young people who are NEET (not in employment, education or training).

The newest Eurofound report (2023) incorporates new indicators into the SJI to address conceptual gaps or improve the measurement of certain aspects. The exclusion index was rejected for not meeting the quality criterion, and two indicators were chosen in its place: social capital and overall life satisfaction. Social capital is the sum of interpersonal and social networks that facilitate collaboration between people (Günay and Sülün 2021). It is one of 12 pillars[5] of the Legatum Prosperity Index (LPI), and it is calculated based on the following five components: personal and family relationships, social networks, interpersonal trust, corporate trust and citizenship and social participation (Legatum Prosperity Index 2024). Table 4 presents the ranking of CEE countries based on social capital according to the LPI, as well as changes in social capital over the past ten years. Among CEE countries, Poland ranked highest at 27 in the social capital index in 2023 and has improved its position the most during the analysed period. The top ten rankings include four old EU countries, with Denmark as the leader with a score of 82.56 scores. Conversely, Lithuania and Romania had the lowest score.

Table 4. Social Capital Rank and Score of CEE Countries by Legatum Prosperity Index

Country	2013	2023	Rank (1 to 167) 2023	10-year rank change
Slovenia	61.2	62.7	30	6↓
Czechia	48.7	61.6	36	57↑
Estonia	53.0	61.9	34	33↑
Lithuania	36.0	47.3	129	30↑
Croatia	38.7	52.2	103	48↑
Latvia	48.9	55.1	79	12↑
Poland	47.7	63.3	27	76↑
Slovakia	46.0	61.2	39	73↑
Hungary	50.8	59.5	47	31↑
Bulgaria	43.8	54.6	81	42↑
Romania	39.6	50.0	116	31↑

Source: elaboration based on Legatum Prosperity Index 2024.

5 The remaining pillars of the Legatum Prosperity Index are: safety & security, personal freedom, governance, investment environment, the enterprise conditions, market access & infrastructure, economic quality, living condition, health, education, natural environment. The LPI covers 167 countries and the scale of the index ranges from 0 (low) to 100 (high).

Another indicator in the sub-dimension of *social cohesion and non-discrimination* is overall life satisfaction. It is a subjective well-being indicator provided by Eurostat[6]. Di Martino and Prilleltensky (2020) confirmed the hypothesis that social justice is highly related to life satisfaction. Meanwhile, Jia, Zhou, and Huang (2020) show there is also a great deal of evidence showing that inequality decreases life satisfaction, happiness, or subjective well-being. The term "life satisfaction" refers to the degree to which individuals positively evaluate the overall quality of their lives (Martikainen 2009). Many factors influence life satisfaction, including sociodemographic factors such as health, work, financial and family situations, age, and gender, as well as psychological factors, lifestyle, and involvement in leisure activities (Malvaso and Kang 2022). In 2023, people in the EU27 assessed their overall life satisfaction at an average of 7.3 points (see Table 5). Among CEE countries, the most satisfied with life were Slovenians and Romanians, with scores of 7.7 points. Poland, with a score of 7.6, was in 3rd place. Across the entire EU, with the exception of Bulgaria, this indicator of well-being was above 6 points, indicating that people generally reported being satisfied rather than dissatisfied. The average rating of overall life satisfaction in the CEE countries increased between 2013 and 2023, with the highest rise recorded in Hungary and Bulgaria.

Table 5. Overall life satisfaction in CEE countries

	2013	2018	2021	2022	2023
EU27	7.0	7.3	–	7.1	7.3
Slovenia	7.0	7.2	7.6	7.6	7.7
Czechia	6.9	7.4	7.3	7.4	7.4
Estonia	6.5	7.0	7.2	7.2	7.2
Lithuania	6.7	6.4	7.0	7.1	7.2
Croatia	6.4	6.3	6.8	6.8	7.1
Latvia	6.5	6.7	6.7	6.8	6.9
Poland	7.3	7.7	7.5	7.7	7.6
Slovakia	7.0	7.1	7.1	7.0	7.3
Hungary	6.1	6.5	6.5	6.9	7.2
Bulgaria	4.8	5.4	5.7	5.6	5.9
Romania	7.2	7.4	7.7	7.7	7.7

Source: Eurostat 2024f.

Other factors that influence the level of social justice are employment rates among young and older people. According to Eurostat data, youth employment (aged 15–29) in the EU27 fell from an average of 48.2% in 2019 to 46.1% in 2020, largely due to the COVID-19 pandemic. Among CEE countries, the largest declines were recorded in Bulgaria, Latvia, Romania and Czechia. Eurostat data for 2022 showed a recovery in almost all CEE countries compared to 2021, with the exceptions of Romania and Czechia. Nonetheless, youth employment rates in Croatia and Hungary still exceeded 2019 levels. In 2023, Estonia had the highest rate, at 53.2%, while Romania

6 The research is conducted among people aged 16 and over living in private households. Respondents assess their level of life satisfaction rating on a scale from 0 to 10, where 0 is "not satisfied at all" and 10 is "fully satisfied".

had the lowest, at only 35.3%. Interestingly, for those aged 55–64, the COVID-19 pandemic did not appear to cause any major employment losses. Among CEE countries, a slight decline in employment between 2019 and 2020 was recorded only in Lithuania and Bulgaria. Looking at Eurostat data, there has been a steady increase over the past two decades. In 2023, the highest employment rates of older people in CEE were recorded in Estonia (76%) and Czechia (74%), while the EU27 average was 63.9%. As was the case with youth employment, Romania also had the lowest employment rate for older people (51%).

Combating gender inequality is an important factor in increasing social justice by promoting an equal and inclusive society, investing in education and health as well as reducing income inequality. A recent study by the European Institute for Gender Equality shows progress in gender equality among the European Union countries. In 2023, the average score for the 27 EU Member States was 70.2 points, representing an increase of 7.1. points since the first edition of the index in 2013[7]. The area of power recorded the lowest score, at only 59.1 points, although it has the most significant progress (by 17.2 points) of all areas due, in part, to improvements in women's participation in economic decision-making. Health received a score of 88.5 points, maintaining its position as the highest-scoring area within the index (EIGE 2023).

As Figure 5 shows, all CEE countries scored below the EU27 average in the Gender Equality Index. Four countries had scores below 60 points, with Romania facing the greatest difficulties in supporting gender equality. This country has the largest gender gap in labour force participation among all EU countries, accompanied by substantial disparities in entrepreneurship opportunities. In Romania, only about 17% of companies have a woman as a senior manager, and only one-third have at least one woman as an owner. In addition, female entrepreneurs report lower incomes than their male counterparts. The country has one of the highest rates of teenage pregnancy in the EU, which puts women at risk of health problems related to early childbirth and causes them to end their education early. Due to the country's still rigid social norms, more than 80% of Romanians still believe that a woman's primary role is to care for the home and family. Gender inequality in Romania is influenced by many factors, mainly unequal care burden and limited access to child and elderly care services, unequal access to assets, gender-related social norms, gaps in financial inclusion, flaws in parental leave policies, and limited skills being a constraint among older women and Roma (Robayo-Abril et al. 2023). While Slovenia currently has the highest level of gender equality among CEE countries, Bulgaria, Croatia, and Lithuania have recorded the fastest progress in reducing the gender equality gap over the last 10 years.

7 The Gender Equality Index (GEI) gives a score from 1 (full inequality) to 100 (full equality between women and men). It synthesises six basic areas (work, money, knowledge, time, power, health) that comprehensively reflect the challenges women face in their professional, social, and family lives.

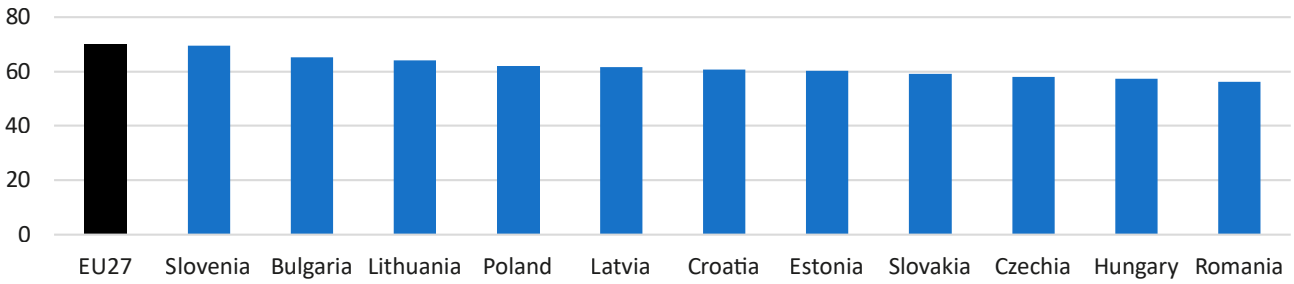


Figure 5. Gender Equality Index in CEE countries, 2023

Source: elaboration based on EIGE 2024.

The penultimate indicator in the sub-dimension of *social cohesion and non-discrimination* is the long-term unemployment rate, which is defined as the percentage of people unemployed for 12 months or more within the labour force. As Table 6 shows, long-term unemployment has consistently fallen over the last eight years. In 2023, the EU27 rate was 2.1%, less than half the 4.9% it was in 2015. The largest drop among CEE countries during this period was observed in Croatia, where it fell from 10.2% to 2%. According to Eurostat, in 2023, Poland and Czechia had the lowest long-term unemployment rates in the CEE region. By contrast, the highest rate was recorded in Slovakia at 3.8%, although this was still relatively low compared to Greece's rate of 6.2%.

Table 6. Long-term unemployment rate in CEE countries (%) (people aged 15–74)

	2015	2017	2019	2021	2023
EU27	4.9	3.7	2.7	2.8	2.1
Slovenia	4.7	3.1	1.9	1.9	1.4
Czechia	2.4	1.0	0.6	0.8	0.8
Estonia	2.4	2.0	0.9	1.6	1.3
Lithuania	3.9	2.7	1.9	2.6	2.3
Croatia	10.2	4.6	2.4	2.8	2.0
Latvia	4.9	3.6	2.7	2.3	1.8
Poland	3.0	1.5	0.7	0.9	0.8
Slovakia	8.8	5.9	3.9	3.9	3.8
Hungary	3.0	1.6	1.1	1.3	1.4
Bulgaria	6.1	3.9	2.9	2.6	2.3
Romania	3.6	2.4	2.0	2.0	2.2

Source: Eurostat 2024g.

As with gender equality, youth employment and the employment rate for older people, Romania has the worst situation regarding the share of young people classified as NEET (19.3%). This rate was the highest among all EU countries (see Figure 6). These individuals are at risk of social exclusion and disconnection from the labour market. The EU has set a target to reduce the youth NEET rate to below 9% by 2030. Among the CEE countries, Slovenia already achieved this goal in 2023, with a rate of 7.8%. In Poland, this indicator was 9.1% in 2023, while the EU27 average was 11.2%.

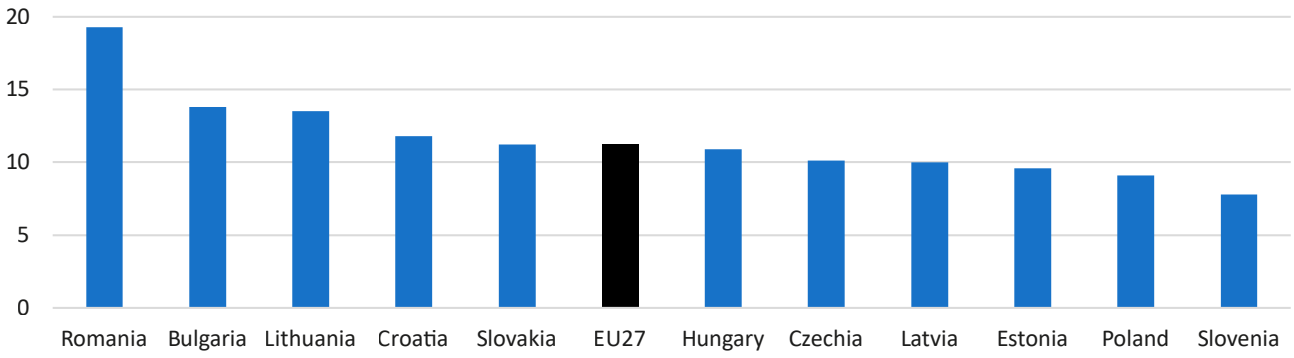


Figure 6. Young people (15–29 years) in CEE countries neither in employment nor in education and training (in %), 2023

Source: Eurostat 2024h.

Equality of opportunities in education

According to Eurofound's initial concept, the sub-dimension *equality of opportunities* comprised two indicators (Eurofound 2018, p. 24):

- Early leavers from education and training.
- The percentage of individuals with less than upper secondary educational attainment.

Early leavers are defined as people aged 18–24 who have completed at most lower secondary school and were not in further education or training in the four weeks preceding the Labour Force Survey (Eurostat 2024i). As Figure 7 illustrates, Romania recorded the largest proportion of early leavers among CEE countries in 2023, at 16.6%. It was also the highest rate across the whole EU. In contrast, Croatia had the best situation, with only 2% of people aged 18–24 in this category. According to Wagner, Stan, and Brusis (2022), the education system in Romania has long been struggling. Since the fall of the communist system, public education has never received adequate funding, and the COVID-19 pandemic further compounded this difficult situation. A large proportion of children in Romania do not attend school, over 40% of 15-year-olds cannot read and write properly, and rural areas have very high dropout rates, exacerbated by the lack of IT-based infrastructure.

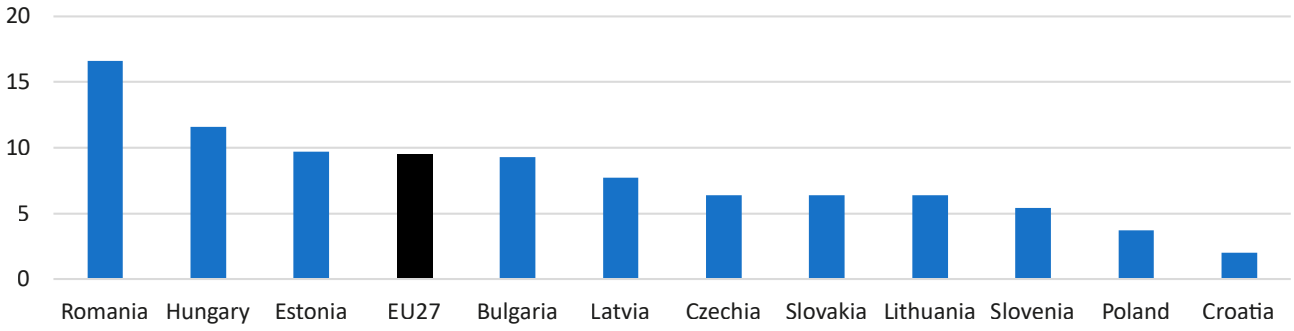


Figure 7. Early leavers from education and training in CEE countries (% of the population aged 18–24), 2023

Source: Eurostat 2024j.

Romania also scored worst among CEE countries in terms of the second indicator in the sub-dimension equality of opportunities in education. In 2023, almost 20% of people

aged 25–64 in this country did not have a secondary education (see Figure 8). However, it is noteworthy that this figure is still lower than the EU27 average. Meanwhile, Lithuania, Poland, Czechia and Slovakia reported the lowest shares of individuals in this category, indicating a highly educated adult population in these four countries. The highest share of the adult population without a secondary education was recorded in Portugal (40.6%).

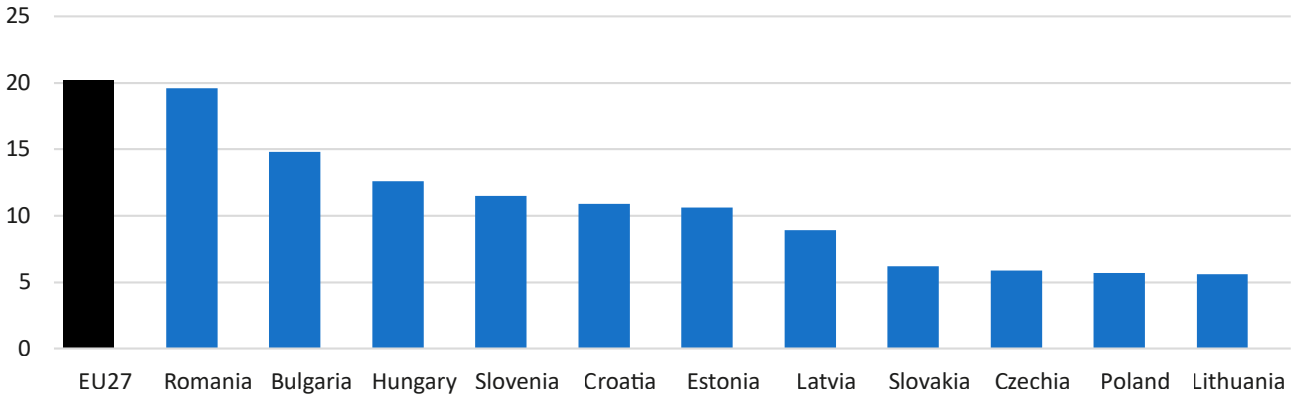


Figure 8. Share of individuals with less than upper secondary educational attainment in CEE countries (% of the population aged 25–64)

Source: own calculation based on Eurostat 2024k.

Discussion and conclusion

Comparing the components of the social justice index shows that Romania achieves the worst results in almost all indicators in the *poverty and income inequality* sub-dimension. However, it also recorded the greatest improvement among CEE countries in three of the four indicators over the last few years. It also had the worst employment rates for both young and older people. Moreover, it clearly lags behind the other CEE countries and the EU as a whole on the NEET indicator. In 2023, Romania ranked at the bottom of the gender equality ranking, although the rates were also lower than the EU-27 average for the rest of Central and Eastern Europe. Furthermore, educational opportunities are the least evenly distributed in Romania. In 2023, it had the highest rate of early leavers from education and training, as well as the highest share of the adult population without upper secondary education. According to national experts in Romania, it is precisely the country's political instability in recent years that has caused the neglect of such important social issues as poverty, education and healthcare. In addition, the country continues to struggle with high levels of corruption, a lack of independence and integrity of the judiciary, and economic stagnation. This reduces public trust in state institutions (Wagner, Stan, Bönker 2020; Wagner, Stan, and Brusis 2022) and may partially explain the country's very low position in the social capital ranking.

A similarly difficult situation can be found in Bulgaria. The country has the highest income inequality rate among all EU countries: in 2023, the disposable income of the richest 20% of Bulgarians was 6.6 times higher than that of the poorest 20%. Bulgaria is also struggling with very high levels of poverty and low living standards, as well as the instability of successive governments

and waves of social protests. The life satisfaction indicator is 5.9 points out of 10, which places the country at the lowest level in the EU. This low level may result not only from high levels of poverty but also from a deep demographic crisis, which, as Kobeszko (2024) points out, includes the ageing of society, high mortality, the constantly decreasing number of working-age population, and mass emigration, especially educated and qualified people. This leads to an imbalance between the number of young and old people, which weakens the labour market, additionally increasing the sense of uncertainty in society and causing widespread passivity and pessimism among Bulgarians. In addition, the persistent political crisis causes social dissatisfaction and hinders the implementation of effective social and economic reforms, which in turn affects the low level of trust in institutions.

According to Stoilova and Haralampiev (2022, p. 34), these countries' low positions on the social justice index – including high poverty and high income inequality – indicate that satisfactory conditions for the perception of justice in key areas of transformation have not been achieved there. The economic transformation has forced people to make numerous changes in their everyday lives, leading to the loss of importance of previous qualifications and the need to adapt to a new labour market dominated by the service sector. It is expected that the cost will be shared, if not equally, then at least proportional to individuals' motivations and contributions to the country's economic development. Only in this case could the social transformation be assessed as just. During the centrally planned economy, income distribution in the CEE region was more equal than in other European countries. However, with the development of the private sector and institutional transformation, income inequality began to grow, becoming a significant challenge in these economies (Görkey 2022). Nae, Florescu, and Bălăsoiu (2024) list the following key factors influencing the dynamics of income distribution, especially in post-communist countries: weakened labour market institutions, unequal access to education, diversified rates of economic growth, globalisation, and institutional factors related to governance inefficiency or corruption. Stoilova and Haralampiev (2022), referring to Rawls' theory of justice, point to surveys indicating that in CEE, there is a higher perception of the legitimacy of inequality than in Western Europe, which results from the change of the political regime.

Countries with the lowest levels of social justice are nonetheless undertaking various actions and reforms to improve their rankings, improve social conditions and strengthen the rule of law. In Romania, in response to the large number of people at risk of poverty and social exclusion, in 2020, the government increased pensions by 40% and adopted a minimum package of basic health care, education and social protection services, guaranteeing free access to all children in rural areas. According to experts, these actions are only a small step, although in the right direction (Wagner, Stan, and Brusis 2022). However, the country still requires major reforms in the education system and the health sector, improvements in the efficiency of social transfers, as well as greater efforts to fight corruption and strengthen democracy.

In Bulgaria, the most important recommendations aimed at reducing inequality include fostering economic growth, establishing a minimum wage rate that reflects the standard of living, implementing progressive taxation, and improving education at all levels – particularly by expanding curricula to increase students' skills and make them relevant to market requirements.

Other measures include ensuring equal access for men and women to well-paid jobs and opportunities for professional development (Dobreva 2024).

The analysis shows that Slovenia and Czechia have a more even income distribution – not only among CEE countries but also across the EU – while leading in social justice in Central and Eastern Europe. These countries have the lowest poverty levels in the region, which is due to high employment and stable economic growth. Moreover, citizens of these countries enjoy a better quality of life, which can help build social trust, one of the key elements of social justice (see more: OECD 2024; *Wniosek…* 2024).

Among CEE countries, Slovenia has the lowest percentage of young people classified as NEET (not in employment, education or training). The country also has the highest gender equality rate in this group. Women in Slovenia have a relatively high employment rate compared to other EU countries, and the share of women working part-time is lower than the EU average, supporting their economic independence. In 2022, there was significant progress in women's representation in politics – 40% of deputies were women (Ministry of Labour, Family, Social Affair and Equal Opportunities 2024).

Czechia, meanwhile, has a strong social protection system, including well-developed health care and family policies, which helps prevent poverty and provide pregnant women and families with a sense of security (Dębiec 2025). The country ranks first among CEE countries in terms of the influence of social transfers on poverty reduction. It also had the lowest long-term unemployment rate in the CEE region.

Both Slovenia and Czechia achieved the highest positions among CEE countries in the industrial democracy index. The positive correlation between industrial democracy and social justice, shown in Figure 1, indicates that countries that promote social dialogue and employee participation rights also have better social protection, lower income inequality, and more equitable access to opportunities such as education and the labour market.

The analysis carried out in this paper is not without its limitations. The first is that the comparison of the level of social justice in CEE countries concerned only the components of the social justice index developed by Eurofound. Bertelsmann Stiftung's Social Justice Index covers a much wider range of indicators, including the subdimensions of health and intergenerational justice. It is important to note that social justice also concerns other aspects, such as civil rights and social mobility. The second limitation concerns the comparability of social justice indicators in relation to the subjective indicator of overall life satisfaction. Further research could provide a deeper analysis of the relationship between social justice and industrial democracy by examining which indicators of social justice contribute most to increases in the industrial democracy index. Additionally, future research could extend the analysis to include the old EU member states.

References

Beyer, G.J. (2014), *Poverty, freedom, and solidarity in the thought of Amartya Sen*, "Prakseologia", 156, pp. 135–156.

Bohle, D., Greskovits, B. (2012), *Capitalist on Europe's Periphery*, Cornell University Press, New York.

Dębiec, K. (2025), *Demografia Czech: niegdyś wzór, dziś raczej przestroga*, https://www.osw.waw.pl/pl/publikacje/komentarze-osw/2025-03-21/demografia-czech-niegdys-wzor-dzis-raczej-przestroga (accessed: 15.05.2025).

Di Martino, S., Prilleltensky, I. (2020), *Happiness as fairness: The relationship between national life satisfaction and social justice in EU countries*, "Journal of Community Psychology", 48 (6), pp. 1997–2012, https://doi.org/10.1002/jcop.22398

Dobreva, J. (2023), *Income inequality in Bulgaria: Recent trends and factors*, 7th International Conference on Research in Business, Management and Economics, 14–16 July 2023, Helsinki.

EIGE (2023), *Gender Equality Index 2023. Towards a green transition in transport and energy*, https://eige.europa.eu/publications-resources/publications/gender-equality-index-2023-towards-green-transition-transport-and-energy (accessed: 22.07.2024).

EIGE (2024), *Gender Equality Index*, https://eige.europa.eu/gender-equality-index/2023/country (accessed: 22.07.2024).

Eurofound (2016), *Mapping key dimensions of industrial relations*, Publications Office of the European Union, Luxembourg.

Eurofound (2018), *Measuring varieties of industrial relations in Europe: A quantitative analysis*, Publications Office of the European Union, Luxembourg.

Eurofound (2022), *Industrial relations' influence on convergence: A literature review*, "Eurofound Working Paper", Dublin.

Eurofound (2023), *Measuring key dimensions of industrial relations and industrial democracy (2023 update),* Publications Office of the European Union, Luxembourg.

Eurostat (2024a), *Persons at risk of poverty or social exclusion (sdg_01_10)*, https://ec.europa.eu/eurostat/cache/metadata/en/sdg_01_10_esmsip2.htm (accessed: 23.06.2024).

Eurostat (2024b), *Persons at risk of poverty or social exclusion by age and sex*, https://ec.europa.eu/eurostat/databrowser/view/ilc_peps01n__custom_11031087/default/table?lang=en (accessed: 19.06.2024).

Eurostat (2024c), *In-work at-risk-of-poverty rate by sex*, https://ec.europa.eu/eurostat/databrowser/view/tesov110/default/table?lang=en&category=t_ilc.t_ilc_ip.t_ilc_iw (accessed: 23.06.2024).

Eurostat (2024d), *Impact of social transfers (excluding pensions) on poverty reduction by sex*, https://ec.europa.eu/eurostat/databrowser/view/tespm050/default/table?lang=en (accessed: 2.07.2024).

Eurostat (2024e), *Income quintile share ratio S80/S20 for disposable income by sex and age group*, https://ec.europa.eu/eurostat/databrowser/view/ilc_di11/default/table?lang=en&category=livcon.ilc.ilc_ie.ilc_iei (accessed: 2.07.2024).

Eurostat (2024f), *Overall life satisfaction by sex, age and educational attainment*, https://ec.europa.eu/eurostat/databrowser/view/ilc_pw01__custom_12085949/default/table?lang=en (accessed: 8.07.2024).

Eurostat (2024g), *Long-term unemployment rate by sex*, https://ec.europa.eu/eurostat/databrowser/view/sdg_08_40/default/table?lang=en&category=t_labour.t_employ.t_lfsi.t_une (accessed: 23.07.2024).

Eurostat (2024h), *Young persons neither in employment nor in education and training (NEET) by sex*, https://ec.europa.eu/eurostat/databrowser/view/tesem150/default/table?lang=en&category=es.tesem (accessed: 25.07.2024).

Eurostat (2024i), *Early leavers from education and training*, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Early_leavers_from_education_and_training (accessed: 6.08.2024).

Eurostat (2024j), *Early leavers from education and training by sex*, https://ec.europa.eu/eurostat/databrowser/view/sdg_04_10/default/table?lang=en&category=t_educ.t_educ_outc (accessed: 6.08.2024).

Eurostat (2024k), *Persons aged 25–64 with at least upper secondary educational attainment level by sex*, https://ec.europa.eu/eurostat/databrowser/view/tps00065/default/table?lang=en&category=t_educ.t_educ_outc (accessed: 30.08.2024).

Glassner, V. (2013), *Central and eastern European industrial relations in the crisis: national divergence and path-dependent change*, "Transfer", 19 (2), pp. 155–169, https://doi.org/10.1177/1024258913480716

Goleński, W. (2013), *Polityka społeczna i ekonomia społeczna. Kilka uwag o sprawiedliwości społecznej*, „Ekonomia Społeczna", 2, pp. 9–19.

Golinowska, S. (2012), *O biedzie i polityce jej zwalczania współcześnie. Podejście porównawcze w świetle Europejskiego Roku Zwalczania Ubóstwa i Wykluczenia Społecznego*, [in:] H.E. Kubiak (ed.), *Polska bieda w świetle Europejskiego Roku Zwalczania Ubóstwa i Wykluczenia Społecznego*, Oficyna Wydawnicza AFM, Kraków, pp. 91–117.

Görkey, S. (2022), *Income Inequality in Central and Eastern European Countries*, "Journal of Social Science", 2 (2), pp. 303–316.

Guasti, P., Mansfeldová, Z., Myant, M., Bönker, F. (2021), *Czechia Report. Sustainable Governance in the Context of the COVID-19 Crisis*, Bertelsmann Stiftung, Gütersloh, https://doi.org/10.11586/2021086

Günay, E.K., Sülün, D. (2021), *The evaluation of the impact of social capital on economic development within the framework of the Legatum Prosperity Index: the case of OECD countries*, "Electronic Journal of Social Sciences", 20 (80), pp. 1982–1996, https://doi.org/10.17755/esosder.864792

Hellmann, T., Schmidt, P., Heller, S.M. (2019), *Social Justice in the EU and OECD. Index Report 2019*, Bertelsmann Stiftung, Gütersloh, https://www.bertelsmann-stiftung.de/en/publications/publication/did/social-justice-in-the-eu-and-oecd (accessed: 3.09.2024).

Jia, Q., Zhou, J., Huang, M. (2020), *Life Satisfaction Predicts Perceived Social Justice: The Lower Your Life Satisfaction, the Less Just You Perceive Society to Be*, "Frontiers in Psychology", 11, 540835, https://doi.org/10.3389/fpsyg.2020.540835

Kaczmarczyk, H. (2010), *F.A. Hayek jako krytyk pojęcia sprawiedliwości społecznej*, https://mises.pl/artykul/h-kaczmarczyk-f-a-hayek-jako-krytyk-pojecia-sprawiedliwosci-spolecznej (accessed: 21.05.2024).

Kielesińska, A. (2015), *Ekonomia społeczna determinantą rozwoju lokalnego*, "Prace Naukowe Akademii im. Jana Długosza w Częstochowie. Pragmata tes Oikonnomias", 9, pp. 9–27, https://doi.org/10.16926/pto.2015.09.01

Kobeszko, Ł. (2024), *Naród w fazie topnienia. Bułgaria nad demograficzną przepaścią*, https://www.osw.waw.pl/pl/publikacje/komentarze-osw/2024-12-16/narod-w-fazie-topnienia-bulgaria-nad-demograficzna-przepascia (accessed: 3.05.2025).

Kohl, H. (2015), *Convergence and divergence – 10 years since EU enlargement*, „Transfer", 21 (3), pp. 285–311, https://doi.org/10.1177/1024258915585939

Krašovec, A., Novak, M., Deželan, T., Guasti, P. (2024), *Slovenia Report: Sustainable Governance Indicators 2024*, Bertelsmann Stiftung, Gütersloh, https://doi.org/10.11586/2024141

Kruszka, R. (2008), *Wykluczenie społeczne – rys interpretacyjny i użyteczność badawcza*, "Kultura i Edukacja", 1, pp. 35–69.

Legatum Prosperity Index (2024), *Country Profiles*..., https://www.prosperity.com/all-countries (accessed: 24.07.2024).

Lissowska, M. (2017), *The financial crisis and changing labour markets in post-transition countries*, "European Journal of Industrial Relations", 23 (1), pp. 17–32, https://doi.org/10.1177/0959680116685490

Malvaso, A., Kang, W. (2022), *The relationship between areas of life satisfaction, personality, and overall life satisfaction: An integrated account*, "Frontiers in Psychology", 3, 894610, https://doi.org/10.3389/fpsyg.2022.894610

Martikainen, L. (2009), *The Many Faces of Life Satisfaction among Finnish Young Adults*', "Journal of Happiness Studies", 10 (6), pp. 721–737, https://doi.org/10.1007/s10902-008-9117-2

Miklaszewska, J. (2014), *Teorie sprawiedliwości społecznej: Amartya Sen i Martha Nussbaum*, "Prakseologia", 156, pp. 25–46.

Miller, D. (2017), *Justice*, [in:] *The Stanford Encyclopedia of Philosophty*, https://plato.stanford.edu/entries/justice/ (accessed: 20.05.2024).

Miłaszewicz, D., Łatuszyńska, M., Nermend, K., Piwowarski, M. (2018), *Ubóstwo w Unii Europejskiej – porównania czasowe i przekrojowe*, "Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu", 539, pp. 136–145, https://doi.org/10.15611/pn.2018.539.13

Ministry of Labour, Family, Social Affair and Equal Opportunities (2024), *SLOVENIA Comprehensive national review report Beijing+30*, https://www.unwomen.org/sites/default/files/2024-09/b30_report_slovenia_en.pdf (accessed: 15.05.2025).

Nae, T.M., Florescu, M.-S., Bălăsoiu, G.-I. (2024), *Towards Social Justice: Investigating the Role of Labor, Globalization, and Governance in Reducing Socio-Economic Inequality within Post-Communist Countries*, "Sustainability", 16 (2234), pp. 1–16, https://doi.org/10.3390/su16062234

OECD (2024), *OECD Better Life Index*, https://www.oecdbetterlifeindex.org (accessed: 15.05.2025).

Okun, A.M. (1975), *Equality and Efficiency. The Big Tradeoff*, Brookings Institution Press, Washington.

Panek, T., Zwierzchowski, J. (2016), *Ubóstwo w krajach Unii Europejskiej*, "Ekonomista", 2, pp. 180–199.

Przybyła, H. (2006), *John Rawls i kategoria sprawiedliwości*, "Studia Ekonomiczne", 38, pp. 9–29.

Rawls, J. (2009), *Teoria sprawiedliwości*, Wydawnictwo Naukowe PWN, Warszawa.

Robayo-Abril, M., Patience Chilera, Ch., Rude, B., Costache, I. (2023), *Gender Equality in Romania: Where Do We Stand? – Romania Gender Assessment*, World Bank Group, Washington, https://doi.org/10.1596/40666

Rosner, A. (2022), *Kilka uwag o pojęciu "sprawiedliwość"*, "Wieść i Rolnictwo", 4 (197), pp. 11–21, https://doi.org/10.53098/wir042022/01a

Salamon, M. (1987), *Industrial Relations. Theory and Practice*, Prentice Hall, London.

Sen, A. (2000), *Nierówności. Dalsze rozważania*, Wydawnictwo Znak, Kraków.

Skorupińska-Cieślak, K. (2018), *Stosunki przemysłowe w krajach Europy Środkowo-Wschodniej. Perspektywa porównawcza*, "Studia Prawno-Ekonomiczne", 109, pp. 303–326, https://doi.org/10.26485/SPE/2018/109/19

Skorupińska-Cieślak, K. (2021), *Partycypacja pracownicza w krajach UE – analiza porównawcza*, "Studia Prawno-Ekonomiczne", 120, pp. 221–238, https://doi.org/10.26485/SPE/2021/120/12

Smith, A. (2004), *The Theory of Moral Sentiments*, Cambridge University Press, Cambridge.

Stanchev, K., Popova, M., Brusis, M. (2022), *Bulgaria Report. Sustainable Governance Indicators 2022*, Bertelsmann Stiftung, Gütersloh, https://doi.org/10.11586/2022086

Stiglitz, J. (2004), *Ekonomia sektora publicznego*, Wydawnictwo Naukowe PWN, Warszawa.

Stoilova, R., Haralampiev, K. (2022), *Inequalities and Justice in the Balkans. A Comparison Between Bulgaria, Croatia, Montenegro, Slovenia and Serbia*, "Sociological Problems", 1, pp. 32–48.

Sztumski, J. (2010), *Aktualność idei sprawiedliwości społecznej w polityce społecznej*, [in:] B. Balcerzak-Paradowska, A. Rączaszek (eds.), *Międzynarodowa polityka społeczna – aspekty porównawcze*, IPiSS, AE w Katowicach, Warszawa–Katowice, pp. 67–79.

Wagner, A., Stan, L., Bönker, F. (2020), *Romania Report. Sustainable Governance Indicators 2020*, Bertelsmann Stiftung, Gütersloh, https://www.sgi-network.org/docs/2020/country/SGI2020_Romania.pdf (accessed: 3.05.2025).

Wagner, A., Stan, L., Brusis, M. (2022), *Romania Report. Sustainable Governance Indicators 2022*, Bertelsmann Stiftung, Gütersloh, https://doi.org/10.11586/2022114

Wilkin, J. (2023), *Sprawiedliwość – najważniejsza cnota społecznych instytucji*, "Wieś i Rolnictwo", 1 (198), pp. 23–38, https://doi.org/10.53098/wir012023/01a

Wniosek dotyczący wspólnego sprawozdania Komisji i Rady o zatrudnieniu (2024), Komisja Europejska, Bruksela, COM/2024/701 final, https://orka.sejm.gov.pl/SUE10.nsf/Pliki-zal/COM%282024%29_701_1_PL_ACT_part1_v2.pdf/%24File/COM%282024%29_701_1_PL_ACT_part1_v2.pdf (accessed: 15.05.2025).

Sprawiedliwość społeczna w krajach Europy Środkowo-Wschodniej

Celem artykułu jest porównanie poziomu sprawiedliwości społecznej w krajach Europy Środkowo-Wschodniej (EŚW) w obszarze poszczególnych wskaźników tworzących Indeks Sprawiedliwości Społecznej oraz określenie poziomu ich konwergencji w stosunku do średniej unijnej. W opracowaniu przedstawiono również zmiany wskaźników sprawiedliwości społecznej w ostatnich latach i zbadano związek między sprawiedliwością społeczną a demokracją przemysłową. Analiza została oparta na danych statystycznych Eurostatu oraz wynikach badania przeprowadzonego przez Europejską Fundację na rzecz Poprawy Warunków Życia i Pracy, Europejski Instytut ds. Równości Kobiet i Mężczyzn oraz Instytut Legatum. Wyniki wskazują, że choć Rumunia osiągnęła najgorsze wyniki w większości wskaźników tworzących Indeks Sprawiedliwości Społecznej, wiele z nich w ostatnich latach istotnie się poprawiło. Słowenia, Czechy i Słowacja odnoszą zaś największe sukcesy w obszarze zapobiegania ubóstwu i wyrównywania dochodów. Wskaźnik równości płci we wszystkich krajach EŚW był niższy niż średnia UE-27. Ponadto kraje Europy Środkowo-Wschodniej promujące dialog społeczny i prawa pracownicze mają również wyższy poziom sprawiedliwości społecznej.

Słowa kluczowe: sprawiedliwość społeczna, ubóstwo, stosunki przemysłowe, Europa Środkowo-Wschodnia

Comparative Economic Research. Central and Eastern Europe
Volume 28, Number 4, 2025
https://doi.org/10.18778/1508-2008.28.29

The Clash of Civilisations? Religion as a Major Component of Cultural Differentiation on the Example of Belarus and Poland

Andrzej Pieczewski https://orcid.org/0000-0002-0643-1157
Associate Professor, University of Lodz, Lodz, Poland, e-mail: andrzej.pieczewski@uni.lodz.pl

Aliaksandra Sidarava https://orcid.org/0000-0003-1803-5650
Ph.D., Polish Academy of Sciences, Warsaw, Poland, e-mail: a.sidarava@twarda.pan.pl

Abstract

This comparative study investigates the role of religion as an important factor in shaping political and economic mental models, focusing on the contexts of Belarus and Poland. It builds upon Samuel Huntington's thesis, which posits that cultural and religious differences are fundamental to civilisational conflicts. By analysing how Catholicism and Orthodoxy have shaped the divergent mentalities of these neighbouring nations, this research highlights the long-lasting influence of religious traditions on societal development. Employing a mixed-methods approach, including CATI surveys, statistical analyses, and historical comparisons, the study identifies significant differences in political and economic behaviours between Belarusians and Poles. These disparities underline the long-term impact of religion on attitudes toward power, property, and individualism. The findings contribute to a nuanced understanding of how religious values not only define societal norms but also shape national trajectories and contemporary geopolitical alignments. This research underscores the enduring relevance of religion in explaining cultural dynamics and civilisational divides in Eastern Europe.

Keywords: religion, civilisation, mental models, Belarus, Poland

JEL: O57, P30, P50, P51

Funding information: A.P. – Associate Professor, University of Lodz, Lodz, Poland; A.S. – Polish Academy of Sciences, Warsaw, Poland.
The percentage share of the Authors in the preparation of the work is: A.P. – 50.00%, A.S. – 50.00%.
Declaration regarding the use of GAI tools: Not used.
Conflicts of interests: None.
Ethical considerations: The Authors assure of no violations of publication ethics and take full responsibility for the content of the publication.
Received: 19.03.2025. Verified: 12.05.2025. Accepted: 30.09.2025

Introduction

The role of religion in shaping cultural and societal norms has long been a topic of scholarly interest. Although religion is not the only factor that shapes mentality, it is a factor of particular importance. For centuries, religious teachings have shaped mentality and visions of what society and authority look like and should look like. Religions have shaped attitudes towards work, wealth and money. They have defined the role of the individual in society and what is fair or unfair. The teachings and ideas preached by religions are deeply rooted in the mentality of modern people, despite secularisation trends.

More than thirty years ago, Samuel P. Huntington (1993; 1996) posited that cultural differences between major civilisations would be the main cause of conflict in the world in the 21st century. While initial critiques dismissed this notion in favour of a more unified global trajectory, contemporary geopolitical tensions between the West and Russia appear to validate Huntington's thesis. This divide can be further understood through the contrasting trajectories of Poland and Belarus. As neighbouring nations with shared historical experiences yet distinct religious and cultural frameworks, they serve as compelling case studies of Huntington's thesis in action. In the context of Eastern Europe, the religious traditions of Catholicism in Poland and Orthodoxy in Belarus provide tangible examples of how civilisational differences manifest in cultural and societal norms.

Although the reality of the 1990s did not indicate this – there was talk of megatrends such as the democratisation of political systems and the transition to a free market in most countries, while Francis Fukuyama (1992) prophesied the 'End of History' – the contemporary world seems closer to Huntington's vision.

In Europe, Russia's war with Ukraine is currently underway. The West (Western civilisation) and Russia, together with the countries subordinate to it, such as Belarus, are in open conflict arguably even more intense than during the Cold War. Today, the political and economic systems of the countries belonging to these two civilisations are axiologically different and, in the case of political systems, completely different. Huntington (1996) pointed to religion as one of the main factors that shape culture within a civilisation. This study situates itself within this discourse by analysing the mental models of two nations – Belarus and Poland – that sit at the crossroads of Western Catholic and Eastern Orthodox civilisations.

The differing affiliations – Catholicism in Poland and Orthodoxy in Belarus – offer a clear lens to observe how religion shapes societal models and aligns with Huntington's vision of civilisational fault lines.

Poland and Belarus share a complex historical relationship, marked by periods of political union, cultural exchange, and subsequent division. This shared history includes the medieval Polish–Lithuanian Commonwealth, a multi-ethnic and multi-religious entity that was heavily influenced by both Catholic and Orthodox traditions (Davies 2005). However, with the partitions of Poland and the rise of the Russian Empire, the religious landscape shifted significantly, particularly in Belarus, where Orthodox Christianity became the dominant religious force. In contrast, Poland remained a bastion of Catholicism, deeply intertwined with its sense of national identity, particularly during foreign occupation and communist rule. As a result, religious

identity in both countries has become a powerful tool for political mobilisation and national consolidation, contributing to the formation of distinctive mental and behavioural characteristics in their populations (Pospielovsky 1988; Riasanovsky 2011). *This divergence prompts a central question: How has religion shaped the mentalities of Belarusians and Poles, and what implications does this have for their respective political and economic trajectories?* **This framework directly informs the hypothesis of this study: that the Catholic and Orthodox traditions in Poland and Belarus have cultivated divergent mental models, influencing attitudes toward power, property, and individualism.**

This article employs a mixed-methods approach, integrating CATI (Computer-Assisted Telephone Interview) survey data, statistical analysis, and historical context to investigate these questions. Specifically, it examines how religious traditions influence key mental variables, including attitudes toward power, property, individualism, and social trust. By exploring these variables, the study aims to illuminate the broader cultural and civilisational dynamics at play in Eastern Europe. This study uniquely integrates mental models into the analysis of civilisational differences rooted in religious traditions, specifically Catholicism in Poland and Orthodoxy in Belarus, offering new insights into Eastern European cultural dynamics.

The objective is to analyse how Catholicism and Orthodoxy influence mental variables, including attitudes toward power, property, and individualism, and to assess their implications for the political and economic systems of Poland and Belarus.

The Complex Interplay of Religion, Culture, and Economic Development

Mental models are subjective frameworks through which individuals and societies interpret the world, make decisions, and interact with their environment (Johnson-Laird and Byrne 1993, pp. 323–380). They shape attitudes toward various societal factors, including power, property, and social relationships. Civilisations, as defined by Huntington (1996), are the highest cultural groupings of people, characterised by shared religion, language, customs, and institutions. While they ensure the stability of social systems, they can also perpetuate inertia (Rosenbaum 2022, pp. 1–18). Culture, defined as the values and beliefs transmitted across generations, evolves slowly, remaining largely stable within individuals' lifetimes (Becker 1996; Guiso, Sapienza, and Zingales 2006, pp. 23–48). The robust intergenerational transmission of cultural values often persists even when these values prove ineffective (Grusec and Kuczynski 1997). Oded Galor (2022) points to cultural characteristics as a significant factor that influences the development of societies and explains inequalities between them. Among the critical components of culture, religion seems to play a pivotal role. Religious teachings, philosophical tenets, and ethical norms influence political behaviour and, directly or indirectly, economic productivity (Barro and Sala-i-Martin 2004). Politics and economics, deeply interlinked, shape and condition each other (Porter M. 2000, pp. 14–28).

Religion profoundly shapes societal mentalities, influencing values, behaviours, and institutions. Max Weber's *The Protestant Ethic and the Spirit of Capitalism* highlights Protestantism's emphasis on hard work and frugality as foundational to capitalism. Studies like that of Guiso,

Sapienza, and Zingales (2003) affirm religiosity's role in fostering trust and cooperation, crucial for economic success. However, Barro and McCleary (2003) caution against excessive dogmatism, which can hinder innovation and economic freedom.

Religious doctrines also affect human capital through education and health. Protestant missionaries historically advanced literacy and economic development (Woodberry 2012, pp. 244–274), while McCleary and Barro (2006) connect community health improvements to religious influence. Yet, doctrines that prioritise spiritual over material pursuits may deter entrepreneurship and education (Noland 2005, pp. 1215–1232).

Religious values underpin political and economic institutions. North (1990) links religious ethics with governance quality, noting that Protestant traditions emphasise accountability. Conversely, Kuran (2004) critiques rigid theocratic systems for restricting innovation and market freedoms. Harrison (2006) argues that cultural factors, including religious beliefs, significantly shape economic performance, with traditions valuing education and work ethic often correlating with stronger economies.

In The Clash of Civilisations, Samuel Huntington (1996) posits that religion shapes cultural identities, influencing governance and economic trajectories. For instance, Christianity's emphasis on individualism supports economic dynamism in Western civilisations, while collective-focused Islamic and Orthodox traditions yield differing outcomes. Huntington warns that rigid religious systems can stifle innovation and exacerbate economic divides, as seen in conflicts over secularism and financial systems between Western and Islamic civilisations.

Mental models, shaped by cultural and religious influences, embody subjective worldviews that guide decision-making and social systems (Johnson-Laird and Byrne 1993, pp. 323–380; Rosenbaum 2022, pp. 1–18). Despite cultural evolution, intergenerational transmission of values ensures religion's enduring impact, even in secularising societies (Becker 1996; Grusec and Kuczynski 1997).

Religion's role is particularly significant where it intertwines with national identity, as seen in Poland and Belarus. In Poland, Catholicism has historically symbolised resistance against oppression, preserving national identity through foreign partitions, Nazi occupation, and Soviet influence. The Catholic Church's activism, epitomised by the Solidarity movement, shaped Poland's transition from communism and continues to inform its conservative policies (Kubik 1994; Porter B. 2000).

In contrast, Belarus reflects the Orthodox Church's alignment with state power, fostering conformity and loyalty to the authoritarian regime of Alexander Lukashenko (Rudling 2014). This alignment mirrors the Russian model, where religion reinforces state narratives, shaping a deferential societal mentality (Stoeckl 2014).

These divergent trajectories, rooted in distinct religious traditions, underline the interplay between cultural, political, and economic factors. Despite a shared history as part of the Polish–Lithuanian Commonwealth, differences in governance, international alignment, and economic structures persist. Poland, representing Western civilisation, exemplifies democracy and market

integration as an EU and NATO member, while Belarus, aligned with the Slavic Orthodox world, remains authoritarian with a regulated economy.

This article examines how these religious and cultural influences shape mental models related to political and economic behaviour in Poland and Belarus. Following Huntington's thesis, we hypothesise that Christianity's denominational differences have played a pivotal role in moulding long-lasting societal values, attitudes, and laws (Williamson 2000, pp. 595–613). This analysis identifies the mental variables most significantly impacted by religion, providing insights into the enduring interplay of culture and economics in shaping national trajectories.

Religion's impact is particularly pronounced in contexts where it intertwines with national identity, culture, and politics. Poland and Belarus, as neighbouring nations, offer a compelling study of how Catholicism and Orthodoxy – two branches of Christianity – have shaped societal trajectories. These religious traditions continue to influence political, social, and economic dynamics, embedding collective mentalities and shaping responses to authority and cohesion (Casanova 1994; Ramet 2006).

In Poland, Catholicism has historically symbolised resistance to foreign domination, preserving national identity through periods of partition, Nazi occupation, and Soviet control. The Catholic Church's opposition to state power nurtured a tradition of social activism, epitomised by the Solidarity movement of the 1980s, which contributed to the fall of communism (Stokes 1993; Porter B. 2000). Today, Catholic values of independence and moral responsibility influence Poland's conservative stances on immigration, European integration, and relations with Russia (Kubik 1994). Recent research shows that the political relevance of religiosity, especially in Poland, may be more nuanced than traditionally assumed. For instance, Olejnik and Wroński (2025) argue that electoral preferences in highly religious regions are shaped more by economic underdevelopment than by religiosity itself.

Conversely, Belarus exhibits a contrasting trajectory. The Orthodox Church has traditionally aligned closely with state power, functioning as a tool of propaganda and control during Tsarist Russian imperial and Soviet eras (Payne 2011). During the Soviet era, the communist authorities initially brutally suppressed the Orthodox Church. Atheism was part of communist ideology. However, it soon became apparent that it was difficult to completely eradicate religion from people's lives. The Orthodox Church was therefore allowed to function in a limited capacity, while at the same time being widely used as another tool for surveillance of society (Mironowicz 2001).

In contemporary Belarus, this alignment persists, with the Church supporting the authoritarian regime of Alexander Lukashenko, reinforcing loyalty to the state and promoting narratives that align with government objectives (Rudling 2014; Stoeckl 2014). This collaboration fosters a passive societal mentality, linking religious identity to political conformity (Marples 2014). What is more, the modern Belarusian Orthodox Church has its patriarch in Moscow. The Belarusian Orthodox Church is therefore essentially the Moscow Orthodox Church. It, in turn, is at the service of President Putin and is an integral part of the regime's propaganda machine (Köllner 2021).

According to the 2021 census, there were 27.1 million Catholics in Poland. This accounted for 71.3% of the population, although it represents a decrease compared to 2011, when 87.6% of the population (33.7 million people) declared themselves to be Catholic. In 2021, 6.87% of the Polish population declared themselves atheists. Additionally, 20.57% of people refused to answer the question about their religion (Statistics Poland 2012; 2022).

Although information on religion is currently unavailable on Belstat, it can be found through other official sources: from 2019, there were 6.87 million Orthodox Christians in Belarus. This accounted for 73% of the population and represents a decrease compared to 2009, when 81% (7.7 million people) declared themselves Orthodox. In 2019, 14.3% of the Belarusian population declared themselves atheists (Гурко, Мартинович 2025). According to the World Values Survey Cultural Map (World Values Survey 2023), Belarus belongs to "Orthodox Europe," which differs from "Catholic Europe," which contains Poland. Therefore, these nations can exemplify Huntington's (1996) thesis on the role of religion in defining civilisations.

This article examines the influence of the two denominations of Christianity (Orthodox and Catholic) on the political and economic mentalities of Belarus and Poland. Drawing on Huntington's framework, we hypothesise that religious traditions, particularly Catholicism and Orthodoxy, have profoundly shaped long-standing societal values, attitudes, and laws (Williamson 2000, pp. 595–613).

Methodology and Survey[1]

This study employs a mixed-methods approach, combining quantitative CATI surveys with historical and statistical analysis. The aim of the first stage of the study (the CATI survey) was to outline the political and economic mentality (understood as a set of unconscious and conscious attitudes, ways of thinking and, consequently, behaviour) of Belarusians and Poles. Mentality is analysed based on the structure of behavioural and thinking stereotypes that are responsible for reducing uncertainty in the external world, building relationships (cooperation) with others, and for being open to new experiences.

This study should be understood as a pilot empirical investigation carried out in cooperation with a licensed sociological research agency as part of a larger project funded by the Polish National Centre for Research and Development (NCBR). While the sample sizes (N = 282 for Belarus and N = 252 for Poland) are not statistically representative in the strict probabilistic sense, they provide valuable exploratory insight into mental patterns and are adequate for identifying trends and formulating hypotheses for further research.

The survey was conducted using the CATI method by trained interviewers. Participants were selected according to predefined quota sampling criteria to ensure balance in terms of age groups

1 The sociological research was conducted as part of the NCBR project implemented at the University of Lodz. The fieldwork for the sociological study was carried out at the Belarusian Analytical Workshop Foundation (Fundacja Białoruska Pracownia Analityczna), and the survey results were analysed by the authors.

and regional distribution across voivodeships (in Poland) and oblasts (in Belarus). The recruitment and interviews were conducted in the respondents' native languages.

The survey questions were developed in close collaboration with sociologists from the research agency and were carefully designed to align with the study's conceptual framework. Special attention was paid to minimising sensitivity, ensuring that the items could effectively capture key political and economic mental variables without causing discomfort to respondents. The issue of potential self-censorship among Belarusian respondents due to the authoritarian context was indeed carefully considered during the design phase of the survey, and this specific concern was discussed in detail with the research agency.

To address it, the questionnaire was deliberately formulated in a way that minimises the sensitivity of politically charged topics. In particular, questions related to "Attitudes to Power" and governance were framed indirectly. Rather than asking about political authority or government structures, we used proxy questions referring to perceptions of superiors and decision-making processes in workplace settings. This approach, developed in collaboration with the experienced sociologists, was intended to reduce the perceived risk for respondents while still allowing us to access the core dimensions of the construct.

No survey weights were applied, as the study aimed at exploratory and comparative rather than population-level generalisations. The objective was not to produce statistically representative population estimates, but to examine attitudinal patterns and test the conceptual framework. Future representative studies may incorporate appropriate weighting techniques.

The response rate was estimated at approximately 25–30%, which is typical for CATI surveys. The data collection was conducted by a professional sociological research agency, following established recruitment and quality assurance procedures.

The research focuses on two populations: Belarusians and Poles, whose political and economic mentalities were evaluated to assess the influence of religious traditions (Orthodoxy and Catholicism) on key mental variables. The survey was designed to capture mental variables associated with political and economic attitudes. Respondents were presented with 13 carefully crafted statements, each corresponding to a specific mental variable.

While cross-national surveys such as the World Values Survey (WVS) and European Social Survey (ESS) provide invaluable large-scale data, the added value of our study lies in its specific theoretical focus, contextual adaptation, and conceptual coherence tailored to the Belarusian–Polish comparison.

First, unlike the WVS, which covers a broad and diverse range of topics, our survey is theory-driven. It focuses specifically on key mental dimensions of political and economic culture, such as Locus of Control, Power Distance, Attitudes to Property, and Uncertainty Avoidance, all selected and formulated based on a unified conceptual framework. This enhances the depth and interpretability of results within the targeted domain.

Participants provided their level of agreement on a seven-point Likert scale, allowing for nuanced responses.

Key mental variables assessed include:

1. Political Mentality: Locus of Control (internal vs. external); Individualism vs. Collectivism; Power Distance (acceptance of authority and inequality)
2. Economic Mentality: Attitudes toward Property (private vs. public ownership); Attitudes toward Work (effort and success correlation); The Role of the State in the Economy (market vs. interventionism); Short- vs. Long-Term Orientation; Attitudes to Uncertainty (openness to innovation vs. conservatism); Social Trust
   - **Belarus Sample (N = 282):**
     - Gender: female (53.9%), male 45.4%.
     - Age distribution: 18–30 years (17%), 31–45 years (29.1%), 46–60 years (27.3%), 61+ years (25.9%).
     - Education: primary (4.6%), secondary (30.5%), technical/vocational (39.4%), higher (24.8%).
     - Religious Affiliation: Orthodox (74.8%), Catholic (17.7%), Jewish (2.8%), Muslim (0.4%), others.
   - **Poland Sample (N = 252):**
     - Gender: female (52%), male (48%)
     - Age distribution: 18–24 years (8.33%), 25–29 years (7.14%), 30–39 years (19.05%), 40–49 years (18.65%), 50–60 years (14.68%), 61+ years (32.15%)
     - Education: primary (24.6%), secondary (32.54%), technical/vocational, higher (23.41%)
     - Religious Affiliation: Catholic (76.59%), Orthodox (1.59%), others.

Responses were analysed using the Chi-Square test to determine statistical significance in differences between the two populations.

Findings of the CATI survey

The findings from this study show significant differences in the mental models of these societies (see Tables 1 and 2). In the following section, we explain how Poland's Catholic traditions have fostered individual agency and democratic values, while Belarus's Orthodox heritage has reinforced collective thinking and deference to state authority.

The systemic elements of mentality were selected based on the research of the Culture Factor Group (2025) and the World Values Survey (2023). They were divided into two categories: political mentality and socio-economic mentality.

The first variable refers to a fundamental psychological parameter, the locus of control. It indicates the extent to which a person is convinced that they have a say in what happens to them. It can oscillate between two extremes: I am the sole author of my fate, or everything that affects me does not depend on me. This parameter is of paramount importance. Among other things, it determines the level of entrepreneurship, the propensity to innovate, participation in political life, and the sense of responsibility for oneself and the state. The differences between the two countries on this issue are

very pronounced. More than 71% of Poles place control over their lives 'within' (i.e., they feel they are in charge of their lives); only about one-tenth of respondents say they are not 'the master of their own destiny'. In contrast, 40% of Belarusian respondents place control 'within' and almost as many 'outside'.

Table 1. Comparative characteristics of the political mentality of Belarusians and Poles (based on the 2023 survey)

Mental variables	Belarus	Poland	Statistical significance of differences (χ2 values and p-values)
Locus of control (1)	**40.8%** believe they have a say in their own destiny (internal locus of control). **37.2%** believe the opposite (external locus of control) – permission to be passive.	**71.0%** believe that they have a say in their own destiny (internal locus of control). **9.5%** believe the opposite (external locus of control) – permission to be passive.	**64.8342** p < 0.00001
Individualism vs. collectivism (2)	**50.0%** represent typically individualistic values. **33.0%** represent typically collectivist values.	**64.7%** represent typically individualistic values. **17.1%** represent typically collectivist values.	**18.3897** p = 0.000102
Attitude to power (power distance) **(3)**	**62.4%** accept the distance between society and authority and are willing to submit to its decisions, even though they disagree with them. **19.9%** do not accept the distance to authority.	**35.7%** accept the distance that separates society and authority and are willing to submit to its decisions, even though they disagree with them. **31.0%** do not accept the distance to authority.	**38.4794** p < 0.00001

Source: CATI survey carried out as part of the NCBR project.

The second mental variable refers to the individuals' mindset (individualism vs. collectivism). Individualism refers to the degree to which people feel independent, while collectivism refers to the degree to which people feel interdependent on other members of society. In individualistic societies, individual choices are accepted and socially expected, whereas in collectivistic societies, individuals need to 'know their place', and their choices are more determined by social expectations. Polish society is more individualistic than Belarusian society. Almost 65% of the Poles and 50% of the Belarusians agreed with the statement 'Life is first and foremost about realising one's goals'; 17.1% of Poles and 33.0% of Belarusians disagreed.

The third variable, 'relation to power' (distance to power), determines the extent to which members of society accept the inequalities that separate them from people with some kind of formal power. This applies to social relations at all levels (student–teacher, employee–boss, citizen–official/politician). Societies with higher levels of 'power distance' are more likely to accept authoritarian forms of government and consider them natural. Conversely, as the power distance decreases, support for authoritarianism declines, demands for democratisation of political life increase, and democratic systems are considered natural. The majority of Belarusians (62.4%) accept the distance that separates them from those holding some kind of power and are willing to submit to their decisions, even when they do not agree with them. In contrast, only

35.7% of Polish respondents feel this way. Meanwhile, 19.9% of Belarusians reject these inequalities compared to 31.0% of Poles. A greater distance to authority is characteristic of societies with a predominance of collectivist thinking and a greater external locus of control the Culture Factor Group (2025). Belarus and Poland seem to confirm these correlations.

Table 2. Comparative characteristics of the economic mentality of Belarusians and Poles (based on the 2023 survey)

Mental variables	Belarus	Poland	Statistical significance of differences (χ2 values and p-values)
Attitude to property (4)	**56.6%** – private ownership is more efficient in the economy. **27.4%** disagree.	**58.7%** – private ownership is more efficient in the economy. **23.0%** disagree.	**1.47** p = 0.226
Attitude to work (5)	**41.5%** – achieving wealth requires effort and honest work. **38.3%** disagree.	**53.6%** – achieving wealth requires effort and honest work. **26.2%** disagree.	**10.1035** p = 0.001
Attitudes towards the role of the state in the economy (6)	**69.5%** support strict regulation and control of the economy by the state. **15.6%** disagree.	**40.5%** support strict regulation and control of the economy by the state. **41.3%** disagree.	**52.6379** p < 0.00001
Short- or long-term orientation (7)	**44.3%** prefer to live according to short-term plans and goals. **42.2%** say that the future is more important than the present and that life requires long-term planning.	**39.3%** prefer to live according to short-term plans and goals. **34.1%** say that the future is more important than the present and that life requires long-term planning.	**14.7006** p = 0.001
Attitude to uncertainty (openness to innovation and new experiences versus tradition and conservatism) **(8)**	**45.0%** declare openness to new developments. **36.5% are** cautious about new developments; **60.6%** believe that tradition plays an important role in their lives. **19.9%** do not consider tradition to be important. **62.8%** need clear rules and find it difficult to function under uncertainty. **19.1%** accept orders created spontaneously.	**35.3%** declare openness to new developments. **31.3% are** cautious about new solutions; **69.4%** believe that tradition plays an important role in their lives. **14.7%** do not consider tradition to be important. **76.2%** need clear rules and find it difficult to function under uncertainty. **7.9%** accept orders created spontaneously.	**15.93** p = 0.0003
Social trust (9)	**29.4%** say that most people can be trusted. **48.9%** are of the opinion that most people cannot be trusted.	**38.1%** say that most people can be trusted. **32.1%** are of the opinion that most people cannot be trusted.	**15.5847** p =0.0004

Source: CATI survey carried out as part of the NCBR project.

The fourth variable (see Table 2), attitude to ownership, is a basic element of economic mentality and a key element of views on how the economy should be arranged. It determines the extent to which society believes that private property is natural and unquestionable, and that the economic system should take this into account. The majority of respondents (about 60%) from both countries were in favour of private ownership (Poles slightly more than Belarusians),

describing it as 'better' than state ownership. However, state ownership was unequivocally favoured by a large number of respondents, with many people in both countries supporting state ownership (27.4% of Belarusians and 23.0% of Poles).

The fifth variable, 'attitude to work', refers to the adoption of certain life attitudes and strategies that are perceived as effective and profitable. Adopting more of a 'hard work' strategy as a recipe for success in life will imply social demands for the system to respect private property and economic freedom. Here, there is no similarity between countries. Almost 40% of Belarusians believe that hard work, career planning and saving are not effective strategies. The same number (just over 40%) hold the opposite view. More than 50% of Poles declare that they rely on honest work, saving and planning for the future in their lives. Nevertheless, 26.2% consider these attitudes to be ineffective.

The sixth variable, 'attitudes towards the role of the state in the economy', refers to the age-old dilemma of 'how much market and how much state,' and it directly relates to social system preferences: liberalism vs. interventionism. Here, there were significant differences of opinion. Almost 70% of Belarusians believe that the economy requires strict regulation and control by the state (and only about 16% disagree). Polish society, on the other hand, is almost symmetrically polarised on this issue – 40% of respondents are in favour of strong state intervention, and the same number are against it. The Poles' experience bears the stigma of socialism, although not as much as that of the Belarusians.

The seventh variable, 'short-term or long-term orientation', indicates whether people plan and how far their plans go. Belarusian society is symmetrically polarised: 44.3% prefer to live according to short-term plans, while 42.2% say that the future is more important than the present and that life requires planning. Poles are similar, except that fewer respondents are decisive: 39.3% live for the moment or plan for the short term, while 34.1% make long-term plans.

Variable eight describes people's attitudes to uncertainty. It includes openness to new experiences and innovation, attitudes to tradition, and the level of conservatism. Belarusian society is more open to novelties. Openness is declared by 45.0% of Belarusians (Poles 35.3%), while 36.5% have the opposite attitude (Poles 31.3%). Both societies are attached to tradition (60.6% of Belarusians and 69.4% of Poles), and people need clear rules to function (62.8% of Belarusians and 76.2% of Poles). The stronger the need for clear rules, the greater the demand for a system that respects property rights and freedom of contract.

The ninth variable is social trust. Among other things, it influences how business is done in a country. When people trust each other, the transaction costs of operating on the market are lower than when they do not trust each other. This variable also reflects political behaviour. When public trust is low, people do not trust politicians and the government, and the government does not trust the public. In such a system, control is socially required and accepted, and transaction costs are high at every level of functioning – markets, organisations, and the political system. In comparison with the level of social trust achieved in Western countries, Poland fares badly (32.1% of respondents are of the opinion that most people cannot be trusted) and Belarus very badly (almost half declare a lack of trust in people).

When comparing the political attitudes of Poles and Belarusians, distinct patterns emerge that align with Huntington's civilisational thesis. The divergence in mental models underscores the role of religion as a cultural foundation that shapes societal norms and governance structures. For example, while Polish respondents consistently displayed higher levels of trust in non-governmental organisations and civic activism, Belarusian respondents exhibited stronger loyalty to centralised authority, reflecting the Orthodox Church's historical alignment with state power. The influence of religion on mental variables related to economic behaviour does not seem to be direct or particularly strong. Material living and economic conditions may be of significant importance in this case.

To summarise this part of the article, the research reveals significant differences in both political and economic mentalities between Belarusians and Poles. We found the most profound differences are in the mental variables we categorised as 'political mentality': locus of control, individualistic vs. collectivistic thinking, and power distance. These subtle traits are first shaped in childhood within the family environment during the upbringing process. They are among the basic components of a worldview in which religion plays a crucial formative role.

Regarding economic mentalities, there are also generally more differences than similarities. Poles and Belarusians have similar attitudes to property, wealth and inequality (acceptance of redistribution), attitudes to tradition, and the predominance of short-term orientation. However, this is where the similarities end. The economic mentality is generally formed a little later than in childhood (also as a result of interacting with the environment outside the family). Therefore, in our opinion, the differences in mentality were and are influenced by different historical experiences – religion is also relevant here, but not as much as in the case of 'political mentality'. Economic mentality develops over slightly shorter periods (over two to four generations) and is greatly influenced by material living conditions and their variability. Both countries have experienced significant institutional changes over the last 100–150 years. However, recent studies indicate that Belarus has been and continues to be poorer than Poland (Markevich 2019; Bukowski, Kowalski, and Wroński 2025a; 2025b). The climate, population density, and proportion of urban dwellers are also important factors. In this respect, Belarus has fared worse than Poland over the last few generations.

This analysis demonstrates how religious traditions, deeply embedded in the historical and cultural contexts of Belarus and Poland, have shaped the divergent mentalities of these societies. Catholicism in Poland has contributed to values such as individualism, low power distance, and personal agency, fostering a democratic ethos and liberal economic attitudes. Orthodoxy in Belarus has reinforced collectivist values, acceptance of authority, and reliance on state structures, contributing to a preference for centralised governance and economic regulation. While historical experiences and socio-political systems also play crucial roles, religion emerges as a foundational influence, particularly in shaping the political mentality of both societies.

These results reveal a profound interplay between religion and societal behaviour, affirming the study's hypothesis and objectives. By shaping perceptions of power, property, and individual agency, religious traditions continue to influence not only the mentalities of Poles and Belarusians but also their broader geopolitical orientations. The Catholic emphasis on moral responsibility and resistance to authority aligns Poland with Western democratic ideals, while Belarus's Orthodox values of collectivism and loyalty to authority anchor it within the Slavic Orthodox civilisation.

Table 3. Comparative Analysis of Mentality Differences and Religious Influence in Belarus and Poland

Aspect of Mentality	Explanation of Religious Influence
Locus of Control	Poles demonstrate a strong internal locus of control, believing in personal agency and accountability. This belief is rooted in Catholic teachings that highlight moral responsibility and individual choice. In contrast, Belarusians tend to lean towards an external locus of control, influenced by Orthodox doctrines that promote acceptance of fate and humility towards higher powers. This divergence contributes to Poland's more active and participatory political culture compared to Belarus's tendency to passively accept authoritarian rule.
Individualism vs. Collectivism	The strong individualism present in Poland aligns with the Catholic emphasis on personal dignity and the importance of individual rights. Meanwhile, Belarus, influenced by Orthodoxy, exhibits a balance that skews towards collectivism, placing greater value on community and the common good over personal ambitions. This collective mindset supports hierarchical governance and social unity but can restrict the pursuit of democratic reforms.
Power Distance	Poles expect accountability from their leaders, which is consistent with Catholicism's legacy of opposing oppressive rule, as illustrated by the Catholic Church's historical role as an opposition force. Conversely, Belarusians demonstrate a greater tolerance for power distance, shaped by Orthodoxy's historical association with state authority that reinforces respect for hierarchy and authority.
Attitude to Property and Work	In Poland, Catholicism has nurtured the belief that hard work is essential for success and emphasises the importance of property rights, reflecting its advocacy for personal responsibility and economic initiative. Conversely, in Belarus, Orthodoxy's focus on communal welfare and its ties to state control during the Soviet era have led to a more ambivalent attitude toward the efficacy of work and a greater acceptance of state ownership. Orthodoxy's alignment with state power supports a collectivist approach, while Catholicism promotes the value of private property rights. Apart from religion, the high support for 'state ownership' among Belarusians can be explained not only by the longer episode of socialism compared to Poland, but also by the very high level of nationalisation in the contemporary Belarusian economy. The high support for state ownership among Poles is more difficult to explain, however. The period of the Polish People's Republic (1947–1989) undoubtedly had an impact. The widespread pessimism about the importance of 'hard work' among Belarusians is most likely due to collective experience acquired back in the period of tsarist Russia and under communism, as well as Lukashenko's state capitalism. The 'hard work' strategy generally works well under conditions of respect for private property, i.e., under capitalism, which is where Poles have more experience.
Attitudes towards the role of the state in the economy	Belarusians predominantly support state intervention in the economy, a viewpoint shaped by their history of central governance and the Orthodox Church's partnership with state authority. In contrast, Poles, although divided, generally show less support for state control, reflecting their more liberal economic experiences and the emphasis Catholicism places on personal responsibility and solidarity. Besides religion, historical experiences seem to be crucial in this regard. Taking into account only the 20th and 21st centuries, apart from short episodes of marketisation (the reforms of Stolypin and Vite in tsarist Russia, the period of the Second Republic for the lands of western Belarus, or the beginning of independence, 1991–1994), the economy in Belarus has always been heavily regulated.

Aspect of Mentality	Explanation of Religious Influence
Short- or long-term orientation	Both societies tend to have a short-term orientation, influenced by historical instability and the unpredictability of their circumstances. This could align with the teachings of both religious traditions that emphasise humility and dependence on divine providence. However, both countries' treatment of the future as something unpredictable that makes no sense to plan for stems from their historical experiences of the 20th and early 21st centuries, when the precarity was on an incomparably larger scale than in other parts of Europe. ‚Big history' (The Bolshevik Revolution, the Polish–Soviet War, World War I, World War II, changes in states, borders, political and economic systems) generated enormous uncertainty, which became inherent in the mentality of these countries. Nonetheless, Poles exhibit slightly more long-term planning, possibly influenced by a more stable post-communist economic environment.
Attitude to uncertainty	Poles prefer clear rules and adherence to tradition, reflecting a conservative perspective shaped by Catholic teachings that value order and structure. On the other hand, Belarusians tend to be more open to new experiences and innovations, which might derive from the Orthodox Church's historical adaptability to changing governmental systems. Both religions emphasise the significance of tradition, but they manifest this emphasis differently – Orthodoxy connects tradition to state authority, while Catholicism links it to moral and civic identity.
Social Trust	Both countries display low levels of social trust, with Poland exhibiting slightly higher trust levels. Catholic teachings that promote community and solidarity have contributed to the modest levels of trust in Poland. In contrast, Orthodoxy's focus on institutional loyalty has fostered a reliance on government structures rather than interpersonal trust in Belarus. In addition to the religious factor, historical experiences in this area may also be of great importance. Social trust can develop under certain institutional conditions: power under public control, a transparent and efficient justice system, and long periods of stability. This has been lacking in the history of both countries. What dominated was authoritarian power, not infrequently oppressive and arbitrary, and corruption and nepotism in administration, the economy and almost every area of life. However, Poland's greater democratic traditions, the relatively law-abiding interwar period, and the last three decades of democracy and the free market have resulted in greater public trust.

Source: authors' development.

Religion as a key factor shaping mental models

A country's affiliation with a particular civilisation is determined by a common set of meta-rules. These include, above all, the scope of individual freedom and responsibility (location of control), the perception of the role of the individual in society (individualism vs. collectivism), the relationship between the authorities and society, and the resulting type of legal order (distance from the authorities). These factors are complemented by social trust (understood as predictability of behaviour), attitudes towards private property and the role of the state in the economy, attitudes towards work, planning and others. Meta-rules (embodied in culture and mental models) are shaped in a long- and medium-term historical process and depend on many factors, including religion, science, art, and natural and material living conditions and their variability, among others. They constitute what is known as the cultural pro-development potential (Hryniewicz 2023).

During our historical analysis, we noted that the components of "political mentality" (location of control, individualism, distance from power) are shaped more over long periods of time. Religion plays a key role in shaping them. By religion, we mean not only the content of holy books, but also their practical interpretations, the attitude of the church towards authority, and the role played by the church in the nation. This gives a more complete picture of the influence of religion on mentality than the content of holy books alone. Religion has also been and continues to be of great importance in shaping the "economic mentality" (attitudes towards property, wealth, work, the role of the state, etc.), but it seems that material living conditions, economic management and their variability have no less influence. We have also noted that this type of mentality develops over medium periods of history.

The cultural potential for development, reflected in a higher level of individualism, a more internal locus of control, a lower distance from authority, and greater social trust, will create conditions for the development of a democratic political system and a market economy based on private property. Less individualism, external control, greater distance from authority and less social trust tend to support the development of an authoritarian political system and an economy that is significantly regulated by the state.

Orthodoxy vs. Catholicism

Although 1054 is considered the official date of the Great Schism that divided Christianity into Eastern (Orthodox) and Western (Catholic) churches, differences in biblical interpretation, liturgy, and rites emerged long before then. From the middle of the 11th century, these religions began to live fully independent lives, establishing meta-rules that formed the foundations of Western and Eastern Christian civilisations.

In general, Western Christianity (Catholicism) imposed fewer restrictions on the faithful, partly due to competition between Christian denominations during the Reformation. This gradually reduced the negative impact of strict ethical norms on participation in political and economic life. One important advantage of Catholicism was its early acceptance of private property, as reflected in the writings of St. Augustine and St. Thomas Aquinas (Sawicki 2010), thereby "endowing" the faithful with agency and responsibility.

The Catholic interpretation and teaching of Christian doctrine placed a much greater emphasis on the individual's responsibility for their actions than was the case with Orthodoxy. The principle of "rendering unto Caesar what is Caesar's, and unto God what is God's", emphasised by the Catholic Church, created a space for individual choice that was unknown to Orthodox believers. Over the centuries, this interpretation of Christian teaching has meant that Catholics generally have greater 'internal control' than their Orthodox neighbours. Individualistic thinking also prevails over collectivist thinking among Catholics, and the opposite is true for Orthodox Christians.

Both branches of Christianity also have different historical experiences in their relations with political authority. From the beginning, the patriarchs of Byzantium and later of the Orthodox Church were not in the habit of criticising rulers. This custom evolved into the Orthodox Church's complete subordination to state authority. The Orthodox

Church was even part of the state administration of the Russian tsars, served the communists as a tool of surveillance, and today is an integral part of the Lukashenko regime in Belarus and Putin's regime in Russia. The relationship between secular and spiritual authority was and still is completely different in Catholicism. The church authorities sought to be independent of the state authorities, and there were frequent disputes and conflicts between them. This created space for discussion and intellectual debate, encouraging people to interpret political, legal and moral issues for themselves (Winiecki 2012, pp. 202–212). The different relations and attitudes of Orthodox Christianity and Catholicism towards the state authorities shaped a different political mentality. The distance between Catholics and the authorities is much smaller than that between Orthodox Christians and the authorities.

The Role of Orthodoxy in Belarus and Catholicism in Poland: A Historical and Contemporary Overview

Belarus presents a unique religious and political trajectory, especially in comparison to Poland. While Poland's Catholic Church has historically been a strong force of resistance to external and internal oppression, the Orthodox Church in Belarus has played a much more ambivalent role, often aligning itself with ruling authorities. The Orthodox Church has been historically dominant in Belarus since the 18th century, following the partitions of the Polish–Lithuanian Commonwealth and Belarus's gradual incorporation into the Russian Empire (Plokhy 2015). This period marked the beginning of a closer association between the Belarusian Orthodox Church and the Russian state, as the church became a tool for promoting Russian imperial interests and identity in the region. As mentioned above, the Orthodox Church did not criticise the authorities; moreover, it became, in a sense, part of the state administration, helping the tsars to oppress the faithful (Pipes 2006, pp. 227–230).

During the period of Soviet rule, the Orthodox Church in Belarus, much like its counterpart in Russia, was heavily controlled and manipulated by the communist state. Despite the official atheism of the Soviet Union, the Orthodox Church was permitted to continue operating under strict government supervision, primarily as a means of ensuring social order and loyalty to the regime (Ramet 1998). This legacy of state control has persisted into the post-Soviet era, where the Belarusian Orthodox Church has remained closely aligned with the authoritarian government of Alexander Lukashenko. Unlike in Poland, where the Catholic Church played a leading role in opposing communist rule, the Orthodox Church in Belarus has often functioned as a supporter of state power, reinforcing narratives of national unity and loyalty to the regime.

In the modern Belarusian state, the Orthodox Church continues to serve as a vital instrument of state propaganda and control. Since coming to power in 1994, Lukashenko has fostered close ties with the Belarusian Orthodox Church, using it as a means of promoting his own legitimacy and consolidating national identity. This relationship mirrors the broader alliance between the Russian Orthodox Church and the Russian government under Vladimir Putin, with both churches playing key roles in promoting conservative social values and reinforcing loyalty to the state (Stoeckl 2014). The Belarusian Orthodox Church, in particular, has supported

the government's geopolitical alignment with Russia, endorsing its anti-Western and anti-liberal policies. The church often frames its support for the regime as a defence of traditional values against the perceived moral and cultural degradation of the West (Payne 2011).

This close relationship between the Orthodox Church and the Belarusian state has had a profound impact on the mental and behavioural characteristics of the Belarusian population. The Orthodox Church's historical role as a supporter of state power, rather than a challenger to it, has fostered a culture of political passivity and deference to authority in Belarusian society. Religious identity in Belarus is often linked to political loyalty, with the church reinforcing narratives of national unity and obedience to the state. Unlike in Poland, where the Catholic tradition has cultivated a strong sense of civic engagement and resistance to authoritarianism, the Orthodox tradition in Belarus has reinforced a more hierarchical and deferential social structure (Marples 2014).

Moreover, the Orthodox Church in Belarus plays a central role in shaping the country's geopolitical identity. As the state continues to align itself with Russia both politically and culturally, the church reinforces this alignment through its promotion of shared religious and historical narratives. These narratives emphasise Belarus's role as part of the "Russian world" (Russkiy mir), a concept that frames Belarusian identity as inherently tied to Russian culture, language, and Orthodoxy (Rudling 2014).

In addition to reinforcing political loyalty, the Orthodox Church also plays a crucial role in promoting traditional social values in Belarus. The church is a vocal supporter of conservative positions on issues such as family, gender roles, and sexuality, and its influence extends into the educational and cultural spheres. This promotion of traditional values is closely aligned with the state's broader geopolitical agenda, which seeks to distance Belarus from liberal Western influences and maintain its close relationship with Russia (Stoeckl 2014). In this way, the church not only supports the political status quo but also shapes the moral and cultural framework within which Belarusian society operates.

While Poland benefits from a growing body of quantitative research on religiosity and political preferences, such data remains limited in the Belarusian context, largely due to political constraints and restrictions on sociological research. Nevertheless, studies on Russia, such as Köllner (2021), offer relevant comparative insights, particularly regarding how Orthodox Christianity can be mobilised symbolically and institutionally in state narratives. These parallels may be useful for interpreting Belarusian patterns in the absence of direct empirical studies.

Poland adopted Christianity in the late 10th century from the West and with it a set of identifiers and meta-principles common to Western civilisation. Their adoption set Poland on certain trajectories of development that shaped the social system and mentality of the Poles. The adoption of Christianity precisely from the West had and still has a significant impact on the differentiation of the mentality of Poles from their Eastern Orthodox neighbours.

In the 19th century, during the period of the formation of modern nation-states in Europe, the Catholic Church played a special role in the Polish lands. Poland was not an independent state at that time, but was divided between the partitioners. Membership of the Church soon became a marker

of 'Polishness', which gave rise to the stereotype that a Pole is a Catholic, embodied in the saying 'Pole-Catholic'. The Catholic Church has always been politically involved in Poland, independent of the authorities (Pawlak 2014). It shaped a culture of criticism of authority, of dispute, of dissent. Hence, the mental 'distance to authority' of Poles is much smaller than that of Belarusians.

The Catholic Church has been particularly active in recent Polish history, which has further influenced contemporary Poles. Under communism in Poland, the Catholic Church openly opposed the authorities and contested the culturally alien social orders imposed by the Soviets. During the rise of the Solidarity movement, it actively supported it; one could even say that it was an integral part of it. In the 1980s, the churches were full of the faithful, who found a space to hear opinions that were very different from those propagated by the government propaganda (Pieczewski, Sidarava 2022, pp. 168–198).

Although the churches are no longer so full in Poland and society is slowly becoming secularised, the Catholic Church still plays a very important role in the world of Polish politics by upholding, in this case, conservative values and supporting right-wing parties. In a general sense, the very attitude of the Church – active participation in political life – shows people that authorities are not to be feared, can be criticised, can be changed, and that power should serve the people, not the other way around.

The influence of Orthodoxy in Belarus has been fundamentally shaped by its historical alignment with state power, from the Russian Empire to the Soviet Union and the contemporary regime of Alexander Lukashenko. Unlike Poland's Catholic Church, which has often acted as a force of resistance and moral authority in the face of authoritarianism, the Belarusian Orthodox Church has traditionally reinforced political conformity and deference to authority. This has had a significant impact on the mental characteristics and behaviour of the Belarusian people, fostering a more passive and hierarchical society in contrast to the more civic-oriented and independent mentality found in Poland. In the context of contemporary geopolitics, the Orthodox Church continues to play a vital role in reinforcing Belarus's alignment with Russia, promoting conservative social values, and supporting the authoritarian state. The World Values Survey (2023) confirms significant differences in the cultural foundations of Belarus and Poland, clearly classifying Poland as 'Catholic Europe' and Belarus as 'Orthodox Europe'.

Beyond religion

There are, of course, many other factors that influence mentality besides religion. Western civilisation is shaped by the influence of ancient Greece – its democratic political system and economy based on private property, as well as its love of philosophy and science. Ancient Rome, with its republican heritage and highly developed laws (including property law), had a very significant influence. The development of cities and merchant capitalism, as well as a more decentralised political system in Western Europe (multiple levels of the feudal ladder), also played an important role (Ferguson 2011). Eastern European civilisation was influenced by the legacy of ancient Greece, but then, as a result of historical events, the Moscow state became a vassal of the Mongol khans (13th–14th centuries), adopting the culture and patterns of strong, ruthless, and oppressive rule that originated in Asia. This also permanently shaped a certain legal culture in which the ruler stands above the law,

is its source, and can shape it at will according to his needs. The absolute power of the Russian tsars also included an almost complete monopoly on property. Suffice it to say that the traditions of private property protection in Russia are very young compared to the West – they were introduced by Catherine II in the mid-18th century (Pipes 2006). Other factors that influence differences in mentality include differences in climate, population density, wealth, literacy, and size of cities, among others. As for recent history, life under communism had a huge impact on the mentality.

Conclusions

The research objectives were to explore how religious traditions influence mental variables, including attitudes toward power, property, and individualism, among others, and what implications they had for the political and economic systems of both nations.

These mental variables, shaped to a large extent by religious traditions, have broader implications for contemporary geopolitics, highlighting the enduring relevance of Huntington's civilisational framework. While Poland integrates with Western democratic and economic systems, Belarus remains aligned with the Slavic Orthodox world, characterised by authoritarian governance and state-dominated economies. This divergence not only reflects historical religious influences but also perpetuates their impact on global alignments and conflicts.

Our research into the mental models of contemporary Belarusians and Poles reveals significant differences in mentality. We found the most profound differences in the mental variables we categorised as 'political mentality': locus of control, individualistic vs. collectivistic thinking, and power distance. In Poles, the locus of control, which influences the sense of agency, initiative, and entrepreneurship, is more 'internal', while in Belarusians, it is more 'external'. We found more individualistic attitudes among Poles than among Belarusians. The distance to authority is much higher among Belarusians than among Poles. These subtle traits are initially shaped during childhood within the family environment during the upbringing process. They are among the basic components of a worldview in which religion plays a crucial formative role.

In terms of the mental variables we categorised as economic, there are also generally more differences than similarities. Both nations have similar attitudes to tradition and the predominance of short-term orientation. In both countries, we also noted low social trust, although it is higher in Poland. Clear differences emerge in attitudes towards work – many more Poles believe that hard work leads to success. Regarding attitudes towards uncertainty, Poles are more attached to tradition than Belarusians are, and they are more in need of clear rules to function.

Economic mentality is generally formed a little later than childhood through interactions with the environment outside the family. Therefore, in our opinion, the differences in mentality were and are influenced by the distinct historical experiences with private property and different economic systems – particularly Belarus' longer and more radical episode of communism – and varying levels of economic development. Nevertheless, the characteristics singled out as 'political mentality' are, in our view, of greater importance as they shape the political system, which in turn determines the economy.

In our opinion, the perceived differences in mentality (especially political mentality) are largely due to the influence of two different Christian denominations over the centuries: the Orthodox Church mainly on Belarusians and the Catholic Church mainly on Poles. This was despite the fact that Poles and Belarusians shared the same state organisms for a long time. The seemingly minor differences in the truths proclaimed and the differences in relations with the authorities of these two denominations have for centuries shaped the worldview, values, and attitudes, and consequently the mental models of their followers in different ways.

Western Christianity (in this case, Catholicism) has encouraged greater responsibility for one's actions, individual choice, and a willingness to contest political authority, showing what independence means. In contrast, Orthodoxy promotes more humility, acceptance of fate, collective thinking, and cooperation with – and dependency on – state power, teaching the faithful to respect authority. Despite the gradual secularisation of both societies, ancestral faith is still of colossal importance in shaping the mentality of modern people. The current East–West conflict can thus be viewed as a conflict of values.

This study confirms Samuel Huntington's thesis that cultural and religious differences significantly shape the political and economic systems of nations. By examining the divergent mental models of Belarusians and Poles, the findings underscore how centuries of religious influence – Orthodoxy in Belarus and Catholicism in Poland – have forged distinct societal attitudes and behaviours. Looking at the current situation in Eastern Europe, it seems that Huntington was right. Today's conflict between the West and Russia and its satellites (including Belarus) is a conflict of two civilisations based on different values on which the political and economic systems of these countries are built. These values have been shaped over centuries, with religion being one of the main forces.

References

Barro, R.J., McCleary, R.M. (2003), *Religion and Economic Growth across Countries*, "American Sociological Review", 68 (5), pp. 760–781, https://doi.org/10.2307/1519761

Barro, R.J., Sala-i-Martin, X. (2004), *Economic Growth*, MIT Press, Cambridge.

Becker, G. (1996), *Accounting for Taste*, Harvard University Press, Cambridge, https://doi.org/10.4159/9780674020658

Bukowski, M., Kowalski, M., Wroński, M. (2025a), *The Economic Growth and Regional Convergence in Interwar Poland: Detailed Historical National Accounts*, "Faculty of Economic Sciences Working Paper", 3 (466), University of Warsaw, https://www.wne.uw.edu.pl/application/files/6817/4013/4800/WNE_WP466.pdf (accessed: 13.02.2025).

Bukowski, M., Kowalski, M., Wroński, M. (2025b), *Agriculture in interwar Poland: development in a turbulent time*, "Faculty of Economic Sciences Working Paper", 2 (465), University of Warsaw, https://ideas.repec.org/p/war/wpaper/2025-02.html (accessed: 17.02.2025).

Casanova, J. (1994), *Public Religions in the Modern World*, University of Chicago Press, Chicago, https://doi.org/10.7208/chicago/9780226190204.001.0001

Davies, N. (2005), *God's Playground: A History of Poland*, Columbia University Press, New York.

Ferguson, N. (2011), *Civilization. The West and the Rest*, Penguin Books, London.

Fukuyama, F. (1992), *The End of History and the Last Man*, Maxwell Macmillan International, New York.

Galor, O. (2022), *The Journey of Humanity: The Origins of Wealth and Inequality*, Vintage Publishing, Zittau.

Grusec, J.E., Kuczynski, L. (1997), *Parenting and Children's Internalization of Values: A Handbook of Contemporary Theory*, John Wiley & Sons, Inc., New York.

Guiso, L., Sapienza, P., Zingales, L. (2003), *People's opium? Religion and economic attitudes*, "Journal of Monetary Economics", 50 (1), pp. 225–282, https://doi.org/10.1016/S0304-3932(02)00202-7

Guiso, L., Sapienza, P., Zingales, L. (2006), *Does Culture Affect Economic Outcomes?*, "Journal of Economic Perspectives", 20 (2), pp. 23–48, https://doi.org/10.1257/jep.20.2.23

Harrison, L.E. (2006), *The Central Liberal Truth: How Politics Can Change a Culture and Save It from Itself*, Oxford University Press, Oxford, https://doi.org/10.1093/oso/9780195300413.001.0001

Hryniewicz, J.T. (2023), *The impact of processes of long duration on the cultural potential for economic development in the peripheries of the European Union*, "Studia z Dziejów Rosji i Europy Środkowowschodniej", 58 (3), pp. 188–216, https://doi.org/10.12775/SDR.2023.EN7.08

Huntington, S. (1993), *The Clash of Civilisations?*, "Foreign Affairs", 72 (3), pp. 22–49, https://doi.org/10.2307/20045621

Huntington, S. (1996), *The Clash of Civilisations and the Remaking of World Order*, Simon & Schuster, New York.

Jonson-Laird, P.N., Byrne, R.M.J. (1993), *Précis of Deduction*, "Behavioural and Brain Sciences", 16 (2), pp. 323–380, https://doi.org/10.1017/S0140525X00030260

Köllner, T. (2021), *Religion and Politics in Contemporary Russia. Beyond the Binary of Power and Authority*, Routledge, Oxon, https://doi.org/10.4324/9780429424632

Kubik, J. (1994), *The Power of Symbols against the Symbols of Power: The Rise of Solidarity and the Fall of State Socialism in Poland*, Penn State University Press, University Park.

Kuran, T. (1997), Islam and Underdevelopment: An Old Puzzle Revisited, "Journal of Institutional and Theoretical Economics", 153 (1), pp. 41–71, https://www.jstor.org/stable/40752985?read-now=1 (accessed: 17.03.2025).

Markevich, A. (2019), *A Regional Perspective on the Economic Development of the late Russian Empire*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2555273 (accessed: 17.03.2025).

Marples, D. (2014), *Our Glorious Past: Lukashenka's Belarus and the Great Patriotic War*, Columbia University Press, Columbia.

McCleary, R.M., Barro, R.J. (2006), *Religion and Political Economy in an International Panel*, "Journal for the Scientific Study of Religion", 45 (2), pp. 149–175, https://doi.org/10.1111/j.1468-5906.2006.00299.x

Mironowicz, A. (2001), *The Orthodox Church and Byelorussian People*, Brotherhood of Sts. Cyril and Methodius in the Poland, Białystok.

Noland, M. (2005), *Religion and economic performance*, "World Development", 33 (8), pp. 1215–1232, https://doi.org/10.1016/j.worlddev.2005.03.006

North, D.C. (1990), *Institutions, Institutional Change, and Economic Performance*, Cambridge University Press, Cambridge, https://doi.org/10.1017/CBO9780511808678

Olejnik, Ł., Wroński, M. (2025), *The Roots of Populism in Poland. Do Uneven Economic Development, Social Transfers, Inequality and Migration Explain the Success of Populist Parties?*, "Economics & Politics", 37 (2), pp. 685–698, https://doi.org/10.1111/ecpo.12335

Pawlak, K. (2014), *Miejsce i rola kościoła katolickiego w polskim dyskursie publicznym*, Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

Payne, D.P. (2011), *Orthodox Christianity and the Politics of Transition: Ukraine, Serbia, and Georgia*, Routledge, London, https://doi.org/10.4324/9780367817329

Pieczewski, A., Sidarava, A. (2022), *Belarusian vs. Polish transformation. Two paths of institutional change*, "UR Journal of Humanities and Social Sciences", 1 (22), pp. 168–198, https://doi.org/10.15584/johass.2022.1.8

Pipes, R. (2006), *Russia of the Tsars*, Magnum Publishing House, Warsaw.

Plokhy, S. (2015), *The Gates of Europe: A History of Ukraine*, Basic Books, New York.

Porter, B. (2000), *When Nationalism Began to Hate: Imagining Modern Politics in Nineteenth-Century Poland*, Oxford University Press, Oxford, https://doi.org/10.1093/oso/9780195131468.001.0001

Porter, M.E. (2000), *Attitudes, Values, Beliefs, and the Microeconomics of Prosperity*, [in:] L.E. Harrison, S.P. Huntington (eds.), *Culture Matters. How Values Shape Human Progress*, Basic Books, New York, pp. 14–28.

Pospielovsky, D. (1988), *The Orthodox Church in the History of Russia*, St. Vladimir's Seminary Press, Crestwood–New York.

Ramet, S.P. (1998), *Nihil Obstat: Religion, Politics, and Social Change in East-Central Europe and Russia*, Duke University Press, Durham.

Ramet, S.P. (2006), *The Three Yugoslavias: State-Building and Legitimation, 1918–2005*, Indiana University Press, Bloomington, https://doi.org/10.2979/3961.0

Riasanovsky, N.V. (2011), *A History of Russia*, Oxford University Press, Oxford.

Rosenbaum, E. (2022), *Mental models and institutional inertia*, "Journal of Institutional Economics", 18 (3), pp. 1–18, https://doi.org/10.1017/S174413742100059X

Rudling, P.A. (2014), *The Rise and Fall of Belarusian Nationalism, 1906–1931*, University of Pittsburgh Press, Pittsburgh, https://doi.org/10.2307/j.ctt1287p7r

Sawicki, F. (2010), *U źródeł chrześcijańskiej myśli. Św. Augustyn, św. Tomasz z Akwinu, mistrz Eckhart*, Wydawnictwo Antyk Marcin Dybowski, Warszawa.

Statistics Poland (2012), *National Census of Population and Housing 2011*, Warsaw, https://stat.gov.pl/en/national-census/national-census-of-population-and-housing-2011/ (accessed: 9.02.2025).

Statistics Poland (2022), National Population and Housing Census 2021, Warsaw, https://stat.gov.pl/en/national-census/national-population-and-housing-census-2021/ (accessed: 9.02.2025).

Stoeckl, K. (2014), *The Russian Orthodox Church and Human Rights*, Routledge, London, https://doi.org/10.4324/9781315818788

Stokes, G. (1993), *The Walls Came Tumbling Down: The Collapse of Communism in Eastern Europe*, Oxford University Press, Oxford.

The Culture Factor Group (2025), *Country Comparison Tool*, https://www.theculturefactor.com/country-comparison-tool?countries= (accessed: 9.02.2025).

Williamson, O. (2000), *The New Institutional Economics: Taking Stocks, Looking Ahead*, "Journal of Economic Literature", 38 (3), pp. 595–613, https://doi.org/10.1257/jel.38.3.595

Winiecki, J. (2012), *Transformacja postkomunistyczna. Studium przypadku zmian instytucjonalnych*, C.H. Beck, Warszawa.

Woodberry, R.D. (2012), *The Missionary Roots of Liberal Democracy*, "American Political Science Review", 106 (2), pp. 244–274, https://doi.org/10.1017/S0003055412000093

World Values Survey (2023), *WVS Cultural Map: 2023 Version Released*, https://www.worldvaluessurvey.org/WVSNewsShow.jsp?ID=467 (accessed: 17.05.2025).

Гурко, А., Мартинович, В. (2025), *Религиозная ситуация в Республике Беларусь 2025*, https://belarusenc.by/belarus/detail-article.php?ID=418 (accessed: 28.05.2025).

Zderzenie cywilizacji? Religia jako główny składnik zróżnicowania kulturowego na przykładzie Białorusi i Polski

Niniejsze studium porównawcze bada rolę religii jako kluczowego czynnika w kształtowaniu politycznych i ekonomicznych modeli mentalnych, koncentrując się na przykładach Białorusi i Polski. Opiera się ono na tezie Samuela Huntingtona, która zakłada, że różnice kulturowe i religijne mają fundamentalne znaczenie dla konfliktów cywilizacyjnych. Analizując, w jaki sposób katolicyzm i prawosławie ukształtowały rozbieżne mentalności tych sąsiadujących ze sobą narodów, badania te podkreślają głęboki wpływ tradycji religijnych na rozwój społeczny. Wykorzystując zróżnicowane metody badawcze, w tym ankiety CATI, analizy statystyczne i porównania historyczne, badanie identyfikuje znaczące różnice w zachowaniach politycznych i ekonomicznych między Białorusinami i Polakami. Różnice te podkreślają długoterminowy wpływ religii na postawy wobec władzy, własności i indywidualizmu. Wyniki badania mogą przyczynić się do lepszego zrozumienia tego, w jaki sposób wartości religijne nie tylko definiują normy społeczne, ale także kształtują trajektorie rozwoju i współczesne układy geopolityczne. Badania te podkreślają trwałe znaczenie religii w wyjaśnianiu dynamiki kulturowej i podziałów cywilizacyjnych w Europie Wschodniej.

Słowa kluczowe: religia, cywilizacja, modele mentalne, Białoruś, Polska

Comparative Economic Research. Central and Eastern Europe
Volume 28, Number 4, 2025
https://doi.org/10.18778/1508-2008.28.30

Gendered Wage Penalties for the Overeducated: The Experiences of Young Men and Women in Ten European Countries

Radha Jagannathan https://orcid.org/0000-0001-5614-8176
Ph.D., Professor, Edward J. Bloustein Rutgers University, School of Planning and Public Policy, New Brunswick, NJ, USA, e-mail: radha@rutgers.edu

Michael J. Camasso
Ph.D. (passed away on August 31, 2024), Professor, Rutgers University, New Brunswick, NJ, USA

Abstract

In this study, we examine the impact of overeducation on wages and wage penalties among 19,000 young men and women aged 18–35 in ten European countries. Using data from the Cultural Pathways to Economic Self-sufficiency and Entrepreneurship (CUPESSE) project and controlling for some endogeneity from omitted ability variables and employment selection, we find that women's wages and wage penalties align with job search theory, while men's observed wage offers are consistent with job competition theory. However, once selection is accounted for, wage penalties incurred by young men do not follow the predictions from this theory. Despite lower baseline wages, women in many countries face larger overeducation penalties than men, a pattern shaped by institutional regime type and gender norms. We offer possible explanations for this disparity and conclude with policy recommendations to address overeducation penalties.

Keywords: overeducation, wage penalty, selection model, job search theory, job competition theory

JEL: I0, I2, J0, J1, J3

Funding information: The authors did not receive support from any organization for the submitted work. The original Cultural Pathways to Economic Self-sufficiency and Entrepreneurship (CUPESSE) project was funded by the European Commission under the 7th Framework Programme.
The percentage share of the Authors in the preparation of the work is: R.J. – 60,00%; M.J.C. – 40,00%.
Declaration regarding the use of GAI tools: Not used.
Conflicts of interests: None.
Ethical considerations: The Authors assure of no violations of publication ethics and take full responsibility for the content of the publication.
Received: 25.04.2024. Verified: 16.06.2025. Accepted: 9.10.2025

Introduction

Young adults entering the labor market today face significant challenges that reflect broader changes in labor market structures, educational attainment levels, and employment practices. A growing body of evidence documents a mismatch between the educational qualifications of young workers and the demands of the jobs they occupy. This mismatch is especially acute for young people with tertiary degrees who are unable to secure employment that fully utilizes their level of education, a condition commonly referred to as overeducation. While overeducation has been extensively studied, relatively less is known about its gendered consequences – specifically, whether young women face larger wage penalties than young men when overeducated. Addressing this question is critical to understanding how gender inequalities are reproduced in contemporary labor markets, particularly during the critical early years of employment.

In this paper, we attempt to extend the research on the wage penalties associated with overeducation in three ways, viz., by (a) identifying how wage penalties fit into the human capital, job search, and job competition theories and other related theories of labor force attachment; (b) demonstrating the dependence of overeducation penalties on gender and on country-specific macro level factors that affect how human capital is absorbed into the labor market; and (c) addressing the contribution that individual ability makes in the assessment of wage penalties through the introduction of "soft skills" and work values such as grit, risk-taking, motivation, etc., in participation and earnings models (Carneiro and Heckman 2003; Chevalier 2003; Duckworth and Yeager 2015; Galloway et al. 2017; Stewart 2018; Palczyńska 2021).

The data we use to meet these research objectives originate from the Cultural Pathways to Economic Self-sufficiency and Entrepreneurship (CUPESSE) database, which contains the survey responses of 20,008 young adults aged 18 to 35 from 11 European countries. This 2017–2018 survey, funded by the European Commission, asked respondents from Austria, Czechia, Denmark, Germany, Greece, Hungary, Italy, Spain, Switzerland, Turkey, and the United Kingdom a wide variety of questions concerning labor force participation, work values and skills, and labor market conditions. More information on CUPESSE research goals and methodology can be found in Tosun et al. (2019) and Kraaykamp, Cemalcilar, and Tosun (2019).

Our empirical findings reveal that: (1) consistent with job search theory, women in a large majority of our study countries exhibit observed wages in OLS regressions that are greater than offered wages. Moreover, when earnings models are adjusted for women not observed in the labor market, these women are less likely to be overeducated and hence, less likely to incur wage penalties; (2) men in our country-specific samples appear to have observed wages that are less than those offered, an indication of job competition theory. However, contrary to job competition predictions, when above-average credentialed men, who are more likely to be overeducated, are accounted for, wage penalties *do not* increase as would be expected; and (3) one possible explanation for this second result is the significant display of "grit" or perseverance by men in our sample, which may serve as a productivity signal to employers and as a prophylactic against wage erosion.

The rest of the paper is organized as follows: Section 2 provides the theoretical framework for our empirical work and discusses the endogeneity problem and the potential role of soft

skills in controlling for endogeneity (at least partially) in the selection and wage equations; Section 3 reviews the relevant literature on wage penalty and its gendered nature; Section 4 details data sources, sample, measures and analytical methods used in this study; Section 5 reviews our empirical findings; and Section 6 discusses our findings and provides conclusions and policy suggestions.

Theoretical Framework

Overeducation and Economic Theory

Several labor market theories explain how overeducation affects employment and earnings, each offering distinct mechanisms for understanding why individuals may work in jobs below their educational level and how this affects earnings.

Human Capital

Human capital theory (HCT) posits that education enhances worker productivity and wages, implying that surplus education still generates positive returns, albeit at a lower marginal rate than education aligned with job requirements. From this perspective, overeducation represents a transitional or frictional state, as market adjustments eventually align supply and demand for skills (Becker 1964; 1993; Mincer 1974; Duncan and Hoffman 1981; Card 1999). The compensation model suggests that overeducation offsets lower abilities, and wage penalties should vanish when controlling for skills (Chevalier 2003). Yet, persistent wage penalties challenge this view (Sicherman 1991; Büchel 2002; McGuinness 2003; Korpi and Tåhlin 2009; Kampelmann and Rycx 2012; Kleibrink 2016), perhaps due to inadequate skill measures on verbal ability or math proficiency. Two theories of labor force participation, namely, job search theory and career mobility theory, tend to support HCT by offering extenuating market demand circumstances for HCT's often less than perfect predictions of employment and earnings. A third, job competition theory, does not support an HCT explanation. Together, HCT and the job search, job mobility, and job competition models provide a foundation for understanding how educational attainment affects wages; this foundation is further enriched by Assignment Theory and Search and Matching Theory, which consider how workers are allocated to positions and how frictions in the matching process influence wage outcomes for the overeducated.

Job Search

This model argues workers accept jobs only above their reservation wage, implying higher earning potential correlates with employment (Baldwin and Johnson 1992; Nicaise 2001; Caroleo and Pastore 2016; 2018). Consequently, OLS may overstate wage penalties. Studies of younger women in the Netherlands and Belgium (Hartog and Oosterbeek 1988; Nicaise 2001) illustrate that overeducated women still require returns to education to justify labor force participation. Heckman's (1979) selection model suggests that a positive lambda (λ+) indicates wage penalties may shrink when accounting for unobserved traits like motivation (Baldwin and Johnson 1992; Ermisch and Wright 1994; Nicaise 2001).

Job Mobility

Sicherman (1991) finds that overeducated workers often accept lower initial wages but use these jobs for advancement (Sicherman and Galor 1990). Over time, wage penalties diminish due to job mobility and on-the-job training (OJT) (Büchel 2002; Korpi and Tåhlin 2009; Kampelmann and Rycx 2012), though the "genuinely overeducated" continue to suffer penalties (Chevalier 2003; Chevalier and Lindley 2009). While U.S. labor markets support mobility and OJT, other systems may not (Zimmerman et al. 2013; Caroleo and Pastore 2018; Marques, Suleman, and Costa 2022).

Job Competition

Thurow's model (Kalamazoo and Thurow 1979) offers a demand-side perspective and depicts rigid labor markets where educated individuals take lower-level jobs, leading to wage penalties, especially in slow-growth economies (López Fogués 2017; Caroleo and Pastore 2018; Marques, Suleman and Costa 2022). Unlike job search theory, it predicts more penalties as motivated individuals accept suboptimal jobs. In sample selection models, this is reflected in a negative lambda (λ–), indicating unobserved traits increase employment probability, but reduce wages (Heckman 1979; Ermisch and Wright 1994).

Assignment Theory

This theory complements Thurow's thinking while emphasizing the roles of job constraints *and* individual capital (Sattinger 1993; McGuinness 2006; Kleibrink 2016; Caroleo and Pastore 2018). Overeducation leads to productivity losses because workers' skills are underutilized, and employers do not fully compensate for unused human capital. This model predicts persistent penalties if mismatches reflect structural labor market rigidities rather than temporary frictions.

Search and Matching Models

These models (Mortensen and Pissarides 1994) highlight that mismatches can result from imperfect information and frictions in job search. Overeducation in this framework reflects suboptimal matching rather than pure surplus supply. These models predict that penalties may be mitigated when labor markets are dynamic, and workers can transition more easily to better-matched jobs.

Together, these perspectives suggest that the incidence and penalty of overeducation will vary depending on whether mismatches are transitional (as in HCT and search models), structural (as in assignment theory), or employer-driven (as in job competition models). This study interprets its findings through these theoretical lenses, acknowledging that institutional features – such as vocational training systems, wage-setting mechanisms, gender norms and job mobility opportunities – will shape which mechanisms dominate in different contexts.

Overeducation and Knowledge, Skills, Ability (KSA) Bias

Leuven and Oosterbeek (2011) note that wage penalties linked to overeducation may stem from endogeneity due to the correlation of measured overeducation with the error term and unobserved

heterogeneity in wage models. There, of course, is an additional source of potential endogeneity due to sample selection, affecting both labor force participation and earnings.

Omitted Variables in Wage Equations

Common methods to address endogeneity include fixed effects, instrumental variables (IVs), and direct KSA measures. IVs, such as family background or early-life factors (Korpi and Tåhlin 2009; Kleibrink 2016; Caroleo and Pastore 2018), or baseline earnings at first job (Chevalier 2003) often fail to meet exclusion criteria. Including KSA measures such as numeracy and literacy has had minimal success in explaining wage variation in samples from OECD countries, Poland, Spain and Northern Ireland (McGuinness 2003; Kankaraš et al. 2016; Nieto and Ramos 2017; Palczyńska 2021). While soft skills – perseverance or grit, dependability, trustworthiness, and agreeability – may be more relevant (Heckman, Stixrud, and Urzua 2006; Heckman and Masterov 2007; Rosso, Dekas, and Wrzesniewski 2010; Duckworth and Yeager 2015; Hauff and Kircher 2015; Stewart 2018; Gesthuizen, Kovarek, and Rapp 2019; Camasso and Jagannathan 2021), they are largely absent from overeducation studies, with the exception being Palczyńska (2021).

Omitted Variables in Participation Equations

Accounting for both workers and nonparticipants is essential, as models like job search and job competition highlight selection dynamics. When specifying sample selection models, choosing which KSAs and other factors should be included in the participation model and which should appear in the wage (earnings) equation is fundamental. Following Heckman (1979) and Killingsworth (1984), employment depends on income–leisure trade-offs, while wages reflect productivity. If we consider overeducation primarily as a labor market mismatch and not an individual characteristic, it only belongs in the wage equation. It has also been shown that including irrelevant KSAs in the wage equation may misstate selection effects (Dolton and Makepeace 1986; Caroleo and Pastore 2018).

Our approach in this paper addresses the issue of overeducation endogeneity at least to some extent by directly including often omitted KSAs in our wage equations and by including additional KSAs in our selection equations that we believe have an indirect impact on wages through their influence on the decision to seek employment. However, we acknowledge that a substantial portion of endogeneity may remain due to unobserved factors, including cognitive and non-cognitive skills, motivation, or other individual-level characteristics that influence both participation and wage outcomes. We also refine our analyses of wage penalties experienced by young adults by conducting a series of country- and gender-specific analyses.

Background Literature

In the empirical literature, two main approaches dominate the analysis of wage effects stemming from educational mismatch. The first is the ORU (Over-Required-Under education) specification (Hartog 2000), which decomposes total schooling into three additive components: required schooling, overeducation, and undereducation. Studies employing this framework consistently

find that overeducation yields positive but lower returns than required education, and higher returns than undereducation – highlighting a hierarchy of educational match in shaping wages. The second widely used method, developed by Verdugo and Verdugo (1989), treats overeducation as a dummy variable while controlling for actual education. In this approach, the wage penalty for overeducation is interpreted as the loss incurred by individuals who are mismatched, relative to similarly educated but adequately matched peers. The distinction between these approaches is not merely methodological; it affects the interpretation of wage effects. While the ORU model assesses the relative productivity of excess education, the Verdugo model captures the penalty associated with mismatch status itself. This study follows the latter approach, which is particularly suited for large-scale, cross-national data where direct job-education alignment measures are limited.

In one of the earliest discussions of overeducation in the social science literature, Duncan and Hoffman (1981) described the phenomenon of overeducation as the simple difference between attained years of schooling and years of schooling required to "discharge job responsibilities." Since that work, other researchers have reported one of two general findings: (1) overeducation yields positive returns to schooling; however, each year of "surplus" education does not have as much economic value as an additional year of required education (Duncan and Hoffman 1981; Sicherman 1991; Cohn and Khan 1995; Büchel 2002; Leuven and Oosterbeek 2011; Kampelmann and Rycx 2012); and (2) overeducation is responsible for substantial wage penalties which may or may not persist indefinitely (Verdugo and Verdugo 1992; Korpi and Tåhlin 2009; McGuinness, Pouliakas, and Redmond 2017; Caroleo and Pastore 2018; McGuinness, Bergin, and Whelan 2018). Of course, these two findings need not be mutually exclusive, as Cohn and Khan (1995) and Sicherman (1991) clearly point out.

The accumulated research on the economic impact of overeducation has refined our understanding of this mismatch, particularly in cross-national contexts. Leuven and Oosterbeek (2011) and McGuinness (2006) found that wage penalties vary widely across countries depending on measurement method and institutional context. Meanwhile, Caroleo and Pastore (2016) demonstrated that wage penalties can even vary considerably within a country. Studies using the vertical mismatch perspective (Barone and Ortiz 2011; Levels, van der Velden, and Allen 2014) suggest that institutional factors such as vocational tracking, employment protection, and educational expansion shape both the incidence and impact of overeducation.

Gender has become an increasingly central dimension in overeducation research, which shows that gender differences in wage penalties are the rule rather than the exception (Duncan and Hoffman 1981; McGoldrick and Robst 1996; Blau and Khan 2003; McGuinness, Bergin, and Whelan 2018; European Commission 2021). Women are more likely to be overeducated than men, especially in countries with weaker family support policies or stronger occupational gender segregation (Boll et al. 2016). More recent studies confirm this trend and show that the wage penalty for overeducation tends to be steeper for women (Robst 2007; Boto-García and Escalonilla 2022). This reflects not only labor market discrimination but also institutional constraints limiting women's occupational mobility, especially post-childbirth (Budig and England 2001; Cha and Weeden 2014).

Recent contributions have also examined how labor market institutions interact with gender to structure overeducation outcomes. For example, Reisel, Østbakken, and Attewell (2019) found that the gender gap in overeducation is narrower in countries with strong public sector employment and generous parental leave, whereas it is exacerbated in dualized labor markets with precarious service-sector jobs. Similarly, findings from Fernandez-Macias and Hurley (2020) suggest that technological change and polarization disproportionately affect women's job-matching prospects in certain occupations.

Despite the depth of prior work, few studies adopt a multi-country comparative design that simultaneously considers institutional regimes and gendered outcomes of overeducation. This study addresses that gap by using harmonized data across ten European countries and evaluating how gender shapes the wage penalties of overeducation in different labor market contexts.

Data, Measures, and Methods

Selection of Study Countries

The data used to examine the impact of overeducation on labor force participation and wages were generated from the youth sample (ages 18–35 years) of the Cultural Pathways to Economic Self-sufficiency and Entrepreneurship (CUPESSE) survey research project. Young people from 11 countries[1] were queried from 2017 to 2018 on a broad range of issues, including labor force attachment, school-to-work transitions, perceptions of skill levels and work values. The choice of the ten countries studied here is not only driven by data availability but is anchored in comparative labor market and welfare regime theory, which helps explain the institutional roots of overeducation and its gendered wage penalties. We draw on comparative frameworks such as Esping-Andersen's (1990) welfare regime typology, and its extensions (Estevez-Abe, Iversen, and Soskice 2001; Emmenegger et al. 2012), which explain cross-national variations in education systems, labor market regulations, and social protection. These institutional arrangements have direct implications for how education credentials are matched to jobs, the prevalence of overeducation, and the extent to which gendered norms moderate penalties.

The ten countries represent a range of regimes along three key institutional dimensions discussed in the recent literature on overeducation:

1. Education–Employment Linkages: In Coordinated Market Economies (CMEs) like Germany and Austria, strong vocational education and training (VET) systems and close school-to-work pathways should reduce the likelihood of overeducation (Shavit and Müller, 2000). These countries provide clear occupational signaling to employers, which facilitates better matching. In contrast, Liberal Market Economies (LMEs) like the United Kingdom feature generalized higher education and looser credentialing norms, which should increase educational mismatch due to weak institutional alignment between education and labor market demand (Hall and Soskice 2001).

1 Switzerland was excluded from our analyses due to low levels of variation in both participation and wages.

2. Labor Market Regulation and Segmentation: In Mediterranean countries such as Spain and Italy, labor markets are characterized by high levels of segmentation, with stable, regulated employment in the public sector and insecure, flexible contracts in the private sector (Barbieri and Scherer 2009). This dualism should increase the overeducation risk, particularly for young and female workers entering precarious sectors. In post-socialist economies (e.g., Hungary and Czechia), educational systems are relatively standardized, but labor markets are transitioning, often with liberalized hiring and weaker employment protections. This may simultaneously increase mismatch and diminish the wage returns to education.

3. Gender Norms and Care Responsibilities: Countries also differ significantly in gender role expectations and care infrastructure, both of which influence women's educational and occupational trajectories. In countries like Denmark, public childcare and generous leave policies support maternal employment and reduce occupational downgrading. Conversely, in countries like Italy and Spain, traditional gender norms and weak state support for caregiving often restrict women to a narrower set of jobs, heightening their risk of being overeducated and increasing the wage penalties they incur (Mandel and Semyonov 2005; Boll et al. 2016).

To clarify our rationale for including these ten countries, we draw on comparative political economy frameworks that emphasize how institutional variation shapes education–employment linkages, labor market segmentation, and gender norms. Table 1 provides a summary classification of the study countries along these three dimensions, drawing on Esping-Andersen's (1990; 2002) welfare regime typology and Hall and Soskice's (2001) varieties of capitalism, as well as subsequent comparative research (Gallie 2007; Iversen and Stephens 2008). As shown, our sample captures diversity across coordinated and liberal market economies, Mediterranean regimes, post-socialist contexts, and a Nordic comparator, with Turkey serving as a hybrid/transitional case. This classification demonstrates the theoretical breadth of our country selection and highlights how institutional contexts condition both the incidence of overeducation and the magnitude of its wage penalties.

Table 1. Institutional classification of study countries by education–employment linkages, labor market segmentation, and gender norms

Country	Education–Employment Linkages	Labor Market Regulation/ Segmentation	Gender Norms & Care Responsibilities	Welfare/Market Regime
Austria	Strong vocational orientation (VET system)	Coordinated wage bargaining, moderate segmentation	Conservative family model, limited childcare support	Coordinated Market Economy, Conservative regime
Germany	Strong VET, high school-to-work linkages	Coordinated labor markets, insider–outsider divide	Conservative family model, part-time female employment common	Coordinated Market Economy, Conservative regime
United Kingdom	Weak linkages between education and jobs	Deregulated, flexible labor markets, low employment protection	Dual-earner model but limited family policy supports	Liberal Market Economy
Italy	Weak school-to-work transitions	Rigid labor markets, high segmentation	Traditional gender norms, weak childcare provision	Mediterranean regime
Spain	Weak transitions, high graduate underemployment	Rigid labor markets, high youth unemployment	Strong male-breadwinner legacy, limited family supports	Mediterranean regime

Country	Education–Employment Linkages	Labor Market Regulation/ Segmentation	Gender Norms & Care Responsibilities	Welfare/Market Regime
Greece	Weak transitions, clientelistic hiring	Highly segmented, rigid markets	Strong traditional norms, weak childcare infrastructure	Mediterranean regime
Czechia	Moderate transitions, less developed VET	Transitional labor markets, some segmentation	Legacy of dual-earner norm, but care burden on women	Post-socialist economy
Hungary	Moderate transitions, limited VET expansion	Transitional labor market, insider–outsider divide	Dual-earner legacy but weak family supports	Post-socialist economy
Turkey	Weak education-to-work linkages; high graduate underemployment	Highly segmented labor market; large informal sector	Strongly traditional gender roles; low female labor force participation	Hybrid/Transitional; often grouped with Southern/ Mediterranean regimes
Denmark	Strong linkages via active labor market policy	Flexible security ("flexicurity"), low segmentation	Strong gender equality supports, extensive childcare	Nordic coordinated market economy

Source: adapted from Esping-Andersen 1990; Hall and Soskice 2001; Gallie 2007; Iversen and Stephens 2008.

Each of the participating countries was required to interview at least 1,000 respondents who represented the (age-adjusted) employed, unemployed and in-school segments of their populations. Country samples were stratified to ensure regional labor market representation that was consistent with NUTS 1 (Nomenclature of Territorial Units for Statistics) and NUTS 2 (in the cases of Czechia and Denmark) 2017 classification. Most of these interviews were conducted using computer-assisted telephone interviewing (CATI) or computer-assisted personal interviewing (CAPI) techniques, with Turkey relying on traditional paper and pencil methodology. As shown in Table 2, each country was able to meet the sample size minimum, with Germany, Turkey and the United Kingdom far surpassing 1,000. Funding for CUPESSE was provided by the European Commission from February 2014 through January 2018 (Tosun et al. 2019).

Table 2. General Description of the CUPESSE Young Adults Database

Country	Number of observations	Gender (%)	
		Male	Female
Austria	1,684	44	56
Czechia	1,214	43	57
Denmark	1,142	56	44
Germany	3,279	49	51
Greece	1,538	40	60
Hungary	1,295	45	55
Italy	1,008	54	46
Spain	1,826	49	51
Switzerland	1,002	40	60
Turkey	3,016	50	50
UK	3,004	49	51
Total	**20,008**	**47**	**53**

Source: Tosun et al. 2019.

Study Variables

We provide descriptions of the study variables in Table 3. The measurement and coding of the earnings, education, and work experience variables follow the stylized manner of Mincer returns-to-education equations (Mincer 1974; Verdugo and Verdugo 1989; Card 1999). Overeducation is the Yes (= 1) or No (= 0) response to the questions: (a) "Do you think your present job is a good match with your overall qualifications?" (if employed) and (b) "Do you think your previous job(s) were a good match?" (if currently not working).

The literature on overeducation uses three main measurement approaches: (1) Individual Self-Assessment (ISA), (2) Job Analysis (JA), and (3) Statistical Approach (SA). In the ISA method (Alba-Ramirez 1993; Hartog 2000; Chevalier 2003; Boto-Garcia and Escalonilla 2022), the respondent is directly asked whether their current job requires a lower level of education than they possess. JA (Rumberger 1987; Baert, Cockx, and Verhaest 2013) compares the respondent's actual education to benchmarks devised by expert ratings or occupation-specific guidelines, such as ISCO codes, to determine overeducation. SA (Verdugo and Verdugo 1989) uses the statistical mode or median of education levels within occupations to define required education; individuals who exceed this occupational average are considered overeducated.

Each approach has its advantages and disadvantages. The ISA method, used in this study, is the simplest and most widely used in large-scale surveys (e.g., European Social Survey (ESS) and the Programme for the International Assessment of Adult Competencies (PIAAC)). However, it is quite vulnerable to subjective distortions and reporting biases, including:

- Perception bias: individuals may misjudge job requirements based on career aspirations, job satisfaction or cultural expectations (Hartog 2000).
- Gender bias: men are more likely to report mismatch, possibly inflating perceived overeducation, while women may normalize underemployment due to constrained labor market opportunities or caregiving obligations (Robst 2007; Bender and Heywood 2011).
- Cross-national comparability issues: interpretations of what constitutes "required education" may differ across national and occupational contexts, making standardization difficult.

While more objective than ISA, both JA and SA have their own difficulties, such as the cost involved and the difficulty of measurement across multiple countries with varying job classification systems (JA) or the sensitivity to outliers and educational inflation within occupations and the heterogeneity in job complexity or skill use (SA). Given the cross-national scope of this study and the structure of the CUPESSE dataset, where occupational codes or even broad industry sectors are missing for a high proportion of the observations, ISA is the most feasible and internally consistent option.

While acknowledging its weaknesses, we believe that the ISA method allows for comparability across diverse labor market contexts and captures the subjective experience of mismatch, which is particularly relevant when analyzing gendered labor market outcomes. Moreover, recent studies have shown that subjective and objective measures of overeducation tend to converge at the macro level (Mavromaras et al. 2013) and that self-perceived mismatch is a strong predictor of job dissatisfaction

and wage penalties (Green and Zhu 2010; Pecoraro 2014). The use of ISA, therefore, while imperfect, provides meaningful insight into how workers experience and report educational mismatch – especially across countries with different job classification systems, wage structures, and gender norms.

Specific items used to construct "soft skills" and "work values" scales are also included in Table 3, along with Cronbach alphas used to assess internal consistency reliability. Inasmuch as many of these values/skills items have not typically been measured in the employment literature (Heckman 2000; Carneiro and Heckman 2003; Heckman, Stixrud, and Urzua 2006), it is not possible to state if the distributions of these variables are either typical or uncharacteristic of country norms. Data collected by Camasso and Jagannathan (2021) would suggest that risk-taking levels in the CUPESSE sample are lower, on average, than they are for youth (18–34 years) in the United States. The measure of "grit", i.e., perseverance, is based on the work of Duckworth and Yeager (2015), while the indicators of intrinsic vs. extrinsic values, work centrality, and motivation follow from the work done by Hauff and Kirschner (2015), Gesthuizen, Kovarek, and Rapp (2019), and Kraaykamp, Cemalcilar, and Tosun (2019).

All demographic variables, except age, were collected as yes/no questions and were coded as dummy variables. In addition to these variables, NUTS regions were used to control for regional and territorial differences within countries, thus serving as a labor market proxy. NUTS 1 level controls were utilized in all countries excepting Denmark and Czechia, which have only one NUTS level 1 designation. In these two countries, NUTS 2 level controls were used.

Table 3. Description of Study Variables

Variable Description	Detailed Description
Employment / Earnings	
The logarithm of standardized hourly wages	The CUPESSE survey asked for personal monthly income. If employed, monthly income was divided by 148 hours.[2,3]
Currently Employed	In paid work in the last month as either an employee or self-employed.
Education / Experience	
Formal Education	CUPESSE survey coded the highest level of education using ES-ISCED Categories I, II, III, IV, V, and V2. Converted into years using UNESCO Country Specific Comparison Charts (2011).
Work Experience	Measured as Potential Experience (age – years of schooling – 6) following the Mincer definition. EXPERIENCE squared variable is included, again following the Mincer definition
Currently / Recently Overeducated	The CUPESSE survey asked, "Do you think your job is a good match with your overall qualifications?" Response options: Yes – Good Match / No – I am overqualified / No – I am underqualified.

2 We calculate a *standardized hourly wage* by dividing monthly earnings by a constant of 148 hours, the assumed average monthly workload. This allows for comparability across respondents but does not capture variation in actual hours worked.

3 Wages were not CPI-deflated following established practice in cross-European mismatch/wage studies (e.g., McGuinness and Pouliakas 2016; Cultrera et al. 2022). The CUPESSE survey was conducted in 2017–2018, a period of low and stable inflation across Europe, making real wage erosion negligible. Moreover, since our analysis emphasizes relative wage penalties rather than absolute wage levels, and the ranking of high-wage (e.g., Denmark, Germany) and low-wage (e.g., Hungary, Greece, Turkey) contexts is preserved, the absence of deflation does not bias the substantive conclusions.

Variable Description	Detailed Description
Soft Skills/Work Values Motivation: Willingness to change jobs	Willingness to change or start new jobs: Summed score over four questions, coded 1 = No, 2 = Maybe, 3 = Yes. Cronbach's alpha = 0.63. Items include: a) I would be willing to move within the country. b) I would be willing to move to a different country. c) I would be willing to learn new skills, such as a new language or computer programs. d) I would be willing to learn completely new skills or retrain to get a job.
Value-centrality of work on life	Mean value calculated over five questions, coded 1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Somewhat Agree, 4 = Strongly Agree. Cronbach's alpha = 0.67. Items include: a) To fully develop your talents, you need to have a job. b) It's humiliating to receive money without having to work. c) If welfare benefits are too high, there is no incentive to work. d) Work is a duty towards society. e) Work should always come first, even if it means less spare time.
Grit (Perseverance)	Mean value calculated over nine items - Coded 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. Cronbach's alpha = 0.69. Items include: a) I often set a goal but later choose to pursue a different one. b) I have difficulty maintaining my focus on projects that take more than a few months to complete. c) New ideas and projects sometimes distract me from previous ones. d) I always finish whatever I begin. e) Setbacks discourage me. f) I am hard working. g) I am confident that I can deal efficiently with unexpected events. h) Usually, I do more than I am asked to do. i) My life is determined by my own actions.
Aversion to Risk	Coded on a scale of 0 (I tend to avoid risks) to 10 (I am fully prepared to take risks).
Intrinsic and Extrinsic Motivation	Mean value calculated over nine items, coded 1 = Very Unimportant, 2 = Rather Unimportant, 3= Rather Important, 4 = Very Important. Cronbach's alpha = 0.78. Items include the importance of: a) ...a job that is secure. b) ...a high income. c) ...a job that allows me to help other people. d) ...a job that allows me to work independently. e) ...a job that allows me to learn new things. f) ...a job that leaves me enough time for leisure activities. g) ...a job that allows me to develop my creativity. h) ...a job that allows me to meet and interact with people. i) ...a job that gives me a feeling of self-worth.
Demographics	
Age	CUPESSE question - How old are you? (Years).
Marital status	Coded 1 = Married, 0 = Single/separated/widowed.
Has children	Coded 1 if respondent had one or more children, 0 otherwise.
Caring responsibilities	Coded 1 if respondent had caregiving responsibilities, 0 otherwise.
Permanent contract	Coded 1 if respondent had a permanent contract, 0 otherwise.
Works full-time	Coded 1 if respondent worked full-time, 0 otherwise.
Religiosity	Respondent identifies as belonging to a particular religion. Coded 1 = Yes, 0 = No.
Immigrant status	Respondent identifies as belonging to a minority ethnic group. Coded 1 = Yes, 0 = No.

Source: Tosun, Hörisch, Schuck 2018.

Description of Study Sample

Table 4 provides information on the variable distributions for young men and women in each of the 10 countries we examine. These data include comparative information on employment status, self-reported overeducation, attained education, experience, standardized hourly earnings, full-time work and permanent contract status. It also shows gender-specific distributions on five measures of soft skills and work values, and six additional demographic variables, including caring responsibilities.

The table shows a substantial gender gap in wages among the 10 countries. This gap ranges from €9.26 (females) to €12.11 (males) in Germany, the highest wage country, to €1.72 to €2.64 in Turkey. Furthermore, in all ten countries, the average standardized hourly wages (computed) are lower for women. Comparative information on measures of age, immigrant status, education level and experience does not reveal much insight.

Men are more likely to hold permanent work contracts in all sample countries. The levels of such contracts in Italy, Greece, Spain and Turkey for both men and women are much lower when contrasted with Austria, Germany, and the UK. The Turkish respondents are, by far, the most religious, with the Czech sample the most secular.

With respect to soft skills and work values, men and women in Spain and Italy were most likely to state their willingness to make geographic and job sector moves, while Turkish and Czech respondents were the most likely to take risks. Levels of intrinsic/extrinsic work motivation, grit, and work centrality were very similar across countries, trending toward the view that these are all positive values/traits to possess.

Self-reported overeducation levels ranged from lows of 10% (males) and 6.5% (females) in Turkey to highs of 26% (males) and 27% (females) in the UK. In five countries (Austria, Czechia, Germany, Italy and the UK), women reported higher levels of overeducation than men, with the opposite being true in Denmark, Greece, Hungary, Spain and Turkey. Women in all countries more often reported having caring responsibilities, with children accounting for a good deal of those responsibilities.

Table 4. Sample Characteristics for Males and Females in the Ten Study Countries

Country characteristics	Austria		Czechia		Denmark		Germany		Greece	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Number of Cases	745	939	521	693	636	506	1603	1696	612	926
Employment / Earnings										
Standardized[4] Wages (Euro)	9.40 (9.75)	6.92 (8.43)	4.01 (2.82)	2.66 (2.04)	11.43 (13.24)	8.09 (10.91)	12.11 (10.04)	9.26 (9.88)	3.85 (4.66)	3.03 (4.13)
Employed (1 = Yes)	0.567 (0.50)	0.460 (0.50)	0.698 (0.46)	0.477 (0.50)	0.541 (0.50)	0.421 (0.49)	0.758 (0.43)	0.606 (0.49)	0.604 (0.49)	0.462 (0.50)
Education / Experience										
Education (Years)	14.81 (2.78)	15.46 (2.46)	13.92 (2.54)	14.43 (2.74)	14.70 (2.84)	15.06 (2.78)	15.08 (2.59)	14.92 (2.61)	16.09 (2.14)	16.33 (1.91)
Experience (Years)	5.94 (5.09)	5.15 (4.90)	8.09 (4.65)	8.07 (4.63)	7.81 (4.25)	7.37 (4.26)	7.38 (5.00)	6.79 (5.16)	7.65 (4.71)	6.93 (4.60)
Overeducation (1 = Yes)	0.205 (0.40)	0.266 (0.44)	0.199 (0.40)	0.233 (0.42)	0.227 (0.42)	0.208 (0.41)	0.191 (0.39)	0.202 (0.40)	0.399 (0.49)	0.371 (0.48)
Soft Skills / Work Values										
Motivation – Willingness to Change Jobs	9.55 (1.73)	9.38 (1.72)	9.36 (0.459)	8.95 (1.54)	9.61 (1.64)	9.45 (1.52)	9.31 (1.83)	9.26 (1.78)	9.94 (1.65)	9.86 (1.64)
Work Centrality	2.74 (0.59)	2.72 (0.59)	3.10 (0.42)	2.72 (0.51)	2.77 (0.59)	2.71 (0.54)	2.86 (0.60)	2.87 (0.55)	2.75 (0.56)	2.65 (0.51)

4 Male-female wage difference within each country is statistically significant in all countries.

Country characteristics	Austria		Czechia		Denmark		Germany		Greece	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Grit	2.93 (0.42)	2.94 (0.40)	2.84 (0.39)	2.87 (0.37)	2.86 (0.35)	2.94 (0.34)	2.86 (0.40)	2.89 (0.40)	2.95 (0.40)	3.01 (0.39)
Risk-Taking	5.66 (2.15)	4.97 (2.28)	5.78 (2.44)	4.93 (2.34)	5.03 (2.32)	4.69 (2.22)	5.09 (2.15)	4.46 (2.17)	5.43 (2.55)	5.21 (2.44)
Motivation – Intrinsic and Extrinsic	3.23 (0.44)	3.30 (0.37)	3.10 (0.42)	3.15 (0.39)	3.06 (0.37)	3.18 (0.32)	3.12 (0.40)	3.21 (0.38)	3.45 (0.42)	3.52 (0.41)
Demographics										
Age (Years)	26.00 (4.99)	25.76 (5.00)	27.13 (4.98)	27.39 (5.06)	27.32 (4.84)	26.48 (4.97)	27.75 (4.08)	26.93 (4.85)	28.56 (4.76)	27.95 (4.79)
Married (1 = Yes)	0.244 (0.43)	0.193 (0.40)	0.224 (0.42)	0.343 (0.48)	0.320 (0.47)	0.414 (0.49)	0.304 (0.46)	0.283 (0.45)	0.254 (0.44)	0.325 (0.50)
Has Children (1 = Yes)	0.166 (0.37)	0.180 (0.38)	0.227 (0.42)	0.411 (0.50	0.209 (0.41)	0.227 (0.42)	0.189 (0.39)	0.242 (0.43)	0.150 (0.36)	0.233 (0.42)
Has Caring Responsibilities (1 = Yes)	0.167 (0.37)	0.237 (0.43)	0.234 (0.42)	0.447 (0.50)	0.226 (0.42)	0.255 (0.44)	0.197 (0.40)	0.254 (0.44)	0.278 (0.45)	0.357 (0.48)
Has Permanent Contract (1 = Yes)	0.707 (0.46)	0.691 (0.46)	0.601 (0.49)	0.543 (0.50)	0.692 (0.46)	0.673 (0.47)	0.746 (0.44)	0.715 (0.45)	0.629 (0.48)	0.613 (0.49)
Works Full-time (1 = Yes)	0.673 (0.47)	0.456 (0.50)	0.818 (0.39)	0.692 (0.46)	0.692 (0.462	0.514 (0.500	0.814 (0.39)	0.626 (0.48)	0.748 (0.43)	0.645 (0.48)
Religious (1 = Yes)	0.417 (0.49)	0.455 (0.50)	0.176 (0.38)	0.147 (0.35)	0.275 (0.45)	0.400 (0.49)	0.375 (0.48)	0.403 (0.49)	0.554 (0.50)	0.587 (2.44)
Immigrant (1 = Yes)	0.128 (0.33)	0.132 (0.34)	0.032 (0.18)	0.020 (0.14)	0.030 (0.12)	0.031 (0.12)	0.074 (0.26)	0.090 (0.29)	0.037 (0.19)	0.011 (0.26)
Country characteristics	**Hungary**		**Italy**		**Spain**		**Turkey**		**United Kingdom**	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Number of Cases	582	713	510	498	893	933	1,497	1,519	1,479	1,525
Employment / Earnings										
Standardized Wages (Euro)	2.25 (1.03)	1.91 (1.01)	3.37 (2.76)	2.55 (2.37)	3.62 (4.62)	3.28 (3.79)	2.64 (3.60)	1.72 (2.44)	11.11 (10.27)	8.35 (7.05)
Employed (1 = Yes)	0.722 (0.45)	0.576 (0.50)	0.563 (0.50)	0.432 (0.50)	0.444 (0.50)	0.430 (0.50)	0.652 (0.48)	0.295 (0.46)	0.745 (0.44)	0.691 (0.46)
Education / Experience										
Education (Years)	12.93 (3.16)	13.12 (3.07)	15.46 (2.27)	15.74 (2.15)	14.62 (3.75)	15.06 (3.65)	12.44 (3.32)	13.18 (3.19)	14.66 (2.85)	14.42 (2.81)
Experience (Years)	7.94 (6.11)	8.57 (5.92)	6.55 (4.28)	6.45 (4.14)	7.73 (5.78)	7.63 (5.57)	8.92 (5.76)	10.31 (7.39)	7.07 (5.62)	6.66 (5.69)
Overeducation (1 = Yes)	0.122 (0.33)	0.107 (0.31)	0.107 (0.31)	0.118 (0.32)	0.233 (0.42)	0.202 (0.40)	0.100 (0.30)	0.065 (0.25)	0.258 (0.44)	0.273 (0.45)
Soft Skills / Work Values										
Motivation – Willingness to Change Jobs	9.36 (2.08)	8.98 (2.21)	10.09 (1.43)	9.91 (1.44)	10.27 (1.61)	10.06 (1.70)	8.10 (2.61)	7.71 (2.56)	9.47 (1.87)	9.33 (1.81)
Work Centrality	2.92 (0.50)	2.86 (0.50)	2.96 (0.50)	2.94 (0.51)	2.72 (0.544	2.65 (0.57)	3.30 (0.48)	3.26 (0.47)	2.87 (0.56)	2.86 (0.52)
Grit	2.96 (0.43)	2.92 (0.44)	2.79 (0.39)	2.84 (0.41)	2.92 (0.446)	3.03 (0.43)	3.07 (0.48)	3.03 (0.47)	2.82 (0.39)	2.83 (0.38)
Risk-Taking	5.58 (2.46)	4.62 (2.60)	5.53 (2.44)	5.49 (2.60)	5.56 (2.44)	5.52 (2.57)	6.56 (2.42)	5.63 (2.72)	5.41 (2.18)	5.15 (2.15)
Motivation – Intrinsic and Extrinsic	3.39 (0.46)	3.41 (0.43)	3.20 (0.45)	3.31 (0.44)	3.27 (0.43)	3.39 (0.40)	3.55 (0.39)	3.54 (0.38)	3.19 (0.43)	3.22 (0.42)

Country characteristics	Hungary		Italy		Spain		Turkey		United Kingdom	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Demographics										
Age (Years)	26.51 (5.17)	27.11 (5.00)	27.36 (4.54)	27.33 (4.40)	27.39 (4.97)	27.70 (5.04)	25.57 (5.20)	25.97 (5.45)	27.01 (5.17)	26.37 (4.98)
Married (1 = Yes)	0.240 (0.43)	0.391 (0.49)	0.174 (0.38)	0.181 (0.39)	0.191 (0.35)	0.381 (0.45)	0.347 (0.48)	0.389 (0.50)	0.277 (0.48)	0.262 (0.44)
Has Children (1 = Yes)	0.196 (0.40)	0.408 (0.39)	0.119 (0.33)	0.153 (0.36)	0.133 (0.34)	0.236 (0.43)	0.80 (0.40)	0.947 (0.22)	0.234 (0.42)	0.248 (0.43)
Has Caring Responsibilities (1 = Yes)	0.206 (0.40)	0.407 (0.49)	0.202 (0.40)	0.383 (0.45)	0.288 (0.45)	0.371 (0.48)	0.363 (0.48)	0.450 (0.50)	0.237 (0.43)	0.277 (0.45)
Has Permanent Contract (1 = Yes)	0.751 (0.43)	0.727 (0.45)	0.492 (0.50)	0.396 (0.49)	0.426 (0.50)	0.475 (0.50)	0.377 (0.48)	0.396 (0.50)	0.791 (0,41)	0.760 (0.43)
Works Full-time (1 = Yes)	0.946 (0.19)	0.928 (0.26)	0.644 (0.49)	0.522 (0.50)	0.577 (0.49)	0.542 (0.509)	0.950 (0.22)	0.906 (0.29)	0.668 (0.47)	0.482 (0.49)
Religious (1 = Yes)	0.356 (0.48)	0.408 (0.49)	0.521 (0.50)	0.540 (0.50)	0.228 (0.42)	0.298 (0.45)	0.966 (0.18)	0.965 (0.19)	0.255 (0.44)	0.257 (0.44)
Immigrant (1 = Yes)	0.015 (0.12)	0.022 (0.15)	0.036 (0.19)	0.022 (0.15)	0.057 (0.23)	0.071 (0.26)	0.004 (0.06)	0.007 (0.098)	0.091 (0.299)	0.026 (0.33)

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Analytic Model

For each of the ten countries and separately for men and women[5], we estimated log-linear wage equations of the form:

$$\mathrm{Log}(W_i) = B'x_i + w\lambda_i + e_i. \quad (1)$$

Here, B' represents the effect of a set of explanatory variables x_i, which include education, experience, possession of a permanent work contract, works full time, possession of the soft skill of grit and the values of work centrality, and the focal independent variable, overeducation. x_i also includes controls for NUTS labor market regions. In addition, a specific independent variable can exert an indirect influence on $\mathrm{Log}(W_i)$ through:

$$Z_i^{\star} = \gamma' w_i + u_i, \quad (2)$$

where $Z_i^{\star}$ is the likelihood a case is observed in equation (1) and γ' is a set of variables that influence wages through their impact on the decision to participate in the labor force. γ' includes education, experience, marital status, having children, having caring

5 Prior to conducting gender- and country-specific analyses, we estimated two regression models using the pooled data across all ten countries. The first model included a gender dummy variable, coded as 1 = Male, interacted with overeducation to test if gender moderates the wage penalty. The second model tested whether wage penalty significantly differed across countries by including country fixed effects and their interaction with the overeducation dummy. The first model produced an interaction coefficient that was significant at the 5% level (coefficient: 0.07, standard error: 0.03, p-value 0.047). The second model produced significant coefficients at the 1% or 5% level for virtually every country x overeducation interaction term. Given these results, we proceeded to estimate models that were specific to each gender and country. The results from both regressions are available from the authors upon request.

responsibilities, possessing KSAs of risk taking, willingness to change jobs, grit, centrality of work, and intrinsic and/or extrinsic motivation, immigrant status, religiosity, and controls for NUTS regions.

If the probability of Z_i^* is positive, it is hypothesized to influence Log(Wi) through its presence in lambda (λi), i.e., the probability an individual chooses employment over the cumulative probability of the individual's decision $[\varphi(Z_i^* \gamma') / \Phi((Z_i^* \gamma')]$. The term λ_i in equation (1) controls that component of the error term wherein the decision to work influences the wage earned.

Our choice of which variables are included in equations (1) and (2) is based on whether they are hypothesized to affect wages exclusively or through the decision to seek employment (instrumental variables). Of our five soft skills and values items, three – willingness to change jobs, risk taking, and intrinsic/extrinsic motivation – met the exclusion criterion. Grit and work centrality were hypothesized to exert both direct and indirect effects on wages. Following Dolton and Makepeace (1986), we include religion, childcare, and other caring responsibilities only in the participation models, while marital and immigration statuses are included in both equations. The principal independent variable, overeducation, is excluded from the selection equation since it is considered more a labor market mismatch characteristic than a personal one.

Results

The results from our analyses of labor force participation, controlling for both omitted variables (soft skills) and sample selection, are presented as marginal effects in Table 5a for young men and Table 5b for young women[6].

Table 5a shows that formal education significantly increases employment probability by 2–3 percentage points for males in half of our sample countries; exceptions are Austria, Greece, Hungary, Italy and Turkey. Except for Hungary, Italy and Turkey, experience significantly increases the probability of labor force participation by 1–3 percentage points. Being married increases this probability by 10–17 percentage points in most countries. Caring responsibilities, however, do not appear to exert a significant influence on employment probability in any country. Among our soft skills and work values questions, only work centrality demonstrates a consistent positive effect across countries. This effect is statistically significant in Germany and the UK at the 5% level or lower, and is marginally significant in Czechia, Greece and Turkey.

For women (Table 5b), education significantly increases the probability of labor force participation by 2–4 percentage points in most countries; the exceptions are Hungary and Italy. Work experience exerts an increase of 1–4 percentage points everywhere except for Hungary, Italy, Spain, and Turkey. Young married women are about 13–15 percentage points less likely to participate in the labor market in Greece and Hungary, but 7–9 percentage points more likely to be employed in the UK and Austria. Having children significantly lowers this probability in Austria, Czechia, Hungary, and Turkey, ranging from 8.4 percentage points (Austria) to 56 percentage

6 Table of coefficients and standard errors for the full selection models appear in the Appendix as Table A1 for males and Table A2 for females.

points (Hungary). Caring responsibilities lower employment probability by 9 and 18 percentage points in Germany and Italy, respectively. Work centrality generally exerts a positive effect of about 8–10 percentage points; this is statistically significant in Austria, Germany, Hungary, and the UK.

Table 5a. Marginal Effects from Probit Sample Selection Equations for Male Labor Force Participation in Ten Countries

Variable	Austria	Czechia	Denmark	Germany	Greece	Hungary	Italy	Spain	Turkey	UK
Education	0.003	0.028[c]	0.032[c]	0.019[c]	0.017	−0.002	0.014	0.027[c]	0.005	0.019[c]
Experience	0.015[c]	0.025[c]	0.017[c]	0.009[c]	0.025[c]	−0.005	0.008	0.010[a]	−0.005	0.013[c]
Married	0.151[c]	0.100[a]	0.164[b]	0.093[c]	0.050	0.020	0.167[b]	0.031	0.092[a]	0.105[c]
Immigrant	−0.045	−0.088	−0.157	0.015	0.295	0.125	0.166	−0.304[c]	0.941[c]	0.000
Has child(ren)	0.188[b]	0.049	−0.068	−0.049	0.152[a]	0.080	0.046	0.199[b]	−0.109[b]	−0.016
Has caring responsibilities	−0.080	−0.116	0.055	−0.000	−0.068	−0.048	−0.107	0.033	0.001	0.042
Work Centrality	0.065	0.070[a]	0.066	0.071[c]	0.077[a]	0.030	0.012	0.052	0.075[a]	0.086[c]
Grit	0.140[c]	−0.021	0.086	−0.024	0.061	−0.068	0.011	−0.005	−0.026	0.004
Risk-Taking	−0.017	−0.001	0.001	−0.003	−0.002	−0.003	−0.014	0.006	0.004	0.005
Willingness to change jobs	−0.014	0.008	−0.000	0.000	−0.000	−0.025[b]	0.045[b]	0.015	−0.006	0.012[a]
Job Importance	−0.064	0.017	0.178[b]	0.018	0.001	−0.069	0.072	0.029	0.059	0.022
Religious	−0.041	−0.049	0.104[b]	0.001	0.060	−0.085[a]	−0.045	0.013	0.120[a]	−0.059[b]
NUTS regions	Not Sig	Sig	Not Sig	Sig	Not sig	Not Sig	Sig	Not Sig	Sig	Not Sig

[a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table 5b. Marginal Effects from Probit Sample Selection Equations for Female Labor Force Participation in Ten Countries

Variable	Austria	Czechia	Denmark	Germany	Greece	Hungary	Italy	Spain	Turkey	UK
Education	0.028[c]	0.025[c]	0.043[c]	0.016[c]	0.038[c]	−0.012	0.016	0.027[c]	0.019[a]	0.032[c]
Experience	0.018[c]	0.037[c]	0.017[b]	0.013[c]	0.011[a]	0.004	0.008	−0.002	0.011	0.019[c]
Married	0.091[b]	−0.047	−0.010	0.010	−0.149[b]	−0.132[c]	−0.023	−0.009	−0.093	0.071[b]
Immigrant	−0.091	0.070	−0.198	0.108[b]	−0.108	0.014	−0.050	0.074	−0.173	0.010
Has child(ren)	−0.084[b]	−0.492[c]	−0.126	−0.025	−0.047	−0.557[c]	0.061	−0.065	−0.327[b]	−0.085
Has caring responsibilities	−0.013	−0.030	0.034	−0.087[b]	−0.105	0.231[a]	−0.183[b]	−0.065	0.001	0.031
Work Centrality	0.081[c]	0.047	0.063	0.094[c]	0.007	0.094[a]	0.064	0.052	−0.010	0.105[c]
Grit	0.109[b]	0.007	0.180[a]	0.010	0.088	0.021	0.105	−0.008	0.072	−0.038
Risk-Taking	0.007	0.007	0.002	−0.001	−0.007	−0.018[b]	0.007	0.004	0.001	−0.002

Variable	Austria	Czechia	Denmark	Germany	Greece	Hungary	Italy	Spain	Turkey	UK
Will-ingness to change jobs	0.007	0.009	−0.024	0.002	−0.000	−0.014	−0.029	−0.001	0.008	0.012[a]
Job Impor-tance	0.010	−0.058	0.009	0.033	−0.142[b]	−0.261[c]	0.160[b]	0.083	0.077	−0.029
Religious	−0.016	0.011	0.001	−0.023	0.008	0.036	0.020	0.026	−0.097	−0.021
NUTS regions	Not Sig	Not Sig	Not Sig	Not Sig	Not sig	Not Sig	Not Sig	Not Sig	Not Sig	Not Sig

[a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Tables 6a (males) and 6b (females) present abbreviated estimation results that show only the key variables returns to education and experience, and wage penalty in the earning equations from both the OLS and selection-corrected estimations. Full estimation results are provided in Appendix Tables A3 for males and A4 for females. There is also a graphical description of the selection-corrected wage distribution of those who are over- and not overeducated by gender for each country in Appendix Figure A1.

Table 6a shows that for males, returns to education and experience are positive in both the OLS and selection-corrected models for all countries, but these effects are typically smaller in the latter. Overeducation is found to reduce earnings consistently across sample countries, and the effect is statistically significant everywhere except Austria and Italy. These wage penalties range from 6% in Hungary to 56% in Spain. While the general pattern of negative lambdas (λ-) signals that our OLS models overstate the wage magnitude (i.e., observed wage < offered wage), consistent with crowding theory, the prediction that wage penalties from overeducation should be higher in the selection models does not hold. In fact, the wage penalties in these models are lower in all country samples except Greece, where OLS and selection-adjusted wage penalties are equal, and Turkey, where the selection-adjusted penalties are about four percentage points higher. Finally, we highlight the magnitude of explained variance (R2) in our country-specific models. Adjusted R2s are quite large for employment studies with self-reported data, especially those lacking occupational data[7].

The more complete Table A3 shows that possessing a permanent work contract and/or a full-time job increases earnings in most countries. Notably, the "soft skill" grit positively impacts earnings in all country samples except Denmark, Hungary, Turkey and the UK. In the selection-adjusted regressions, the impact ranges from approximately 13% in Austria, Germany, and Spain to 27% in Greece. Work centrality, however, a factor of some consequence in our participation models, proves to be significant only in Denmark, Germany, and the UK.

7 Data on occupations were missing in 54% of the cases in our overall sample, preventing the use of this important variable in the analyses. In addition, where available, these data were so inconsistently coded as to render them unusable for analyses. The available data also show that of those responses that were coded correctly, only about 6% were classified as professionals and/or managers, preventing the possibility of employing the professional/managerial–non-professional/non-managerial contrast often used with sparse occupation data (Borjas 2008; Blau and Kahn 2017).

Table 6b presents abbreviated results from our OLS and selection-adjusted earnings regressions for women. As in the case of men, returns to education and experience are positive and significant in most countries, except for Italy and Greece, where returns to education are not significant. As hypothesized, overeducation among women negatively affects earnings, with wage penalties generally smaller in the selection-adjusted models in all the countries where this effect was significant, the one exception being Italy, where the effect is only significant in the selection-adjusted model. The wage penalties range from 7% in Hungary to 44% in Denmark.

For women, we find a pattern of positive lambdas (λ+), which indicates that our OLS tends to understate the wage magnitudes in nine of the ten countries; in Austria, Germany, Spain, and the UK, those effects are statistically significant. This suggests that observed wages > offered wages, a symptom of markets where job search is predominant. The expectation that wage penalties should be lower in selection-adjusted models is also consistent with job search theory.

Finally, the adjusted R2s for the country-specific wage regressions in Table 6b are smaller, except in Hungary and Italy. This indicates that additional, omitted variables that distinguish the job experiences of men and women are at play.

The more complete Table A4 shows that, as with men, having a full-time job exerts a large, significant impact on wages. However, unlike our regression models for men, we find a reverse pattern of "soft skill" impact on wages for women. Grit is significant only in Austria and Hungary, and only marginally so in Germany. The value of work centrality has a stronger impact, however, achieving statistical significance in Austria, Germany, Greece, Hungary, Italy (marginally), and the UK.

Table 6a. Returns to Education, Experience and Wage Penalty from OLS and Selection-Corrected Regressions – Males Coefficients and (Std. Errors)

	Education		Experience		Overeducation		Lambda (Selection)	Adj. R2 (OLS)
Country	OLS	Selection--Corrected	OLS	Selection--Corrected	OLS	Selection--Corrected		
Austria	0.042[b] (0.192)	0.013 (0.009)	0.024 (0.025)	0.021[a] (0.012)	−0.293[b] (0.019)	−0.040 (0.060)	−0.011 (0.112)	0.42
Czechia	0.059[c] (0.010)	0.036[c] (0.011)	0.101[c] (0.023)	0.021 (0.019)	−0.154[c] (0.055)	−0.136[c] (0.039)	−0.164 (0.171)	0.43
Denmark	0.107[c] (0.023)	0.088[c] (0.016)	0.115[b] (0.052)	0.048[a] (0.025)	−0.507[b] (0.133)	−0.269[c] (0.066)	−0.269 (0.217)	0.46
Germany	0.046[c] (0.008)	0.048[c] (0.007)	0.017 (0.011)	0.014[a] (0.007)	−0.159[c] (0.048)	−0.102[c] (0.031)	−0.468[c] (0.017)	0.19
Greece	0.086[c] (0.031)	0.079[c] (0.031)	−0.000 (0.041)	−0.068 (0.053)	−0.267[b] (0.117)	−0.267[b] (0.110)	0.063 (0.543)	0.18
Hungary	0.005 (0.006)	0.011[b] (0.005)	0.028[c] (0.009)	0.006 (0.008)	−0.072[a] (0.039)	−0.055[b] (0.032)	−0.129[c] (0.028)	0.16
Italy	0.018 (0.020)	0.028[a] (0.015)	0.036 (0.036)	−0.002 (0.025)	−0.007 (0.103)	−0.023 (0.069)	−0.226 (0.213)	0.04
Spain	0.075[c] (0.016)	0.025 (0.019)	0.092[c] (0.023)	−0.001 (0.021)	−0.564[c] (0.090)	−0.262[c] (0.072)	−0.442[b] (0.194)	0.43

	Education		Experience		Overeducation		Lambda (Selection)	Adj. R2 (OLS)
Country	OLS	Selection--Corrected	OLS	Selection--Corrected	OLS	Selection--Corrected		
Turkey	0.044[c] (0.009)	0.055[c] (0.013)	0.014 (0.013)	0.015 (0.022)	−0.255[c] (0.065)	−0.304[c] (0.094)	−0.223 (0.337)	0.24
UK	0.050[c] (0.009)	0.039[c] (0.006)	0.073[c] (0.011)	0.012 (0.008)	−0.311[c] (0.048)	−0.236[c] (0.032)	−0.073[a] (0.039)	0.31

Standard errors in parentheses.

[a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table 6b. Returns to Education, Experience and Wage Penalty from OLS and Selection-Corrected Regressions – Females Coefficients and (Std. Errors)

	Education		Experience		Overeducation		Lambda (Selection)	Adj. R2 (OLS)
Country	OLS	Selection--Corrected	OLS	Selection--Corrected	OLS	Selection--Corrected		
Austria	0.098[c] (0.023)	0.055[c] (0.012)	0.085[c] (0.025)	0.021[b] (0.010)	−0.0148 (0.113)	−0.120[c] (0.038)	0.543[c] (0.037)	0.34
Czechia	0.053[c] (0.012)	0.022[c] (0.006)	0.062[b] (0.028)	0.015 (0.013)	−0.313[c] (0.065)	−0.112[c] (0.032)	−0.032 (0.039)	0.29
Denmark	0.105[c] (0.034)	0.088[c] (0.031)	0.102 (0.074)	0.031 (0.030)	−0.540[c] (0.194)	−0.435[c] (0.082)	0.333 (0.427)	0.34
Germany	0.063[c] (0.012)	0.058[c] (0.008)	0.003 (0.016)	0.021[b] (0.008)	−0.264[c] (0.065)	−0.097[c] (0.032)	0.578[c] (0.021)	0.17
Greece	0.050 (0.035)	0.059 (0.040)	0.103[b] (0.041)	0.048 (0.044)	−0.165 (0.111)	−0.150 (0.106)	0.256 (0.350)	0.09
Hungary	0.012[c] (0.004)	0.011[c] (0.003)	0.024[c] (0.005)	0.013[c] (0.004)	−0.068[c] (0.027)	−0.072[b] (0.020)	0.018 (0.019)	0.29
Italy	0.002 (0.033)	0.021 (0.020)	0.092[a] (0.051)	0.038 (0.027)	−0.028 (0.142)	−0.127[a] (0.074)	0.354 (0.202)	0.07
Spain	0.060[c] (0.019)	0.054[c] (0.018)	0.066[c] (0.025)	0.037[b] (0.017)	−0.427[c] (0.095)	−0.331[c] (0.063)	0.326[a] (0.181)	0.27
Turkey	0.041[c] (0.015)	0.069[b] (0.027)	0.050[c] (0.017)	0.029 (0.046)	−0.135 (0.091)	−0.119 (0.184)	0.494 (0.356)	0.20
UK	0.037[c] (0.011)	0.043[c] (0.005)	0.103[c] (0.011)	0.030[c] (0.005)	−0.187[c] (0.053)	−0.146[c] (0.024)	0.294[c] (0.014)	0.32

Standard errors in parentheses.

[a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

To guard against the possibility that our OLS results might mask any differential effects of over-education among low- versus high-wage earners, we also estimated quantile regressions, assessing overeducation effects at the first, second, and third quartiles of the wage distribution for each gender and country. These results, along with the OLS and selection-adjusted results, are presented in Appendix Table A5 for men and Table A6 for women. Table A5 shows that the coefficients across the quartiles are not significantly different according to the Wald test in eight out of the ten countries, the exceptions being Czechia (significant at 1%) and Denmark (significant

at 10%). For females, Table A6 shows that nine out of the ten countries do not show that the effect of overeducation varies significantly across quartiles, except for Turkey.

Discussion and Conclusions

The results of this study, based on data from 19,000 young adults across ten European countries, underscore the importance of understanding overeducation and its wage penalties not only as individual outcomes but as phenomena embedded in distinct institutional and welfare contexts. By examining countries that span Coordinated Market Economies (Austria, Germany), a Liberal Market Economy (United Kingdom), Mediterranean regimes (Italy, Spain, Greece), post-socialist economies (Czechia, Hungary), and Denmark as a Nordic comparator, we ground our analysis in the institutional diversity emphasized by Esping-Andersen (1990) and subsequent comparative labor market research. These regimes differ systematically in their education–employment linkages, labor market segmentation, and gender role norms, all factors that our theoretical framework – spanning human capital theory, job search theory, job competition theory, assignment theory, and search and matching models – predict will shape both the incidence and magnitude of overeducation penalties. Our findings should thus be read through this dual lens of theoretical mechanisms and institutional variation.

We can draw seven key conclusions from our cross-national examination of wage penalties due to overeducation:

1. **Observed wages for women often exceed offered wages.** This pattern aligns with job search theory, especially in liberal and Nordic regimes like the UK and Denmark, where flexible labor markets and strong family policy infrastructures allow women to reject below-average wage offers and accept only those above their reservation wage.
2. **Selection-adjusted models reduce wage penalties for women.** This reflects job search dynamics where women who participate in employment likely possess unobserved traits (e.g., motivation or family support) associated with higher wages. Once selection is accounted for, penalties decline, although they remain higher than men's, suggesting persistent structural or discriminatory barriers.
3. **Observed wages for men fall below offered wages.** Consistent with job competition theory, especially in Mediterranean and post-socialist countries (e.g., Italy, Spain, Hungary, Turkey), many men accept below-average wage offers, with labor market rigidities and seniority-based systems limiting reward for higher qualifications.
4. **Selection-adjusted models reduce penalties for men as well.** Contrary to job competition theory's prediction of increasing penalties when higher-ability individuals are included, selection corrections yield smaller penalties, pointing to the moderating role of perseverance or work values in actual wage outcomes.

5. **Work centrality among women correlates with higher wages.** In half of the countries analyzed, women who assign greater importance to work earn significantly more, aligning with assignment theory and search and matching dynamics, which posit that valuing work influences the quality of job matches and wage outcomes.

6. **Grit reduces wage penalties, especially for men.** In nearly all selection-adjusted models, the soft skill of grit (perseverance) emerges as a significant wage enhancer. This is consistent with growing empirical evidence on the value of non-cognitive traits in labor market outcomes (Heckman, Stixrud, and Urzua 2006; Gutman and Schoon 2013; Duckworth and Yeager 2015; Bryan, Choi, and Karlan 2021).

7. **Wage penalties are typically higher for women than for men, with notable country variation.** Despite lower baseline wages, women face larger penalties for overeducation in most contexts. This gender gap is especially wide in countries like Denmark (Nordic, coordinated market economy: 44% for women vs. 27% for men), Spain (Mediterranean: 33% vs. 26%), and Italy (13% vs. 2%, not significant). These disparities are shaped by differences in institutional context, gender norms, and labor market segmentation. For example, Denmark's surprising results suggest that egalitarian systems may still harbor occupational sorting or undervaluation of female qualifications, while Spain and Italy reflect more traditional barriers associated with rigid labor markets and care burdens. Austria, another coordinated economy with a conservative welfare regime, shows a significant gap (12% for women vs. 4% for men), likely due to traditional family models. Hungary, a post-socialist coordinated economy, has smaller but still gendered penalties (7.2% vs. 6%), suggesting the persistence of inequality despite wage compression legacies.

The consistent pattern described in (7) begs the question: Why are women more heavily penalized for overeducation? One potential explanation lies in occupational sorting. As Blau and Kahn (2017), McGuinness, Bergin, and Whelan (2018), and Barroso and Brown (2021) note, women may be overrepresented in lower-paying sectors or roles where overeducation is more common or less rewarded. Unfortunately, the lack of harmonized and consistently coded occupational data across the full sample precludes a direct test of this hypothesis. Moreover, occupational data where available are often incomplete or non-random, risking selection bias. For these reasons, we chose not to include occupational codes, though future work using rich task- or skill-based data could yield more refined insights.

Another explanation invokes the argument that women are less productive than men due to shorter or more discontinuous work histories, often linked to caregiving responsibilities. If this were true, one might expect smaller wage penalties for women, given expectations of weaker labor force attachment and concentration in lower-risk jobs. However, our findings suggest the opposite.

A third explanation, and one supported by accumulating evidence, is that women face prejudice-based discrimination. Numerous studies (Blau and Kahn 2017; Barroso and Brown 2021; European Commission 2021; Jagannathan, Camasso, and LeFleur 2024) have found that employers may undervalue women's qualifications or avoid hiring women unless a wage discount compensates for perceived costs. Our findings suggest that overeducation penalties may

represent a second layer of gender discrimination beyond baseline wage gaps what might be considered a "piling on" effect.

From a policy perspective, addressing overeducation penalties requires a dual strategy tailored to different institutional contexts. For employers, greater recognition of non-cognitive skills – particularly persistence and centrality of work can help ensure that overeducated workers are not systematically undervalued. For governments, policies that strengthen anti-discrimination frameworks, expand affordable childcare, and support active labor market programs are especially crucial in regimes where structural barriers weigh most heavily on women (OECD 2020; European Commission 2021). Addressing overeducation penalties is not solely a matter of improving individual attributes or aligning education with jobs; it requires interventions that confront the institutional and cultural conditions shaping how education is rewarded.

Another implication is the value of publishing overeducation penalties by occupation and sector, much like pay scales. Providing workers with data on potential earnings gains alongside expected losses would give job seekers a "balance sheet" framework for shaping job search, on-the-job training, and mobility strategies. Publicizing such information could also prompt wage-setting institutions to act when gender disparities emerge, leading to reforms in professional licensure, apprenticeship programs, collective bargaining, and minimum wage policies.

This study faces several limitations beyond the lack of occupational data. Its cross-sectional design precludes testing hypotheses about job mobility or the long-term effects of overeducation. Self-reported data bring risks of recall error, survey fatigue, dissembling, and comprehension issues. Moreover, perceptions of overeducation may be distorted or amplified by volatile labor markets and rapidly changing technological conditions, which shape young workers' expectations and experiences. Finally, we recognize that we have not eliminated all sources of endogeneity through our modeling and that a good deal that emanates from omitted ability and skills could remain. This may bias estimated penalties; future research employing longitudinal or instrumental variable approaches could address this limitation more robustly.

References

Alba-Ramirez, A. (1993), *Mismatch in the Spanish Labor Market: Overeducation?*, "Journal of Human Resources", 28 (2), pp. 259–278, https://doi.org/10.2307/146203

Baert, S., Cockx, B., Verhaest, D. (2013), *Overeducation at the start of the career: Stepping stone or trap?*, "Labour Economics", 25, pp. 123–140, https://doi.org/10.1016/j.labeco.2013.04.013

Baldwin, M., Johnson, W.G. (1992), *Estimating the Employment Effects of Wage Discrimination*, "The Review of Economics and Statistics", 74 (3), pp. 446–455, https://doi.org/10.2307/2109489

Barbieri, P., Scherer, S. (2009), *Labour Market Flexibilization and its Consequences in Italy*, "European Sociological Review", 25 (6), pp. 677–692, https://doi.org/10.1093/esr/jcp009

Barone, C., Ortiz, L. (2011), *Overeducation among European University Graduates: a comparative analysis of its incidence and the importance of higher education differentiation*, "Higher Education", 61, pp. 325–337, https://doi.org/10.1007/s10734-010-9380-0

Barroso, A., Brown, A. (2021), *Gender pay gap in US held steady in 2020*, Pew Research Center, Washington.

Becker, G.S. (1964), *Human capital: A theoretical and empirical analysis, with special reference to education*, University of Chicago Press, Chicago.

Becker, G.S. (1993), *Human Capital: A Theoretical and Empirical Analysis, with Special Reference To Education*, University of Chicago Press, Chicago, https://doi.org/10.7208/chicago/9780226041223.001.0001

Bender, K.A., Heywood, J.S. (2011), *Educational mismatch and the careers of scientists*, "Education Economics", 19 (3), pp. 253–274, https://doi.org/10.1080/09645292.2011.577555

Blau, F.D., Kahn, L.M. (2003), *Understanding International Differences in the Gender Pay Gap*, "Journal of Labor Economics", 21 (1), https://doi.org/10.1086/344125

Blau, F.D., Kahn, L.M. (2017), *The Gender Wage Gap: Extent, Trends, and Explanations*, "Journal of Economic Literature", 55 (3), pp. 789–865, https://doi.org/10.1257/jel.20160995

Boll, C., Leppin, J., Rossen, A., Wolf, A. (2016), *Magnitude and impact factors of the gender pay gap in EU countries*, "European Commission Discussion Paper".

Borjas, G.J. (2008), *Labor Economics*, McGraw-Hill Education, New York.

Boto-García, D., Escalonilla, M. (2022), *University education, mismatched jobs: are there gender differences in the drivers of overeducation?*, "Economia Politica: Journal of Analytical and Institutional Economics", 39 (3), pp. 861–902, https://doi.org/10.1007/s40888-022-00270-y

Bryan, G., Choi, J.J., Karlan, D. (2021), *Randomizing Religion: the Impact of Protestant Evangelism on Economic Outcomes*, "The Quarterly Journal of Economics", 136 (1), pp. 293–380, https://doi.org/10.1093/qje/qjaa023

Budig, M.J., England, P. (2001), *The Wage Penalty for Motherhood*, "American Sociological Review", 66 (2), https://doi.org/10.1177/000312240106600203

Büchel, F. (2002), *The effects of overeducation on productivity in Germany – the firms' viewpoint*, "Economics of Education Review", 21 (3), pp. 263–275, https://doi.org/10.1016/S0272-7757(01)00020-6

Camasso, M.J., Jagannathan, R. (2021), *Caught in the Cultural Preference Net: Three Generations of Employment Choices in Six Capitalist Democracies*, Oxford University Press, Oxford, https://doi.org/10.1093/oso/9780190672782.001.0001

Card, D. (1999), *The causal effect of education on earnings*, [in:] O.C. Ashenfelter, D. Card (eds.), *Handbook of Labor Economics*, Vol. 3, Elsevier, Amsterdam, pp. 1801–1863.

Carneiro, P.M., Heckman, J.J. (2003), *Human Capital Policy*, "IZA Discussion Paper", 821, https://doi.org/10.2139/ssrn.434544

Caroleo, F.E., Pastore, F. (2016), *Overeducation: A Disease of the School-to-Work Transition System*, "IZA Discussion Paper", 9049, https://doi.org/10.2139/ssrn.2606902

Caroleo, F.E., Pastore, F. (2018), *Overeducation at a Glance. Determinants and Wage Effects of the Educational Mismatch Based on AlmaLaurea Data*, "Social Indicators Research", 137, pp. 999–1032, https://doi.org/10.1007/s11205-017-1641-1

Cha, Y., Weeden, K.A. (2014), *Overwork and the Slow Convergence in the Gender Gap in Wages*, "American Sociological Review", 79 (3), https://doi.org/10.1177/0003122414528936

Chevalier, A. (2003), *Measuring Over-education*, "Economica", 70 (279), pp. 509–531, https://doi.org/10.1111/1468-0335.t01-1-00296

Chevalier, A., Lindley, J. (2009), *Overeducation and the Skills of UK Graduates*, "Journal of the Royal Statistical Society Series A: Statistics in Society", 172 (2), pp. 307–337, https://doi.org/10.1111/j.1467-985X.2008.00578.x

Cohn, E., Khan, S.P. (1995), *The wage effects of overschooling revisited*, "Labour Economics", 2 (1), pp. 67–76, https://doi.org/10.1016/0927-5371(95)80008-L

Cultrera, L., Mahy, B., Rycx, F., Vermeylen, G. (2022), *Educational and Skills Mismatches: Unravelling Their Effects on Wages across Europe*, "IZA Discussion Papers", 15108.

Dolton, P.J., Makepeace, G.H. (1986), *Sample selection and male-female earnings differentials in the graduate labour market*, "Oxford Economic Papers", 38 (2), pp. 317–341, https://doi.org/10.1093/oxfordjournals.oep.a041743

Duckworth, A.L., Yeager, D.S. (2015), *Measurement Matters: Assessing Personal Qualities Other Than Cognitive Ability for Educational Purposes*, "Educational Researcher", 44 (4), https://doi.org/10.3102/0013189X15584327

Duncan, G.J., Hoffman, S.D. (1981), *The incidence and wage effects of overeducation*, "Economics of Education Review", 1 (1), pp. 75–86, https://doi.org/10.1016/0272-7757(81)90028-5

Emmenegger, P., Häusermann, S., Palier, B., Seeleib-Kaiser, M. (eds.) (2012), *The Age of Dualization: The Changing Face of Inequality in Deindustrializing Societies*, Oxford University Press, Oxford–New York, https://doi.org/10.1093/acprof:oso/9780199797899.001.0001

Ermisch, J.F., Wright, R.E. (1994), *Interpretation of negative sample selection effects in wage offer equations*, "Applied Economics Letters", 1 (11), pp. 187–189, https://doi.org/10.1080/135048594357844

Esping-Andersen, G. (1990), *The three worlds of welfare capitalism*, Princeton University Press, Princeton.

Esping-Andersen, G. (2002), *Why we need a new welfare state*, Oxford University Press, Oxford.

Estevez-Abe, M., Iversen, T., Soskice, D. (2001), *Social Protection and the Formation of Skills: A Reinterpretation of the Welfare State*, [in:] P.A. Hall, D. Soskice (eds.), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford University Press, Oxford, pp. 145–183, https://doi.org/10.1093/0199247757.003.0004

European Commission (2021), *The gender pay gap situation in the EU*, Brussels, https://commission.europa.eu/strategy-and-policy/policies/justice-and-fundamental-rights/gender-equality/equal-pay/gender-pay-gap-situation-eu_en (accessed:12.02.2024).

Fernandez-Macias, E., Hurley, J. (2017), *Routine-biased technical change and job polarization in Europe*, "Socio-Economic Review", 15 (3), pp. 563–585, https://doi.org/10.1093/ser/mww016

Gallie, D. (eds.) (2007), *Employment Regimes and the Quality of Work*, Oxford University Press, Oxford, https://doi.org/10.1093/acprof:oso/9780199230105.001.0001

Galloway, T., Lippman, L., Burke, H., Diener, O., Gates, S. (2017), *Measuring soft skills and life skills in international youth development programs: A review and inventory of tools*, USAID Youth Power Implementation IDIQ, Washington.

Gesthuizen, M., Kovarek, D., Rapp, C. (2019), *Extrinsic and Intrinsic Work Values: Findings on Equivalence in Different Cultural Contexts*, "The ANNALS of the American Academy of Political and Social Science", 682 (1), https://doi.org/10.1177/0002716219829016

Green, F., Zhu, Y. (2010), *Overqualification, job dissatisfaction, and increasing dispersion in the returns to graduate education*, "Oxford Economic Papers", 62 (4), pp. 740–763, https://doi.org/10.1093/oep/gpq002

Gutman, L.M., Schoon, I. (2013), *The impact of non-cognitive skills on outcomes for young people: A literature review*, Institute of Education, University of London, London.

Hall, P.A., Soskice, D. (eds.) (2001), *Varieties of Capitalism. The Institutional Foundations of Comparative Advantage*, Oxford University Press, Oxford, https://doi.org/10.1093/0199247757.001.0001

Hartog, J. (2000), *Over-education and earnings: where are we, where should we go?*, "Economics of Education Review", 19 (2), pp. 131–147, https://doi.org/10.1016/S0272-7757(99)00050-3

Hartog, J., Oosterbeek, H. (1988), *Education, allocation and earnings in the Netherlands: Overschooling?*, "Economics of Education Review", 7 (2), pp. 185–194, https://doi.org/10.1016/0272-7757(88)90043-X

Hauff, S., Kirchner, S. (2015), *Identifying work value patterns: cross-national comparison and historical dynamics*, "International Journal of Manpower", 36 (2), pp. 151–168, https://doi.org/10.1108/IJM-05-2013-0101

Heckman, J.J. (1979), *Sample Selection Bias as a Specification Error*, "Econometrica: Journal of the Econometric Society", 47 (1), pp. 153–161, https://doi.org/10.2307/1912352

Heckman, J.J. (2000), *Policies to foster human capital*, "Research in Economics", 54 (1), pp. 3–56, https://doi.org/10.1006/reec.1999.0225

Heckman, J.J., Masterov, D.V. (2007), *The Productivity Argument for Investing in Young Children*, "NBER Working Papers", 13016, National Bureau of Economic Research, Cambridge, https://www.nber.org/papers/w13016 (accessed: 24.11.2024).

Heckman, J.J., Stixrud, J., Urzua, S. (2006), *The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior*, "Journal of Labor Economics", 24 (3), https://doi.org/10.1086/504455

Iversen, T., Stephens, J. (2008), *Partisan Politics, the Welfare State, and the Three Worlds of Human Capital Formation*, "Comparative Political Studies", 41 (4–5), https://doi.org/10.1177/0010414007313117

Jagannathan, R., Camasso, M.J., LeFleur, J. (2024), *Gender pay gaps in the young adult labor force: prejudice-based discrimination or misreading of the observed-to-offered wage relationship?*, "Oxford Economic Papers", 76 (4), pp. 1168–1188, https://doi.org/10.1093/oep/gpae009

Kampelmann, S., Rycx, F. (2012), *The impact of educational mismatch on firm productivity: Evidence from linked panel data*, "Economics of Education Review", 31 (6), pp. 918–931, https://doi.org/10.1016/j.econedurev.2012.07.003

Kankaraš, M., Montt, G., Paccagnella, M., Quintini, G., Thorn, W. (2016), *Skills Matter: Further Results from the Survey of Adult Skills*, OECD Skills Studies, OECD Publishing, Paris.

Killingsworth, M.R. (1984), *Labor supply*, Cambridge University Press, New York, https://doi.org/10.1017/CBO9780511572104

Kleibrink, J. (2016), *Inept or Badly Matched? – Effects of Educational Mismatch in the Labor Market*, "Labour", 30 (1), pp. 88–108, https://doi.org/10.1111/labr.12065

Korpi, T., Tåhlin, M. (2009), *Educational mismatch, wages, and wage growth: Overeducation in Sweden, 1974–2000*, "Labour Economics", 16 (2), pp. 183–193, https://doi.org/10.1016/j.labeco.2008.08.004

Kraaykamp, G., Cemalcilar, Z., Tosun, J. (2019), *Transmission of Work Attitudes and Values: Comparisons, Consequences, and Implications*, "The ANNALS of the American Academy of Political and Social Science", 682 (1), https://doi.org/10.1177/0002716219831947

Leuven, E., Oosterbeek, H. (2011), *Overeducation and Mismatch in the Labor Market*, [in:] E.A. Hanushek, S. Machin, L. Woessmann (eds.), *Handbook of the Economics of Education*, Vol. 4, Elsevier, Amsterdam, pp. 283–326, https://doi.org/10.1016/B978-0-444-53444-6.00003-1

Levels, M., Velden, R. van der, Allen, J. (2014), *Educational mismatches and skills: new empirical tests of old hypotheses*, "Oxford Economic Papers", 66 (4), pp. 959–982, https://doi.org/10.1093/oep/gpu024

López Fogués, A. (2017), *Addressing Mismatch in Spain: A Concern and Proposal Beyond the Economic Sphere*, [in:] M. Pilz (ed.), *Vocational Education and Training in Times of Economic Crisis*, Springer, Cham, pp. 355–368, https://doi.org/10.1007/978-3-319-47856-2_19

Mandel, H., Semyonov, M. (2005), *Family Policies, Wage Structures, and Gender Gaps: Sources of Earnings Inequality in 20 Countries*, "American Sociological Review", 70 (6), https://doi.org/10.1177/000312240507000604

Marques, P., Suleman, F., Costa, J.M. (2022), *Moving beyond supply-side arguments to explain over-qualification: The ability to absorb graduates in different models of capitalism*, "European Journal of Education", 57 (2), pp. 342–360, https://doi.org/10.1111/ejed.12500

Mavromaras, K., McGuinness, S., O'Leary, N., Sloane, P., Wei, Z. (2013), *Job Mismatches and Labour Market Outcomes: Panel Evidence on University Graduates*, "Economic Record", 89 (286), pp. 382–395, https://doi.org/10.1111/1475-4932.12054

McGoldrick, K., Robst, J. (1996), *Gender Differences in Overeducation: A Test of the Theory of Differential Overqualification*, "The American Economic Review", 86 (2), pp. 280–284, https://www.jstor.org/stable/2118137

McGuinness, S. (2003), *Graduate overeducation as a sheepskin effect: evidence from Northern Ireland*, "Applied Economics", 35 (5), pp. 597–608, https://doi.org/10.1080/0003684022000029284

McGuinness, S. (2006), *Overeducation in the Labour Market*, "Journal of Economic Surveys", 20 (3), pp. 387–418, https://doi.org/10.1111/j.0950-0804.2006.00284.x

McGuinness, S., Pouliakas, K. (2016), *Deconstructing Theories of Overeducation in Europe: A Wage Decomposition Approach*, "IZA Discussion Papers", 9698, https://doi.org/10.2139/ssrn.2731961

McGuinness, S., Bergin, A., Whelan, A. (2018), *Overeducation in Europe: trends, convergence, and drivers*, "Oxford Economic Papers", 70 (4), pp. 994–1015, https://doi.org/10.1093/oep/gpy022

McGuinness, S., Pouliakas, K., Redmond, P. (2017), *How Useful is the Concept of Skills Mismatch?*, "IZA Discussion Paper", 10786, https://doi.org/10.2139/ssrn.2979934

Mincer, J. (1974), *Schooling, Experience, and Earnings*, National Bureau of Economic Research, New York.

Mortensen, D.T., Pissarides, C.A. (1994), *Job Creation and Job Destruction in the Theory of Unemployment*, "The Review of Economic Studies", 61 (3), pp. 397–415, https://doi.org/10.2307/2297896

Nicaise, I. (2001), *Human capital, reservation wages and job competition: Heckman's lambda re-interpreted*, "Applied Economics", 33 (3), pp. 309–315, https://doi.org/10.1080/00036840121810

Nieto, S., Ramos, R. (2017), *Overeducation, Skills and Wage Penalty: Evidence for Spain Using PIAAC Data*, "Social Indicators Research", 134, pp. 219–236, https://doi.org/10.1007/s11205-016-1423-1

OECD (2020), *Tackling discriminatory social institutions to pave the way towards women's full inclusion and gender equality in G20 countries*, OECD Publishing, Paris, https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/11/tackling-discriminatory-social-institutions-to-pave-the-way-towards-women-s-full-inclusion-and-gender-equality-in-g20-countries_addd61a5/87c9ef24-en.pdf (accessed: 7.02.2025).

Palczyńska, M. (2021), *Overeducation and wages: the role of cognitive skills and personality traits*, "Baltic Journal of Economics", 21 (1), pp. 85–111, https://doi.org/10.1080/1406099X.2021.1950388

Pecoraro, M. (2014), *Is There Still a Wage Penalty for Being Overeducated but Well-Matched in Skills? A Panel Data Analysis of a Swiss Graduate Cohort*, "Labour", 28 (3), pp. 309–337, https://doi.org/10.1111/labr.12031

Reisel, L., Østbakken, K.M., Attewell, P. (2019), *Dynamics of Claims Making and Gender Wage Gaps in the United States and Norway*, "Social Politics: International Studies in Gender, State & Society", 26 (1), pp. 87–115, https://doi.org/10.1093/sp/jxy019

Robst, J. (2007), *Education and job match: The relatedness of college major and work*, "Economics of Education Review", 26 (4), pp. 397–407, https://doi.org/10.1016/j.econedurev.2006.08.003

Rosso, B.D., Dekas, K.H., Wrzesniewski, A. (2010), *On the meaning of work: A theoretical integration and review*, "Research in Organizational Behavior", 30, pp. 91–127, https://doi.org/10.1016/j.riob.2010.09.001

Rumberger, R.W. (1987), *The Impact of Surplus Schooling on Productivity and Earnings*, "Journal of Human Resources", 22 (1), pp. 24–50, https://doi.org/10.2307/145865

Sattinger, M. (1993), *Assignment Models of the Distribution of Earnings*, "Journal of Economic Literature", 31 (2), pp. 831–880, https://www.jstor.org/stable/2728516 (accessed: 10.10.2024).

Shavit, Y., Müller, W. (2000), *Vocational secondary education: Where diversion and where safety net?*, "European Societies", 2 (1), pp. 29–50, https://doi.org/10.1080/146166900360710

Sicherman, N. (1991), *"Overeducation" in the Labor Market*, "Journal of Labor Economics", 9 (2), https://doi.org/10.1086/298261

Sicherman, N., Galor, O. (1990), *A Theory of Career Mobility*, "Journal of Political Economy", 98 (1), https://doi.org/10.1086/261674

Stewart, F. (2018), *The STEM Dilemma: Skills That Matter to Regions*, WE Upjohn Institute for Employment Research, Kalamazoo.

Thurow, L.C. (1979), *A job competition model*, [in:] M.J. Piore (ed.), *Unemployment and Inflation: Institutionalist and Structuralist Views*, Routledge, London, pp. 17–32.

Tosun, J., Hörisch, F., Schuck, B. (2018), *CUPESSE: Cultural Pathways to Economic Self-Sufficiency and Entrepreneurship*, https://search.gesis.org/research_data/ZA7475 (accessed: 6.11.2023).

Tosun, J., Arco-Tirado, J.L., Caserta, M., Cemalcilar, Z., Freitag, M., Hörisch, F., Jensen, C., Kittel, B., Littvay, L., Lukeš, M., Maloney, W.A. (2019), *Perceived economic self-sufficiency: A country- and generation-comparative approach*, "European Political Science", 18, pp. 510–531, https://doi.org/10.1057/s41304-018-0186-3

Verdugo, R.R., Verdugo, N.T. (1989), *The Impact of Surplus Schooling on Earnings: Some Additional Findings*, "Journal of Human Resources", 24 (4), pp. 629–643, https://doi.org/10.2307/145998

Verdugo, R.R., Verdugo, N.T. (1992), *Surplus Schooling and Earnings: Reply to Cohn and to Gill and Solberg*, "Journal of Human Resources", 27 (4), pp. 690–695, https://doi.org/10.2307/146083

Zimmermann, K.F., Biavaschi, C., Eichhorst, W., Giulietti, C., Kendzia, M.J., Muravyev, A., Schmidl, R. (2013), *Youth unemployment and vocational training*, "Foundations and Trends® in Microeconomic", 1–2.

APPENDIX

Table A1. Sample Selection Equations for Male Labor Force Participation in Ten Countries

Variable	Austria	Czechia	Denmark	Germany	Greece	Hungary	Italy	Spain	Turkey	UK
Education	0.008 (0.025)	0.139[c] (0.040)	0.101[c] (0.028)	0.065[c] (0.016)	0.054 (0.038)	−0.006 (0.025)	0.041 (0.037)	0.075[c] (0.023)	0.029 (0.033)	0.069[c] (0.018)
Experience	0.043[c] (0.015)	0.122[c] (0.024)	0.055[c] (0.019)	0.032[c] (0.009)	0.078[c] (0.019)	−0.016 (0.016)	0.025 (0.021)	0.029[a] (0.016)	−0.025 (0.024)	0.048[c] (0.010)
Married	0.446[c] (0.153)	0.484[a] (0.289)	0.513[b] (0.206)	0.326[c] (0.089)	0.160 (0.218)	0.060 (0.199)	0.502[b] (0.227)	0.088 (0.197)	0.485[a] (0.289)	0.377[c] (0.122)
Immigrant	−0.133 (0.196)	−0.430 (0.550)	−0.493 (0.419)	0.054 (0.140)	0.937 (0.597)	0.375 (0.584)	0.498 (0.515)	−0.848[c] (0.307)	0.542 (0.451)	0.000 (0.169)
Has child(ren)	0.557[b] (0.278)	0.238 (0.421)	−0.212 (0.360)	−0.170 (0.114)	0.480[a] (0.286)	0.239 (0.288)	0.138 (0.288)	0.556[b] (0.268)	−0.576[b] (0.284)	−0.056 (0.225)
Has caring responsibility	−0.235 (0.256)	−0.562 (0.347)	0.173 (0.322)	0.000 (0.106)	−0.216 (0.216)	−0.143 (0.251)	−0.321 (0.232)	0.092 (0.184)	0.000 (0.101)	0.152 (0.212)
Work Centrality	0.192[a] (0.113)	0.340[a] (0.190)	0.206 (0.133)	0.249[c] (0.064)	0.244[a] (0.130)	0.091 (0.151)	−0.035 (0.181)	0.144 (0.123)	0.394[a] (0.208)	0.307[c] (0.083)
Grit	0.415[c] (0.160)	−0.103 (0.256)	0.269 (0.211)	−0.085 (0.100)	0.193 (0.201)	−0.204 (0.182)	0.034 (0.229)	−0.013 (0.152)	−0.135 (0.191)	0.016 (0.122)
Risk-Taking	−0.050 (0.031)	−0.004 (0.040)	0.004 (0.033)	−0.012 (0.014)	−0.006 (0.030)	−0.009 (0.028)	−0.042 (0.036)	0.016 (0.027)	0.022 (0.037)	0.017 (0.022)
Willingness to change jobs	−0.040 (0.038)	0.040 (0.057)	−0.001 (0.047)	0.002 (0.016)	−0.001 (0.050)	−0.074[b] (0.034)	0.136[b] (0.061)	0.042 (0.040)	−0.032 (0.036)	0.043[a] (0.026)
Job Importance	−0.190 (0.151)	0.082 (0.222)	0.559[b] (0.222)	0.064 (0.071)	0.002 (0.183)	−0.208 (0.169)	0.217 (0.201)	0.080 (0.169)	0.312 (0.235)	0.077 (0.116)
Religious	−0.122 (0.126)	−0.237 (0.238)	0.327[b] (0.172)	0.002 (0.060)	0.191 (0.150)	−0.253[a] (0.132)	−0.136 (0.166)	0.036 (0.161)	1.056[a] (0.578)	−0.211[b] (0.104)
NUTS regions	Not Sig	Sig	Not Sig	Sig	Not sig	Not Sig	Sig	Not Sig	Sig	Not Sig

Standard errors in parenthesis. [a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table A2. Sample Selection Equations for Female Labor Force Participation in Ten Countries

Variable	Austria	Czechia	Denmark	Germany	Greece	Hungary	Italy	Spain	Turkey	UK
Education	0.073[c] (0.021)	0.077[c] (0.026)	0.123[c] (0.035)	0.044[c] (0.015)	0.106[c] (0.034)	−0.036 (0.027)	0.045 (0.044)	0.074[c] (0.022)	0.067[a] (0.040)	0.097[c] (0.017)
Experience	0.047[c] (0.011)	0.114[c] (0.020)	0.049[b] (0.024)	0.036[c] (0.008)	0.030[a] (0.016)	0.013 (0.018)	0.021 (0.025)	−0.006 (0.016)	0.039 (0.028)	0.057[c] (0.009)
Married	0.242[b] (0.122)	−0.146 (0.149)	−0.029 (0.210)	0.027 (0.085)	−0.411[b] (0.167)	−0.41[c] (0.151)	−0.064 (0.274)	−0.024 (0.159)	−0.323 (0.324)	0.212[b] (0.101)
Immigrant	−0.240 (0.153)	0.217 (0.426)	−0.596 (0.718)	0.304[b] (0.126)	−0.297 (0.239)	0.042 (0.447)	−0.137 (0.619)	0.203 (0.251)	−0.597 (0.718)	0.029 (0.126)
Has child(ren)	−0.224[b] (0.114)	−1.525[c] (0.305)	−0.357 (0.482)	−0.071 (0.107)	−0.128 (0.228)	−1.71[c] (0.404)	0.167 (0.338)	−0.177 (0.229)	−1.13[c] (0.427)	−0.255 (0.185)
Has caring responsibility	−0.034 (0.112)	−0.094 (0.273)	0.097 (0.447)	−0.244[b] (0.097)	−0.290[a] (0.178)	0.711[a] (0.382)	−0.502[b] (0.263)	−0.178 (0.199)	0.000 (0.012)	0.092 (0.176)

Variable	Austria	Czechia	Denmark	Germany	Greece	Hungary	Italy	Spain	Turkey	UK
Work Centrality	0.216[c] (0.081)	0.144 (0.127)	0.178 (0.171)	0.264[c] (0.066)	0.019 (0.113)	0.290[a] (0.156)	0.175 (0.178)	0.143 (0.106)	−0.036 (0.273)	0.315[c] (0.079)
Grit	0.289[b] (0.124)	0.022 (0.028)	0.513[a] (0.291)	0.027 (0.093)	0.241 (0.168)	0.066 (0.181)	0.288 (0.231)	−0.021 (0.148)	0.250 (0.284)	−0.114 (0.110)
Risk-Taking	0.018 (0.014)	0.022 (0.028)	0.007 (0.041)	−0.002 (0.010)	−0.018 (0.024)	−0.056[b] (0.027)	0.019 (0.036)	0.012 (0.025)	0.005 (0.044)	−0.006 (0.016)
Willingness to change jobs	0.019 (0.019)	0.027 (0.044)	−0.067 (0.064)	0.006 (0.013)	0.000 (0.036)	−0.043 (0.034)	−0.079 (0.063)	−0.003 (0.039)	0.027 (0.049)	0.036[a] (0.019)
Job Importance	0.026 (0.082)	−0.179 (0.167)	0.025 (0.295)	0.093 (0.063)	−0.392[b] (0.163)	−0.80[c] (0.186)	0.440[b] (0.218)	0.227 (0.165)	0.267 (0.339)	−0.087 (0.079)
Religious	−0.042 (0.062)	0.033 (0.179)	0.003 (0.177)	−0.066 (0.050)	0.023 (0.122)	0.110 (0.138)	0.054 (0.183)	0.070 (0.132)	−0.336 (0.721)	−0.062 (0.074)
NUTS regions	Not Sig	Not Sig	Not Sig	Not Sig	Not sig	Not Sig	Not Sig	Not Sig	Not Sig	Not Sig

Standard errors in parenthesis. [a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table A3. Earnings Equations for Males – OLS (Left Columns) and Selection Corrected (Right Columns) for each of the Ten Countries

Variable	Austria		Czechia		Denmark		Germany		Greece	
	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection
Education	0.042[b]	0.013	0.059[c]	0.036[c]	0.107[c]	0.088[c]	0.046[c]	0.048[c]	0.086[c]	0.079[b]
	(0.192)	(0.009)	(0.010)	(0.011)	(0.023)	(0.016)	(0.008)	(0.007)	(0.031)	(0.031)
Overeducation	−0.293[b]	−0.040	−0.154[c]	−0.136[c]	−0.507[c]	−0.269[c]	−0.159[c]	−0.102[c]	−0.267[b]	−0.267[b]
	(0.121)	(0.060)	(0.055)	(0.039)	(0.133)	(0.066)	(0.048)	(0.031)	(0.117)	(0.110)
Experience	0.024	0.021[a]	0.101[c]	0.021	0.115[b]	0.048[a]	0.017	0.014[a]	−0.000	−0.068
	(0.025)	(0.012)	(0.023)	(0.019)	(0.052)	(0.025)	(0.011)	(0.007)	(0.041)	(0.053)
Experience	−0.001	0.001	−0.004[c]	0.000	−0.003	−0.001	0.000	0.000	0.003	0.005[b]
	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)
Perm. Contract	0.501[c]	0.058	0.094[a]	0.040	0.297[b]	0.189[c]	0.190[c]	0.148[c]	0.129	0.008
	(0.115)	(0.058)	(0.049)	(0.034)	(0.120)	(0.059)	(0.045)	(0.027)	(0.100)	(0.096)
Full-time Job	1.176[c]	0.154[b]	0.494[c]	0.067	0.984[c]	0.150[b]	0.313[c]	0.118[c]	0.405[c]	0.331[c]
	(0.117)	(0.061)	(0.064)	(0.052)	(0.132)	(0.071)	(0.050)	(0.031)	(0.109)	(0.105)
Married	0.238[b]	0.127[b]	0.068	0.145[c]	0.343[c]	0.147[a]	0.218[c]	0.268[c]	0.158	0.168
	(0.105)	(0.053)	(0.054)	(0.041)	(0.116)	(0.077)	(0.039)	(0.032)	(0.103)	(0.120)
Immigrant	0.018	−0.158[b]	−0.031	0.085	−0.028	−0.169	0.029	0.052	−0.036	−0.122
	(0.152)	(0.071)	(0.126)	(0.091)	(0.334)	(0.169)	(0.067)	(0.055)	(0.232)	(0.287)
Work centrality	−0.062	−0.013	−0.003	0.014	0.178[b]	0.139[c]	0.034	0.087[c]	0.023	0.030
	(0.086)	(0.039)	(0.045)	(0.038)	(0.090)	(0.053)	(0.032)	(0.026)	(0.082)	(0.098)
Grit	−0.026	0.125[b]	0.076	0.151[c]	0.243	0.127	0.115[b]	0.129[c]	0.173	0.266[b]
	(0.118)	(0.057)	(0.058)	(0.042)	(0.153)	(0.086)	(0.047)	(0.038)	(0.116)	(0.120)

Variable	Austria		Czechia		Denmark		Germany		Greece	
	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection
NUTS regions	Not	Not	Sig	Sig	Not	Not	Sig	Not	Not	Not
	Sig	Sig			Sig	Sig		Sig	Sig	Sig
Lambda (λ)		−0.011		−0.164		−0.269		−0.468[c]		0.063
		(0.112)		(0.171)		(0.217)		(0.017)		(0.543)
Adjusted R^2	0.42		0.43		0.46		0.19		0.18	

Standard errors in parenthesis. [a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table A3. Earnings Equations for Males – OLS (Left Columns) and Selection Corrected (Right Columns) for each of the Ten Countries

Variable	Hungary		Italy		Spain		Turkey		UK	
	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection
Education	0.005	0.011[b]	0.018	0.028[a]	0.075[c]	0.025	0.044[c]	0.055[c]	0.050[c]	0.039[c]
	(0.006)	(0.005)	(0.020)	(0.015)	(0.016)	(0.019)	(0.009)	(0.013)	(0.009)	(0.006)
Overeducation	−0.072[a]	−0.055[a]	−0.007	0.023	−0.564[c]	−0.262[c]	−0.255[c]	−0.304[c]	−0.311[c]	−0.236[c]
	(0.039)	(0.032)	(0.103)	(0.069)	(0.090)	(0.072)	(0.065)	(0.094)	(0.048)	(0.032)
Experience	0.028[c]	0.006	0.036	−0.002	0.092[c]	−0.001	0.014	0.015	0.073[c]	0.012
	(0.009)	(0.008)	(0.036)	(0.025)	(0.023)	(0.021)	(0.013)	(0.022)	(0.011)	(0.008)
Experience	−0.001[b]	0.000	−0.001	0.001	−0.002	0.000	0.000	0.000	−0.003[c]	0.000
	(0.000)	(0.000)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Perm. Contract	0.029	0.037	0.092	−0.027	0.276[c]	0.212[c]	0.141[c]	0.117[a]	0.215[c]	0.050
	(0.032)	(0.026)	(0.080)	(0.052)	(0.089)	(0.066)	(0.050)	(0.069)	(0.051)	(0.035)
Full-time Job	0.306[c]	0.031	−0.006	−0.138[b]	0.244[c]	0.179[b]	−0.004	−0.214	0.304[c]	0.136[c]
	(0.073)	(0.068)	(0.086)	(0.058)	(0.091)	(0.070)	(0.099)	(0.183)	(0.045)	(0.030)
Married	−0.014	−0.006	0.077	0.126[a]	0.096	0.055	−0.136[c]	−0.104	0.186[c]	0.163[c]
	(0.033)	(0.028)	(0.088)	(0.072)	(0.095)	(0.104)	(0.051)	(0.089)	(0.044)	(0.030)
Immigrant	0.127	0.155[b]	0.295	0.218	−0.124	0.086	0.378	0.093	−0.047	−0.086[a]
	(0.090)	(0.079)	(0.204)	(0.149)	(0.206)	(0.210)	(0.416)	(0.593)	(0.069)	(0.046)
Work centrality	0.012	0.009	0.047	0.071	0.069	0.034	0.114[b]	−0.028	0.118[c]	0.053[b]
	(0.031)	(0.026)	(0.076)	(0.053)	(0.074)	(0.068)	(0.053)	(0.087)	(0.036)	(0.026)
Grit	0.023	0.013	0.186[a]	0.154[b]	0.190[b]	0.134[a]	0.126[c]	0.098	−0.010	0.052
	(0.035)	(0.031)	(0.097)	(0.069)	(0.092)	(0.080)	(0.047)	(0.065)	(0.054)	(0.036)
NUTS regions	Sig	Sig	Not	Not	Not	Not	Sig	Sig	Sig	Sig
			Sig	Sig	Sig	Sig				
Lambda (λ)		−0.13[c]		−0.226		−0.442[b]		−0.223		−0.073[a]
		(0.028)		(0.213)		(0.194)		(0.337)		(0.039)
Adjusted R^2	0.16		0.04		0.43		0.24		0.31	

Standard errors in parenthesis. [a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table A4. Earnings Equations for Females – OLS (Left Columns) and Selection Corrected (Right Columns) for each of the Ten Countries

Variable	Austria		Czechia		Denmark		Germany		Greece	
	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection
Education	0.098[c]	0.055[c]	0.053[c]	0.022[c]	0.105[c]	0.088[c]	0.063[c]	0.058[c]	0.050	0.059
	(0.023)	(0.012)	(0.012)	(0.006)	(0.034)	(0.031)	(0.012)	(0.008)	(0.035)	(0.040)
Overeducation	−0.148	−0.12[c]	−0.313[c]	−0.112[c]	−0.540[c]	−0.435[c]	−0.26[c]	−0.097[c]	−0.165	−0.150
	(0.113)	(0.038)	(0.065)	(0.032)	(0.194)	(0.082)	(0.065)	(0.032)	(0.111)	(0.106)
Experience	0.085[c]	0.021[b]	0.062[b]	0.015	0.102	0.031	0.003	0.021[b]	0.103[b]	0.048
	(0.025)	(0.010)	(0.028)	(0.013)	(0.074)	(0.030)	(0.016)	(0.008)	(0.041)	(0.044)
Experience^2	−0.001	0.000	−0.002	0.000	−0.002	0.000	0.001	0.000	−0.006[b]	−0.002
	(0.002)	(0.001)	(0.001)	(0.001)	(0.004)	(0.002)	(0.001)	(0.000)	(0.003)	(0.003)
Perm. Contract	0.446[c]	0.014	0.123[b]	−0.021	0.155	0.144[b]	0.264[c]	0.110[c]	0.097	0.034
	(0.108)	(0.039)	(0.060)	(0.027)	(0.172)	(0.069)	(0.060)	(0.029)	(0.095)	(0.091)
Full-time Job	0.869[c]	0.159[c]	0.425[c]	0.030	0.882[c]	0.113[a]	0.348[c]	0.122[c]	0.198[a]	0.118
	(0.104)	(0.036)	(0.063)	(0.031)	(0.166)	(0.069)	(0.054)	(0.027)	(0.103)	(0.098)
Married	0.309[b]	0.202[c]	−0.132[b]	0.056[a]	0.065	0.031	0.266[c]	0.206[c]	0.190[a]	0.123
	(0.122)	(0.062)	(0.066)	(0.034)	(0.160)	(0.076)	(0.057)	(0.042)	(0.110)	(0.162)
Immigrant	−0.210	−0.170[b]	−0.028	0.104	1.453[b]	0.449	0.119	0.047	−0.165	−0.189
	(0.150)	(0.085)	(0.174)	(0.086)	(0.723)	(0.493)	(0.086)	(0.065)	(0.195)	(0.196)
Work centrality	0.229[c]	0.141[c]	0.058	−0.001	−0.035	0.087	0.113[b]	0.194[c]	0.279[c]	0.236[c]
	(0.081)	(0.044)	(0.054)	(0.026)	(0.141)	(0.074)	(0.047)	(0.035)	(0.090)	(0.089)
Grit	0.076	0.168[b]	−0.195[b]	−0.009	−0.061	0.126	0.010	0.093[a]	−0.027	0.016
	(0.125)	(0.067)	(0.080)	(0.038)	(0.237)	(0.163)	(0.065)	(0.049)	(0.123)	(0.120)
NUTS regions	Not	Not	Sig	Sig	Not	Not	Not	Sig	Not	Not
	Sig	Sig			Sig	Sig	Sig		Sig	Sig
Lambda (λ)		0.543[c]		−0.032		0.333		0.578[c]		0.256[b]
		(0.037)		(0.039)		(0.427)		(0.021)		(0.120)
Adjusted R^2	0.34		0.29		0.34		0.17		0.09	

Standard errors in parenthesis. [a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table A5. Earnings Equations for Females – OLS (Left Columns) and Selection Corrected (Right Columns) for each of the Ten Countries

Variable	Hungary		Italy		Spain		Turkey		UK	
	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection	OLS	Selection
Education	0.012[c]	0.011[c]	0.002	0.022	0.060[c]	0.054[c]	0.041[c]	0.069[b]	0.037[c]	0.043[c]
	(0.004)	(0.003)	(0.033)	(0.020)	(0.019)	(0.018)	(0.015)	(0.027)	(0.011)	(0.005)
Overeducation	−0.068[b]	−0.07[c]	0.028	−0.127[a]	−0.427[c]	−0.33[c]	−0.135	−0.119	−0.187[c]	−0.146[c]
	(0.027)	(0.020)	(0.142)	(0.074)	(0.095)	(0.063)	(0.091)	(0.184)	(0.053)	(0.024)
Experience	0.024[c]	0.013[c]	0.092[a]	0.038	0.066[c]	0.037[b]	0.050[c]	0.029	0.103[c]	0.030[c]
	(0.005)	(0.004)	(0.051)	(0.027)	(0.025)	(0.017)	(0.017)	(0.046)	(0.011)	(0.005)
Experience^2	−0.001[c]	0.000[b]	−0.005	0.002	−0.002	−0.001	−0.002[c]	−0.002	−0.004[c]	−0.001[b]
	(0.000)	(0.000)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)
Perm. Contract	0.079[c]	0.042[c]	0.103	0.054	0.302[c]	0.177[c]	0.179[b]	0.436[c]	0.337[c]	0.054[b]
	(0.021)	(0.015)	(0.112)	(0.058)	(0.082)	(0.055)	(0.079)	(0.142)	(0.051)	(0.023)
Full-time Job	0.096[b]	0.062[b]	−0.025	−0.126[b]	0.309[c]	0.185[c]	−0.345[c]	−0.435[a]	0.308[c]	0.129[c]
	(0.038)	(0.028)	(0.106)	(0.056)	(0.084)	(0.056)	(0.128)	(0.233)	(0.045)	(0.020)
Married	−0.028	−0.013	0.213	0.026	0.125	0.120	0.114	0.156	0.133[c]	0.102[c]
	(0.020)	(0.016)	(0.141)	(0.085)	(0.096)	(0.074)	(0.077)	(0.182)	(0.050)	(0.026)
Immigrant	0.056	0.051	1.054[b]	0.496[a]	−0.182	−0.139	0.064	−0.490	0.037	0.021
	(0.061)	(0.044)	(0.472)	(0.259)	(0.152)	(0.114)	(0.342)	(0.488)	(0.066)	(0.035)
Work centrality	0.017	0.035[b]	0.180[a]	0.130[a]	0.076	0.040	0.093	0.242	0.041	0.064[c]
	(0.020)	(0.015)	(0.097)	(0.067)	(0.071)	(0.057)	(0.074)	(0.155)	(0.042)	(0.022)
Grit	0.044[a]	0.036[b]	−0.154	−0.022	−0.031	0.046	0.189[b]	0.229	0.021	0.009
	(0.024)	(0.018)	(0.069)	(0.087)	(0.095)	(0.068)	(0.081)	(0.184)	(0.058)	(0.031)
NUTS regions	Sig	Sig	Not Sig	Not Sig	Not	Not	Sig	Sig	Not	Sig
					Sig	Sig			Sig	
Lambda (λ)		0.018		0.354		0.326[a]		0.494		0.294[c]
		(0.019)		(0.202)		(0.181)		(0.356)		(0.014)
Adjusted R^2	0.29		0.065		0.27		0.20		0.32	

Standard errors in parenthesis. [a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table A6. Comparison of Wage Penalty from OLS, Quantile and Selection-Corrected Regressions – Males Coefficients and (Std. Errors)

	Overeducation Penalty					
Country	Quartile 1	Quartile 2	Quartile 3	Wald Test Sig?#	OLS	Selection--Corrected
Austria	−0.087 (0.054)	−0.138[b] (0.065)	−0.103 (0.082)	No	−0.293[b] (0.019)	−0.040 (0.060)
Czechia	−0.031 (0.034)	−0.098[b] (0.043)	−0.138[c] (0.038)	Yes[c]	−0.154[c] (0.055)	−0.136[c] (0.039)
Denmark	−0.150 (0.104)	−0.334[c] (0.115)	−0.432[c] (0.091)	Yes[a]	−0.507[b] (0.133)	−0.269[c] (0.066)
Germany	0.175[c] (0.056)	−0.111[c] (0.034)	−0.049[c] (0.054)	No	−0.159[c] (0.048)	−0.102[c] (0.031)
Greece	−0.273[c] (0.063)	−0.272[c] (0.077)	−0.287 (0.269)	No	−0.267[b] (0.117)	−0.267[b] (0.110)
Hungary	−0.127[c] (0.045)	−0.143[c] (0.031)	−0.073[b] (0.034)	No	−0.072[a] (0.039)	−0.055[b] (0.032)
Italy	0.000 (0.000)	0.000 (0.000)	−0.127 (0.115)	No	−0.007 (0.103))	−0.023 (0.069)
Spain	−0.616[c] (0.184)	−0.499[c] (0.122)	−0.356[c] (0.117)	No	−0.564[c] (0.090)	−0.262[c] (0.072)
Turkey	−0.074[c] (0.026)	−0.156[c] (0.052)	−0.262[c] (0.091)	No	−0.255[c] (0.065)	−0.304[c] (0.094)
UK	−0.200[c] (0.026)	−0.168[c] (0.023)	−0.249[c] (0.033)	No	−0.311[c] (0.048)	−0.236[c] (0.032)

Standard errors in parenthesis. [a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

Wald test for equivalence of coefficients across quartiles.

Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Table A7. Comparison of Wage Penalty from OLS, Quantile and Selection-Corrected Regressions – Females Coefficients and (Std. Errors)

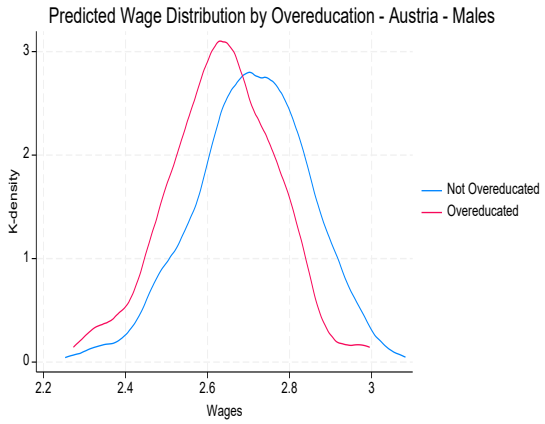
	Overeducation Penalty					
Country	Quartile 1	Quartile 2	Quartile 3	Wald Test Sig?#	OLS	Selection--Corrected
Austria	−0.077 (0.134)	−0.250[a] (0.130)	−0.157[b] (0.072)	No	−0.0148 (0.113)	−0.120[c] (0.038)
Czechia	−0.070 (0.050)	−0.154[c] (0.044)	−0.119[c] (0.044)	No	−0.313[c] (0.065)	−0.112[c] (0.032)
Denmark	−0.127 (0.266)	−0.314[a] (0.177)	−0.528[c] (0.101)	No	−0.540[c] (0.194)	−0.435[c] (0.082)
Germany	0.194[c] (0.062)	−0.148[c] (0.050)	−0.161[c] (0.054)	No	−0.264[c] (0.065)	−0.097[c] (0.032)
Greece	−0.147[b] (0.059)	−0.020[c] (0.057)	−0.380 (0.319)	No	−0.165 (0.111)	−0.150 (0.106)
Hungary	−0.073[b] (0.029)	−0.062 (0.038)	−0.044 (0.030)	No	−0.068[c] (0.027)	−0.072[b] (0.020)
Italy	0.000 (0.000)	0.000 (0.000)	−0.150 (0.121)	No	−0.028 (0.142)	−0.127[a] (0.074)

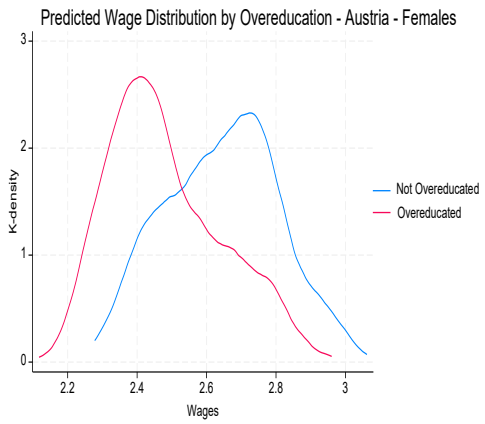
	Overeducation Penalty					
Country	Quartile 1	Quartile 2	Quartile 3	Wald Test Sig?#	OLS	Selection--Corrected
Spain	−0.540[c] (0.113)	−0.417[c] (0.077)	−0.406[c] (0.084)	No	−0.427[c] (0.095)	−0.331[c] (0.063)
Turkey	−0.008[c] (0.059)	−0.007[c] (0.076)	−0.219[c] (0.087)	Yes[b]	−0.135 (0.091)	−0.119 (0.184)
UK	−0.149[b] (0.042)	−0.155[c] (0.022)	−0.176[c] (0.023)	No	−0.187[c] (0.053)	−0.146[c] (0.024)

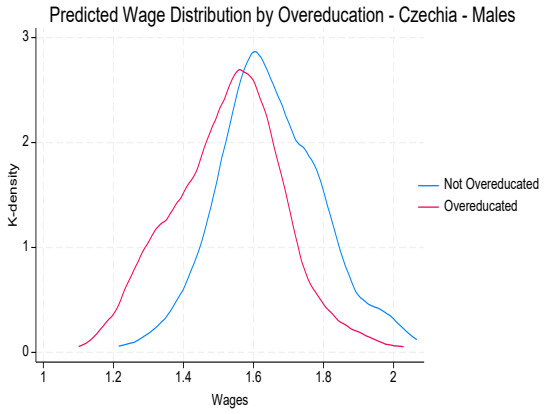
Standard errors in parenthesis. [a] Significant at 10%, [b] significant at 5%, [c] significant at 1%.

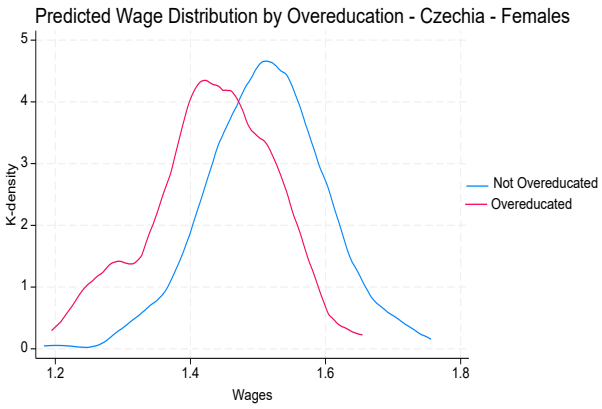
Wald test for equivalence of coefficients across quartiles.

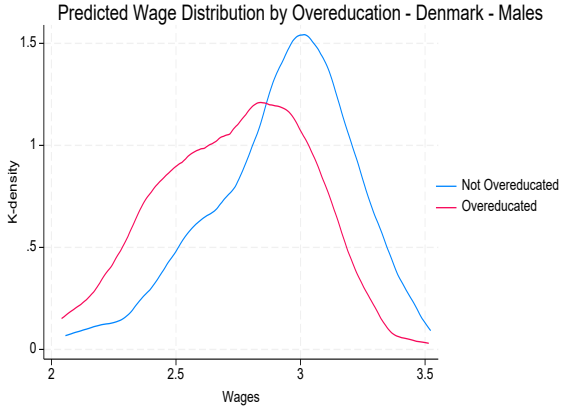
Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

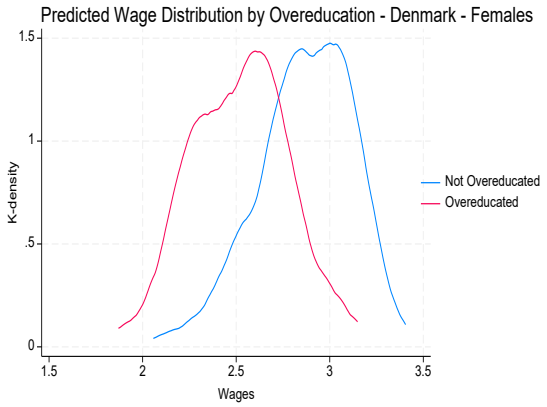


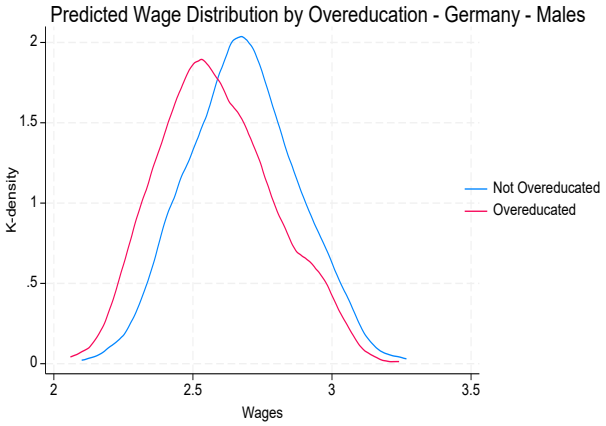


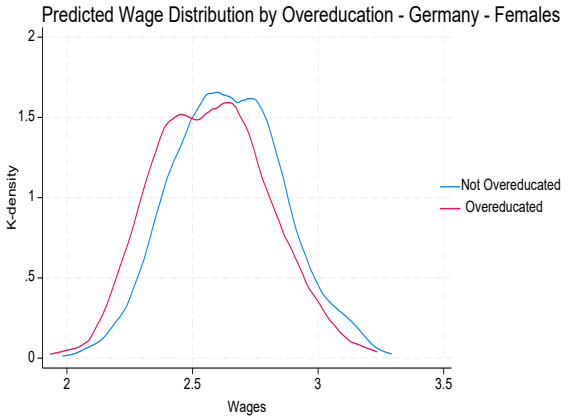


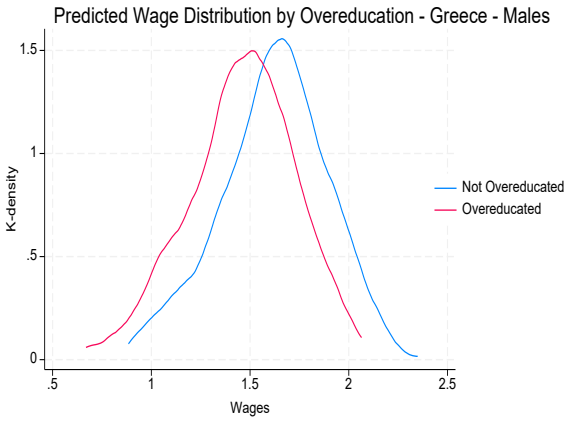


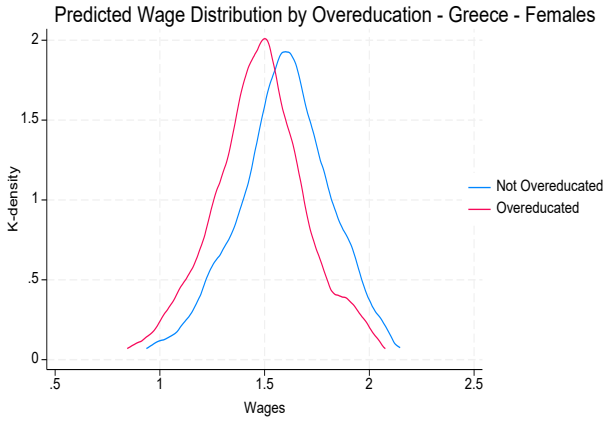

Predicted Wage Distribution by Overeducation - Denmark - Males
K-density
Wages
Not Overeducated
Overeducated

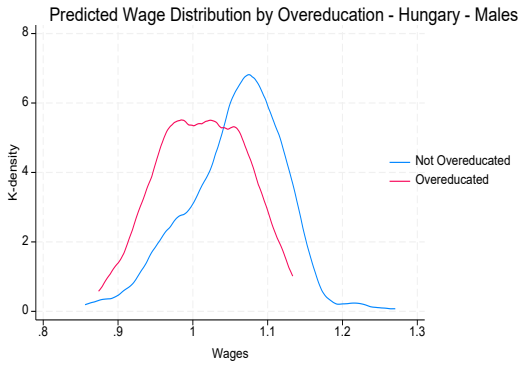

Predicted Wage Distribution by Overeducation - Denmark - Females
K-density
Wages
Not Overeducated
Overeducated

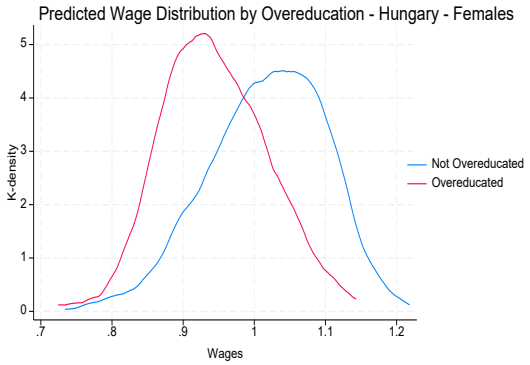

Predicted Wage Distribution by Overeducation - Germany - Males
K-density
Wages
Not Overeducated
Overeducated

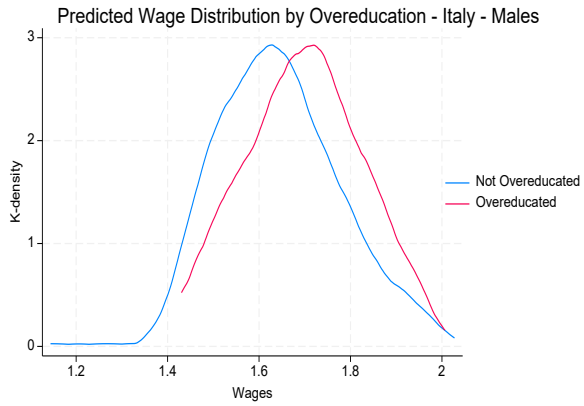

Predicted Wage Distribution by Overeducation - Germany - Females
K-density
Wages
Not Overeducated
Overeducated

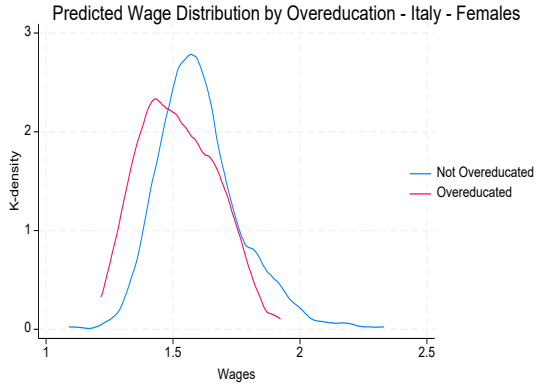

Predicted Wage Distribution by Overeducation - Greece - Males
K-density
Wages
Not Overeducated
Overeducated

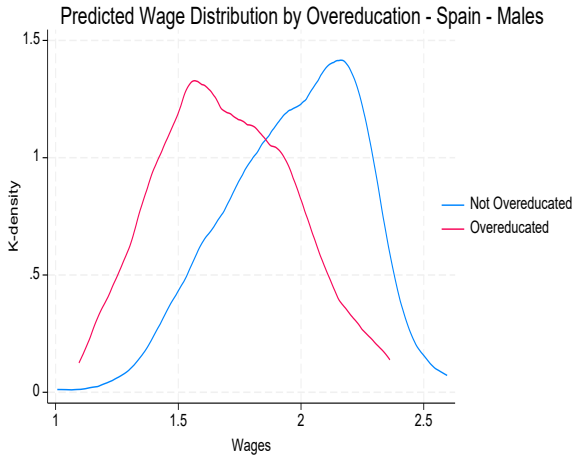

Predicted Wage Distribution by Overeducation - Greece - Females
K-density
Wages
Not Overeducated
Overeducated

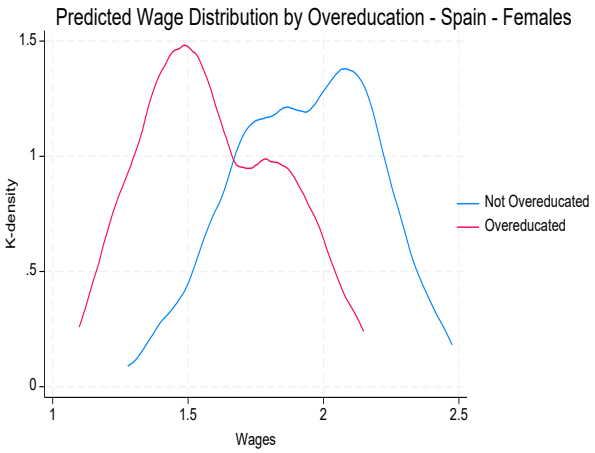

Predicted Wage Distribution by Overeducation - Hungary - Males
K-density
Wages
Not Overeducated
Overeducated


Predicted Wage Distribution by Overeducation - Hungary - Females
K-density
Wages
Not Overeducated
Overeducated


Predicted Wage Distribution by Overeducation - Italy - Males
K-density
Wages
Not Overeducated
Overeducated


Predicted Wage Distribution by Overeducation - Italy - Females
K-density
Wages
Not Overeducated
Overeducated


Predicted Wage Distribution by Overeducation - Spain - Males
K-density
Wages
Not Overeducated
Overeducated


Predicted Wage Distribution by Overeducation - Spain - Females
K-density
Wages
Not Overeducated
Overeducated

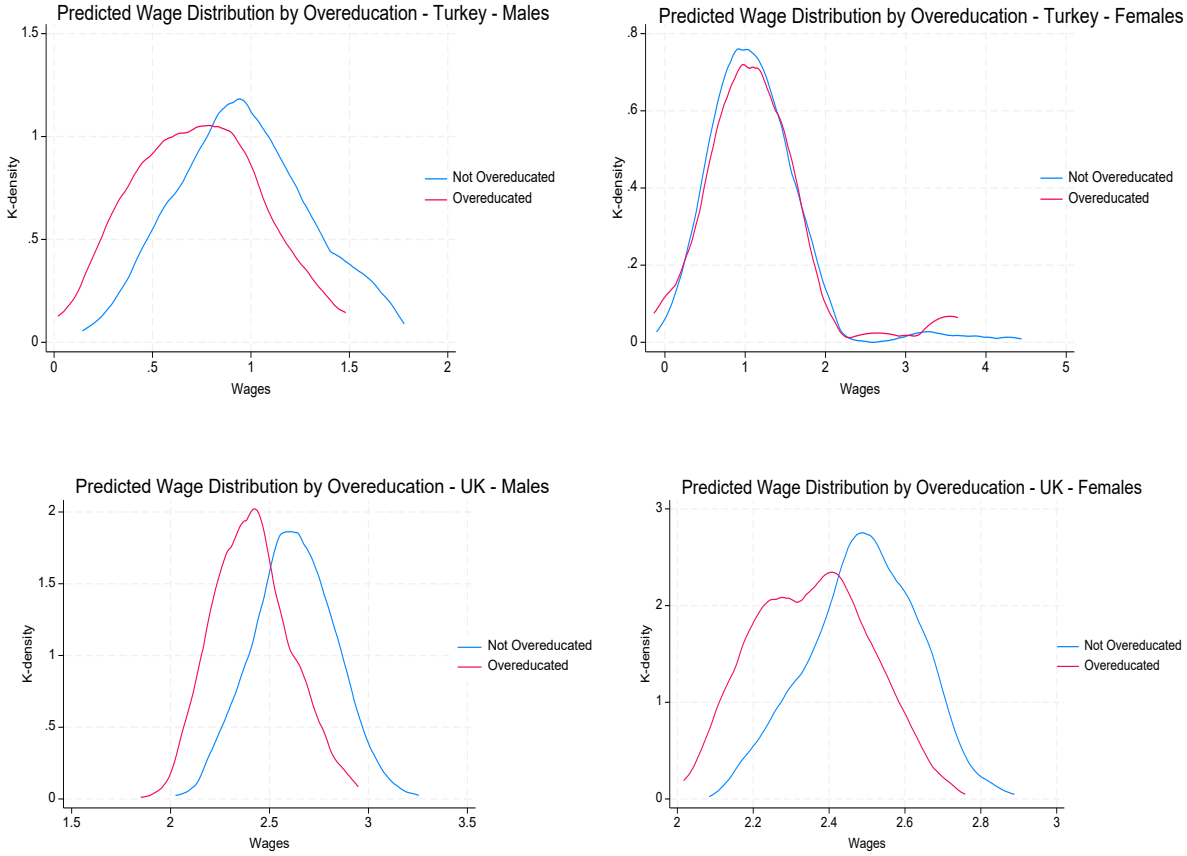


Figure A1. Predicted Wage Distribution by Overeducation for Males and Females
Source: current data analysis using data from Tosun, Hörisch, Schuck 2018.

Różnice w wynagrodzeniach kobiet i mężczyzn z nadmiernym wykształceniem: doświadczenia młodych mężczyzn i kobiet w dziesięciu krajach europejskich

Artykuł przedstawia analizę wpływu nadmiernego wykształcenia na wynagrodzenia i różnice w wynagrodzeniach wśród 19 000 młodych mężczyzn i kobiet w wieku 18–35 lat w dziesięciu krajach europejskich. Na podstawie danych pochodzących z projektu „Cultural Pathways to Economic Self-sufficiency and Entrepreneurship (CUPESSE)", z uwzględnieniem pewnej endogeniczności wynikającej z pominięcia zmiennych dotyczących umiejętności i poszukiwania zatrudnienia, stwierdzono, że wynagrodzenia kobiet i dyskryminacja płacowa kobiet są zgodne z teorią poszukiwania pracy, podczas gdy wynagrodzenia oferowane mężczyznom są zgodne z teorią konkurencji na rynku pracy. Jednak po uwzględnieniu zmiennej poszukiwania zatrudnienia dyskryminacja płacowa młodych mężczyzn okazuje się niezgodna z przewidywaniami wynikającymi z tej teorii. Pomimo niższych wynagrodzeń bazowych kobiety w wielu krajach są bardziej dyskryminowane z tytułu nadmiernego wykształcenia niż mężczyźni, co wynika z rodzaju systemu instytucjonalnego i norm dotyczących płci. W artykule przedstawiono możliwe wyjaśnienia tych dysproporcji, a w podsumowaniu zaprezentowano zalecenia dotyczące polityki mającej na celu wyeliminowanie dyskryminacji wynikającej z nadmiernego wykształcenia.

Słowa kluczowe: nadmierne wykształcenie, dyskryminacja płacowa, model wyboru, teoria poszukiwania pracy, teoria konkurencji na rynku pracy

Comparative Economic Research. Central and Eastern Europe
Volume 28, Number 4, 2025
https://doi.org/10.18778/1508-2008.28.31

How Enterprises from Czechia, Poland and Slovakia Engage in Reporting CSR Activities during Crises

Alina Nowotarska https://orcid.org/0000-0002-4268-205X
M.Sc., Poznan University of Life Sciences, Poznan, Poland, e-mail: alina.nowotarska@up.poznan.pl

Rafał Baum https://orcid.org/0000-0001-5415-0555
Assoc. Prof., Ph.D, Poznan University of Life Sciences, Poznan, Poland, e-mail: rafal.baum@up.poznan.pl

Abstract

The objective of this article is to analyse selected topics included in the corporate social responsibility (CSR) reports of companies from three Visegrad Group countries: Czechia, Poland, and Slovakia. The study focuses on the emphasis that these companies place on the topics discussed and the extent to which they include them in their CSR reports to stakeholders. The study adopts a quantitative design, using an online questionnaire to explore CSR reporting in the Visegrad countries, with a sample size of 375 companies. It employs statistical tools like the Shapiro–Wilk normality test, the Kruskal-Wallis test, and the Bonferroni post hoc test to analyse data on CSR reporting across different company sizes and sectors. Despite potential methodological limitations and bias, the survey identifies differences in CSR reporting practices among companies in the three countries. The leader in CSR reporting in the region is Slovakia, which can serve as an example of good CSR reporting practices. Czechia shows moderate commitment to CSR reporting activities, while companies in Poland are the least engaged. The discrepancies are due to differences in regulations, levels of public awareness, and business priorities. The results of the study will be valuable to researchers, managers and policymakers in developing tools to support companies in introducing new reporting standards and providing information on actions taken during a crisis. The novelty of this article is the analysis, at the enterprise level, of the type of CSR activities of selected companies from Visegrad Group countries from the perspective of the anti-crisis measures they have taken. This research fills a gap in the literature and provides a basis for discussing the legitimacy of socially responsible activities in contexts extending beyond a single crisis.

Funding information: A.N. – Poznan University of Life Sciences, Poznań, Poland; R.B. – Poznań University of Life Sciences, Poznan, Poland.
The percentage share of the Authors in the preparation of the work is: A.N. – 50.00%, R.B. – 50.00%.
Declaration regarding the use of GAI tools: Not used.
Conflicts of interests: None.
Ethical considerations: The Authors assure of no violations of publication ethics and take full responsibility for the content of the publication.
Received: 8.05.2025. Verified: 4.06.2025. Accepted: 9.10.2025

Keywords: Corporate Social Responsibility, CSR reg, CSR activities, Visegrad enterprises, sustainability

JEL: G34, M14, Q56

Introduction

Companies' disclosure of their corporate social responsibility (CSR) activities is of paramount importance. Implementing CSR reporting increases transparency and accountability, which are essential for establishing trust among stakeholders, including consumers, employees, and investors. This is currently one of the key issues being addressed in European countries, especially in the Visegrad Group countries (V4; Czechia, Hungary, Poland and Slovakia), where CSR practices are still in their infancy and are not as prevalent as in Western Europe. Similarly, research on this topic remains limited (Hąbek 2017; Zemanová and Druláková 2020; Lament and Jarolímová 2021). Integrating CSR into business practices has the potential to yield financial benefits and improve the corporate image (Nagy, Valaskova, and Durana 2022). The quality and prevalence of CSR reporting in the V4 are also less developed, and there is considerable room for improvement in terms of the relevance and credibility of the information disclosed (Hąbek 2017; Carran et al. 2023). This is the reason for the comprehensive study that has been conducted.

Although the article investigates CSR implementation and reporting in three of these countries (Czechia, Slovakia and Poland), it also addresses two important niche issues. First, it examines how these countries transitioned from communist regimes to market economies, focusing on the specific economic and political factors that significantly shaped CSR practices in the region. Second, it analyses how the CSR activities undertaken by enterprises in these countries contribute to counteracting emerging global crises within the context of crisis management. As far back as 2010, Koleva et al. (2010, p. 276) called for a new approach "to deal with the specifics of CSR development in [Central and Eastern European Countries]." Our research and analysis contribute to the development of theory and extend the CSR framework. The empirical testing of our hypotheses aims to reveal the influence of the systemic transformation and incorporate specific, additional channels of CSR adoption in the three countries.

The analysis of the literature on the subject indicates that current enterprise engagement in pro-social activities in Czechia, Slovakia, and Poland was influenced primarily by the economic transformation and integration with the European Union (EU), which created fundamental conditions and incentives for the adoption of CSR (Cameron 2004; Rojek-Nowosielska 2019). Another important factor was the influx of multinational corporations, which became "CSR transformers". The entry of these corporations and the introduction of their global standards enabled the transfer of knowledge to local companies in areas such as occupational health and safety, environmental protection, and ESG reporting through employment and cooperation (Tetrevova 2018; Przytuła et al. 2019; Skýpalová, Bohušová, and Křápek 2024).

This article also contributes to the discussion about whether companies' involvement in CSR and reporting on sustainable development (SD) had an impact on their behaviour in the context

of global crises. Our research aims to confirm whether companies that implemented CSR activities were better prepared for crisis management and showed greater commitment and effectiveness in activities related to employee health protection, communication, and adaptation of business strategy (Schwartz and Kay 2023). For example, Huang, Chen, and Nguyen (2020) analysed over 1,500 companies in China and demonstrated that a higher level of CSR before the COVID-19 crisis strongly correlated with lower losses and a faster return to pre-pandemic levels. We also want to ascertain how the war in Ukraine has affected the behaviour of companies, and whether activities such as donations, support for refugees, or humanitarian aid appeared (Bamiatzi et al. 2025). An analysis will also be carried out to determine whether the energy crisis has forced companies in Czechia, Poland and Slovakia to revise their CSR strategies, e.g. in the areas of energy efficiency, energy savings, investments in renewable energy sources and infrastructure modernisation (European Investment Bank 2023). This research thread will also examine whether active CSR acts as an organisational safeguard (strengthens organisational culture, communication with stakeholders, internal and external trust and readiness to adapt in a turbulent environment). The issues listed above constitute the justification for conducting a comprehensive study.

The objective of this paper is to research selected topics included in the CSR reporting of companies in these three Visegrad countries. These topics are analysed from the perspective of the emphasis that companies place on these topics, or how much they include them in their CSR reporting to their stakeholders.

This paper contributes to the existing literature by analysing the type of CSR activities undertaken by companies from Visegrad countries in response to the global economic crisis. This analysis provides a basis for a discussion on the legitimacy of socially responsible activities in the context of the crisis and beyond. The paper addresses the following research question: To what extent do Czech, Slovak and Polish companies report on their CSR activities? (RQ1) Which countries are the most active in particular CSR areas? (RQ2).

The article is structured as follows: Section 1 introduces the study by outlining its motivation, significance, novelty, objectives, and research questions. Section 2 presents the literature review, highlighting the current state of knowledge and identifying the research gap addressed by the study. Section 3 describes the methodology used for data collection and analysis. Section 4 presents the results of the research. Section 5 offers an interpretation and further discussion of the findings. Finally, Section 6 concludes the paper by summarising the key findings.

Literature review

A review of the relevant literature indicates that CSR reporting is more firmly established in Western European countries than in Central and Eastern Europe (CEE) (Zemanová and Druláková 2020; Nagy, Valaskova, and Durana 2022) point to an increase in reporting within the Visegrad area, particularly in the Czech Republic, Hungary, Poland, and Slovakia. This phenomenon is related to integration within the EU and also to the growing influence of multinational corporations operating in these countries.

Post-communist countries continue to suffer from low trust in public institutions, limited experience with corporate governance, and a reactive approach to CSR (Matten and Moon 2008; Miska, Stahl, and Mendenhall 2013) model, which distinguishes between overt and covert CSR, is particularly helpful in analysing these issues. Institutional theory provides a framework for understanding how regulatory and normative pressures shape corporate practices, particularly in post-communist countries where trust in public institutions is low and corporate governance is underdeveloped. Explicit CSR involves voluntary corporate policies, while implicit CSR is embedded in a broader institutional framework. In post-communist countries, the transition from state-controlled to market economies led to a reactive approach to CSR, influenced by both historical and institutional factors. Coercive pressures stem from formal regulations and laws that compel organisations to adopt certain practices. In these countries, the lack of robust regulatory frameworks often results in weak enforcement of CSR practices (*Institutional theory* 2022). Normative pressures are driven by social norms and values (Sapsford et al. 2015).

Organisations in uncertain environments often imitate successful peers. Thus, in post-communist countries, this can lead to the adoption of CSR practices observed in Western societies, albeit superficially (*Institutional theory* 2022). Institutional theory provides insight into the pressures that shape CSR, but it is important to take into account the unique historical and cultural contexts of post-communist countries. The transition from communism to market economies has been uneven, with varying levels of trust and institutional development in different countries. This diversity suggests that a universal approach to CSR may not be effective, and tailored strategies that take local contexts into account are necessary. CSR reporting in the V4 countries was also influenced by the adoption of EU directives, in particular Directive 2014/95/EU (Non-Financial Reporting Directive – NFRD) and the more recent Directive 2022/2464/EU (Corporate Sustainability Reporting Directive – CSRD). These directives introduced mandatory non-financial reporting for large companies, requiring them to disclose information on environmental, social, and governance (ESG) issues (European Union 2014; 2022). Each V4 country has transposed these directives into national legislation, although the timetable and details of implementation vary.

Insurance companies in the V4, for instance, demonstrate higher levels of non-financial disclosure when a significant proportion of foreign capital is present (Lament and Jarolímová 2021). However, the quality of these reports is often lacking. In Czechia, although many companies exceed legal disclosure requirements, the content frequently lacks depth and consistency. Research shows that while large Czech companies are increasingly engaging in non-financial reporting, the quality and complexity of these disclosures vary significantly. Larger firms tend to align with global trends, while smaller firms lag behind in both quantity and quality. The CSRCZ dataset, which comprises 1,000 corporate reports, offers a basis for further analysis of how disclosures reflect actual CSR performance (Hąbek 2017; Munzarová, Košťálová, and Fialová 2022; Vogli and Çano 2023).

These differences in reporting quality and engagement can be interpreted through the lens of legitimacy theory and stakeholder theory. Legitimacy theory suggests that companies engage in CSR reporting to maintain or gain social approval, especially in times of increased scrutiny. Stakeholder theory emphasises that companies respond to the expectations of their stakeholders, including investors, customers, and employees, thereby shaping the content and scope of CSR

disclosure. Polish companies similarly report a lack of standardisation, underscoring the need for more uniform reporting practices (Przytuła et al. 2019).

In the banking sector, CSR activities across the V4 have evolved to focus more on climate protection and financial literacy, highlighting a shift in strategic priorities (Wójcik-Jurkiewicz 2017; Jastrzębska 2023; Papa, Wieczorek-Kosmala, and Syty 2023). Kašparová (2018) argues that separate CSR reports offer greater communicative value for stakeholders. Despite the implementation of the CSR Directive making non-financial reporting mandatory for large firms, many reports still lack quality and coherence, particularly in the integration of financial and non-financial data.

In Slovakia, CSR reporting has notably progressed in sectors such as the food industry, where companies are increasingly required to disclose social and environmental information. This development is largely driven by legal reforms, including the 2017 amendment to Slovak legislation that mandates annual reporting on environmental and social impacts in accordance with EU requirements (Holienčinová and Nagyová 2019; Tešovičová and Krchová 2022). Slovakia transposed Directive 2014/95/EU into its national legislation through Act No. 431/2002 Coll. on Accounting, as amended in 2017. This amendment introduced mandatory reporting of non-financial information for large public-interest entities, thereby bringing national practice into line with EU standards (Slovak Republic 2017).

Although CSR reporting is gradually expanding in the V4, it remains less widespread and mature than in Western Europe, particularly in terms of report quality and scope (De Vries and Špaček 2023). This study responds to current challenges by focusing on CSR reporting practices in Czechia, Slovakia, and Poland.

The adoption and content of CSR reporting in the V4 reflect the influence of EU legislation, national regulatory frameworks, local corporate culture, and stakeholder expectations (Černek 2022; Caratas 2023). In Czechia, the transposition of EU Directive 2014/95/EU into national law led large firms to disclose non-financial information. Czech companies often focus on environmental issues, ethical conduct, and local community support, with larger firms – especially those integrated into multinational structures – adopting global standards such as the Global Reporting Initiative (GRI) and ISO 26000 (Munzarová, Košťálová, and Fialová 2022; Havel et al. 2023).

In Slovakia, similar legal requirements apply to companies that meet specific size criteria. Slovak CSR reports often prioritise transparency and sustainability, and many firms engage in voluntary initiatives aimed at promoting sustainable business practices (Holienčinová and Nagyová 2019; Kádeková et al. 2022; Skýpalová et al. 2023).

Poland has also implemented EU requirements, resulting in greater transparency and accountability. Polish firms increasingly recognise the relevance of CSR and seek to incorporate social, labour, and environmental concerns into their operations, often using international reporting standards (Tomala 2022; Papa, Wieczorek-Kosmala, and Syty 2023).

During the COVID-19 pandemic, V4 companies continued to report on CSR, adapting their strategies to reflect new priorities, particularly regarding employee protection and social concerns.

This suggests that the pandemic did not negatively affect the overall level of CSR disclosure (Kusumawardani et al. 2023). Studies from Western Europe and the United States show similar trends. German and French companies, for example, increased transparency in the areas of employee health, remote working, and supply chain resilience (Capron and Quairel 2020; Butollo et al. 2023). During the pandemic, American companies placed greater emphasis on diversity, equality, and community support, using CSR as a tool to strengthen public trust. (Scaliza et al. 2022; Mahoney et al. 2024).

Following the outbreak of the war in Ukraine, V4 companies expanded their CSR activities to address the crisis. These initiatives focused on humanitarian aid, refugee support, and mitigating the conflict's consequences. Firms provided financial assistance, medical support, and shelter, as well as contributing to the Armed Forces of Ukraine and territorial defence (Asemah-Ibrahim, Nwaoboli, and Asemah 2022; Klymanska 2023). Countries with higher climate vulnerability are exposed to a higher risk of geopolitical conflict. Strong ESG preparedness (particularly in social and governance areas) can mitigate or even avert the risk of geopolitical conflict. This reality challenges the re-evaluation of CSR responsibilities at the national level (Alam et al. 2024; Kim, Kwak, and Park 2024). many international companies had scaled back or ceased operations in Russia due to ethical concerns and public pressure, while others sought to balance business and responsibility.

CSR has also helped Ukrainian enterprises build stakeholder trust, improve competitiveness, and strengthen their market presence, including through the development of exit strategies from Russian markets (Evtushenko, Tymohova, and Kurilenko 2022). Social investments by global firms aim to foster human development and improve quality of life, demonstrating CSR's potential to address both regional and global challenges (Honcharenko et al. 2022).

In addition to content, visual rhetoric and message distribution are critical in shaping the meaning and reception of CSR communication. A case study of the French company Total demonstrates how varied visual strategies – such as photographs, videos, and virtual tools – can enhance engagement and stakeholder perception (Andrew and Baker 2020; Lee, Zhao, and Chen 2021).

These visual tools also serve a strategic function in managing legitimacy. According to legitimacy theory, symbolic communication (including visual communication) is used by organisations to project conformity with social norms, especially in times of reputational threat (Seele and Lock 2015). The strategic use of visual elements not only supports impression management but also contributes to the construction and dissemination of CSR performance, ultimately influencing public legitimacy (Chung and Lee 2020).

Despite the growing emphasis on CSR, some companies still use CSR reporting selectively to legitimise their activities, often omitting negative aspects to preserve a positive image (Liu 2022). This selective reporting is particularly common in controversial sectors, where firms may alter the volume and type of disclosures without explanation (Pavlović and Denčić-Mihajlov 2022). While CSR reporting is evolving in the V4, comparability across firms remains problematic (Xu and Woo 2022). Therefore, continuous improvement is needed to meet international standards and stakeholder expectations.

Existing research suggests that there are statistically significant differences in the strength and focus of CSR reporting among Czech, Polish, and Slovak companies. For example, Polish companies are more likely to publish CSR reports than their Slovak counterparts, and CSR development in Poland is generally more dynamic (Hąbek, Sujová, and Čierna 2018; Wegrzynska 2021). Nonetheless, reporting disparities also exist within Poland: Polish subsidiaries of US firms report less extensively than their American parent companies (Cho et al. 2021). In Czechia, CSR communication remains limited in key industries, such as chemicals, with reports tending to focus on economic and environmental aspects while neglecting ethical dimensions (Tetrevova 2018; Vogli and Çano 2023). Although similarities exist across the V4, significant differences in the scope, quality, and thematic orientation of CSR reports are shaped by firm size, industry, and regulatory environments.

Although we did not conduct a detailed survey based on company size, many studies confirm that companies in the "very large" category (> 500 employees) are much better prepared for CSR reporting, particularly in relation to the CSRD and NFRD requirements, which require companies to report on CSR (Baier et al. 2022; KPMG 2022; Deloitte 2023).

Building upon these findings, the present study focuses on the strength of CSR reporting and the types of activities disclosed by V4 companies. It pays particular attention to crisis-related measures and aims to contribute to the understanding of CSR legitimacy in times of instability.

Research methodology

The research employed a quantitative approach based on an online questionnaire survey (Roopa and Rani 2012; Chang and Vowles 2013) designed to target diverse aspects of CSR management (Martin 2006; Brace 2018) using Likert scales and multiple-choice options (Maeda 2015). The research forms part of the project "Corporate Social Responsibility in Business Practice of the Visegrad Region" (Visegrad Grant No. 22220149). Although the Visegrad Group comprises four countries, Hungary was not included in the project framework. Consequently, no data were collected from Hungarian companies, and this exclusion is acknowledged as a limitation of the study.

As part of the extensive study, the questionnaire covered various aspects of CSR implementation; however, this paper presents only the section regarding reporting. To ensure question relevance and reduce respondent fatigue, skip-logic and branching features were used (Peytchev et al. 2006). For example, if a company indicated no involvement in a particular activity, related follow-up sections were skipped automatically.

The study aimed for a well-balanced representation of 125 companies from each country, categorised as follows: Extra-Large (500+ employees), Large (250–499), Medium-sized (50–249), Small enterprises (10–49), and Microenterprises (0–9). This structure ensured 25 companies per size category and country, totalling 375 companies. The "extra large" category was included based on thresholds introduced in the EU's Corporate Sustainability Reporting Directive – CSRD (European Union 2022) and Non-Financial Reporting Directive – NFRD (European Union

2014), which introduce non-financial reporting obligations in the EU primarily for companies with more than 500 employees.

The data collection process lasted from November 2022 to June 2023, preceded by a pilot study, as suggested by Lowe (2019), in November 2021, which involved ten companies per country. The questionnaire was distributed via email and was available on the official project website and social media platforms aimed at business entities, professional organisations, university partners, and business associations. While most companies responded independently, some questionnaires were completed with the assistance of trained interviewers (Bolderston 2012; Goodell, Stage, and Cooke 2016) during structured face-to-face consultations. Due to the diverse distribution channels and indirect invitations, the total number of companies contacted is unknown. Consequently, a precise response rate cannot be calculated (Montgomery, Dennis, and Ganesh 2016).

The study involved only companies officially listed in the commercial registers of Slovakia (SK), Czechia (CZ), and Poland (PL) to ensure data credibility and verification of company status. The initial phase of data collection employed randomised sampling, which was later adjusted to stratified random sampling to address underrepresented size categories in later stages. The final research sample comprised 375 companies equally distributed across three Visegrad countries. Of these, 129 belong to multinational corporations, while 246 are local companies with no affiliation to foreign multinationals. In terms of legal form, the dataset includes 84 joint stock companies, 249 limited liability companies, 10 public companies, 11 limited partnerships, and 21 sole proprietorships. Among the sample, 113 entities were primarily engaged in trade, 137 in services, and 125 in production. Concerning size, the 375 companies were equally distributed with 75 companies across the defined size categories.

The study includes seventeen variables designed to monitor various aspects of CSR reporting among companies in the region. Among them, seven variables represent company characteristics: F1_Country; F2_International integration; F3_Legal Form; F4_Primary operation; F5_Size of the company; F6_Frequency of CSR reporting; F7_Format of CSR reporting. They were derived from the multiple-choice questions that reflected the structure and classification of the company's profile. Ten variables (V1 to V10) were included to capture both the strength of current CSR reporting practices and the companies' preparedness for mandatory CSR/ESG reporting as outlined in EU directives (NFRD, CSRD): V1_CSR in general; V2_Environmental activities; V3_Social issues; V4_Economic issues; V5_Pandemic-related activities; V6_Conflict in Ukraine-related activities; V7_Energy crisis-related activities; V8_Diversity management; V9_Anti-corruption strategies; V10_Respect for human rights (Table 1). All of these thematic variables were assessed using a 5-point Likert scale, based on the question: "How strongly does the company report on selected CSR activities?" with the following response options: 1. Fully; 2. Largely; 3. Partially; 4. Briefly; 5. Not at all.

Table 1. Survey questions used in the study

Variable	Question in Questionnaire	Topic	Answer Possibilities
F1_Country	–	Control variable – Geographic context	1. CZ, 2. PL, 3. SK
F2_International integration	–	Control variable – Global integration	1. Part of a multinational company, 2. Local company with no connection to a foreign MNC
F3_Legal Form	–	Control variable – Organisational structure	1. Joint stock company, 2. Limited Liability Company, 3. Public Company, 4. Limited Partnership, 5. Sole Proprietorship
F4_Primary operation	–	Control variable – Sectoral classification	1. Trade, 2. Services, 3. Production
F5_Size of the company	–	Control variable – Organisational size	1. Microenterprise (0–9), 2. Small (10–49), 3. Medium (50–249), 4. Large (250–499), 5. Extra large (500+)
F6_Frequency of CSR reporting	How often does the company publish a CSR report?	CSR reporting practices	1. Regular reporting, 2. Occasional (once/3 yrs), 3. Limited (> 3 yrs), 4. No formal CSR reporting
F7_Format of CSR reporting	In which format does the company publish its CSR report for shareholders?	CSR reporting practices	1. Specialised CSR report, 2. Sustainability report, 3. Annual report, 4. Other (PR etc.), 5. Managerial (non-public)
V1_CSR in general	Does the company report on CSR in general in its CSR report?	CSR disclosure (general)	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never
V2_Environmental activities	Does the company report on environmental CSR activities in its CSR report?	CSR disclosure – Environmental dimension	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never
V3_Social issues	Does the company report on social CSR activities in its CSR report?	CSR disclosure – Social dimension	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never
V4_Economic issues	Does the company report on economic CSR activities in its CSR report?	CSR disclosure – Economic dimension	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never
V5_Pandemic-related activities	Does the company report on COVID-19 pandemic activities in its CSR report?	CSR disclosure – Health crisis	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never
V6_Conflict in Ukraine activities	Does the company report on activities related to the conflict in Ukraine in its CSR report?	CSR disclosure – Political crisis	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never

Variable	Question in Questionnaire	Topic	Answer Possibilities
V7_Energy crisis-related activities	Does the company report on energy crisis-related activities in its CSR report?	CSR disclosure – Energy crisis	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never
V8_Diversity management	Does the company report on diversity management-related activities in its CSR report?	CSR disclosure – diversity management	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never
V9_Anti-Corruption strategies	Does the company report on anti-corruption strategies-related activities in its CSR report?	CSR disclosure – anti-corruption strategies	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never
V10_Respect for human rights	Does the company report on respect for human rights-related activities in its CSR report?	CSR disclosure – respect for human rights	1. Regularly, 2. Often, 3. Occasionally, 4. Rarely, 5. Never

Source: own study based on the survey.

These variables support hypotheses developed to evaluate country-level differences in CSR reporting:

- H0: There is no statistically significant difference in the extent to which Czech, Polish, and Slovak companies report on specific CSR areas.
- Ha: There is a statistically significant difference in the extent to which Czech, Polish, and Slovak companies report on specific CSR areas.

These basic null (H0) and alternative hypotheses (Ha) served as the foundation for additional derived hypotheses (Ha1–Ha4), which reflect the selected variables:

- Ha1: Companies in the "extra-large" category (> 500 employees) are more engaged in.
- CSR reporting.

This hypothesis reflects EU legal requirements mandating ESG disclosures for companies exceeding the 500-employee threshold (Manes-Rossi et al. 2018; Kozáková et al. 2023).

- Ha2: There are significant national differences in the frequency of CSR reporting (F6), with Slovak and Czech companies reporting more frequently than Polish companies.

This is supported by research highlighting cross-country variations across EU in macroeconomics indicators, CSR maturity and stakeholder pressure (Kozáková et al. 2023; Valaskova and Nagy 2023).

- Ha3: CSR reporting formats vary significantly between monitored countries. Mariappanadar et al. (2022) and Paridhi and Ritika (2024) suggested that format differences are often tied to institutional environments.
- Ha4: Companies are more likely to report CSR activities in response to acute global crises (such as the COVID-19 pandemic, the war in Ukraine, or the energy crisis) than in standard CSR areas.

This hypothesis is supported by empirical findings in crisis-driven CSR behaviour and crisis-response strategies (Stanislawska 2022; Chang, Weng, and Wu 2023; Katsampoxakis et al. 2024).

The analysis was conducted using Jamovi software with a significance threshold of $p < 0.05$, indicating the rejection of the null hypothesis (H0) in favour of the alternative hypothesis (Ha). The Shapiro–Wilk normality test (Shapiro and Francia 1972) revealed significant deviations from normality across most variables. Given the nature of the responses and non-normal distributions, non-parametric methods were employed. Specifically, the non-parametric Kruskal-Wallis test (Kruskal and Wallis 1952) was used under the assumption of no significant differences across the monitored countries. After identifying statistically significant differences, a post hoc analysis was conducted using the Bonferroni correction method (Weisstein 2004) to account for multiple comparisons.

Despite employing rigorous methodology, certain limitations must be acknowledged. Potential bias stems from the online survey format and self-reported data, which may be influenced by social desirability bias or varied respondent interpretation. Additionally, the exclusion of Hungary – due to its non-inclusion in the umbrella project – means no data was collected from Hungarian companies, limiting generalizability to the entire V4 region. Nonetheless, the study provides valuable insights that should be interpreted with an awareness of these methodological constraints and potential biases.

Results

After applying the Kruskal-Wallis Test (Table 2) for independent samples for the variables considered, F6–F7, V1–V10, a probability of p less than the significance level of 0.05 was obtained for each case, which allowed us to reject the null hypothesis in favour of the alternative hypothesis that there are significant differences between Czechia, Poland and Slovakia on the issue of CSR reporting. Variables F6 and F7 describe differences in frequency (V6) and format (V7) of CSR reporting, and V1–V10 describe differences in how strongly businesses report on individual CSR areas. Pairwise comparisons with Bonferroni correction make it possible to determine between which countries there were significant differences and in which areas these differences are greatest.

For the variable V6 (reporting frequency), the Kruskal-Wallis test (Table 2) yielded a test statistic of 15.706 with significance (p-value) of less than 0.000. This result strongly suggests that there are significant differences in the frequency of CSR reporting (F6) among the three countries. Therefore, these countries do not share the same median values regarding the frequency of their CSR reporting, implying that country-specific factors might influence these practices.

The pairwise comparisons highlight significant differences in the countries' reporting frequencies (Table 3). A notable variance exists between Poland and its counterparts, with a significant difference between Slovakia and Poland ($p < 0.000$, after adjustment) and between Czechia and Poland ($p = 0.016$, after adjustment). However, no significant difference exists between

Slovakia and Czechia (p = 0.885, after adjustment), suggesting similar reporting behaviours in these two countries.

This discrepancy is primarily driven by Polish companies' lower engagement in formal CSR reporting. This divergence could stem from different regulatory environments, corporate cultures, or stakeholder pressures in these countries. Our findings show that 33 Slovak companies and 34 Czech companies engage in regular CSR reporting, while only 22 Polish companies do the same. Even more striking, 90 out of the 125 companies in Poland do not engage in formal CSR reporting at all, compared to 54 in Slovakia and 67 in Czechia (Chart 1). This lag in Poland's CSR engagement, alongside the statistical significance highlighted by the p-values (0.000 for SK–PL and 0.005 for CZ–PL comparisons, after adjustment), suggests a pressing need for Poland to enhance its CSR reporting practices.

Table 2. Summary of Kruskal–Wallis Test Results for Independent Samples

	F6	F7	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
Total N	375	375	375	375	375	375	375	375	375	375	375	375
Test Statistic	15.706[a]	41.537[a]	36.702[a]	39.678[a]	25.518[a]	33.808[a]	21.344[a]	10.068[a]	22.728[a]	22.297[a]	23.496[a]	36.937[a]
Degree of Freedom	2	2	2	2	2	2	2	2	2	2	2	2
Asymptotic Sig (2-sided test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000

[a] The test statistic is adjusted for ties.

Source: own study based on the survey.

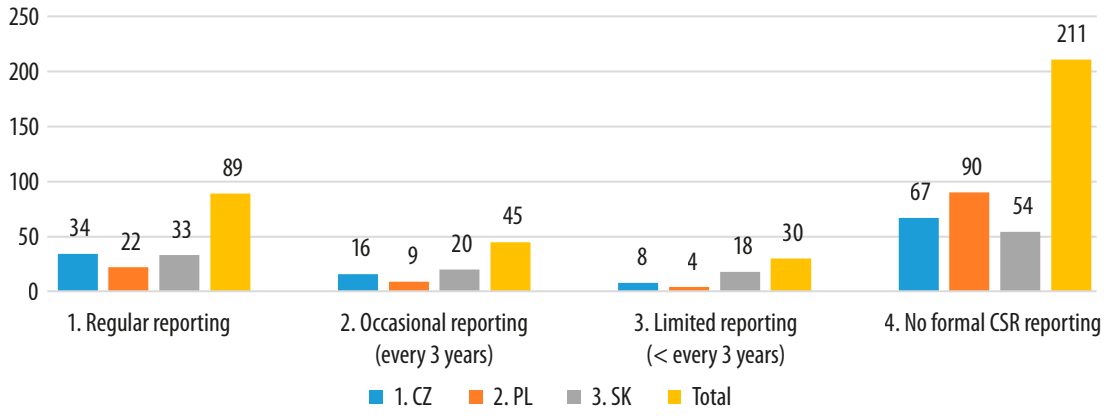


Chart 1. Differences in frequency of CSR reporting (F6) between countries (number of answers)

Source: own study based on the survey.

These observed differences likely stem from cultural, regulatory, and economic environments across these countries. Our findings align with broader research that emphasises the role of senior management's cultural values and the firm's operations context in shaping CSR investments and actions. Ling (2019) and Tolmie, Lehnert, and Zhao (2020) highlighted how cultural values and stakeholder expectations can significantly influence a firm's CSR activities, suggesting another possible explanation for the observed disparities between the three countries.

Furthermore, Lu and Wang's (2021) findings on how internal corporate governance practices and cultural dimensions impact environmental performance and CSR disclosure underscore the complex interplay of internal and external governance mechanisms with country-specific cultural traits. This complexity is mirrored in our observed differences in CSR reporting frequencies, where country-specific regulatory, cultural, and institutional factors might influence the corporate behaviour in Visegrad countries. Moreover, Sannino et al. (2020) and Khan, Lockhart, and Bathurst (2021) further support the notion that internal drivers, such as family traditions, religion, and cultural dimensions like power distance and uncertainty avoidance, play a crucial role in shaping CSR practices, offering a lens through which to interpret the variance in CSR engagement across different national contexts.

Analysis of the report formats (F7) yielded a test statistic of 41.537 with 2 degrees of freedom and an asymptotic significance (p-value) of less than 0.000, adjusted for correlations. This result strongly suggests that there are significant differences in CSR reporting formats among the three countries. The significance of the test statistic suggests that the countries do not have the same median format values, suggesting that country-specific factors may influence these practices. Pairwise comparisons further clarify these differences: significant differences exist between Slovakia and Poland and between Slovakia and Czechia ($p < 0.000$, after adjustment), as well as between Czechia and Poland ($p = 0.010$, after adjustment). These results indicate that the CSR reporting formats used by Polish and Czech companies differ significantly from their Slovakian counterparts.

Slovakia stands out for its use of sustainability reports, with 46 companies (37% of its sample) using these reports. Poland is dominated by managerial reports (98 companies, 78%), which are not made publicly available. Czechia exhibits a diverse mix of reporting formats: 21 companies use marketing and PR reports, and 13 include CSR in their annual reports.

The reporting format in Poland suggests a more pragmatic, internally focused approach that prioritises organisational needs over public disclosure of CSR activities. Slovakia is a leader in reporting transparency, which may be due to greater regulatory pressure or cultural emphasis on social responsibility. Broader research (Bhattacharya, Sen, and Korschun 2011) highlights that CSR programs use multiple communication channels – mass media, corporate offline and online channels, as well as interpersonal communications, and formal reports – to engage the public. Thus, our research reveals steady progress in improving the quality of reporting.

Analysis of the ten key CSR topics (V1–V10) revealed significant country-level differences in reporting, with Slovakia most often the leader in reporting on each area. The biggest differences were observed between Slovakia and Czechia and between Slovakia and Poland for reporting of CSR activities in general (V1), environmental activities (V2), social issues (V3), the pandemic (V5), the energy crisis (V7), diversity management (V8), and economic issues (V4).

Further analysis revealed significant differences between Czechia and Poland with regard to the reporting of CSR activities related to the conflict in Ukraine (V6). Most Polish companies reported no activities related to conflict (90), followed by Czechia (74) and Slovakia (58). However, Poland also had the highest number of complete reports (9), though this was not important for the overall evaluation.

Overall, Slovakia shows a clear advantage in CSR reporting, especially in the environmental (V2), social (V3) and diversity management (V8) areas. Poland shows a much lower level of engagement, suggesting a lack of a strategic approach to these topics. Czechia ranks between the two countries, showing moderate engagement, which may be due to cultural differences, stakeholder pressures, and internal corporate practices.

Post hoc tests with the Bonferroni correction (Table 3) confirm significant differences between the countries:

- Slovakia vs. Poland: The largest differences are observed in reporting CSR in general (V1), environmental activities (V2) and economic issues (V4).
- Czechia vs. Poland: The differences are smaller, but still significant, especially in reporting frequency (F6).
- Slovakia vs. Czechia: Some differences are less pronounced, such as on social issues reporting (V3).

The results show that Slovakia consistently stands out as a leader in the region, while Poland lags behind, highlighting the need for measures to support companies' commitment to CSR activities.

Table 3. Pairwise Comparisons using the Bonferroni correction

Pairwise Comparisons	Sample 1 – Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig	Adj. Sig a
F1_Country*F6	3. SK – 1. CZ	12.896	12.312	1.047	0.295	0.885
	3. SK – 2. PL	47.200	12.312	3.834	0.000	0.000
	1. CZ – 2. PL	–34.304	12.312	–2.786	0.005	0.016
F1_Country*F7	3. SK – 1. CZ	46.604	12.192	3.823	0.000	0.000
	3. SK – 2. PL	78.088	12.192	6.405	0.000	0.000
	1. CZ – 2. PL	–31.484	12.192	–2.582	0.010	0.029
F1_Country*V1	3. SK – 1. CZ	50.468	12.659	3.987	0.000	0.000
	3. SK – 2. PL	75.244	12.659	5.944	0.000	0.000
	1. CZ – 2. PL	–24.776	12.659	–1.957	0.050	0.151
F1_Country*V2	3. SK – 1. CZ	55.892	12.615	4.431	0.000	0.000
	3. SK – 2. PL	76.864	12.615	6.093	0.000	0.000
	1. CZ – 2. PL	–20.972	12.615	–1.662	0.096	0.289
F1_Country*V3	3. SK – 1. CZ	35.648	12.656	2.817	0.005	0.015
	3. SK – 2. PL	63.784	12.656	5.040	0.000	0.000
	1. CZ – 2. PL	–28.136	12.656	–2.223	0.026	0.079
F1_Country*V4	3. SK – 1. CZ	40.068	12.612	3.177	0.001	0.004
	3. SK – 2. PL	73.224	12.612	5.806	0.000	0.000
	1. CZ – 2. PL	–33.156	12.612	–2.629	0.009	0.026

Pairwise Comparisons	Sample 1 – Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig	Adj. Sig a
F1_Country*V5	3. SK – 1. CZ	36.972	12.456	2.968	0.003	0.009
	3. SK – 2. PL	56.676	12.456	4.550	0.000	0.000
	1. CZ – 2. PL	– 19.704	12.456	– 1.582	0.114	0.341
F1_Country*V6	3. SK – 1. CZ	19.52	12.164	1.605	0.109	0.326
	3. SK – 2. PL	38.596	12.164	3.173	0.002	0.005
	1. CZ – 2. PL	– 19.076	12.164	– 1.568	0.117	0.35
F1_Country*V7	3. SK – 1. CZ	31.652	12.339	2.565	0.010	0.031
	3. SK – 2. PL	58.768	12.339	4.763	0.000	0.000
	1. CZ – 2. PL	– 27.116	12.339	– 2.198	0.028	0.084
F1_Country*V8	3. SK – 1. CZ	36.988	12.268	3.015	0.003	0.008
	3. SK – 2. PL	57.104	12.268	4.655	0.000	0.000
	1. CZ – 2. PL	– 20.116	12.268	– 1.640	0.101	0.303
F1_Country*V9	3. SK – 1. CZ	34.556	12.210	2.830	0.005	0.014
	3. SK – 2. PL	58.888	12.210	4.823	0.000	0.000
	1. CZ – 2. PL	– 24.332	12.210	– 1.993	0.046	0.139
F1_Country*V10	3. SK – 1. CZ	48.444	12.539	3.863	0.000	0.000
	3. SK – 2. PL	75.168	12.539	5.995	0.000	0.000
	1. CZ – 2. PL	– 26.724	12.539	– 2.131	0.033	0.099

Each row tests the null hypothesis that the distributions of Sample 1 and Sample 2 are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is 0.05.

[a] Significance values have been adjusted using the Bonferroni correction for multiple tests.

Source: own study based on the survey.

The analysis confirmed significant differences (Adj. Sig. < 0.05) present in many comparisons, especially for variables F6, F7, V1, V2, V3, V4, V5, V7, V8, V9, and V10. For V6 and some other variables, the differences are not significant (Adj. Sig. > 0.05), suggesting a more homogeneous approach to CSR in these categories, thus addressing RQ1.

Regarding RQ2, the analysis confirms that Slovakia and Czechia differ significantly from Poland in most variables, with Poland showing the lowest commitment to CSR reporting. The largest deviations are found in variables F6 (frequency of CSR reporting) and F7 (reporting format), where Poland significantly deviates from the other countries. Overall, the analysis of CSR reporting in Czechia, Poland and Slovakia revealed significant differences, underscoring the need for further development of CSR practices, especially in Poland, to increase transparency and commitment to corporate responsibility.

Discussion

The findings of this study highlight significant differences in CSR reporting practices among companies in Czechia, Poland, and Slovakia, emphasising the influence of country-specific factors. Slovak companies appear to engage more consistently in CSR reporting, particularly in sustainability, compared to their Polish counterparts, who show a higher tendency toward minimal or no formal CSR disclosure. This suggests that Slovak firms may experience greater regulatory or stakeholder pressure or have a more developed internal culture of CSR.

These results extend Kozáková, Urbánová, and Skypalova (2024) research on CSR in Slovakia and Czechia, confirming differences in their approaches. They also confirm the outcomes of Bluhm and Trappman (2015), Vveinhardt and Sroka (2020) and Boesso, Fryzel, and Ghitti (2023), who identified a different approach in Poland compared to other countries. The relatively low level of CSR reporting in Poland, as identified in this study, can be partially explained by the enduring institutional and cultural effects from the communist period, which continue to shape current organisational practices. As Albu et al. (2021) note, historical imprints play a significant role in the development of social and environmental reporting in post-communist contexts, confirming the importance of historical conditions for current corporate activities. Interestingly, the study also reveals a gap in regular CSR reporting in Poland, which could be attributed to varying national regulations or the maturity of CSR integration in business operations. Such a gap, which is not unique to Poland, was previously noted by Matuszak and Różańska (2017).

The use of non-financial reporting standards like GRI and ISO 26000 is more prevalent among larger companies, reflecting a global trend of multinational corporations leading in CSR practices (Manes-Rossi et al. 2018; Krasodomska, Michalak, and Świetla 2020). The type and quality of reports presented are also crucial for corporate development, as only substantive reports can serve as effective corporate communication tools and a key factor in decision-making by companies and stakeholders (Freundlieb, Gräuler, and Teuteberg 2014; Hąbek and Brodny 2017).

The research also highlights the role of crises – such as the COVID-19 pandemic, the conflict in Ukraine and the energy crisis – in shaping CSR. Companies increasingly view CSR not just as a marketing tool, but as a critical component of resilience and risk management. The link between CSR and crisis management is evident in the academic literature, especially after 2019, when the COVID-19 pandemic overlapped with the war in Ukraine and the energy crisis (Pündrich, Delgado, and Barin-Cruz 2021; Ursic and Cestar 2022; Chang, Weng, and Wu 2023). The practice of CSR reporting and transparency is becoming more widespread, helping companies to effectively communicate their social and environmental impacts with stakeholders. National governments play an important role in this process, having recognised the importance of CSR and implemented policies and frameworks to promote responsible business practices (Kozáková et al. 2023).

Overall, the study contributes valuable insights into how cultural, regulatory, and economic factors shape CSR practices in the Visegrad region, offering policy implications for harmonising and strengthening CSR frameworks. The findings also suggest that Slovakia's CSR reporting

practices on anti-corruption and human rights are more developed than those of its Visegrad counterparts. This discrepancy can be attributed to:

- The Regulatory Environment: Slovakia has introduced stronger anti-corruption policies in recent years, leading to increased corporate disclosure (Ghazwani et al. 2024).
- Stakeholder Pressure: Higher investor and consumer demand for ethical governance in Slovakia may contribute to enhanced reporting (Freeman, Harrison, and Zyglidopoulos 2018).
- Corporate Culture: Slovak firms may have more integrated sustainability policies, whereas Czech and Polish companies still lag in formalising CSR transparency (Matten and Moon 2008).

These findings align with previous research suggesting that regulatory pressure and corporate governance reforms drive CSR reporting disparities (Ioannou and Serafeim 2017).

The study's large representative sample of 375 companies from the three Visegrad Group countries offers opportunities for further research and recommendations for business owners and decision-makers. This study is all the more valuable because smaller companies, which are not obliged to disclose their CSR activities, were included through direct contact, allowing us to obtain information about their CSR activities. Many business owners did not identify their previous CSR activities as related to CSR. Hąbek (2019) notes that prior studies based on publicly available reports are limited. Conversely, other researchers have conducted survey studies on CSR and social, legal, and corporate governance issues (Hudáková et al. 2024; Zvaríkova et al. 2024), making this study's comparative approach especially valuable for understanding the need for CSR activities.

In summary, a unique form of CSR can be identified in post-communist economies (Mazurkiewicz, Crown, and Bartelli 2005; Lewicka-Strzalecka 2006; Koleva et al. 2010; Caratas 2023). Researchers point to two paths of CSR adoption in these countries: endogenous and exogenous. As Stoian and Zahara (2012) explain, CSR development in post-communist countries is based on both internal elements resulting from the experiences of employees living in socialist countries and the influence of Western corporations. As a result, a hybrid model of CSR has emerged in the region, which is a synthesis of endogenous social values and exogenous market practices

Conclusions

The survey results reveal that companies in the Visegrad countries are most engaged in reporting on environmental activities (V2), social issues (V3), the COVID-19 pandemic (V5), the energy crisis (V7), diversity management (V8) and economic issues (V4), addressing the first research question (RQ1). The high involvement may be due to several key factors: (1) increasingly stringent EU regulations such as the CSRD and the EU Taxonomy, which oblige companies to report transparently on their ESG activities (European Union 2022); (2) the COVID-19 pandemic and the energy crisis have particularly affected the region's economies, increasing the need for risk reporting and adaptation measures (PwC 2022); (3) rising social and investor

expectations in terms of social responsibility and diversity are driving companies to disclose information in these areas (KPMG 2022). Economic aspects remain important due to their strategic importance for the stability and growth of companies in the region (OECD 2020).

However, answering the second research question (RQ2) on country-level differences, the results show that Slovakia leads in reporting on these CSR topics, with companies there demonstrating consistently higher engagement compared to Czechia or Poland. This suggests that Slovak companies are more socially conscious, responsible, and effective in implementing EU regulations.

While Czech and Polish companies also engage in the CSR areas analysed, their involvement is significantly lower than that of Slovak entities. Poland, in particular, shows the greatest need to formalise CSR activities. Companies in Poland are less engaged in formal CSR reporting compared to Czechia and Slovakia, which may be due to differences in regulations, social awareness, or business priorities. The relatively lower level of reporting in Czechia and especially Poland may be due to less regulatory pressure or limited adaptation to European ESG reporting standards. However, the increasing CSR expectations of stakeholders, including investors and customers, may have an impact.

Thus, the research confirmed that there is a statistically significant difference in how intensely Czech, Polish, and Slovak companies report each CSR area, leading to rejection of the null hypothesis (H0) in favour of the alternative (Ha).

The results indicate that socially responsible initiatives undertaken by companies have helped mitigate global crises. Examples of implementing good business practices and engaging in CSR policies in the three Visegrad countries were identified.

Although we did not conduct detailed research by company size, many studies confirm that "very large" companies (> 500 employees) are much better prepared for CSR reporting, especially in the context of CSRD and NFRD requirements (confirming Ha1). In addition, hypotheses Ha2, Ha3 and Ha4 are supported: Slovak and Czech companies report CSR activities more frequently than Polish companies (Ha2); reporting formats differ noticeably between countries due to institutional and regulatory differences (Ha3); and companies are more likely to intensify CSR reporting in response to major crises, such as COVID-19, the war in Ukraine, and the energy crisis (Ha4).

Although examples of good CSR practices have been identified, the available data do not conclusively prove their direct impact on mitigating the effects of the COVID-19 pandemic, the energy crisis, or the war in Ukraine. By examining the level and quality of CSR reporting over this timeframe – and considering the evolving legal framework, such as the implementation of the CSRD and changing stakeholder expectations – future research could better capture whether the observed changes are permanent or merely reactive and temporary.

In Central and Eastern European countries, the legacy of centrally planned systems has had a lasting impact on the development of social capital, institutional trust and state-business relations. The post-communist legacy is also associated with a lower culture of transparency

and less stakeholder engagement, which slows the deeper integration of CSR into business models. Therefore, future research should consider the impact of local social norms, historical memory, and systemic transformation on CSR implementation.

From a practical perspective, the research points to the need for stronger public policies, particularly in Poland and Czechia, to encourage more comprehensive and formalised CSR reporting. Policymakers should consider introducing more precise guidelines, support systems, and appropriate incentives, especially for small and medium-sized enterprises, which currently face barriers to implementing and reporting CSR activities. It is also necessary to develop corporate governance practices to systematically integrate CSR into corporate strategy.

It would be worthwhile to supplement future research with in-depth sector studies, as the degree of CSR implementation and reporting can vary widely from industry to industry. Sector studies would identify specific barriers and good practices for particular segments of the economy.

Finally, our findings offer valuable insights for various actors, both in the public and private sectors. They will be useful for:

- Companies, by allowing them to compare their ESG practices with companies from the region, adjust to regulations, and manage risk;
- Decision-makers, international organisations, and investors, by informing development strategies, public policy creation, investment strategies, and investment risk assessment;
- Consumers and non-governmental organisations, by enabling them to monitor regulations, launch advocacy and information campaigns, and build awareness;
- The scientific community and educators, by serving as a foundation for further research, deeper regional analysis, and the development of educational programs.

Acknowledgements

This research was supported by the project "Corporate Social Responsibility in Business Practice of the Visegrad Region" (Visegrad Grant No. 22220149). The project is co-financed by the Governments of Czechia, Hungary, Poland, and Slovakia through Visegrad Grants from the International Visegrad Fund.

References

Alam, A., Al Banna, H., Alam, A.W., Bhuiyan, Md. B.U., Mokhtar, N.B. (2024), *Climate change and geopolitical conflicts: The role of ESG readiness*, "Journal of Environmental Management", 353, 120284, https://doi.org/10.1016/j.jenvman.2024.120284

Albu, N., Albu, C.N., Apostol, O., Cho, C.H. (2021), *The past is never dead: the role of imprints in shaping social and environmental reporting in a post-communist context*, "Accounting, Auditing & Accountability Journal", 34 (5), pp. 1109–1136, https://doi.org/10.1108/AAAJ-08-2019-4131

Andrew, J., Baker, M. (2020), *Corporate Social Responsibility Reporting: The Last 40 Years and a Path to Sharing Future Insights*, "Abacus", 56 (1), pp. 35–65, https://doi.org/10.1111/abac.12181

Asemah-Ibrahim, M.O., Nwaoboli, E.P., Asemah, E.S. (2022), *Corporate Social Responsibility (CSR) in war-torn areas of Russia and Ukraine from February to July 2022*, "GVU Journal of Communication Studies", 5 (3), pp. 1–14.

Baier, C., Göttsche, M., Hellmann, A., Schiemann, F. (2022), *Too Good To Be True: Influencing Credibility Perceptions with Signaling Reference Explicitness and Assurance Depth*, "Journal of Business Ethics", 178 (3), pp. 695–714, https://doi.org/10.1007/s10551-020-04719-7

Bamiatzi, V., Brieger, S.A., Karakulak, Ö., Kinderman, D., Manning, S. (2025), *The Rise of Partisan CSR: Corporate Responses to the Russia–Ukraine War*, "Journal of Business Ethics", 198, pp. 263–291, https://doi.org/10.1007/s10551-024-05795-9

Bhattacharya, C.B., Sen, S., Korschun, D. (2011), *Leveraging Corporate Responsibility: The Stakeholder Route to Maximizing Business and Social Value*, Cambridge University Press, Cambridge.

Bluhm, K., Trappman, V. (2015), *Corporate social responsibility and executives' attitudes in Germany, Poland and Hungary*, "Warsaw Forum of Economic Sociology", 6 (12), pp. 7–36.

Boesso, G., Fryzel, B., Ghitti, M. (2023), *Corporate social responsibility and comparative capitalism frameworks: Evidence from the United States, Poland, and Italy*, "Corporate Social Responsibility and Environmental Management", 30 (2), pp. 531–547, https://doi.org/10.1002/csr.2372

Bolderston, A. (2012), *Conducting a Research Interview*, "Journal of Medical Imaging and Radiation Sciences", 43 (1), pp. 66–76, https://doi.org/10.1016/j.jmir.2011.12.002

Brace, I. (2018), *Questionnaire design: How to plan, structure and write survey material for effective market research*, Kogan Page Publisher, Market Research Society, London, https://civilenglineering.wordpress.com/wp-content/uploads/2014/10/questionnaire-design-how-to-plan-structure-write.pdf (accessed: 30.06.2025).

Butollo, F., Flemming, J., Gerber, C.J., Krzywdzinski, M., Herzog, L. (2023), *COVID-19 as a Jump Start for Industry 4.0? Motivations and Core Areas of Pandemic-Related Investments in Digital Technologies at German Firms*, "The Scientist", 5 (3), 28, https://doi.org/10.3390/sci5030028

Cameron, D.R. (2004), *The Challenges of EU Accession for Post-Communist Europe*, https://aei.pitt.edu/9273/1/Cameron.pdf (accessed: 30.06.2025).

Capron, M., Quairel, F. (2020), *Corporate social responsibility in France: A renewed approach under pressure from the COVID-19 crisis?*, "Journal of Business Ethics", 167 (4), pp. 681–688.

Caratas, M.A. (2023), *Corporate Social Responsibility Practices Amid Political and Economic Transformation in Europe*, "Technium Social Sciences Journal", 43 (1), pp. 302–313, https://doi.org/10.47577/tssj.v43i1.8876

Carran, S., Hodgson, A., Saudagaran, S.M., Xiong, Z. (2023), *Do CSR ethics dominate weak shareholder protection? The case of corporate insider trading in Europe*, "The European Journal of Finance", 29 (2), pp. 155–184, https://doi.org/10.1080/1351847X.2022.2026440

Chang, T.Z.D., Vowles, N. (2013), *Strategies for improving data reliability for online surveys: A case study*, "International Journal of Electronic Commerce Studies", 4 (1), pp. 121–130, http://doi.org/10.7903/ijecs.1121

Chang, W.C., Weng, L.C., Wu, S.B. (2023), *CSR and Organizational Attractiveness: The Impacts of Crisis and Crisis Response*, "Sustainability", 15 (4), 3753, https://doi.org/10.3390/su15043753

Cho, C.H., Krasodomska, J., Ratliff-Miller, P., Godawska, J. (2021), *Internationalization and CSR reporting: evidence from US companies and their Polish subsidiaries*, "Meditari Accountancy Research", 29 (7), pp. 135–162, https://doi.org/10.1108/MEDAR-06-2020-0922

Chung, S., Lee, S.Y. (2020), *Cognitive processing of corporate social responsibility campaign messages: the effects of emotional visuals on memory*, "Media Psychology", 23 (2), pp. 244–268, https://doi.org/10.1080/15213269.2019.1591999

Černek, M. (2022), *Mapping the Active Membership Base of Corporate Social Responsibility in EU Countries*, "Acta Universitatis Bohemiae Meridionales", 25 (3), pp. 39–53, https://doi.org/10.32725/acta.2022.021

De Vries, M.S., Špaček, D. (2023), *Municipal Participatory Budgeting Designs in the V4 Countries*, "NISPAcee Journal of Public Administration and Policy", 16 (1), pp. 210–231, https://doi.org/10.2478/nispa-2023-0009

Deloitte (2023), *New EU Corporate Sustainability Reporting Directive*, https://www.deloitte.com/nl/nl/services/risk-advisory/perspectives/new-eu-corporate-sustainability-reporting-directive.html (accessed: 30.06.2025).

European Investment Bank (2023), *EIB Investment Survey 2023. European Union Overview*, https://www.eib.org/attachments/lucalli/20230285_econ_eibis_2023_eu_en.pdf (accessed: 30.06.2025).

European Union (2014), Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups, Official Journal of the European Union, L 330, pp. 1–9, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0095 (accessed: 20.06.2025).

European Union (2022), Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 as regards corporate sustainability reporting. Official Journal of the European Union, L 322, pp. 15–106, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464 (accessed: 20.06.2025).

Evtushenko, A., Tymohova, H., Kurilenko, O. (2022), *Analysis of the forms of implementation of the concept of corporate social responsibility in the conditions of hostilities in Ukraine*, "Bulletin of V.N. Karazin Kharkiv National University Economic Series", 103, pp. 91–96, https://doi.org/10.26565/2311-2379-2022-103-11

Freeman, R.E., Harrison, J.S., Zyglidopoulos, S. (2018), *Stakeholder Theory: Concepts and Strategies*, Cambridge University Press, Cambridge, https://doi.org/10.1017/9781108539500

Freundlieb, M., Gräuler, M., Teuteberg, F.A. (2014), *A conceptual framework for the quality evaluation of sustainability reports*, "Management Research Review", 37 (1), pp. 19–44, https://doi.org/10.1108/MRR-04-2012-0087

Ghazwani, M., Alamir, I., Salem, R.I.A., Sawan, N. (2024), *Anti-corruption disclosure and corporate governance mechanisms: insights from FTSE 100*, "International Journal of Accounting & Information Management", 32 (2), pp. 279–307, https://doi.org/10.1108/IJAIM-08-2023-0211

Goodell, L.S., Stage, V.C., Cooke, N.K. (2016), *Practical Qualitative Research Strategies: Training Interviewers and Coders*, "Journal of Nutrition Education and Behavior", 48 (8), pp. 578–585, https://doi.org/10.1016/j.jneb.2016.06.001

Havel, B., Lasák, J., Pihera, V., Štenglová, I. (2023), *Czech Corporate Governance in the Light of its History and the Impact of the G20/OECD Corporate Governance Principles*, "Review of European Trade Organisation Law", 24, pp. 167–200, https://doi.org/10.1007/s40804-022-00253-3

Hąbek, P. (2017), *CSR Reporting Practices in Visegrad group Countries and the Quality of Disclosure*, "Sustainability", 9 (12), 2322, https://doi.org/10.3390/su9122322

Hąbek, P. (2019), *Development of corporate social responsibility in Visegrad group countries*, "Zeszyty Naukowe. Organizacja i Zarządzanie/Politechnika Śląska", 138, pp. 71–82.

Hąbek, P., Brodny, J. (2017), *Corporate Social Responsibility Report – An Important Tool to Communicate with Stakeholders*, [in:] *Proceedings of the 4th International Multidisciplinary Scientific Conference on Social Sciences & Arts, Albena, Bulgaria, 22–31 August 2017*, Sofia, pp. 241–248, https://www.sgemsocial.org/index.php/component/jresearch/?view=publication&task=show&id=2370 (accessed: 20.06.2025).

Hąbek, P., Sujová, E., Čierna, H. (2018), *Comparative analysis of CSR reporting practices in Poland and Slovakia*, "Zeszyty Naukowe. Organizacja i Zarządzanie/Politechnika Śląska", 116, pp. 51–66, https://organizacjaizarzadzanie.blogspot.com/2018/04/2018-zeszyt-116_16.html (accessed: 20.06.2025).

Holienčinová, M., Nagyová, Ľ. (2019), *A New Approach to Sustainable Reporting: Responsible Communication Between Company and Stakeholders in Conditions of Slovak Food Industry*, [in:] D. Cagáňová, M. Balog, L. Knapčíková, J. Soviar, S. Mezarcıöz (eds.), *Smart Technology Trends in Industrial and Business Management*, Springer Nature, Cham, pp. 291–301, https://doi.org/10.1007/978-3-319-76998-1_20

Honcharenko, O., Neskorodzhena, L., Iefremova, I., Lomakina, I., Malyshko, I. (2022), *Development of the Concept of Corporate Social Responsibility: Practice in Ukraine*, "Comparative Legal Review", 28, pp. 367–392, http://doi.org/10.12775/CLR.2022.012

Huang, W., Chen, S., Nguyen, L.T. (2020), *Corporate Social Responsibility and Organizational Resilience to COVID-19 Crisis: An Empirical Study of Chinese Firms*, "Sustainability", 12 (21), 8970, https://doi.org/10.3390/su12218970

Hudáková, M., Cúg, J., Karácsony, P., Petráková, Z., Dvorský, J., Pietrzak, M.B. (2024), *Perception of Selected Factors on the Sustainability of SMEs: Empirical Study from Visegrad Group Countries*, https://doi.org/10.20944/preprints202402.1746.v1

Ioannou, I., Serafeim, G. (2017), *The consequences of mandatory corporate sustainability reporting*, "Harvard Business School Research Working Paper", pp. 11–100.

Jastrzębska, E. (2023), *The reporting of climate-related information by CSR leaders in Poland: a climate-related disclosure index*, "Economics and Environment", 1 (84), pp. 96–115, https://doi.org/10.34659/EIS.2023.84.1.520

Kádeková, Z., Košičiarová, I., Kubicová, Ľ., Predanócyová, K. (2022), *Sustainable Approach within Environmental Protection and PR in Food Enterprises in Slovakia*, [in:] E. Horská, Z. Kapsdorferová, M. Hallová (eds.), *International Scientific Days 2022. Efficient, Sustainable and Resilient Agriculture and Food Systems – The Interface of Science, Politics and Practice. Conference Proceedings*, Slovak University of Agriculture in Nitra, Nitra, pp. 266–273, https://doi.org/10.15414/isd2022.s3.05

Kašparová, K. (2018), *Czech CSR Reports*: *Topics and Quality of Their Processing*, "Acta Academica Karviniensis", 18 (2), pp. 5–15, https://aak.slu.cz/en/artkey/aak-201802-0001_ceske-csr-reporty-temata-a-kvalita-jejich-zpracovani.php?l=en (accessed: 10.03.2025).

Katsampoxakis, I., Xanthopoulos, S., Basdekis, C., Christopoulos, A.G. (2024), *Can ESG Stocks Be a Safe Haven during Global Crises? Evidence from the COVID-19 Pandemic and the Russia-Ukraine War with Time-Frequency Wavelet Analysis*, "Economies", 12 (4), 89, https://doi.org/10.3390/economies12040089

Khan, M., Lockhart, J., Bathurst, R. (2021), *The institutional analysis of CSR: Learnings from an emerging country*, "Emerging Markets Review", 46, 100752, https://doi.org/10.1016/j.ememar.2020.100752

Kim, J.H., Kwak, J., Park, H. (2024), *ESG as a nonmarket strategy to cope with geopolitical tension: Empirical evidence from multinationals ESG performance*, "Strategic Management Journal", 46 (3), pp. 693–722, https://doi.org/10.1002/smj.3671

Klymanska, L. (2023), *The discourse of daily life during the war: The 2022 case of Ukraine*, "Journal of Education, Culture and Society", 14 (1), pp. 125–138.

Koleva, P., Rodet-Kroichvili, N., David, P., Marasova, J. (2010), *Is corporate social responsibility the privilege of developed market economies? Some evidence from Central and Eastern Europe*, "International Journal of Human Resource Management", 21 (2), pp. 274–293, https://doi.org/10.1080/09585190903509597

Kozáková, J., Skýpalová, R., Nowotarska, A., Baum, R., Urbánová, M., Janšto, E., Pieńkowski, D. (2023), *Corporate Social Responsibility in Business Practice of the Visegrad Region (Czechia, Poland, Slovakia)*, University of West Bohemia in Pilsen, Pilsen, https://doi.org/10.24132/ZCU.2023.12075

Kozáková, J., Urbánová, M., Skypalova, R. (2024), *Differences in corporate social responsibility implementation between Slovak and Czech companies*, "Problems and Perspectives in Management", 22 (1), 353, https://doi.org/10.21511/ppm.22(1).2024.29

KPMG (2022), *Big shifts small steps. Survey of Sustainability Reporting 2022*, https://assets.kpmg.com/content/dam/kpmgsites/ch/pdf/survey-of-sustainability-reporting-2022.pdf (accessed: 20.06.2025).

Krasodomska, J., Michalak, J., Świetla, K. (2020), *Directive 2014/95/EU: Accountants' understanding and attitude towards mandatory non-financial disclosures in corporate reporting*, "Meditari Accountancy Research", 28 (5), pp. 751–779, https://doi.org/10.1108/MEDAR-06-2019-0504

Kruskal, W.H., Wallis, W.A. (1952), *Use of Ranks in One-Criterion Variance Analysis*, "Journal of the American Statistical Association", 47 (260), pp. 583–621, https://doi.org/10.2307/2280779

Kusumawardani, K.A., Arquisola, M.J., Amin, G., Restiawati, M. (2023), *Inclusive leadership and workers safety behaviour during the Covid-19 pandemic*, "Evidence-Based HRM. A Global Forum for Experical Scholarship", 11 (3), pp. 465–482, https://doi.org/10.1108/EBHRM-04-2021-0064

Lament, M., Jarolímová, B. (2021), *Foreign capital as a determinant of the non-financial reporting in insurance companies of the Visegrad Group countries*, "Investment Management and Financial Innovation", 18 (1), pp. 203–214, https://doi.org/10.21511/imfi.18(1).2021.17

Lee, Y.J., Zhao, W., Chen, H. (2021), *Consumer Response to Virtual CSR Experiences*, "Journal of Current Issues & Research in Advertising", 42 (1), pp. 102–122, https://doi.org/10.1080/10641734.2020.1734119

Lewicka-Strzalecka, A. (2006), *Opportunities and limitations of CSR in the postcommunist countries: Polish case*, "Corporate Governance", 6 (4), pp. 440–448, https://doi.org/10.1108/14720700610689559

Ling, Y.H. (2019) *Cultural and contextual influences on corporate social responsibility: A comparative study in three Asian countries*, "Cross Cultural & Strategic Management", 26 (2), pp. 290–310, https://doi.org/10.1108/CCSM-02-2018-0024

Liu, S. (2022), *A Critical Genre Analysis of the Negative Parts in CSR Reports*, [in:] L. Gryzun, M. Ciurea (eds.), *Proceedings of the 4th International Seminar on Education Research and Social Science (ISERSS 2021)*, Atlantis Press, pp. 200–204, https://doi.org/10.2991/assehr.k.220107.038

Lowe, N.K. (2019), *What Is a Pilot Study?*, "Journal of Obstetric, Gynecologic & Neonatal Nursing", 48 (2), pp. 117–118, https://doi.org/10.1016/j.jogn.2019.01.005

Lu, J., Wang, J. (2021), *Corporate governance, law, culture, environmental performance and CSR disclosure: A global perspective*, "Journal of International Financial Markets, Institutions and Money", 70, 101264, https://doi.org/10.1016/j.intfin.2020.101264

Maeda, H. (2015), *Response option configuration of online administered Likert scales*, "International Journal of Social Research Methodology", 18 (1), pp. 15–26, https://doi.org/10.1080/13645579.2014.885159

Mahoney, L.S., Brickner, D.R., LaGore, W., Lewis, P.A. (2024), *The Impact of Covid-19 on the Corporate Social Responsibility Performance and Disclosures of US Corporations*, [in:] T.J. Shawver (ed.), *Research on Professional Responsibility and Ethics in Accounting*, Vol. 26, Emerald Publishing Limited, Leeds, pp. 79–99, https://doi.org/10.1108/s1574-076520240000026004

Manes-Rossi, F., Tiron-Tudor, A., Nicolò, G., Zanellato, GG. (2018), *Ensuring More Sustainable Reporting in Europe Using Non-Financial Disclosure – De facto and De Jure Evidence*, "Sustainability", 10 (4), 1162, https://doi.org/10.3390/su10041162

Mariappanadar, S., Maurer, I., Kramar, R., Muller-Camen, M. (2022), *Is it a sententious claim? An examination of the quality of occupational health, safety and well-being disclosures in global reporting initiative reports across industries and countries*, "International Business Review", 31 (2), 101922, https://doi.org/10.1016/j.ibusrev.2021.101922

Martin, E. (2006), *Survey Questionnaire Construction*, "Survey Methodology", 13, pp. 1–13, https://www.census.gov/content/dam/Census/library/working-papers/2006/adrm/rsm2006-13.pdf (accessed: 20.06.2025).

Matten, D., Moon, J. (2008), *"Implicit" and "Explicit" CSR: A Conceptual Framework for a Comparative Understanding of Corporate Social Responsibility*, "Academy of Management Review", 33 (2), pp. 404–424, https://doi.org/10.5465/amr.2008.31193458

Matuszak, Ł., Różańska, E. (2017), *CSR Disclosure in Polish-Listed Companies in the Light of Directive 2014/95/EU Requirements: Empirical Evidence*, "Sustainability", 9 (12), 2304, https://doi.org/10.3390/su9122304

Mazurkiewicz, P., Crown, R., Bartelli, V. (2005), *What Does Business Think about Corporate Social Responsibility? Part II: A Comparison of Attitudes and Practices in Hungary, Poland and Slovakia*, World Bank, Washington, https://documents1.worldbank.org/curated/en/745001468771258151/pdf/410100v20ECA0B1comparison001PUBLIC1.pdf (accessed: 30.06.2025).

Miska, C., Stahl, G.K., Mendenhall, M.E. (2013), *Intercultural competencies as antecedents of responsible global leadership*, "European Journal of International Management", 7 (5), pp. 550–569.

Montgomery, R., Dennis, J.M., Ganesh, N. (2016), *Response Rate Calculation Methodology for Recruitment of a Two-Phase Probability-Based Panel: The Case of AmeriSpeak*, NORC at the University of Chicago, Chicago, https://www.norc.org/content/dam/norc-org/pdfs/WhitePaper_ResponseRateCalculation_AmeriSpeak_2016.pdf (accessed: 19.06.2025).

Munzarová, S., Košťálová, J., Fialová, E. (2022), *Non-financial reporting of chemical companies in the Czech Republic*, "Business: Theory and Practice", 23 (1), pp. 88–98, https://doi.org/10.3846/btp.2022.11972

Nagy, M., Valaskova, K., Durana, P. (2022), *The Effect of CSR Policy on Earnings Management Behavior: Evidence from Visegrad Publicly Listed Enterprises*, "Risks", 10 (11), 203, https://doi.org/10.3390/risks10110203

OECD (2020), *OECD Economic Outlook, Volume 2020 Issue 1*, OECD Publishing, Paris, https://doi.org/10.1787/0d1d1e2e-en

Papa, M., Wieczorek-Kosmala, M., Syty, K. (2023), *Does the non-financial reporting regulation increase diversity and equal opportunity disclosure? Evidence from Poland*, "Theoretical Journal of Accounting", 47, pp. 141–160, https://doi.org/10.5604/01.3001.0053.6063

Paridhi, Ritika (2024), *Sustainability reporting for boosting national commitment and overcoming challenges: A hierarchical model*, "Business Strategy & Development", 7 (1), e334, https://doi.org/10.1002/bsd2.334

Pavlović, M., Denčić-Mihajlov, K. (2022), *CSR reporting during the COVID-19 pandemic: A common way to disclose new social and economic challenges*, Proceedings of the 3rd International Conference "Economic and Business Trends Shaping the Future", Faculty of Economics, Skopje, https://doi.org/10.47063/EBTSF.2022.0013

Peytchev, A., Couper, M.P., McCabe, S.E., Crawford, S.D. (2006), *Web Survey Design: Paging versus Scrolling*, "International Journal of Public Opinion Quarterly", 70 (4), pp. 596–607, https://doi.org/10.1093/poq/nfl028

Przytuła, S., Formánková, S., Ubrežiová, I., Dunay, A. (2019), *Corporate Social Responsibility in Visegrad Countries (Poland, Czech Republic, Slovakia, Hungary) Overall Landscape*, [in:] A. Długopolska-Mikonowicz, S. Przytuła, C. Stehr (eds.), *Corporate Social Responsibility in Poland: Strategies, Opportunities and Challenges*, Springer, Cham, pp. 325–353, https://doi.org/10.1007/978-3-030-00440-8_20

Pündrich, A.P., Delgado, N.A., Barin-Cruz, L. (2021), *The use of corporate social responsibility in the recovery phase of crisis management: A case study in the Brazilian company Petrobras*, "Journal of Cleaner Production", 329, 129741, https://doi.org/10.1016/j.jclepro.2021.129741

PwC (2022), *CSRD is resetting the ESG value-creation agenda in CEE. How can companies create value in a world focused on sustainability?*, https://cee.pwc.com/csrd-is-resetting-the-esg-value-creation-agenda-in-cee.html (accessed: 18.04.2025).

Rojek-Nowosielska, M. (2019), *CSR Level of Enterprises in Poland: Before and After Transition*, [in:] A. Długopolska-Mikonowicz, S. Przytuła, C. Stehr (eds.), *Corporate Social Responsibility in Poland. Strategies, Opportunities and Challenges*, Springer, Cham, pp. 123–133, https://doi.org/10.1007/978-3-030-00440-8_9

Roopa, S., Rani, M.S. (2012), *Questionnaire Designing for a Survey*, "Journal of Indian Orthodontic Society", 46 (4_suppl1), pp. 273–277, https://journals.sagepub.com/doi/abs/10.5005/jp-journals-10021-1104 (accesed: 30.06.2025).

Sannino, G., Lucchese, M., Zampone, G., Lombardi, R. (2020), *Cultural dimensions, Global Reporting Initiatives commitment, and corporate social responsibility issues: New evidence from Organisation for Economic Co-operation and Development banks*, "Corporate Social Responsibility and Environmental Management", 27 (4), pp. 1653–1663, https://doi.org/10.1002/csr.1914

Sapsford, R., Abbott, P., Haerpfer, C., Wallace, C. (2015), *Trust in Post-Soviet Countries, Ten Years On*, "European Politics and Society", 16 (4), pp. 523–539, https://doi.org/10.1080/23745118.2015.1039286

Scaliza, J.A.A., Jugend, D., Jabbour, C.J.C., Latan, H., Armellini, F., Twigg, D., Andrade, D.F. (2022), *Relationships among organizational culture, open innovation, innovative ecosystems, and performance of firms: Evidence from an emerging economy context*, "Journal of Business Research", 140, pp. 264–279, https://doi.org/10.1016/j.jbusres.2021.10.065

Schwartz, M.S., Kay, A. (2023), *The COVID-19 global crisis and corporate social responsibility*, "Asian Journal of Business Ethics" 12, pp. 101–124.

Seele, P., Lock, I. (2015), *Instrumental and/or Deliberative? A Typology of CSR Communication Tools*, "Journal of Business Ethics", 131, pp. 401–414, https://doi.org/10.1007/s10551-014-2282-9

Shapiro, S.S., Francia, R.S. (1972), *An Approximate Analysis of Variance Test for Normality*, "Journal of the American Statistical Association", 67 (337), pp. 215–216, http://doi.org/10.1080/01621459.1972.10481232

Skýpalová, R., Bohušová, H., Křápek, M. (2024), *Preparedness for Mandatory CSR Reporting of Multinational Companies: Case of the Czech Republic*, "Emerging Science Journal", 8 (3), pp. 1016–1036.

Skýpalová, R., Kozáková, J., Urbánová, M., Di Sabato, V. (2023), *Corporate Social Responsibility in Business Practices of Multinational Companies: A Study of the Differences Between Czech and Slovak*, "Business, Managerial and Economic Engineering", 21 (1), pp. 106–123, https://doi.org/10.3846/bmee.2023.18942

Slovak Republic (2017), Zákon č. 431/2002 Z. z. o účtovníctve v znení novely zákona č. 130/2017 Z. z. [Act No. 431/2002 Coll. on Accounting, as amended by Act No. 130/2017 Coll.], Zbierka zákonov Slovenskej republiky.

Stanislawska, M. (2022), *The Impact of the COVID-19 Pandemic and Energy Crisis on CSR Policy in Transport Industry in Poland*, "Energies", 15 (23), 8892, https://doi.org/10.3390/en15238892

Stoian, C.R., Zahara, R.M. (2012), *CSR development in post-communist economies: employees' expectations towards corporate socially responsible behaviour – the case of Romania*, "Business Ethics: A European Review", 21 (4), pp. 380–401, https://doi.org/10.1111/beer.12000

Tešovičová, Z.J., Krchová, H. (2022), *Implementation of of Corporate Social Responsibility Environmental Actions in Comparison of Small, Medium and Large Enterprises in the Slovak Republic*, "Sustainability", 14 (9), 5712, https://doi.org/10.3390/su14095712

Tetrevova, L. (2018), *Communicating CSR in High Profile Industries: Case Study of Czech Chemical Industry*, "Engineering Economics", 29 (4), pp. 478–487, https://doi.org/10.5755/j01.ee.29.4.19199

Tolmie, C.R., Lehnert, K., Zhao, H. (2020), *Formal and informal institutional pressures on corporate social responsibility: A cross-country analysis*, "Corporate Social Responsibility and Environmental Management", 27 (2), pp. 786–802, https://doi.org/10.1002/csr.1844

Tomala, M. (2022), *Sustainable Development in the Strategies of Polish Enterprises*, [in:] A. Visvizi, O. Troisi, M. Grimaldi (eds.), *Research and Innovation Forum 2022. Rupture, Resilience and Recovery in the Post-Covid World*, Springer, Cham, pp. 579–586, https://doi.org/10.1007/978-3-031-19560-0_49

Túri, G., Virág, A. (2021), *Experience and Lessons Learned from COVID-19 Pandemic Management in South Korea and the V4 Countries*, "Tropical Medicine and Infectious Diseases", 6 (4), 201, https://doi.org/10.3390/tropicalmed6040201

Ursic, D., Cestar, A.S. (2022), *Crisis Management and CSR in Slovenian Companies: The Impact of the COVID-19 Pandemic*, "Sustainability", 14 (5), 2690, https://doi.org/10.3390/su14052690

Valaskova, K., Nagy, M. (2023), *Macro-economic development of the EU countries in the context of performance and competitiveness of SMEs*, "Business, Management and Economics Engineering", 21 (1), pp. 124–139, https://doi.org/10.3846/bmee.2023.18958

Visegrad Grant No. 22220149, https://csrvysegradproject.pageride.eu/project-events/ (accessed: 29.06.2025).

Vogli, X., Çano, E. (2023), *CSRCZ: A Dataset About Corporate Social Responsibility in Czech Republic*, https://doi.org/10.48550/arXiv.2301.03404

Vveinhardt, J., Sroka, W. (2020), *Workplace Mobbing in Polish and Lithuanian Organisations with Regard to Corporate Social Responsibility*, "International Journal of Environmental Research and Public Health", 17 (8), 2944, https://doi.org/10.3390/ijerph17082944

Wegrzynska, M. (2021), *Linking of Financial Data with Non-Financial Information on CSR of Companies Listed on the Warsaw Stock Exchange*, "European Research Studies Journal", XXIV (3), pp. 851–873, https://doi.org/10.35808/ersj/2388

Weisstein, E.W. (2004), *Bonferroni Correction*, https://mathworld.wolfram.com/BonferroniCorrection.html (accessed: 19.06.2025).

Wójcik-Jurkiewicz, M. (2017), *Role of CSR Reporting. Evidence from Poland*, "Theoretical Accounting Journals", 94, pp. 173–188, https://doi.org/10.5604/01.3001.0010.5001

Xu, S., Woo, D. (2023), *Key Players in Corporate Social Responsibility (CSR) Institutionalization: An Analysis of Multinational Companies' Interorganizational Positioning via CSR Reports*, "Management Communication Quarterly", 37 (1), pp. 3–31, https://doi.org/10.1177/08933189221095770

Zemanová, Š., Druláková, R. (2020), *Mainstreaming Global Sustainable Development Goals through the UN Global Compact: The Case of Visegrad Countries*, "Journal of Risk and Financial Management", 13 (3), 41, https://doi.org/10.3390/jrfm13030041

Zvaríkova, K., Dvorský, J., Belás Jr., J., Metzker, Z. (2024), *Model of sustainability of SMEs in V4 countries*, "Journal of Business Economics and Management", 25 (2), pp. 226–245, https://doi.org/10.3846/jbem.2024.20729

Zaangażowanie przedsiębiorstw z Czech, Polski i Słowacji w raportowanie działań CSR w czasie kryzysów

Celem artykułu jest analiza wybranych zagadnień poruszanych w raportach dotyczących społecznej odpowiedzialności biznesu (CSR) przedsiębiorstw z trzech wybranych krajów Grupy Wyszehradzkiej – Czech, Polski i Słowacji. Badanie koncentruje się na ocenie znaczenia, jakie przedsiębiorstwa przywiązują do omawianych tematów, oraz stopnia, w jakim uwzględniają je w swoich raportach CSR w odniesieniu do interesariuszy. Badanie ma charakter ilościowy i wykorzystuje kwestionariusz internetowy do zbadania sprawozdawczości CSR w krajach Grupy Wyszehradzkiej, przy próbie obejmującej 375 przedsiębiorstw. Do analizy danych dotyczących sprawozdawczości CSR w przedsiębiorstwach różnej wielkości i z różnych sektorów stosuje się narzędzia statystyczne, takie jak test normalności Shapiro–Wilka, test Kruskala-Wallisa i test *post hoc* Bonferroniego. Pomimo potencjalnych ograniczeń metodologicznych i stronniczości badanie wskazuje na różnice w praktykach sprawozdawczości CSR wśród przedsiębiorstw z Czech, Polski i Słowacji. Liderem w zakresie sprawozdawczości CSR w regionie jest Słowacja, która może służyć za przykład dobrych praktyk w tym zakresie. Czechy wykazują umiarkowane zaangażowanie w działania związane ze sprawozdawczością CSR, podczas gdy firmy w Polsce są najmniej zaangażowane w formalną sprawozdawczość CSR. Rozbieżności te wynikają z różnic w przepisach, poziomie świadomości społecznej i priorytetach biznesowych. Wyniki badania mogą być cenne dla naukowców, menedżerów i decydentów politycznych przy opracowywaniu narzędzi wspierających firmy we wprowadzaniu nowych standardów sprawozdawczości i dostarczaniu informacji o działaniach podejmowanych w czasie kryzysu. Nowością w artykule jest analiza – na poziomie przedsiębiorstw – rodzaju działań CSR wybranych firm z krajów Grupy Wyszehradzkiej z perspektywy podjętych przez nie działań antykryzysowych. Badanie to wypełnia lukę w literaturze i stanowi podstawę do dyskusji na temat zasadności działań społecznie odpowiedzialnych w kontekście wykraczającym poza pojedynczy kryzys.

Słowa kluczowe: Corporate Social Responsibility, społeczna odpowiedzialność biznesu, raportowanie CSR, działania CSR, przedsiębiorstwa państw Grupy Wyszehradzkiej, zrównoważony rozwój

Comparative Economic Research. Central and Eastern Europe
Volume 28, Number 4, 2025
https://doi.org/10.18778/1508-2008.28.32

Motivations and Effects of Mergers and Acquisitions on the Warsaw Stock Exchange, Considering ESG Factors

Justyna Zabawa https://orcid.org/0000-0001-5303-5029
Ph.D., Associate Professor, Wroclaw University of Economics and Business, Wroclaw, Poland,
e-mail: justyna.zabawa@ue.wroc.pl

Ewa Łosiewicz-Dniestrzańska https://orcid.org/0000-0001-7195-4088
Ph.D., Assistant Professor, Wroclaw University of Economics and Business, Wroclaw, Poland,
e-mail: ewa.losiewicz-dniestrzanska@ue.wroc.pl

Mariusz-Jan Radło https://orcid.org/0000-0001-7756-1613
Ph.D., Associate Professor, Warsaw School of Economics, Warsaw, Poland, e-mail: mjradlo@sgh.waw.pl

Tomasz Napiórkowski https://orcid.org/0000-0001-6028-0567
Ph.D., Assistant Professor, Warsaw School of Economics, Warsaw, Poland, e-mail: tnapio@sgh.waw.pl

Abstract

The main purpose of this article is to determine the impact of Environmental, Social, and Governance (ESG) factors on corporate mergers and acquisitions (M&A). The study was conducted on companies listed on the Warsaw Stock Exchange (WSE), which plays a significant role in European capital markets, particularly in the Central and Eastern European (CEE) region. It is the largest stock exchange in the region by both market capitalisation and the number of listed companies. Data for the study were collected in 2024 using CATI (Computer-Assisted Telephone Interviewing) and CAWI (Computer-Assisted Web Interviewing) methods from companies that had conducted M&A in the previous five years. Data analysis was performed using descriptive statistics and several tests, including ANOVA, Kolmogorov-Smirnov, Shapiro–Wilk, Levene, Welch and Kruskal-Wallis. The study investigated the motives for companies to consider ESG factors when conducting M&A transactions. The results show that WSE companies consider managerial awareness to have the greatest influence on the inclusion of these factors

Funding information: J.Z. – Associate Professor, Wroclaw University of Economics and Business, Wroclaw, Poland; E.Ł.-D. – Assistant Professor, Wroclaw University of Economics and Business, Wroclaw, Poland; M.-J.R. – Associate Professor, Warsaw School of Economics, Warsaw, Poland; T.N. – Assistant Professor, Warsaw School of Economics, Warsaw, Poland.
The percentage share of the Authors in the preparation of the work is: J.Z. – 25.00%, E.Ł.-D. – 25.00%, M.-J.R. – 25.00%, T.N. – 25.00%.
Declaration regarding the use of GAI tools: Not used.
Conflicts of interests: None.
Ethical considerations: The Authors assure of no violations of publication ethics and take full responsibility for the content of the publication.
Received: 26.05.2025. Verified: 19.08.2025. Accepted: 28.10.2025

in M&A. Detailed information was obtained on the different motivations of listed companies to include ESG factors in M&A transactions and the subsequent impact of these transactions on their financial performance. Additionally, the study investigated the impact of company size and capital ownership on decisions to include ESG factors in M&A. The results offer an important contribution to existing research on M&A in the CEE region.

Keywords: mergers and acquisitions (M&A), motivations, ESG factors, Warsaw Stock Exchange

JEL: G30, G34, L20

Introduction

The concept of Environmental, Social, and Governance (ESG) considers how factors related to environmental protection, social responsibility, and corporate governance influence companies' activities. Responsible investment, which promotes the integration of ESG, is expected to accelerate in the coming years. This means that investment streams, including investors' access to capital, will increasingly depend on companies considering ESG factors.

A common strategic activity during corporate growth is mergers and acquisitions (M&A). Companies' M&A decisions are motivated by efforts to strengthen market position, diversifying geographically, technologically, or across product lines, or to increase company value. The reasons for merging can vary between different transactions, and disagreements may arise on either side. Typically, the acquiring company pursues a growth strategy, while the target company may be pursuing a divestment strategy (Rozwadowska 2012, p. 25).

Scale effects are also important, which may vary depending on the size of the companies. M&A transactions are beneficial to the profitability of merged companies when companies are of different sizes; however, no significant benefits are noted when the companies are similar in size (Korpus 2014, p. 89). Despite these variations, investors almost always expect these transactions to increase company value through synergy and a better valuation following a successful merger (DePamphilis 2014, pp. 5–9). For sellers, common motivations include a lack of independent development opportunities or a defence against a hostile takeover (Grobelny, Stradomski, and Stobiecki 2018, p. 43).

The ESG concept specifically dictates that environmental protection, social responsibility, and corporate governance factors will be incorporated into a company's activities. The concept was first defined in 2004 in the report "Who Cares Wins: transforming finance and economics through ESG" (UN Global Compact 2020). This was followed in 2006 by the Principles for Responsible Investment (PRI) to accelerate the integration of ESG. Since the late 2010s, the ESG investment concept has begun to be included in European Union (EU) policies under the European Green Deal (2019). This is evident in current and planned EU regulations that integrate ESG into *acquis communautaire*. In addition, the *Action Plan: Financing Sustainable Growth,* adopted by the European Commission in 2018, established an EU taxonomy for sustainable economic activity. It introduced guidelines for investors concerning ESG risk in decision-making and created benchmarks for investors.

The Corporate Sustainability Due Diligence Directive (CSDDD; Directive (EU) 2024/1760), which came into effect on 25 July 2024, represents the next set of EU regulations aimed at promoting responsible business activity by imposing obligations on large firms. It is of particular importance when analysing and assessing aspects related to social and environmental responsibility, as well as the quality of management in companies being merged or acquired through M&A transactions.

In recent years, the M&A market has seen exceptional variability, from a sharp drop in 2020 caused by the COVID-19 pandemic to a record recovery in 2021 (McKinsey & Company 2024). A key emerging trend in M&A strategies in 2024 was the increasing importance of sustainable development. Firms are increasingly prioritising aspects like decarbonisation and investment in renewable energy as key factors in their decision-making related to M&A.

The growing importance of sustainable development in M&A is closely linked to the new ESG regulatory framework, especially in the EU. Deloitte (2024) highlights the role of regulation as a key reason for the growing importance of ESG in M&A. The Taxonomy Regulation (Regulation (EU) 2020/852) requires firms to disclose the sustainable nature of their activity, while the Corporate Sustainability Reporting Directive (CSRD 2022) broadens compulsory ESG reporting from 2024. In addition, the CSDDD will enforce more stringent due diligence obligations, compelling firms to account for their impact on the environment and human rights, which directly influences the inclusion of ESG in M&A strategies. As a result, analysing both the motivations and results of M&A transactions through an ESG lens is critical for ensuring compliance and long-term value creation.

A recent report by KPMG (2023) shows that firms and investors are increasingly incorporating ESG issues into their M&A strategies due to the impact of ESG on company value. Investors are inclined to pay more for a sustainable goal that indicates a high level of ESG maturity in areas that are in accordance with their ESG priorities.

External factors suggest that, in the coming years, investment streams – including access to capital for investors – will increasingly depend on its consideration of ESG factors. Given the growing importance of ESG criteria in determining and implementing a firm's corporate strategies, fulfilling these criteria is increasingly considered not only a matter of compliance and good company management but also an integral component of a firm's corporate strategy.

For companies conducting due diligence on potential acquisitions, reliable target indicators are essential for decision-making. As the KPMG report shows, ESG criteria impact a growing number of M&A transactions, and investors are inclined to pay a premium for goals with a strong history of sustainable development. As a result, M&A teams increasingly conduct due diligence of ESG aspects at an early stage.

Recent years have brought considerable changes to ESG regulations, such as the European Green Deal (2019), CSRD (2022), Taxonomy regulations (Regulation (EU) 2020/852) and the Carbon Border Adjustment Mechanism (CBAM; Regulation (EU) 2023/956). This shift has placed ESG at the top of corporate agendas. At the same time, society as a whole has begun to change, with noticeable changes in the behaviour of clients, employees, and investors. They are increasingly favouring sustainable

products, employers, and investments. These changes constitute a critical force in the strategic environment of many firms, which impacts M&A activity.

Research has even indicated situations where buyers are prepared to cancel a transaction if critical ESG information is not provided or is unavailable. This also drives increased M&A activity. A tendency has been observed where firms use M&A to obtain quick successes while implementing a sustainable development strategy. This trend is set to continue and may even grow in the coming years. On the seller's side, firms focus on reducing the ESG risk profile by selling all potentially unnecessary and mismatched assets and strengthening management by strategically withdrawing from geographical markets that cannot ensure sufficient compliance with CSDDD requirements. On the buyer's side, meanwhile, the goal is the rapid implementation and further expansion of the sustainable business model (Norton Rose Fulbright 2024).

Investors who are aware of this situation place ESG factors at the top of assessment criteria when making investment decisions in both the capital market and the M&A market. Furthermore, the growing number of ESG-focused investments means that advanced ESG due diligence has become an increasing part of M&A negotiations. The M&A market now treats ESG as a key dynamic in financial and legal due diligence reports. As a result, companies are compelled to include new provisions relating to their ESG profile in M&A agreements. The tendency towards ESG compliance is gradually becoming a legal obligation and not only a business and investment model for firms (Huang et al. 2023).

Our research combines two related areas: M&A transactions on the WSE, which influence the function of the economy as a whole, and ESG factors, which have been extensively analysed both in the subject literature and national and international regulations. This underlines the validity of the research topic, which to date has been under-addressed by researchers, especially in the countries of Central and Eastern Europe, including Poland.

This research aims to assess the impact of ESG factors on M&A. The research uses data from a survey conducted among companies listed on the WSE. Data analysis uses descriptive statistics and one-way analysis of variance (ANOVA).

Literature review and main research goals

In the context described above, the question of what compels companies to consider ESG factors in M&A and how these factors actually impact M&A is becoming increasingly important. There is a limited body of research on this issue, and the results described in the literature are inconclusive, especially regarding the specific conditions of the WSE.

Impact of ESG regulations on M&A

The differences in the degree to which an acquiring company and its target company incorporate ESG issues often prolong the transaction period. Such delays in an M&A transaction freeze the economic and financial resources of both firms. Conversely, aligning the sustainable development profiles of the two companies accelerates the completion of the transaction and its

associated cost (Cardillo and Harasheh 2023). This was confirmed by Ma (2023), who underlines that M&A transactions involving a target firm with a high ESG rating have a shorter negotiation time, thereby increasing the likelihood of successful finalisation.

The increasing number of regulations requiring greater transparency and ESG responsibility – such as ESG risk disclosures and covering organisational practices, products and services – is increasing pressure to comply. Banks, for example, are increasingly basing their clients' investment loan approvals on sector-specific risk weights (Markiewicz 2021, pp. 28–29). They tend to work with clients with a similar (high) ESG assessment verified through due diligence. The literature also shows that banks may halt the lending process in response to reputational damaged experienced by the borrower related to ESG issues (Houston and Shan 2022).

On the other hand, regulatory pressure acts as a catalyst for creating a more responsible business environment. However, complying with ESG obligations during M&A incurs costs that can divert resources from integration efforts and impact the results of the transaction as a whole, potentially reducing value (Xin, Zhang, and Xiang 2024). While the growing number of regulations places a heavy burden on companies entering into M&A, these regulations also help raise standards are reduce the risk of reputational damage. Research across multiple sources suggests that regulations should be developed in accordance with the principle of proportionality, so that requirements are tailored to the size of companies and the specific characteristics of individual sectors.

Impact of ESG on M&A results

The literature on the impact of ESG on M&A results is diverse and ambiguous. The decision to incorporate ESG principles into M&A decisions should undoubtedly benefit investors. Authors often analyse the conditions under which these benefits materialise, emphasising the importance of investor patience. Hence, there is a growing consensus that integrating ESG factors in M&A can improve the long-term performance of investors' portfolios. One way to achieve this is by investing in companies that have the strongest environmental, social, and governance practices in their industry. Including these factors in M&A strategies exerts a positive impact on investments, allowing investors to combine financial profit with environmental and social progress (Lu 2021).

Beyond market and competitive effects, the literature also highlights the positive influence of M&A on sustainable development indicators measured by ESG assessments. ESG scores can be used to reduce the possible negative impact of such consequences on market concentration. Firms that develop through M&A may be more open to sharing information, which is beneficial for other stakeholders, especially shareholders and society as a whole (Barros et al. 2022).

Some authors consider that ESG ratings contribute to increased firm value after M&A transactions (Ma, Pan, and Suardi 2023). Engagement in M&A activity may lead to improvements in the ESG ratings of the companies involved, as evidenced by several studies examining acquirers and targets in different regions (Tampakoudis and Anagnostopoulou 2020; Barros et al. 2022; Bax, Bonaccolto, and Paterlini 2023; Rahman and Wu 2024). One motivation for entering into an M&A transaction is to improve sustainable development results. Firms often manage ESG challenges more effectively after M&A, although this improvement is not achieved

immediately. Barros et al. (2022) suggest that changes in ESG scores influence M&A activity and should be considered in future research. The growing pressure for firms to achieve sustainable development goals forces managers to be more involved in improving their ESG results.

Many authors claim that ESG can have a positive impact on the results of M&A transactions, but that this is conditioned by various factors (Feng 2021; Mihaiu et al. 2021; Ma, Pan, and Suardi 2023). Acquiring firms benefit when they acquire targets with higher ESG scores (Teti, Dell'Acqua, and Bonsi 2022). Ozdemir, Binesh, and Erkmen (2022) conclude that if positive ESG ratings of target firms closely correlate with value creation for shareholders, shorter negotiating times, and increased shareholder benefits on the stock market, which potentially generate synergistic results after M&A. Similar positive correlations between ESG scores and financial results after M&A were noted by Mihaiu et al. (2021) and Sihombing and Gandakusuma (2023). Meanwhile, Zheng et al. (2023) observed that ESG ratings are positively correlated with both post-M&A results and the probability of transactions being finalised. Sihombing and Gandakusuma (2023) also underline that high ESG scores can attract the support of stakeholders for creating synergy and financial results following M&A, and their research reveals a positive correlation between ESG scores and financial results after the transactions. Given these positive correlations, it is essential to conduct a comprehensive review of ESG practices during the M&A process. Huang et al. (2023) propose conducting due diligence with regard to agreements between the transaction parties. This comprehensive review should accompany the assessment of investment and an analysis of "real value", which explicitly considers environmental, social and governance risks (KPMG 2023).

One way to improve a firm's ESG assessment is to adopt a goal with a relatively higher ESG rating. Empirical evidence shows a positive relationship between changes in the buyer's ESG assessment and the target's relative ESG assessment after M&A announcements (Tampakoudis and Anagnostopoulou 2020). However, Teti, Dell'Acqua, and Bonsi (2022) argue that higher social engagement and a higher environmental result are not important for creating M&A value, whereas higher corporate governance standards do have a positive effect.

Our analysis reveals that environmental and social aspects affect takeover premiums while governance results are unrelated. The target firm's ESG score has a considerable negative impact on the change in the return on equity (ROE) of the acquiring firm after an M&A transaction (Zrigui, Khanchel, and Lassoued 2024). Most buyers experience a drop in return on assets (ROA) one year after the transaction, with this decline more pronounced for buyers with a low ESG score and less severe for those with a higher ESG score (Feng 2021).

When analysing the results of post-M&A outcomes, researchers use different indicators over different periods of time. The use of different measurement methods – such as ROA and ROE alongside ESG ratings – makes it difficult to compare results. In addition, there is a temporal asymmetry: while integrating ESG may increase costs in the short term, financial benefits or premiums typically materialise only in the long term. This discrepancy can be ascribed to the temporary costs of integration, which are higher for buyers with a low ESG than for those with a high ESG, especially if the target's ESG level is increasing.

It is generally accepted that acquiring a firm with strong ESG performance helps improve the buyer's public image and reduces compliance risk. However, the simplistic view that "the higher the target's ESG, the better" is not advisable and can even be detrimental to buyers. When acquiring a high-ESG target, the buyer should assess and balance both the benefits from good ESG performance in the target firm against the potential costs of integration resulting from differences in corporate systems and strategic goals. Firms with a low ESG level have different corporate policies, strategic goals, and organisational culture and structure compared to their high-ESG counterparts (Feng 2021).

The latest research (Huang et al. 2023) shows that the impact of ESG on financial results following M&A differs across the Environment, Social, and Governance pillars. Both Social and Environmental responsibility are important for long-term M&A success. The Social pillar, in particular, through improved working conditions and career development, fosters a sense of identity with the firm, reducing friction related to M&A. The Environmental pillar is the second most important, enabling companies to reduce operational costs and improve production efficiency by following green practices. It is the most important dimension of sustainable development for improving the long-term results of M&A. Meanwhile, the governance pillar, through effective management systems such as the remuneration system, helps mitigate conflicts of interest between the board and shareholders.

Nguyen et al. (2024) also highlighted the changing and even increasing value of individual ESG components. They found that the buyer's Environmental assessment has the greatest impact on growth, followed by the Social and Governance scores, though these effects weaken in cross-border or cross-industry transactions. Kim, Jung, and Cho (2022) similarly emphasise ESG's positive impact on the business results of cross-border M&A. They suggest that firms with better corporate governance adopt a more aggressive approach to implementing environmental programmes, and more effectively honour implicit agreements with a wide range of stakeholders resulting from cross-border M&A.

The arguments presented, based on the analysed literature, highlight the need to comprehensively embed ESG in the M&A process. However, the reasons for considering ESG factors in M&A transactions differ, just as the results achieved after a finalised M&A transaction are also different. The impact of foreign capital on these results remains underexplored, and further research is needed on how motivations, outcomes, and company size interact in the context of M&A.

Based on the literature review, the research aims to assess the impact of ESG factors on M&A using companies listed on the WSE. The study uses data obtained from a research survey. To achieve the aim, two main research questions were used:

- Q1: What are the most important motivations for considering ESG factors in M&A on the WSE?
- Q2: To what degree do M&A transactions impact financial results on the WSE when considering ESG factors?

Two sub-questions further support the analysis:

- Do motivations for considering ESG in M&A vary by company size (Q1.A) and share of foreign capital (Q1.B)?
- Do the financial impacts of M&A differ based on company size (Q2.A) and share of foreign capital (Q2.B)?

Figure 1. presents a visual overview of the research questions and research.

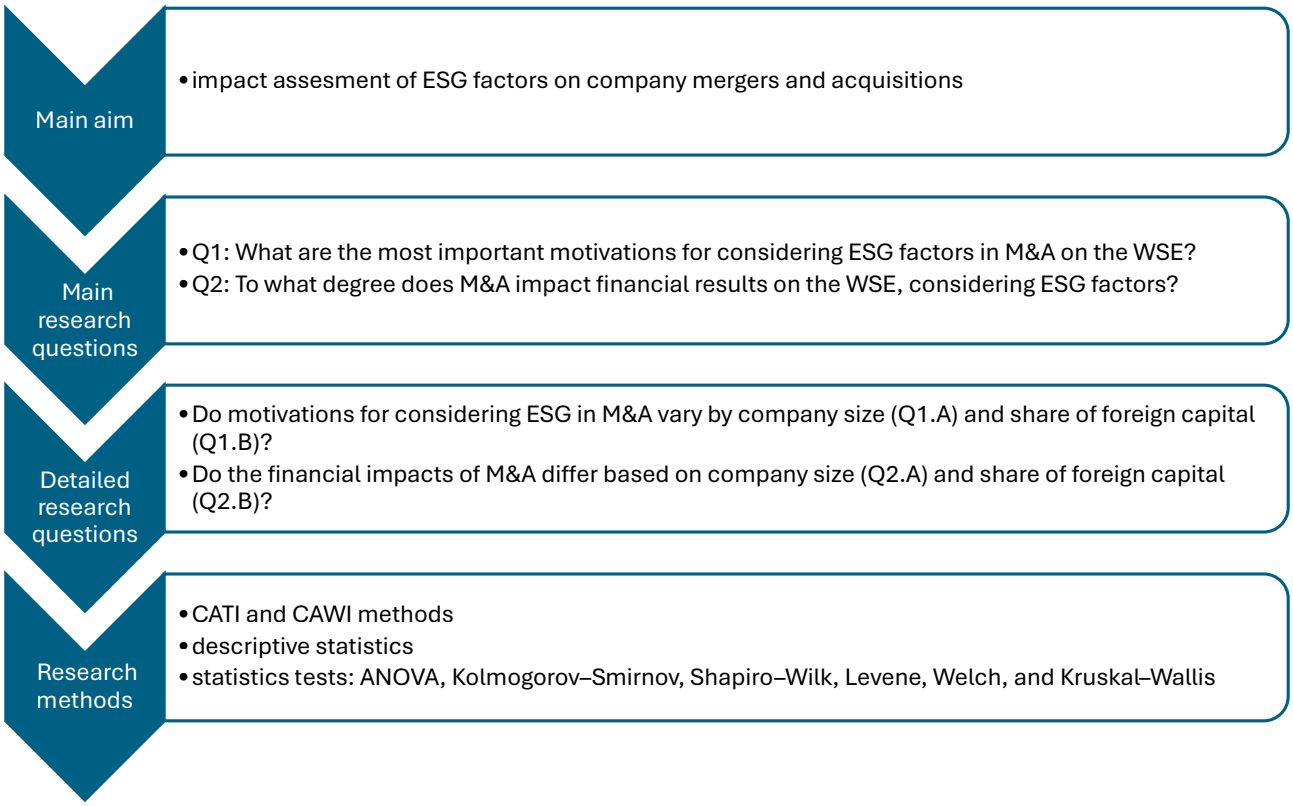


Figure 1. Schematic diagram of the research design

Source: own elaboration.

The research methods, descriptive statistics, and statistical tests will be presented in Section 3.

Research design and methodology

Subjective scope of the study

The starting point for our planned research was a review of the subject literature. The empirical verification of the research plan was conducted on companies listed on the WSE. The decision to focus on WSE-listed companies as the subjective scope of the research was made for several reasons.

First, the importance of ESG factors is increasingly recognised by public companies. In 2019, the WSE replaced the existing RESPECT index with the WIG-ESG index. Furthermore, in 2021, a guide

for stock exchange companies was developed under the title "WSE guidelines for ESG reporting". The number of companies covered by ESG ratings is also growing rapidly.

Second, according to data from March 2022, ESG ratings were available for around 100 of the largest companies listed on the WSE. This situation has meant that companies (including those listed on the WSE) are increasingly considering sustainable development issues in their operational strategies, including their investment strategies.

Third, existing research into the impact of ESG on investment decisions on the WSE shows an increase in the importance of non-financial data in making investment decisions, including M&A. The research also shows that implementing ESG practices is conducive to reducing risk. Consequently, it is anticipated that the importance of considering ESG factors in the strategies of WSE-listed companies will continue to grow.

What is more, WSE-listed companies represent all sectors of the economy, including construction, chemicals, energy, mining, media, financial services, transport and logistics. These vary in size from medium to very large companies (measured by number of employees) and operate nationwide. Basic aggregated data on these companies is presented in Table 1. The significant capitalisation of these companies also testifies to their strength and importance. Data regarding capitalisation are presented for both the main market and the parallel market, including a breakdown into Polish and foreign companies (*Podmioty rynku kapitałowego* n.d.).

Table 1. Characteristics of companies listed on the WSE (as of October 2024)

Total number of companies	Capitalisation (PLN billion)
410:	1,577.97:
368 Polish	797.12 Polish
42 foreign	780.85 foreign
Main market	
308:	1,545.77:
271 Polish	766.14 Polish
37 foreign	779.63 foreign
Parallel market	
102:	32.20:
97 Polish	30.98 Polish
5 foreign	1.22 foreign

Source: GPW 2024.

Data collection

The data for the research were collected between February and May 2024 using the CATI and CAWI methods. The study targeted companies from the WSE that had been actively involved in M&A in the previous five years, verified through a control question. In total, 410 companies were contacted, of which 211 (51.46%) voluntarily agreed to participate (n). With a population size of N = 413 (the number of companies listed on the WSE in the research period),

and a confidence level of 95%, the estimation error is 4.72%. Given that the selection of one company did not determine the selection of another, and with no dependencies between respondents, the collected data can be treated as a random sample. Except for the control question and the respondent descriptors, responses were made using a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

Description of statistical analysis method

Descriptive statistics were used to analyse responses concerning the importance of motivations for considering ESG factors in M&A, and the perceived impact of M&A on financial results, considering ESG factors. Recognising the bias associated with applying the arithmetic mean-based tests and the sums for data measured on an ordinal scale, the calculated means serve only as reference points to compare across groups, rather than as values subject to direct interpretation (Napiórkowski 2022, pp. 37–39).

Detailed questions were used to identify differences in motivations for considering ESG factors in M&A among the studied companies, as presented in Table 2.

Table 2. What motivations influenced the consideration of ESG factors in M&A?

Statement	Code
Regulations related to ESG factors (e.g. the Green Deal, EU Taxonomy, the CSRD – Corporate Sustainability Reporting Directive, SFDR – Sustainable Finance Disclosure Regulation)	1a
Image effects	1b
Awareness among managerial staff	1c
The company's compliance with codes of corporate governance	1d
Expected financial effects	1e
Perceiving at least one of the parties (the buyer, seller or both) as an ESG leader (e.g. participation in the ESG index)	1f
Pressure from investors and regulatory bodies to disclose ESG performance and set goals, in particular, regarding emissions	1g
Assessment of ESG risk	1h

Source: own elaboration.

The detailed statements presented in Table 3 were used to assess the perceived impact of M&A on financial results among the studied companies.

Table 3. How do M&A impact financial results on the WSE, taking into account ESG factors?

Statement	Code
There is concern that M&A will cause a drop in buyers' ROA one year after transactions	2a
The drop in ROA after M&A was greater for buyers with a low ESG score	2b
The drop in ROA after M&A will be greater for buyers with a low ESG score	2c
The M&A was conducted to obtain a competitive advantage in sustainable development	2d
M&A is conducted to obtain a competitive advantage in sustainable development	2e

Statement	Code
The drop in ROA for buyers with a low ESG after M&A score is mitigated by the ROA of sellers with a high ESG score	2f
The drop in ROA for sellers with a low ESG after M&A score is mitigated by the ROA of buyers with a high ESG score	2g
A company with low ESG values lowers the financial results of a company with higher ESG values after M&A	2h
Companies with lower ESG scores usually perform worse on basic financial indicators	2i
High ESG scores are ambiguous regarding the benefits of achieving short-term higher financial results after M&A	2j
Despite the significant risk of high costs and uncertain success, M&A is an important strategy for achieving a competitive advantage in sustainable development	2k
The ESG score, as a measure of sustainable development, has a positive direct impact on company results, including M&A contexts	2l

Source: own elaboration.

For both groups of statements, differences between companies were analysed based on size (measured by the number of employees) and the share of foreign capital (within percentage ranges: 0, 1–25, …, 76–100) using one-way analysis of variance (ANOVA)[1].

In the first step, the requirements of ANOVA as a parametric test – normal distribution in every group (tested using the Kołmogorow-Smirnow and Shapiro–Wilk tests) and homogeneity of variance (using the Levene test) were verified (Van Hecke 2012, p. 242). The survey design and the data collection method ensured suitable measurement scales for the test variable and the randomness of the sample.

While ANOVA demonstrates robustness to violations of normality assumptions, particularly when group sizes are balanced (Field 2013, p. 359), the non-parametric Kruskal-Wallis test was employed as a complementary analytical approach when the dependent variable exhibited non-normal distribution (Van Hecke 2012, pp. 241–247; Lantz 2013, pp. 224–244). In cases where the homogeneity of variance was violated, the Welch test was utilised as a robust alternative for testing equality of means (Mooi and Sarstedt 2011, p. 139). Statistical significance was evaluated at the 10% level, with many outcomes also significant at the 5% and 1% levels.

Findings and results

Descriptive statistics were used to analyse the relative importance of motivations for considering ESG factors in M&A, as well as to assess the perceived influence of M&A on financial results while considering ESG factors. The results are presented in Tables 4 and 5.

1 The ANOVA null hypothesis states that the average values of the test variable are equal across all groups, while the alternative hypothesis states that at least one group mean is statistically significant different from the others.

Table 4. Descriptive statistics for answers regarding motivations for considering ESG factors in M&A

Statistic	1a	1b	1c	1d	1e	1f	1g	1h
Mean	2.83	3.25	3.96	3.33	3.12	3.8	3.53	3.35
Total	598	685	835	702	658	802	745	707
Median	4.00	3.00	4.00	4.00	4.00	4.00	3.00	4.00
Dominant	4.00	2.00	4.00	4.00	4.00	5.00	4.00	4.00
Standard deviation	1.02	1.13	1.05	1.04	1.08	1.21	1.11	1.03
25th percentile	3.00	2.00	3.00	3.00	3.00	3.00	2.00	3.00
75th percentile	5.00	4.00	5.00	5.00	4.00	5.00	4.00	4.00
Coefficient of variation	26.49%	37.06%	26.88%	27.01%	32.14%	31.93%	34.94%	27.66%
5% trimmed mean	3.91	3.07	3.99	3.90	3.40	3.87	3.20	3.76

N = 211.

Source: own elaboration.

The results show that the most important motivator for considering ESG factors in M&A is managerial awareness (1c), followed by ESG regulations (1a), whose enforcement in business activities is becoming increasingly rigorous. Pressure from investors and regulatory bodies to disclose ESG performance has the smallest impact on considering ESG factors in M&A.

The results show that respondents considered the most important statement to be that high ESG assessments are ambiguous as a short-term benefit for achieving higher financial results following M&A transactions. They also agreed that the drop in ROA is greater for buyers with low ESG scores as a result of M&A. The statements with the least agreement were that there is a drop in buyers' ROA a year after conducting an M&A transaction, and that M&A is conducted to gain a competitive advantage in sustainable development. Table 5 presents the remaining descriptive statistics for the responses.

Table 5. Descriptive statistics for responses relating to the impact of M&A on financial results

Statistic	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j	2k	2l
Mean	2.83	3.25	3.96	3.33	3.12	3.8	3.53	3.35	3.66	4.01	3.27	3.48
Total	598	685	835	702	658	802	745	707	772	846	690	735
Median	3.00	3.00	4.00	4,00	3.00	4.00	4.00	3,00	4.00	4.00	4.00	4.00
Dominant	2.00	3.00	4.00	4.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00
Standard deviation	0.95	0.97	0.76	1.13	1.01	0.86	0.92	0.76	0.98	0.67	1.10	0.95
25th centile	2.00	3.00	4.00	2.00	2.00	3.00	3.00	3.00	3.00	4.00	2.00	3.00
75th percentile	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Statistic	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j	2k	2l
Coef-ficient of varia-tion	33.71%	29.97%	19.14%	33.81%	32.37%	22.50%	26.12%	22.75%	26.75%	16.68%	33.49%	27.39%
5% trimmed mean	2.82	3.25	3.99	3.34	3.12	3.84	3.54	3.36	3.68	4.04	3.26	3.50

N = 211.

Source: own elaboration.

Tables 6 and 7 present the ANOVA results examining differences in the motivations for considering ESG factors in M&A across firms, based on their size and share of foreign capital.

Table 6. ANOVA results regarding differences in motivations for considering ESG factors in M&A between firms based on their size

Statement	p-test values					
	Kołmogorow--Smirnow	Shapiro–Wilk	Levene test	ANOVA	Welch	Kruskal-Wallis
1a	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1b	<0.001	<0.001	0.803	0.158	–	0.182
1c	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1d	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1e	<0.001	<0.001	0.011	<0.001	0.002	0.001
1f	<0.001	<0.001	0.007	<0.001	<0.001	<0.001
1g	<0.001	<0.001	0.091	<0.001	<0.001	<0.001
1h	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Note: The "-" in the Welch column indicates that, based on results of the Levene test, robust tests for equality of means were not required.

Source: own elaboration.

Table 7. ANOVA results regarding differences in the motivations for considering ESG factors in M&A between firms based on the share of foreign capital

Statement	p-test values					
	Kołmogorow--Smirnow	Shapiro–Wilk	Levene test	ANOVA	Welch	Kruskal-Wallis
1a	<0.001	<0.001	0.139	0.276	–	0.297
1b	<0.001	<0.001	0.777	0.867	–	0.779
1c	<0.001	<0.001	0.154	0.314	–	0.250
1d	<0.001	<0.001	0.136	0.366	–	0.393
1e	<0.001	<0.001	0.019	0.050	0.001	0.034
1f	<0.001	<0.001	0.034	0.347	0.069	0.463

Statement	p-test values					
	Kołmogorow--Smirnow	Shapiro–Wilk	Levene test	ANOVA	Welch	Kruskal-Wallis
1g	<0.001	<0.001	0.692	0.460	–	0.490
1h	<0.001	<0.001	0.137	0.059	–	0.042

Note 1: The "-" in the Welch column indicates that, based on results of the Levene test, robust tests for equality of means were not required.

Note 2: For question 1f, there is a discrepancy in the conclusion of the null hypothesis test between the Welch test (significance = 0.069) and the Kruskal-Wallis test (significance = 0.463). In this case, the result of the non-parametric test was considered more reliable and was therefore accepted.

Source: own elaboration.

Tables 8 and 9 present the ANOVA results examining differences in the impact of M&A on financial results across firms, based on their size and share of foreign capital.

Table 8. ANOVA results regarding differences in the impact of M&A on financial results among firms, based on their size

Statement	p-test values					
	Kołmogorow--Smirnow	Shapiro–Wilk	Levene test	ANOVA	Welch	Kruskal-Wallis
2a	<0.001	<0.001	0.033	<0.001	<0.001	<0.001
2b	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2c	<0.001	<0.001	0.026	0.010	0.013	0.031
2d	<0.001	<0.001	0.649	0.008	–	0.005
2e	<0.001	<0.001	0.054	0.014	0.062	0,007
2f	<0.001	<0.001	<0.001	<0.001	0.001	0.002
2g	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2h	<0.001	<0.001	0.709	0.001	–	0.003
2i	<0.001	<0.001	0.028	0.021	0.028	0.019
2j	<0.001	<0.001	0.908	0.238	–	0.159
2k	<0.001	<0.001	0.103	0.003	–	0.004
2l	<0.001	<0.001	0.214	0.003	–	0.003

Note 1: The "-" in the Welch column indicates that, based on the results of the Levene test, robust tests for equality of means were not required.

Source: own elaboration.

Table 9. ANOVA results regarding differences in the impact of M&A on financial results between companies, based on their share of foreign capital

Statement	p-test values					
	Kołmogorow-Smirnow	Shapiro–Wilk	Levene test	ANOVA	Welch	Kruskal-Wallis
2a	<0.001	<0.001	0.125	0.283	–	0.335
2b	<0.001	<0.001	0.142	0.654	–	0.643
2c	<0.001	<0.001	0.961	0.831	–	0.689
2d	<0.001	<0.001	0.007	0.719	0.371	0.744
2e	<0.001	<0.001	0.546	0.183	–	0.155
2f	<0.001	<0.001	0.018	0.785	0.820	0.814
2g	<0.001	<0.001	0.338	0.432	–	0.359
2h	<0.001	<0.001	0.129	0.506	–	0.521
2i	<0.001	<0.001	0.888	0.796	–	0.668
2j	<0.001	<0.001	0.452	0.554	–	0.699
2k	<0.001	<0.001	0.009	0.395	0.349	0.421
2l	<0.001	<0.001	0.059	0.588	0.503	0.690

Note: The "-" in the Welch column indicates that, based on results of the Levene test, robust tests for equality of means were not required.

Source: own elaboration.

Based on the research and the results presented in Tables 6–9, collective summaries are given in Tables 10–17. These tables indicate, for each question, whether there is a statistically significant difference:

- in the motivations for considering ESG factors in M&A between firms, based on their size and share of foreign capital (Tables 10–13),
- in the impact of M&A on the financial results between companies, based on their size and share of foreign capital (Tables 14–17).

Table 10. Simplified ANOVA results: Differences in motivations for considering ESG factors in M&A between companies, based on size

Question	1a	1b	1c	1d	1e	1f	1g	1h
Is there a difference (1 = YES, 0 = NO)	1	0	1	1	1	1	1	1

Source: own elaboration.

The research revealed that for questions 1a and 1c–1h, there is a statistically significant difference in motivations for considering ESG factors in M&A between firms based on their size. As shown in Table 11, motivations are greater in large and very large companies, which may suggest that larger companies place greater emphasis on the importance of ESG for the success of M&A. However, for question 1b (the effect of image), no significant difference was found, although larger companies rated image expected after M&A as more important.

Table 11. Impact of firm size on responses to the question: What is the importance of ESG factors in motivations for considering ESG factors in M&A? (mean value)

Firm size	Small (0–49)	Medium (50–249)	Large (250–999)	Very large (1000+)
n	27	85	69	30
Statement	Mean	Mean	Mean	Mean
1a	3.11	3.67	4.19	4.27
1b	2.78	3.00	3.09	3.43
1c	3.19	3.76	4.19	4.30
1d	3.19	3.71	4.04	4.37
1e	2.70	3.26	3.68	3.53
1f	3.04	3.64	4.04	4.30
1g	2.41	3.07	3.51	3.43
1h	3.04	3.49	4.07	4.17

Source: own elaboration.

Share of foreign capital impacts motivations for considering ESG factors only for two items: expected financial effects (1e), and ESG risk assessment (1h).

Table 12. Simplified ANOVA results: Differences in motivations for considering ESG factors in M&A between companies, based on the share of foreign capital

Question	1a	1b	1c	1d	1e	1f	1g	1h
Is there a difference (1 = YES, 0 = NO)	0	0	0	0	1	0	0	1

Source: own elaboration.

In both cases, the highest impact assessments of ESG factors on the success of M&A were from companies with foreign capital participation ranging from 51% to 75%. This suggests that WSE companies with majority – but not full – foreign capital are more aware of ESG regulations and the benefits of complying with them (Table 13).

Table 13. Impact of share of foreign capital on responses to the question: What is the importance of ESG factors in motivations for considering ESG factors in M&A? (mean value)

Share of foreign capital	0%	1–25%	26–50%	51–75%	76–100%
n	74	47	53	11	26
Question	Mean	Mean	Mean	Mean	Mean
1a	3.88	3.72	3.74	4.36	4.04
1b	3.03	3.13	2.98	3.36	3.08
1c	3.92	3.83	3.81	4.55	3.92
1d	3.82	3.81	3.75	4.45	3.88
1e	3.47	3.28	3.25	4.18	3.12
1f	3.76	3.70	3.66	4.36	4.04

Share of foreign capital	0%	1–25%	26–50%	51–75%	76–100%
n	74	47	53	11	26
Question	Mean	Mean	Mean	Mean	Mean
1g	3.24	3.19	2.96	3.55	3.27
1h	3.82	3.62	3.47	4.36	3.85

Source: own elaboration.

No significant differences were found for the remaining motivations by share of foreign capital.

The next stage of analysis (Table 14) shows that for all the questions relating to the impact of M&A on financial results, excluding question 2j, there were significant differences in assessments by firm size.

Table 14. Simplified ANOVA results: Differences in the impact of M&A on financial results between companies, based on size

Question:	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j	2k	2l
Is there a difference (1 = YES, 0 = NO)	1	1	1	1	1	1	1	1	1	0	1	1

Source: own elaboration.

For question 2j ("Are high ESG assessments ambiguous as a short-term benefit for achieving higher financial results after M&A?"), no differences were found by firm size. This suggests that both small and large firms agree that high ESG scores before M&A do not guarantee short-term financial gains.

For question 2a ("There is concern that as a result of M&A there will be a drop in buyers' ROA one year after transactions"), concerns are higher among smaller companies, possibly due to a lack of ESG strategies, and the costs of adapting operations to ESG requirements reducing profitability post-M&A (Table 15).

Table 15. Impact of firm size on responses to the question: How do M&A impact financial results on the WSE, taking into account ESG factors? (mean values)

Firm size	Small (0–49)	Medium (50–249)	Large (250–999)	Very large (1000+)
n	27	85	69	30
Question	Mean	Mean	Mean	Mean
2a	3.56	2.78	2.77	2.50
2b	3.85	2.93	3.28	3.53
2c	4.04	3.75	4.07	4.20
2d	2.96	3.13	3.54	3.73
2e	3.00	3.01	3.06	3.67
2f	4.22	3.54	3.86	4.03

Firm size	Small (0–49)	Medium (50–249)	Large (250–999)	Very large (1000+)
n	27	85	69	30
Question	Mean	Mean	Mean	Mean
2g	3.85	3.28	3.49	4.03
2h	3.74	3.13	3.43	3.43
2i	3.26	3.61	3.91	3.57
2j	3.93	4.00	3.96	4.23
2k	2.81	3.11	3.46	3.70
2l	3.19	3.34	3.55	4.00

Source: own elaboration.

In the next analysis (Table 16), companies largely agreed that the share of foreign capital does not impact the firm's financial results after M&A, considering ESG factors.

Table 16. Simplified ANOVA results: Differences in the impact of M&A on financial results between companies, based on the share of foreign capital

Question	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j	2k	2l
Is there a difference (1 = YES, 0 = NO)	0	0	0	0	0	0	0	0	0	0	0	0

Source: own elaboration.

The lack of impact is confirmed by the results presented in Table 17.

Table 17. Impact of share of foreign capital on responses to the question: How do M&A impact financial results on the WSE when considering ESG factors? (mean value)

Share of foreign capital	0%	1–25%	26–50%	51–75%	76–100%
n	74	47	53	11	26
Question	Mean	Mean	Mean	Mean	Mean
2a	2.82	2.89	2.98	2.36	2.65
2b	3.35	3.21	3.25	2.91	3.15
2c	4.01	3.96	3.94	3.73	3.92
2d	3.32	3.38	3.21	3.73	3.31
2e	3.07	3.28	2.92	3.64	3.15
2f	3.86	3.83	3.77	3.82	3.62
2g	3.62	3.45	3.47	3.91	3.38
2h	3.35	3.38	3.43	3.00	3.27
2i	3.76	3.66	3.53	3.64	3.65
2j	3.93	4.0	3.96	4.09	4.12
2k	3.34	3.34	3.04	3.64	3.27
2l	3.36	3.55	3.49	3.82	3.54

Source: own elaboration.

The diversity of responses indicates individual experiences or expectations regarding the impact of ESG on financial results in M&A, regardless of the proportion of foreign capital participation. Overall, the differences in the responses are minor, which suggests that foreign capital alone does not determine how the impact of ESG on financial performance in M&A is assessed.

To summarise, the research has shown that firm size drives differences between companies, both in most motivations for considering ESG factors in M&A and in the perceived impact of ESG in M&A on financial results. Conversely, the share of foreign capital in WSE-listed companies produced no differences for the majority of motivations for considering ESG factors in M&A or for any of the motivations related to the impact of ESG factors in M&A on financial performance.

Conclusions and discussion

The consideration of ESG factors in M&A on stock exchanges is a complex and multi-threaded issue of increasing importance in today's social, economic and regulatory environment. Research in this area should take into consideration a range of aspects.

Despite the growing number of ESG regulations, particularly those focusing on environmental aspects, a review of the subject literature reveals a research gap specifically addressing ESG factors in M&A transactions. Thus, this study aimed to assess the impact of ESG factors on M&A transactions. The aim was achieved by studying companies listed on the WSE using data obtained from a research questionnaire.

We focused on understanding why companies consider ESG factors during M&A transactions. The research provided us with detailed answers to the two main questions (Q1 and Q2) and two related sub-questions (Q1.A, Q1.B, Q2.A, and Q2.B).

The research allowed us to examine the motivations and effects of considering ESG factors in M&A. Respondents identified managerial awareness as the most important motivator, which increased with firm size. The next most important motivations were increasing regulatory requirements – including compliance with ESG regulations and codes of corporate governance. By contrast, the image effect was of least importance, although it was more important for large and very large companies. The respondents generally agreed that factoring in ESG into M&A transactions does not guarantee improved short-term financial results. This assessment varied by firm size, while the share of foreign capital was not significant.

Our findings largely confirm those found in the literature, which suggest that M&A transactions are smoother and less costly when firms have a high ESG rating (Cardillo and Harasheh 2023; Ma 2023). This was confirmed by WSE-listed companies, which ascribed managerial awareness as the greatest importance when considering ESG factors in the M&A transactions (Q1). Regulatory requirements were the second most important motivator. However, unlike previous studies where acquiring a company with strong ESG performance helps build reputation and reduces compliance risk (Barros et al. 2022; Norton Rose Fulbright 2024) our respondents rated this factor as the least important. Nonetheless, it was rated higher by large and very large companies than

by small and medium-sized ones, which can be interpreted as a reluctance to admit to purely marketing-related motivations.

Regarding post-M&A financial performance, the literature presents conflicting views. Some studies indicate a positive correlation between high ESG performance and financial results (Mihaiu et al. 2021; Ozdemir, Binesh, and Erkmen 2022; Sihombing and Gandakusuma 2023), while others note the risk of a decline in indicators such as ROE or ROA (Feng, 2021; Zrigui, Khanchel, and Lassoued 2024). Our findings echo this ambiguity – respondents expressed the greatest concerns about whether high ESG ratings translate into immediate financial results. Notably, the significant impact of ESG considerations on financial performance growth was identified as the most uncertain factor across all companies, regardless of size and foreign capital composition. The perceived magnitude of this impact increases both with firm size and the share of foreign capital in the company's structure.

Our research results found no clear differences resulting from foreign capital participation, echoing the existing literature. Partial foreign capital participation (51–75%) was associated with the highest valuation of ESG's strategic importance, while companies with entirely domestic or foreign ownership exhibited more balanced assessments.

Our findings significantly fill the research gap regarding how firm size and share of foreign capital in listed companies affect M&A transactions, considering ESG factors. It also aligns with calls in the literature to deepen research into these factors (Barros et al. 2022; Rahman and Wu 2024).

Recent studies contain a comprehensive analysis of the impact of ESG factors on the financial results of companies involved in M&A, disaggregating the effects of Environmental, Social, and Governance dimensions. Huang et al. (2023) demonstrate the greater role of the Social and Environmental pillars in M&A success, while Teti, Dell'Acqua, and Bonsi (2022) identify Governance as the determining factor. These contradictory findings may result from different research approaches, observation periods, and methods of weighting the pillars, suggesting a need for meta-analyses that focus on ESG pillars with sectoral/industry and geographical differentiation. The present study did not analyse the impact of the individual factors separately; this could be an avenue for future research, especially given that companies on the Polish market prioritise the environmental factor in their ESG strategies, at the expense of the Social and Governance dimensions.

Our data set is limited in terms of the number of companies studied, which is the result of the size of the WSE. While the WSE attracts both domestic and foreign investors, offering a wide range of investment opportunities, it still lags behind the major exchanges in Western Europe in terms of turnover and capitalisation. Nevertheless, it is a leader in the region in terms of the number of listed companies and the dynamic development of the market.

A review of the literature underscores the need to improve the transparency of ESG assessment methods through regulatory standardisation of indicators and alignment with EU requirements such as the CSRD. The introduction of new regulations should be accompanied by cost-benefit analyses, which would have a particularly positive impact on investment decisions

involving M&A. Cross-border transactions remain a particular challenge, requiring deeper regulatory harmonisation at both European and global levels to reduce the risk of institutional mismatches.

Our analysis of our findings and the existing literature shows that companies should treat ESG aspects as an integral part of M&A, rather than merely as a reputational factor. At the same time, firms must consider the short-term costs of implementing ESG standards, especially those related to compliance and system integration, which may reduce financial performance in the initial years following a transaction. For this reason, managers should establish "cost buffers" and clearly communicate to investors the long-term perspective of benefits.

From an economic policy perspective, standardising ESG reporting standards would improve data comparability and reduce assessment costs associated with M&A transactions. Rahman and Wu (2024) note another, more general, non-financial benefit of M&A: such activities can also effectively shape companies' performance in environmental and social aspects that are particularly important to society. Therefore, policymakers and governments can treat M&A activities as a mechanism to quickly achieve ultimate sustainability goals.

Caution is advised when generalising these results to stock exchanges in other countries due to differences in characteristics such as market size and regulatory frameworks. Further research on M&A on stock exchanges in other geographical contexts, such as other Central and Eastern European countries, the eurozone, the European Union, and broader regions, would be valuable.

Acknowledgments

This publication forms part of the 4th edition of the Inter-University Research Grants programme SGH-UEW 2023–24.

References

Barros, V., Verga Matos, P., Miranda Sarmento, J., Rino Vieira, P. (2022), *M&A activity as a driver for better ESG performance*, "Technological Forecasting and Social Change", 175, 121338, https://doi.org/10.1016/j.techfore.2021.121338

Bax, K., Bonaccolto, G., Paterlini, S. (2023), *Do lower environmental, social, and governance (ESG) rated companies have higher systemic impact? Empirical evidence from Europe and the United States*, "Corporate Social Responsibility and Environmental Management", 30 (3), pp. 1406–1420, https://doi.org/10.1002/csr.2427

Cardillo, G., Harasheh, M. (2023), *Stay close to me: What do ESG scores tell about the deal timing in M&A transactions?*, "Finance Research Letters", 51, 103498, https://doi.org/10.1016/j.frl.2022.103498

CSRD (2022), Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No. 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022L2464 (accessed: 30.10.2024).

Deloitte (2024), *Wpływ ESG na transakcje M&A (cz. I). Ramy prawne*, https://www.deloitte.com/pl/pl/Industries/financial-services/perspectives/wplyw-ESG-na-transakcje-MA-czesc-I.html (accessed: 30.11.2024).

DePamphilis, D.M. (2014), *An Introduction to Mergers, Acquisitions, and Other Restructuring Activities*, [in:] D.M. DePamphilis, *Mergers, Acquisitions, and Other Restructuring Activities*, Academic Press – Elsevier, Amsterdam–Boston–London–New York–Oxford–Paris–San Diego–San Francisco–Singapore–Sydney–Tokyo, pp. 3–40, https://doi.org/10.1016/B978-0-12-385487-2.00001-5

Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on corporate sustainability due diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859, https://eur-lex.europa.eu/eli/dir/2024/1760/oj (accessed: 30.10.2024).

European Green Deal, COM/2019/640 final, Communication from the Commission to the European Parliament, the European Council, the Council, The European Economic and Social Committee and the Committee of the Regions. The European Green Deal, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN (accessed: 30.10.2024).

Feng, X. (2021), *The role of ESG in acquirers' performance change after M&A deals*, "Green Finance", 3 (3), pp. 287–318, https://doi.org/10.3934/GF.2021015

Field, A. (2013), *Discovering statistics using IBM SPSS Statistics*, Sage Publications, London.

GPW (2024), *GPW statistics*, https://www.gpw.pl/gpw-statistics (accessed: 3.10.2024).

Grobelny, P., Stradomski, M., Stobiecki, P. (2018), *Determinanty aktywności na rynku fuzji i przejęć w Polsce*, CeDeWu, Warszawa.

Houston, J.F., Shan, H. (2022), *Corporate ESG Profiles and Banking Relationships*, "Review of Financial Studies", 35 (7), pp. 3373–3417, https://doi.org/10.1093/rfs/hhab125

Huang, C.J., Ke, W.C., Chiang, R.P.Y., Jhong, Y.C. (2023), *Which of environmental, social, and governance pillars can improve merger and acquisition performance?*, "Journal of Cleaner Production", 398, 136475, https://doi.org/10.1016/j.jclepro.2023.136475

Kim, B.J., Jung, J.Y., Cho, S.W. (2022), *Can ESG mitigate the diversification discount in cross-border M&A?*, "Borsa Istanbul Review", 22 (3), pp. 607–615, https://doi.org/10.1016/j.bir.2021.09.002

Korpus, J. (2014), *Kluczowe czynniki sukcesu i przyczyny niepowodzeń transakcji*, [in:] J. Korpus (ed.), *Fuzje i przejęcia* Wydawnictwa Profesjonalne PWN, Warszawa, pp. 92–117.

KPMG (2023), *ESG Due Diligence in M&A. Clarity on Mergers & Acquisitions*, https://assets.kpmg.com/content/dam/kpmgsites/ch/pdf/esg-due-diligence-mergers-acquisitions.pdf (accessed: 20.11.2024).

Lantz, B. (2013), *The impact of sample non-normality on ANOVA and alternative methods*, "British Journal of Mathematical and Statistical Psychology", 66 (2), pp. 224–244, https://doi.org/10.1111/j.2044-8317.2012.02047.x

Lu, M. (2021), *ESG Investing: Finding Your Motivation*, https://www.visualcapitalist.com/esg-investing-finding-your-motivation/ (accessed: 30.10.2024).

Ma, R. (2023), *The sustainable development trend in environmental, social, and governance issues and stakeholder engagement: Evidence from mergers and acquisitions in China*, "Corporate Social Responsibility and Environmental Management", 30 (6), pp. 3159–3173, https://doi.org/10.1002/csr.2544

Ma, R., Pan, X., Suardi, S. (2023), *Shareholder value maximization via corporate ESG performance: evidence from mergers and acquisitions in China*, "Applied Economics", 56 (58), pp. 8529–8545, https://doi.org/10.1080/00036846.2023.2291095

Markiewicz, M. (2021), *Fuzje i przejęcia międzynarodowe w sektorze bankowym*, Wydawnictwo Uniwersytetu Gdańskiego, Sopot.

McKinsey & Company (2024), *Top M&A trends in 2024: Blueprint for success in the next wave of deals*, https://www.mckinsey.com/capabilities/m-and-a/our-insights/top-m-and-a-trends-in-2024-blueprint-for-success-in-the-next-wave-of-deals (accessed: 30.11.2024).

Mihaiu, D.M., Șerban, R.A., Opreana, A., Țichindelean, M., Brătian, V., Barbu, L. (2021a), *The Impact of Mergers and Acquisitions and Sustainability on Company Performance in the Pharmaceutical Sector*, "Sustainability", 13 (12), 6525, https://doi.org/10.3390/su13126525

Mooi, E., Sarstedt, M. (2011), *A concise guide to market research: The process, data, and methods using IBM SPSS Statistics*, Springer, Berlin–Heidelberg.

Napiórkowski, T.M. (2022), *Praktyczna analiza danych za pomocą metod ilościowych*, Oficyna Wydawnicza SGH, Warszawa.

Nguyen, D.T., Michayluk, D., Van de Venter, G., Walker, S. (2024), *Improvement in sustainability: Evidence from the mergers and acquisitions market*, "Australian Journal of Management", 50 (2), https://doi.org/10.1177/03128962231222824

Norton Rose Fulbright (2024), *Global M&A trends and risks 2024. Consolidation and digital transformation to propel global M&A despite rising regulatory burden*, https://ionanalytics.com/wp-content/uploads/2024/01/NRF-global_ma_report_2024_v8_JF.pdf (accessed: 15.10.2024).

Ozdemir, O., Binesh, F., Erkmen, E. (2022), *The effect of target's CSR performance on M&A deal premiums: a case for service firms*, "Review of Managerial Science", 16 (4), pp. 1001–1034, https://doi.org/10.1007/s11846-021-00471-y

Podmioty rynku kapitałowego, n.d., https://www.gpw.pl/pub/GPW/files/Podmioty_rynku_kapitalowego.pdf (accessed: 1.10.2024).

Rahman, J., Wu, J. (2024), *M&A activity and ESG performance: evidence from China*, "Managerial Finance", 50 (1), pp. 179–197, https://doi.org/10.1108/MF-02-2023-0103

Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0852 (accessed: 30.10.2024).

Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism, https://eur-lex.europa.eu/eli/reg/2023/956 (accessed: 30.10.2024).

Rozwadowska, B. (2012), *Fuzje i przejęcia. Dlaczego kończą się (nie)powodzeniem*, Wydawnictwo EMKA, Warszawa.

Sihombing, M., Gandakusuma, I. (2023), *ESG impact on post M&A company value in Southeast Asia*, "Jurnal Aplikasi Akuntansi", 8 (1), pp. 67–74, https://doi.org/10.29303/jaa.v8i1.271

Tampakoudis, I., Anagnostopoulou, E. (2020), *The effect of mergers and acquisitions on environmental, social and governance performance and market value: Evidence from EU acquirers*, "Business Strategy and the Environment", 29 (5), pp. 1865–1875, https://doi.org/10.1002/bse.2475

Teti, E., Dell'Acqua, A., Bonsi, P. (2022), *Detangling the role of environmental, social, and governance factors on M&A performance*, "Corporate Social Responsibility and Environmental Management", 29 (5), pp. 1768–1781, https://doi.org/10.1002/csr.2325

UN Global Compact (2024), *"Who Cares Wins": transforming finance and economics through ESG*, https://www.sustainabilityinbusiness.org/blogs/who-cares-wins-the-report-that-started-esg (accessed: 30.09.2024).

Van Hecke, T. (2012), *Power study of anova versus Kruskal-Wallis test*, "Journal of Statistics and Management System", 15 (2–3), pp. 241–247, https://doi.org/10.1080/09720510.2012.10701623

Xin, Z., Zhang, Z., Xiang, C. (2024), *Do suppliers value clients' ESG profiles? Evidence from Chinese firms*, "International Review of Economics and Finance", 91, pp. 241–258 https://doi.org/10.1016/j.iref.2024.01.052

Zheng, Z., Li, J., Ren, X., Guo, J.M. (2023), *Does corporate ESG create value? New evidence from M&As in China*, "Pacific Basin Finance Journal", 77, 101916, https://doi.org/10.1016/j.pacfin.2022.101916

Zrigui, M., Khanchel, I., Lassoued, N. (2024), *Does environmental, social and governance performance affect acquisition premium?*, "Review of International Business and Strategy", 34 (4), pp. 469–494, https://doi.org/10.1108/RIBS-07-2023-0076

Motywacje i skutki w procesach fuzji i przejęć na GPW przy uwzględnianiu czynników ESG

Głównym celem artykułu jest określenie wpływu czynników ESG na procesy fuzji i przejęć spółek. Badanie zostało przeprowadzone na spółkach notowanych na Giełdzie Papierów Wartościowych w Warszawie, która odgrywa znaczącą rolę na europejskich rynkach kapitałowych, szczególnie w regionie Europy Środkowo-Wschodniej. Jest największą giełdą w tym regionie pod względem kapitalizacji i liczby notowanych spółek. Dane do badania zostały zebrane w 2024 r. przy użyciu metod CATI i CAWI od spółek notowanych na GPW, które uczestniczyły w fuzjach i przejęciach w ciągu ostatnich 5 lat. Analiza danych została przeprowadzona przy użyciu statystyk opisowych i następujących testów: ANOVA, Kołmogorowa-Smirnowa, Shapiro–Wilka, Levene'a, Welcha i Kruskala-Wallisa. W wyniku badania przeanalizowano motywy, jakimi kierują się spółki przeprowadzające transakcje M&A, przy uwzględnieniu czynników ESG. Wyniki wskazują, że spółki z GPW największy wpływ na uwzględnienie czynników ESG w procesie M&A przypisywały świadomości menedżerskiej. Uzyskano szczegółowe informacje na temat różnych motywacji spółek giełdowych przy uwzględnieniu czynników ESG w transakcjach M&A oraz wpływu tych transakcji na wyniki finansowe tych spółek. Zbadano również wpływ wielkości spółki i własności kapitału na decyzje o uwzględnieniu czynników ESG w procesach M&A. Wyniki te stanowią ważny wkład w dotychczasowe badania w obszarze M&A w regionie Europy Środkowo-Wschodniej.

Słowa kluczowe: fuzje i przejęcia, motywacje, ESG, Giełda Papierów Wartościowych w Warszawie

Comparative Economic Research. Central and Eastern Europe
Volume 28, Number 4, 2025
https://doi.org/10.18778/1508-2008.28.33

A Change in Volatility or Asymmetry? A Monetary Transmission Mechanism in Small Open European Economies during the Financial Crisis

Przemysław Włodarczyk https://orcid.org/0000-0003-1316-6328
Ph.D., Assistant Professor, University of Lodz, Department of Economic Policy, Faculty of Economics and Sociology, e-mail: przemyslaw.wlodarczyk@uni.lodz.pl

Abstract

The article analyses the influence of crisis-induced changes in economic activity on the monetary transmission mechanism in the small open economies of Czechia, Hungary, Poland, and Sweden from 2000: 1 to 2016: 5 using the Markov Switching Structural Bayesian Vector Autoregressive models.
The results confirm that in countries where the exchange rate transmission channel is relatively weak (Hungary and Sweden), changes in volatilities coincide with changes in the coefficients of the monetary transmission mechanism, reducing the efficiency of a monetary policy during a crisis. The changes of the coefficients occurred in neither Poland nor Czechia, where the exchange rate pass-through was not closed completely. The results imply that in small open economies, public authorities' efforts to sustain exchange rate pass-through may critically affect their ability to retain monetary control during a crisis.

Keywords: monetary transmission mechanism, economic crisis, small open economy, Markov Switching Bayesian Structural Vector Autoregression (MSBSVAR)

JEL: E30, E52, E58

Funding information: University of Lodz, Department of Economic Policy, Faculty of Economics and Sociology
Declaration regarding the use of GAI tools: Not used.
Conflicts of interests: None.
Ethical considerations: The Author assures of no violations of publication ethics and takes full responsibility for the content of the publication.
Received: 10.07.2025. Verified: 18.09.2025. Accepted: 3.11.2025

Introduction

Despite the ongoing development of theoretical and empirical economics, the economics community is still polarised over many unresolved and widely debated issues. One fundamental problem faced by economic science is related to controversies concerning the nature of changes in economic activity that accompany economic crises. Although leading economists have made considerable efforts to explain these phenomena, especially in the aftermath of the global financial crisis (GFC) of 2008, it is still widely disputed whether a crisis should be viewed as a period of rapidly increasing volatility of economic processes, as proposed by Stock and Watson (2012) and Sims and Zha (2006b), or as a period of asymmetric reactions from economic entities, as proposed by Hubrich and Tetlow (2015), among authors. This ambiguity has serious consequences for the formulation of normative economic programs and methodological approaches, due to uncertainty over the proper use of standard econometric models in modelling crisis periods.

If a crisis results solely from a sudden change in the volatility of economic processes, traditional economic policy instruments retain their functionality, although their impact may need to be strengthened to manage more erratic economic processes. Accordingly, standard models can be successfully applied to model and forecast economic behaviour during crises. Conversely, if a crisis results in an asymmetric change in the nature of economic relationships, altering the parameters that describe these relationships, standard economic policy instruments may no longer effectively influence economic activity in that period. Similarly, models used to describe and forecast economic behaviour should account for these new circumstances.

These dilemmas also affect the theory of monetary policy, including the concept of the monetary transmission mechanism (MTM). As the MTM is potentially dependent on the expectations of economic agents, which may vary between periods of crisis and prosperity, our knowledge about how monetary policy should be implemented during economic downturns is seriously challenged. The problem of cyclical changes in the MTM is particularly pronounced in small open economies for at least two reasons. First, these economies are more vulnerable to economic downturns because they are more fragile and sensitive to variations in global economic conditions; the use of appropriate and efficient anticyclical policies is therefore more important for them. Second, using traditional methods to model these economies poses more technical problems; as many were or are in transition, the available data series are relatively short. When data series are short, the problem of crisis-induced changes in economic relationships cannot be solved by adjusting data samples, as is sometimes done in studies on developed economies.

Given these considerations, this study aims to provide new evidence on the nature of MTM changes observed during the GFC in the small open economies of the three non-eurozone Visegrad Group countries (i.e., Czechia, Hungary, and Poland), with Sweden serving as a benchmark. The analyses are performed within the Markov Switching Bayesian Structural Vector Autoregression (MSBSVAR) framework and are in line with earlier works by Sims, Wagonner, and Zha (2008) and Hubrich and Tetlow (2015). This approach is flexible enough to account for both the changes in variances and the changes in the coefficients of the estimated econometric model, which makes it suitable to address the research question. The results of the assessment are

ambiguous. In Hungary and Sweden, changes in volatilities coincided with changes in the coefficients of the MTM, while in Czechia and Poland, the crisis resulted only in changes in the volatility of economic processes.

To explain the observed discrepancies in reactions, further investigation was performed. An analysis of Impulse Reaction Functions (IRFs) from the estimated models indicated that the changes in coefficients in the crisis phase occurred in countries where the exchange rate transmission channel was relatively weak. This is mostly due to high levels of indebtedness, which raised concerns about a possible procyclical reaction of liabilities in response to monetary expansion and exchange rate depreciation. In contrast, Poland and Czechia, where debt was kept at reasonable levels, maintained control over the exchange rate transmission channel and were able to use traditional policy instruments, including monetary expansion and exchange rate depreciation, to counteract any negative changes in economic activity throughout the crisis phase. As a result, it can be concluded that efforts by public authorities in small open economies to sustain exchange rate pass-through critically affect their ability to retain monetary control during crises. This explanation offers a new perspective on the fundamental role of fiscal and monetary policy coordination in preserving policy reaction capabilities during economic downturns, a conclusion that is very much overlooked in the existing economic literature.

The article is structured as follows. Part 2 analyses current theories on the evolution of economic variables during a crisis, with particular attention to the monetary policy transmission problem. It also briefly reviews the existing empirical evidence and highlights its main weaknesses. Part 3 describes the model selected for empirical analyses. Part 4 outlines the data used, discusses challenges in model identification, and details the estimation techniques used. Part 5 presents the research findings. The final section summarises the results and briefly discusses their policy implications.

Theoretical background and a review of the empirical evidence

The MTM is relatively well covered in the modern economic literature. MTM analyses gained momentum with the introduction of multivariate structural vector autoregressive (SVAR) models in the seminal works by Sims (1972; 1980; 1986). SVAR models effectively represent the relatively complex system of relationships within the MTM because their inherent overparametrisation allows each system variable to be studied with respect to its impact on all other variables.

The search for a robust specification of SVAR systems for MTM analysis resulted in the introduction of various schemes to identify monetary policy shocks. Sims (1986), Bernanke and Blinder (1992), Gordon and Leeper (1994), Bernanke and Mihov (1998), Christiano, Eichenbaum, and Evans (1999; 2005), Sims and Zha (2006a), Altig et al. (2011), Christiano, Trabandt, and Walentin (2011) used different versions of short-run restrictions. Blanchard and Quah (1989) pioneered the use of long-run identification restrictions, mainly in studies on the impact of technology shocks on labour (for a critical summary, see, e.g., Chari, Kehoe, and McGrattan 2005). Faust

(1998) and Uhlig (2005) proposed schemes based on sign restrictions, which proved especially useful in quadratic programming and Bayesian analysis.

Despite the rapidly growing number of complex identification schemes that utilise increasingly sophisticated assumptions, no consensus has been reached as to the shape of the MTM. As a result, there has recently been a renaissance of the standard Cholesky identification scheme based on a simple arrangement of the order of model variables. The main cause of the renaissance was researchers' growing awareness that complex identification schemes are often difficult to justify on theoretical grounds. They also conflict with the fundamental idea behind VAR modelling, which was intended to be relatively atheoretical and therefore distinct from traditional structural models proposed by the Cowles Commission and the computable and dynamic stochastic general equilibrium models that followed.

The Great Moderation period (1985–2007) was characterised by relatively low economic volatility in developed economies. This stability was attributed to institutional and structural changes and was considered a permanent feature of the Western economic system (Stock and Watson 2002). It encouraged economists to focus on the mechanisms governing monetary policy during "good times", which could be easily identified using traditional econometric methods. However, the Great Recession of 2007–2010 revived the need to better understand the nature of changes in economies affected by declining economic activity. Efforts to explain the changes were also evident in MTM analyses and prompted a new wave of research in this field.

Changes in the MTM of developed economies during a crisis have been recently discussed in many articles. Researchers focusing on eurozone countries – such as Ciccarelli, Maddaloni, and Peydro (2013), Aristei and Gallo (2014) or Leroy and Lucotte (2015) have shown that the effect of monetary policy on output is stronger during a crisis. Periods of greater financial stress increase competition in the banking sector because firms' and consumers' account balances are declining, and problems with finding suitable providers of capital emerge. The resulting narrowing of the spread between customer-paid rates and interbank interest rates forces banks to react more quickly to changes in monetary policy. Similar patterns have been confirmed for the United States by Debes et al. (2014), Hubrich and Tetlow (2015), Fry-Mckibbin and Zheng (2016), and Dahlhus (2017), and for a group of 20 developed OECD countries by Jansen, Potjagailo, and Wolters (2015).

Hubrich and Tetlow (2015) and Jansen, Potjagailo, and Wolters (2015) argue that expectations have a role in explaining changes in the monetary transmission process during a crisis. The idea that the expectations of economic entities influence decisions at different stages of the business cycle is not new. It was first proposed by Keynes (1936), who analysed the role of "animal spirits" in the context of investment decisions and business cycle dynamics. Modern economics increasingly includes expectations into economic modelling because individuals' confidence under systemic uncertainty significantly affects their behaviour. Silvia and Iqbal (2011) observed that when uncertainty is low and confidence is high, people work, invest, and consume more than when confidence is relatively low and uncertainty is high, i.e., during economic crises and military or political unrest. As uncertainty increases, individuals lose their confidence in economic growth, disappointed by distressed markets and companies prioritising balance sheet improvements through savings and employment rationalisation

schemes. These circumstances tend to discourage consumers from consumption and investment plans, especially if they involve borrowing money (Bloom 2009; Jansen, Potjagailo, and Wolters 2015). The dependencies lend rationality to the prediction that the public reaction to an expansionary monetary policy will be weaker during an economic downturn than during prosperity until expectations change.

However, Boyarchenko, Haddad, and Plosser (2016) noted that in developed economies, communications from monetary authorities tend to boost economic entities' confidence, even if they are not followed by changes in monetary policy. Hence, in countries where the monetary authorities manage to stabilise expectations, expansionary monetary policy may be more efficient during a crisis than in times of prosperity (Hubrich and Tetlow 2015).

Studies investigating the relationship between confidence and MTM efficiency suggest this relationship should be treated normatively. Leduc (2010), Hubrich and Tetlow (2015), and Jansen, Potjagailo, and Wolters (2015) recommend that in the acute phase of a financial crisis, monetary authorities should attempt to mitigate a negative spiralling of expectations because convincing the public that the business cycle will soon improve can be a self-fulfilling prophecy, restoring monetary policy effectiveness. Nalban (2016) compares this mechanism to a financial accelerator whereby lower interest rates increase confidence and spending, thus inducing optimism that sustains itself through higher-order effects. This is crucial for an effective monetary policy when traditional transmission channels are absent.

Changes in the MTM of small open economies during a crisis have drawn relatively little attention so far, even though these economies seem to be different from developed economies in several important respects (Nalban 2016), such as lower credibility of monetary authorities, immature financial markets, the stabilising role of the exchange rate pass-through, the likelihood of currency mismatches, and the procyclicality of capital flows.

Developed economies are relatively stable and robust to exogenous economic shocks, allowing their monetary authorities to relatively easily earn a "credibility bonus" that underpins expectation management (Boyarchenko, Haddad, and Plosser 2016). This bonus tends to be absent in small open developing economies, where memories of hyperinflation remain relatively fresh and exogenous shocks that are hard to neutralise are frequently decisive for the overall condition of the economy. It is also disputable whether economic shocks can increase competition in the financial markets of emerging economies. As these economies' financial sectors mostly depend on foreign-controlled capital, declining economic activity and returns would trigger an outflow of capital to countries with more promising economic fundamentals and growth prospects rather than increasing competition between financial institutions (Corsetti, Pesenti, and Roubini 1999), making the monetary policies of developing economies less effective during crises.

According to Frankel (2011), the exchange rate pass-through plays a larger role in small open economies, a finding empirically supported by studies on the Visegrad countries (Ca'Zorzi, Hahn, and Sanchez 2007; Bajo-Rubio and Maria-Dolores 2011; Mirdala 2014; Przystupa and Wróbel 2014). This larger role can additionally stabilise the MTM of developing economies. Based on the uncovered interest rate parity, an expansionary monetary policy understood as a reduction of the domestic

interest rate makes the domestic currency depreciate as a result of capital outflow to countries with relatively high interest rates. This, in turn, increases the exchange rate, which raises the relative costs of imports. If exchange rate changes are relatively quickly transmitted into imports' prices, then, according to Burstein, Neves, and Rebelo (2003), and Burstein, Eichenbaum, and Rebelo (2005), consumers respond by replacing imported goods with cheaper local substitutes, thus increasing domestic demand. At the same time, relatively low prices of domestic goods increase external demand. Both effects together can compensate for lower demand from domestic consumers caused by consumption being suspended in the face of economic instability. This process narrows the channel through which changes in the MTM can occur during a crisis.

The impact of the exchange rate pass-through mechanism can be mitigated by balance sheet effects resulting from currency mismatches. Because banks and companies in transitioning economies often face the problem of inadequate domestic capital funding, they sometimes seek capital abroad. Due to the international financial market incompleteness known as the "original sin", investors are unwilling to finance loans in the borrower's domestic currency (as they risk depreciation of the lender's domestic currency and the erosion of liabilities). Furthermore, the lack of appropriate hedging for foreign-currency-denominated loans in domestic currency means these organisations end up borrowing in foreign currency (Eichengreen and Hausmann 1999; Eichengreen, Hausmann, and Panizza 2002). A currency mismatch occurs because their liabilities are denominated in foreign currency while most revenues are earned in domestic currency. Exchange rate changes associated with an expansionary monetary policy shift may thrust such organisations into debt servicing problems as the total value of their liabilities increases. This may contribute to negative business cycle effects – reducing domestic demand in the wake of employment cuts and bankruptcies – and offsetting the aforementioned positive pass-through effects (Krugman 1999; Frankel 2011; for a recent account of currency mismatch issues in the Visegrad countries, see, e.g. IMF 2015 and Chui, Kuruc, and Turner 2016; for analysis of the Polish economy, see, e.g. Kapuściński 2017).

Another major difference between emerging and developed economies, closely associated with the "original sin" hypothesis and currency mismatches, is the procyclicality of capital flows. Evidence from Hausmann and Panizza (2003) and Mehl and Reynaud (2005) suggests that highly indebted countries are more exposed to foreign currency lending due to their reduced credibility. Additionally, if a country that has substantial external debt adopts an expansionary monetary policy during an economic downturn (as discussed above), its domestic currency is likely to depreciate, which can increase the total debt denominated in foreign currency. In the wake of such changes, the current account deficit and the debt-to-GDP ratio can grow, prompting investors to claim the repayment of outstanding liabilities before new debt is issued. While satisfying investors is straightforward when both the economy and tax revenues are growing, it can be very costly when government expenditure cuts coincide with an economic downturn. Such a confluence of factors can dramatically decelerate economic activity, consequently reducing the current account and further hindering the exchange rate pass-through mechanism (Frankel 2011). As a result, an inherent conflict occurs between fiscal and monetary policy goals, potentially limiting their effectiveness (Adler 2008).

Summing up the available evidence on MTM responses during a crisis, it can be concluded that in developed economies, a monetary policy is more efficient during a crisis than when the economy is expanding. This is due to at least two reasons:

1) increasing competition between banks and financial institutions;
2) the availability of a "credibility bonus" related to consumers' expectations.

It remains debatable whether both effects occur in emerging economies, given their less developed financial markets and less respected monetary authorities. The monetary policy of small open economies is likely to be less effective during a downturn when the expectations of economic entities make them shelve their consumption and investment decisions than when the economy is expanding. However, whether the effect of negative expectations will prevail is largely determined by a mix of three factors: the impact of exchange rate pass-through, the occurrence of balance sheet effects associated with currency mismatches, and the procyclicality of capital flows.

The empirical evidence on MTM in small open European economies affected by a crisis is still relatively sparse and inconclusive. Results pointing to a monetary policy's weaker impact on economic variables during economic downturn were presented for the Visegrad countries by Darvas (2013), and for Poland by Łyziak et al. (2011). According to some studies, changes in the MTM are caused by fluctuations in the volatility of the analysed processes rather than by changes in the parameters of the analysed relationships. Similar results have been reported by Dobešová et al. (2015) for Czechia and Slovakia, and by Rosoiu (2015) for Romania. Conversely, Franta, Horvath, and Rusnak (2014) and Nalban (2016) presented evidence confirming the occurrence of structural changes in the MTM, which increased the efficiency of the Czech and Romanian monetary policies during the crisis. Lastly, Myšková, Hampel, and Dobešová (2013) presented inconclusive results for the Visegrad countries. The importance of the exchange rate pass-through for explaining the performance of small open developing economies during a crisis has been noted by, inter alia, Dąbrowski, Śmiech, and Papież (2015) and Dąbrowski and Wróblewska (2016).

This paper contributes to the literature on this subject in at least two ways. Firstly, it presents new empirical evidence about the nature of crisis-induced changes in the MTM of small open economies while testing the hypothesis that the MTM of small open economies is structurally stable during a crisis. Secondly, it investigates factors that distinguish small open emerging economies from developed economies and that may explain the higher stability of MTM in the former: specifically, the exchange rate pass-through combined with the absence of balance sheet effects associated with a currency mismatch and the procyclicality of capital flows.

The Empirical Model

Recent advancements in econometrics have broadened the range of methods for modelling MTM changes. As a result, researchers use a variety of competing specifications in their analyses. A review of studies on MTM changes shows that most authors used variants of the Threshold Structural Vector Autoregressions (TSVAR) model. For example, Fry-Mckibbin and Zheng (2016) and Nalban (2016) proposed the Threshold Bayesian SVAR (TBSVAR) models, while Ciccarelli, Maddaloni, and Peydro (2013) and Jansen, Potjagailo, and Wolters (2015) chose the Panel

Threshold SVAR models, and Myšková, Hampel, and Dobešová (2013) employed a standard VAR model estimated for two separate sub-periods.

Given the purpose of this analysis, the TSVAR models are not the best choice because their specification assumes simultaneous shifts in volatilities and parameters, thus precluding some intermediary specifications. Moreover, traditional TSVAR models are vulnerable to arbitrary threshold specifications. Nonetheless, this problem can be easily resolved using appropriate Bayesian techniques (see Fry-Mckibbin and Zheng 2016; Nalban 2016).

MTM changes have also been studied with Markov Switching (Bayesian) SVARs based on heteroscedasticity assumptions. This class of models, created by Lanne, Lütkepohl, and Maciejowska (2010), Netsunajev (2013), and Kulikov and Netsunajev (2016), allows researchers to develop agnostic specifications of the MTM because shocks can be identified by assuming heteroscedasticity of the analysed time series instead of making typical assumptions about the matrix of contemporaneous parameters. Woźniak and Dromaguet (2015) proposed an alternative version of the model that combines the standard short-run identifying assumptions and the heteroscedasticity assumptions. While MS(B)SVAR models with heteroscedasticity assumptions present an interesting alternative to the standard SVAR models which identify shocks based on arbitrarily selected contemporaneous matrix restrictions – they are unsuitable for investigating the nature of MTM changes during a crisis because of the heteroscedasticity assumptions, which preclude some potentially valid specifications.

Darvas (2013), Franta, Horvath, and Rusnak (2014), and Dobešová et al. (2015) used Time-Varying Parameters SVAR (TVP-SVAR) models to analyse MTM changes. This class of models allows both the stochastic evolution of parameters and their volatility to be considered. However, the parameter drift may fail to pick up some high-frequency phenomena affecting the MTM (Hubrich and Tetlow 2015). In spite of this criticism, which discourages the use of TVP models in studies such as this one, Hubrich and Tetlow (2015), following Sims, Wagonner, and Zha (2008), propose the Markov Switching Bayesian SVAR (MSBSVAR) as a more appropriate analytical tool. This model is flexible enough to account for: changes in the volatilities of the analysed processes, changes in the parameters of structural relationships, and changes in the parameters and volatilities together.

Furthermore, because both types of changes are governed by separate Markov chains, the model precisely accounts for the time structure of changes. Lastly, the ability of the Markov switching mechanism to detect even abrupt, discrete shifts in the MTM is useful when expectations must be considered. Hence, as Hubrich and Tetlow (2015) recommended, we selected the MSBSVAR class of models to investigate the impacts of a crisis on the MTM in small open economies.

Following Sims et al. (2008), let us consider an unrestricted VAR(l, m, n) model of the form:

$$y_t' A_0\left(s_t^C\right) = \sum_{i=1}^{l} y_{t-i}' A_i\left(s_t^C\right) + \sum_{j=0}^{m} z_{t-j}' C_j\left(s_t^C\right) + \varepsilon_t' \Xi^{-1}\left(s_t^V\right), \tag{1}$$

where: y is a vector of endogenous variables, z is a vector of exogenous variables that are assumed to be at least predetermined and weakly exogenous, A_0, A_i, C_j are the matrices of the appropriate state-dependent parameters, and s_t^n for $n = \{C, V\}$ is a latent variable that describes the current state of an economy separately for parameters s_t^C and variances s_t^V.

Let us assume that the state of an economy is determined by a set of political, economic, technological, and institutional factors which are sensitive to independent shocks that can suddenly change the character of the observed economic processes. Therefore, the latent state variables meet the Markov condition and can be modelled as if they were following an irreducible, aperiodic, time-homogeneous, and ergodic Markov chain. Consequently, and following Hubrich and Tetlow (2015), the variable s_t^n takes values from the set $\{1, 2, \ldots, h^n\}$ and is governed by the first-order Markov chain given by:

$$\Pr\left(s_t^n = 1 \mid s_{t-1}^n = k\right) = p_{ik}^n \quad i,k = 1,2,\ldots,h^n, \tag{2}$$

where p_{ik}^n is the probability of an economy entering state i, provided that in the preceding period it was in state k, and the Markov transition probabilities are given by time-constant matrix P.

If we assume, for simplicity, that $x_t = \left[y_{t-1}', \ldots, y_{t-l}', z_t', \ldots, z_{t-m}'\right]$ and $A_-'\left(s_t^n\right) = \left[A_1'\left(s_t^n\right), \ldots, A_l'\left(s_t^n\right), C_0'\left(s_t^n\right), \ldots, C_m'\left(s_t^n\right)\right]$, we obtain the following equation:

$$y_t' A_0\left(s_t^C\right) = x_t' A_-\left(s_t^C\right) + \varepsilon_t' \Xi^{-1}\left(s_t^V\right). \tag{3}$$

Further, by imposing a normality restriction on the state-dependent errors using the condition:

$$\Pr\left(\varepsilon_t \mid Y^{t-l}, Z^t, S^{n,t}, A_0, A_-, \Xi\right) \sim N\left(0_\eta, I_\eta\right), \tag{4}$$

where $Y^{t-l}, Z^t, S^{n,t}$ are the vectors of variables stacked in the time dimension and $N\left(0_\eta, I_\eta\right)$ is a multivariate normal distribution with a zero mean and a unit variance, we arrive at an unrestricted Markov-Switching VAR model estimable by the Bayesian procedure proposed by Sims, Wagonner, and Zha (2008). It is the same model that Hubrich and Tetlow (2015) used for inference in their original article.

The Data

The following analysis is based on monthly data from 2000: 1–2016: 5 for the three non-eurozone Visegrad countries (V3) – Czechia, Hungary, and Poland – which are small open economies with a similar historical background. In the early 1990s, all three started transitioning to a market economy. The first and most volatile phase of this process was completed in 1995, and the whole transformation came to an end with the countries' entry into the European Union on 1 May 2004.

The institutional monetary policy framework and exchange rate regimes were adjusted in all three countries throughout the period of analysis. Inflation targeting was introduced by Czechia and Poland in January and October 1998, respectively, and by Hungary in the summer of 2001. Czechia and Poland relatively quickly established free float exchange rate regimes, introduced in June 1997 and March 2000, respectively. In Hungary, the exchange rate regime was substantially modified throughout the sample period by replacing a crawling peg with a crawling band in May 2001. Another change, which fixed the exchange rate within a ±15% band, was made in October 2001. Hungary ultimately introduced a free float currency regime in February 2008. Meanwhile, in November 2013, Czechia introduced a fixed exchange rate against the euro as an auxiliary monetary policy instrument in the environment of low interest rates.

These shifts in monetary policy frameworks and exchange rate regimes that occurred in the V3 countries during the sample period may impact both the strength and volatility of the MTM relationships and, thus, have a detrimental effect on the quality of the estimates obtained from traditional, single-regime models. The use of regime-switching models, which allow for changes in both the parameters and the variances of the underlying processes, enables us to address these concerns directly within the model specification. When the timing of these changes is taken into account, we observe that the monetary policy framework changes occurred mostly at the very beginning of the sample, which should have a marginal impact on the quality of the estimates related to the 2008–2010 GFC period. The possible impact of exchange rate regime changes on the estimates is additionally limited by the fact that the analyses are performed using the Real Effective Exchange Rate index (REER) instead of bilateral exchange rates. REER measures the strength of the domestic currency against the strength of the currencies of a country's main trading partners. As such, this relationship might still evolve and provide valuable insight into the development of exchange rate determinants even under fixed exchange rates.

The fourth country, Sweden, was selected to serve as a benchmark. Sweden is a small, open, developed economy renowned for its financial and economic stability. Its monetary policy throughout the period was based on a strategy of targeting the inflation rate, which was fully introduced in January 1995. Free-float exchange rates had been introduced two years earlier, in January 1993.

Despite its relative economic stability, in February 2015, Sweden hit the "zero lower-bound" (ZLB), followed by negative STIBOR (Stockholm Interbank Offered Rate) According to Górajski and Ulrichs (2016, p. 14) and similar studies, such a situation may cause additional non-linearities in the MTM due to the presence of a "liquidity trap", among other factors. Their likely impact on the results of this analysis can be neutralised by a logarithmic transformation that involves imposing non-negativity restrictions on the nominal interest rate. The outcome of this approach is a curtailed sample and the loss of 16 observations for Sweden from the period 2015: 2–2016: 5. This approach should not compromise the overall performance of the estimated models and the quality of the comparisons because, apart from Sweden, none of the analysed V3 countries faced the ZLB problem within the sample period. As a result, the problem falls outside the scope of the present paper.

Table 1. Correlations between the sentiment indicators and industrial production in the sampled countries

Czechia				Hungary			
Variables	ESI	BCI	IP	Variables	ESI	BCI	IP
ESI	1			ESI	1		
BCI	0.86	1		BCI	0.81	1	
IP	0.62	0.7	1	IP	0.33	0.58	1
Poland				**Sweden**			
Variables	ESI	BCI	IP	Variables	ESI	BCI	IP
ESI	1			ESI	1		
BCI	0.93	1		BCI	0.95	1	
IP	0.67	0.7	1	IP	0.52	0.55	1

ESI – Economic Sentiment Indicator, BCI – Business Confidence Indicator, IP – Industrial Production.
Source: author's elaboration.

Table 2. Standard deviations of sentiment indicators for the sampled countries

Variables	Czechia		Hungary		Poland		Sweden	
	$\sigma(x)$	$\frac{\sigma(x)}{\sigma(y)}$	$\sigma(x)$	$\frac{\sigma(x)}{\sigma(y)}$	$\sigma(x)$	$\frac{\sigma(x)}{\sigma(y)}$	$\sigma(x)$	$\frac{\sigma(x)}{\sigma(y)}$
ESI	0.097	0.604	0.113	0.663	0.086	0.329	0.083	1.299
BCI	0.016	0.101	0.015	0.09	0.011	0.041	0.017	0.261
IP	0.160	1	0.171	1	0.262	1	0.064	1

$\sigma(x)$ – standard deviation of a given variable, $\frac{\sigma(x)}{\sigma(y)}$ – standard deviation with respect to the standard deviation of industrial production.
Source: author's elaboration.

Our analysis includes the following variables:

- Industrial production index (IP_t): Serves as a proxy for GDP (sourced from OECD Data Explorer).
- Consumer price index (CPI_t) (sourced from OECD Data Explorer).
- Short-term interest rates (IR_t): Approximated by 1-month PRIBOR (Prague Interbank Offered Rate), BUBOR (Budapest Interbank Offered Rate), WIBOR (Warsaw Interbank Offered Rate) and STIBOR (Stockholm Interbank Offered Rate; all obtained from Eurostat).
- Real effective exchange rate index ($REER_t$): Derived from bilateral exchange rates for the 42 leading trading partners of the analysed countries (obtained from Eurostat).
- Real effective exchange rate of the eurozone ($REER_t^f$): Approximates the exchange rate of the main trading partners (obtained from Eurostat).
- World oil prices (P_t^{oil}): Represented by the Brent crude oil 1-month forward (in the EUR index) (made available by the ECB Statistical Data Warehouse).

In our model, these characteristics of the real economy are enhanced by data reflecting the expectations and sentiments of economic entities, which, according to the literature discussed in Part 2, can significantly influence the transmission of monetary impulses.

Two alternative measures of sentiment are widely used in the economic literature. The Eurostat Economic Sentiment Indicator (ESI_t) is constructed as a weighted average of five sectoral confidence indicators (industry, services, construction, retail trade, and private consumption). They are obtained from monthly surveys of approximately 125,000 companies and 40,000 consumers in the EU. The Business Confidence Indicator (BCI_t), which is calculated by the OECD, provides an insight into manufacturing companies' expectations. The index is smoothed using an appropriate Hodrick-Prescott filter to remove all cycles shorter than six months.

We briefly characterise the data on the sentiment indicators by comparing the correlations between the indicators, as well as correlations between the indicators and the data on industrial production (see Table 1). The information contained in both sentiment indicators is generally comparable, as shown by the correlations between the ESI and the BCI time series, which range from 0.81 to 0.95 depending on the country. The BCI tracks industrial production data relatively closely (correlations between 0.55 and 0.7), whereas the ESI shows a weaker correlation with the industrial production data (correlations between 0.35 and 0.67). Consequently, the ESI effectively compresses a wider information set regarding the expectations of economic entities.

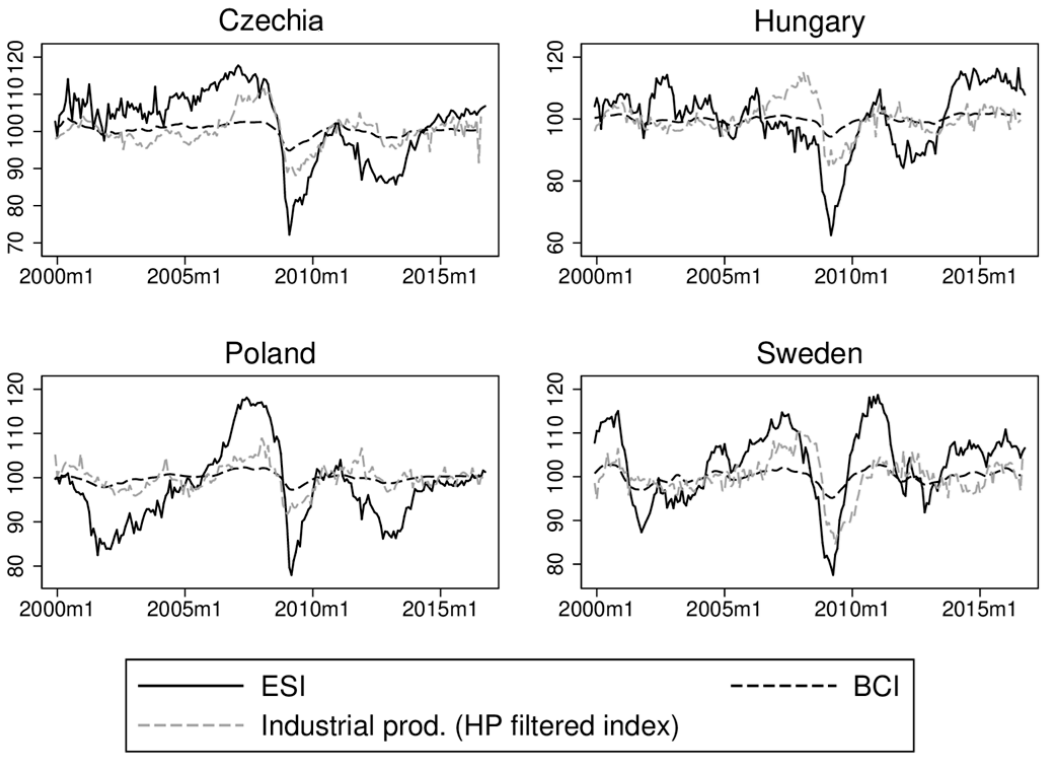


Figure 1. Economic Sentiment Indicator, Business Confidence Indicator, and the index of industrial production for the sampled countries

Source: author's elaboration based on data from Eurostat and OECD Data Explorer.

The business cycle-related characteristics of the analysed economic sentiment indicators can be summed up by their standard deviations and their standard deviations relative to the standard deviation of GDP, approximated by industrial production index (see Table 2). A brief look at the data in Table 2 shows that the ESI is up to six times more volatile than the BCI, although it is also relatively efficient in approximating output volatility. Thus, it outperforms the BCI as a source of information regarding the expectations of economic entities.

The last argument for using the ESI as an indicator of economic sentiments stems from its ability to show real economic phenomena slightly ahead of time, which the BCI lacks. This ability is particularly noticeable with the Hungarian and Swedish data presented in Figure 1. We can therefore conclude that the ESI contains information that can improve the model's fit with the data.

All time series used in the analyses below were seasonally adjusted. They are expressed as annual rates (12-month log-differences) and are denoted by lowercase letters. The key statistical characteristics of the data are presented in Appendix 1.

Model Identification and Estimation

The VAR model proposed for analysing the MTM has seven variables. The endogenous variables given by vector $y_t = [ip_t, cpi_t, ir_t, reer_t, esi_t]$ constitute a relatively standard set of explanatory variables commonly used to model monetary policy transmission in small open economies and large developed economies (e.g., the US and the eurozone) alike.

The literature proposes different variants of this core set of explanatory variables. Sims and Zha (2006a) and Hubrich and Tetlow (2015) modelled the US economy using a VAR model with a money supply measure instead of an exchange rate, whereas Peersman (2004) and Elbourne and de Haan (2006) employed both money supply data and exchange rates to study eurozone countries. Similar specifications of the VAR model were proposed for the small open economies by Kapuściński et al. (2014), Bogusz, Górajski, and Ulrichs (2015), Nalban (2016) and Przystupa and Wróbel (2016). Depending on the goals of their respective studies, the authors also used different supporting variables.

In line with our previous reasoning, our model not only incorporates the standard determinants of monetary transmission but also a measure of economic sentiment. This approach closely follows Nalban (2016) and is somewhat similar to the approach adopted by Hubrich and Tetlow (2015), who included financial stress indicators in their model. It is based on the premise that the expectations of economic entities can significantly influence their decisions and thereby predict regime switches.

Small open economies are vulnerable to changes in external economic conditions. Accordingly, our vector of exogenous variables z_t relates economic activity in the analysed countries to shocks at the global and/or European level. Kim and Roubini (2000) proposed a vector of exogenous variables composed of the oil price index and foreign interest rates. In this analysis, foreign real effective exchange rates are used instead of foreign interest rates, resulting in

$z_t = \left[oil_t,\ reer_t^f \right]$. There are two reasons for this. Firstly, using eurozone interest rates would require reducing the sample because of negative interest rates from February 2015. Secondly, the proposed vector of exogenous variables has a theoretical underpinning. Monetary authorities respond to the commodity prices' effect on the real economy by adjusting interest rates. These interest rate changes influence exchange rates, which then generate shocks that change terms of trade and output levels in the real economy. Thus, exchange rates can also be considered an important monetary policy determinant.

Determining how exogenous variables should be entered into the model is more complicated, and the economic literature has not reached a consensus on this issue. In their original paper, Kim and Roubini (2000) proposed treating these variables as weakly exogenous:

$$\Pr\left(z_t \mid Y^{t-1}, Z^{t-1},\ S^{n,t}, A_0, A_-, \Xi\right) = \Pr\left(z_t \mid Y^{t-1}, Z^{t-1}\right), \tag{5}$$

whereby the weakly exogenous variables are determined not only by their lagged values but also by the lagged values of endogenous variables. As a result, they are influenced, although asynchronously, by developments in the analysed economy. This assumption may be valid for large economies, such as those that comprise the core of the EU, but it may prove incorrect when analysing transition economies. Some researchers (e.g., Hubrich and Tetlow 2015; Górajski and Ulrichs 2016; Nalban 2016) proposed treating exogenous variables as strictly exogenous:

$$\Pr\left(z_t \mid Y^{t-1}, Z^{t-1},\ S^{n,t}, A_0, A_-, \Xi\right) = \Pr\left(z_t \mid Z^{t-1}\right). \tag{6}$$

As the strictly exogenous variables are only determined by their lagged values, changes taking place in the analysed economies have no effect on them. Because this assumption is relevant for the small open economies of the Visegrad countries, it will be considered in our model.

To compute and analyse impulse responses of the VAR model, we must properly interpret the vector of exogenous shocks ε_t'. The most popular method for identifying these shocks imposes exclusion restrictions on the matrix of contemporaneous parameters A_0. This is usually achieved via the Cholesky decomposition, which yields a set of just-identifying restrictions by proper ordering of variables and by introducing a lower-triangular A_0 matrix.

The vector of endogenous variables y_t is split into three blocks: $y_t = \left[y_{1t}, ir_t, y_{2t} \right]$, where y_{1t} is a vector of variables that concurrently enter the monetary authorities' information set, ir_t is an instrument of monetary policy, and comprises all other endogenous variables that are simultaneously influenced by monetary authorities' decisions. This identification scheme is relatively simple to use and reveals patterns hidden in the data without requiring too many a priori assumptions.

Based on the above, we propose the following ordering of endogenous variables for our model: $y_t = [ip_t, cpi_t, ir_t, reer_t, esi_t]$. This specification accounts for the fact that, because of nominal rigidities, real economic variables do not react to monetary policy changes at the same time. For instance, unlike exchange rates and economic entities' expectations that immediately respond to the monetary authorities' decisions, output and inflation take time to react. It is also

notable that the real economic variables are the only ones to concurrently affect the monetary policy. Exchange rate and economic sentiment changes are considered by monetary authorities with a lag.

To account for the openness of the analysed economies, a vector of exogenous variables is introduced, and the assumption is made that they simultaneously influence all other variables in the model. This is achieved by placing them at the front of the vector of endogenous variables. The full ordering of the model's variables is therefore give $y_t = [ip_t, cpi_t, ir_t, reer_t, esi_t]$ by vector $x_t = [oil_t,\ reer_t^f, ip_t, cpi_t, ir_t, reer_t, esi_t]$. This specific identification prompts the question of whether monetary authorities target a domestic exchange rate or a foreign exchange rate when designing their policy. In fact, the above ordering of variables implies that the foreign real exchange rate continuously influences monetary policy and its adjustments are instantaneously transmitted to the domestic real exchange rate. For this assumption to be valid, the exchange rate would have to be viewed in terms of domestic vs. foreign currency price rather than as a real exchange rate. In the latter case, monetary authorities targeting the foreign real exchange rate (the euro real exchange rate in this study) would, in fact, be targeting the exchange rate of its main trading partner's currency, which is quite close to targeting the exchange rate between the domestic currency and the euro.

The model proposed in this paper was estimated in Dynare according to the procedure proposed by Sims, Wagonner, and Zha (2008), with the priors selected as Hubrich and Tetlow (2015) proposed. Specifically, standard Minnesota priors for monthly data were employed for the VAR model elements. Consequently, its hyperparameters were given by the vector [0.57; 0.13; 0.1; 1.2; 10; 10]. For the state transition matrix, we used the Dirichlet priors of 5.6 for the two-state chains and 11.9 for the three-state chains, meaning that the expected duration of stay in a given regime was equal to 20.3 months. To obtain the posterior modes, we used six million replications as a burn-in. Every 5th of the next 2.5 million replications was kept, resulting in a total of 500,000 posterior draws for further analysis.

The goodness-of-fit of the estimated models was determined by comparing the logarithms of Marginal Data Densities (log MDDs), calculated using the method proposed by Sims, Wagonner, and Zha (2008). Following common practice, we assumed that of the two model specifications, one was statistically significantly superior to the other if their log MDDs differed by more than ten orders of magnitude (Kass and Rafferty 1995). As this strategy may sometimes lead to inconclusive results, the competing models were also assessed in terms of the probability of switches occurring in their regimes and the possibility of using historical data to explain them. This empirical strategy is based on a fact indicated by Hubrich and Tetlow (2015) that the MSBSVAR models are characterised by a trade-off between changes in volatility and changes in parameters. According to this trade-off, bigger changes in shock variances are accompanied by smaller changes in the parameters of equations, and vice versa. It is therefore possible that a model that explains both volatility and parameter switches exhibits better goodness-of-fit than one that accounts for changes in only one of these categories. The situation is purely statistical and would be possible if the parameters were moving recursively and hectically between two relatively closely parametrised regimes, with no clear historical events to explain their behaviour.

Empirical Results

This part of the paper presents the results of an empirical analysis performed on the 2000: 1–2016: 5 data for the non-eurozone Visegrad countries and Sweden. The analysis was undertaken to answer two questions:

1. Do the MTMs of small open economies remain relatively stable during a crisis? Specifically, do the models show shifts in the volatilities of economic processes rather than in the parameters?
2. How does the exchange rate pass-through, combined with the absence of balance sheet effects related to a currency mismatch and the procyclicality of capital flows, contribute to the higher stability of the MTMs in these countries?

The first question was answered by estimating models that account for different characteristics of the switches that had taken place in the Czech, Hungarian, Polish and Swedish MTMs. The baseline model (*1v1c*) is a standard Bayesian Structural VAR that disregards switches in both the volatilities of the analysed relationships and the structural parameters. The other models accounted for changes in data variance only (*2v1c* and *3v1c* had two and three variance regimes, respectively) and in parameters only (*1v2c* and *1v3c* had two and three coefficient regimes, respectively). The models were also estimated for changes affecting both the variances and parameters (*2v2c* had two variance regimes and two parameter regimes, while *3v2c* had three variance regimes and two coefficient regimes).

For models that accounted for shifts in both volatilities and coefficients, it was additionally assumed that switches were governed by separate Markov chains to determine whether or not the switches coincided during a business cycle. The proposed model specification and identification yielded estimates capable of recovering a set of impulse response functions whose results proved relatively stable and consistent with economic theory. The log MDDs of the estimated models are presented in Table 3.

To test the robustness of the results, additional variables were used (e.g., employment and unemployment rates), and the ESI was replaced with the BCI index. The results of tests using alternative variables proved fairly stable regarding the strength of economic relationships and the timing of regime and volatility changes. When ESI was substituted with BCI, the models lost some volatility that could have been attributed to easily identifiable economic phenomena such as EU accession or the GFC. This outcome reaffirms the decision to use the ESI index in the baseline model.

Another test was related to the sample choice. The sample for Czechia was shortened to November 2013 (when the exchange rate was fixed against the euro), while the sample for Sweden was extended to the full length (May 2016). The curtailment of the sample in Czechia did not change the identification of states, whereas its extension for Sweden provoked increased and hard-to-interpret changeability of both the volatility and the coefficient states.

Appendix 2 presents the results of robustness tests in which ESI was substituted with BCI and the sample length was adjusted. Due to space limitations, the other robustness tests are available

upon request. These results confirmed that the initial decisions regarding the choice of sample were correct and did not interfere with the results.

Table 3. Log MDDs of the estimated MSBSVAR models

Country	Model type						
	1v1c	*2v1c*	*3v1c*	*1v2c*	*1v3c*	*2v2c*	*3v2c*
Czechia	2960.7	3018.2	3042.5	3001.3	3009.2	3046.5	**3063.6**
diff.	– 102.9	– 45.4	– 21.1	– 62.3	– 54.4	– 17.1	–
Hungary	2606	2723.6	2738.8	2713.7	2723.3	2743.8	**2765.8**
diff.	– 159.8	– 42.2	– 27	– 52.1	– 42.5	– 22	–
Poland	3022.6	3054.1	**3070**	3036.7	3040.1	3061.5	3053.2
diff.	– 47.4	– 15.9	–	– 33.3	– 29.9	– 8.5	– 16.8
Sweden	2602.9	2645.3	2661.2	2644.1	2646.5	2665.9	**2675.9**
diff.	– 73	– 30.6	– 14.7	– 31.8	– 29.4	– 10	–

Source: author's elaboration.

The estimates in Table 3 show that the model accounting only for volatility changes performs statistically significantly better than the other models only for Poland. Conversely, the empirical results for Hungary, Czechia, and Sweden favour models with switches in both volatilities and coefficients, which produced the highest log MDDs. The best-performing of these models were those with three variance regimes and two coefficient regimes.

As previously mentioned, a model with shifts in both volatility and coefficients may outperform models that account for only one type of switch, simply because it has more capacity to adjust to the rapid rate of changes in economic conditions. Nonetheless, following Hubrich and Tetlow (2015), we decided to enhance our comparison of the models' goodness-of-fit by analysing the estimated state probabilities. Figure 2 juxtaposes the probabilities of volatility states obtained with the *3v1c* models (the left-hand panel) with the probabilities of volatility (the solid lines) and coefficient states (the dashed line) produced by the *3v2c* model (the right-hand panel). Volatility states are presented such that the black line represents the high-volatility state (identified by its probability dominating during the GFC of 2008–2010), while the grey line represents the medium-volatility state, which typically either directly precedes or follows the high-volatility state.[1]

The frequent switches between states in both models in Figure 2 show that the Czech MTM was rather unstable in the years of analysis. Looking solely at the volatility regime changes, a period of increased instability in economic processes is noticeable, likely related to the Czech pursuit of EU membership, which was finally granted in May 2004. Czechia differed from the other V3 countries in that increased economic volatility continued beyond that date – its economy would

1 Due to the high level of complicatedness of Markov Switching Structural VAR model it is hard to identifiy these states directly, as the changes might only affect some of the variables and relationships described in the model.

intermittently enter and leave a high-variance state until July 2007. The models show that between January 2008 and January 2013, the Czech economy struggled with the GFC, with its acute phases taking place between July 2008 and July 2010 and again between July 2012 and January 2013, with a respite phase between July 2010 and July 2012. With the beginning of 2014, the volatility of economic processes increased again, likely due to the new geopolitical situation in the region related to the Russia–Ukraine war and the ensuing economic sanctions.

Introducing the coefficient switches in the model did not help explain the analysed processes: the model continued to show state instability, suggesting no valid information was gained. However, the coefficient switches appeared to stabilise changes in variance, thus enabling a clear economic interpretation along the lines mentioned above. We can therefore presume that the main cause of changes in the Czech MTM was the changing volatility of economic processes rather than the swinging nature of economic relationships.

As for Hungary, three periods of elevated economic uncertainty were identified. In the first period, which coincided with Hungary's accession to the EU, uncertainty was especially noticeable towards the end of negotiations. It was at least partially due to the exchange rate regime switches that necessitated intervention in the currency market. The second period occurred during the GFC between October 2008 and June 2010. In the third period, geopolitical factors sustained the crisis-related increased volatility of economic processes until 2015. The results of the *3v2c* model, which show a coincidence between changes in volatility, changes in the model's parameters, and declines in economic sentiment, imply that a structural change may have taken place in the Hungarian economy during those periods.

The comparison of the log MDDs shows that only for Poland is the *3v1c* model superior to the *3v2c* model. The state probabilities confirm this finding. The likely causes of regime changes can be easily identified by analysing estimates produced by the model that accounts for volatility switches alone. The estimates show that accession to the EU contributed to increased economic uncertainty from the beginning of the sample period to May 2004. Between the spring of 2008 and the autumn of 2010, the effects of the GFC are noticeable. Two less distinct spikes in volatility occurred between January 2006 and July 2007 and from mid-2013 to the end of the sample period. The first is very likely to have been caused by political factors, specifically by the first government of the Law and Justice Party. The second spike is a compound of geopolitical and political factors, namely the military unrest in Eastern Europe and the run-up to political elections that culminated in the presidential elections of July 2015 and the subsequent parliamentary elections that saw the Law and Justice Party form its second government.

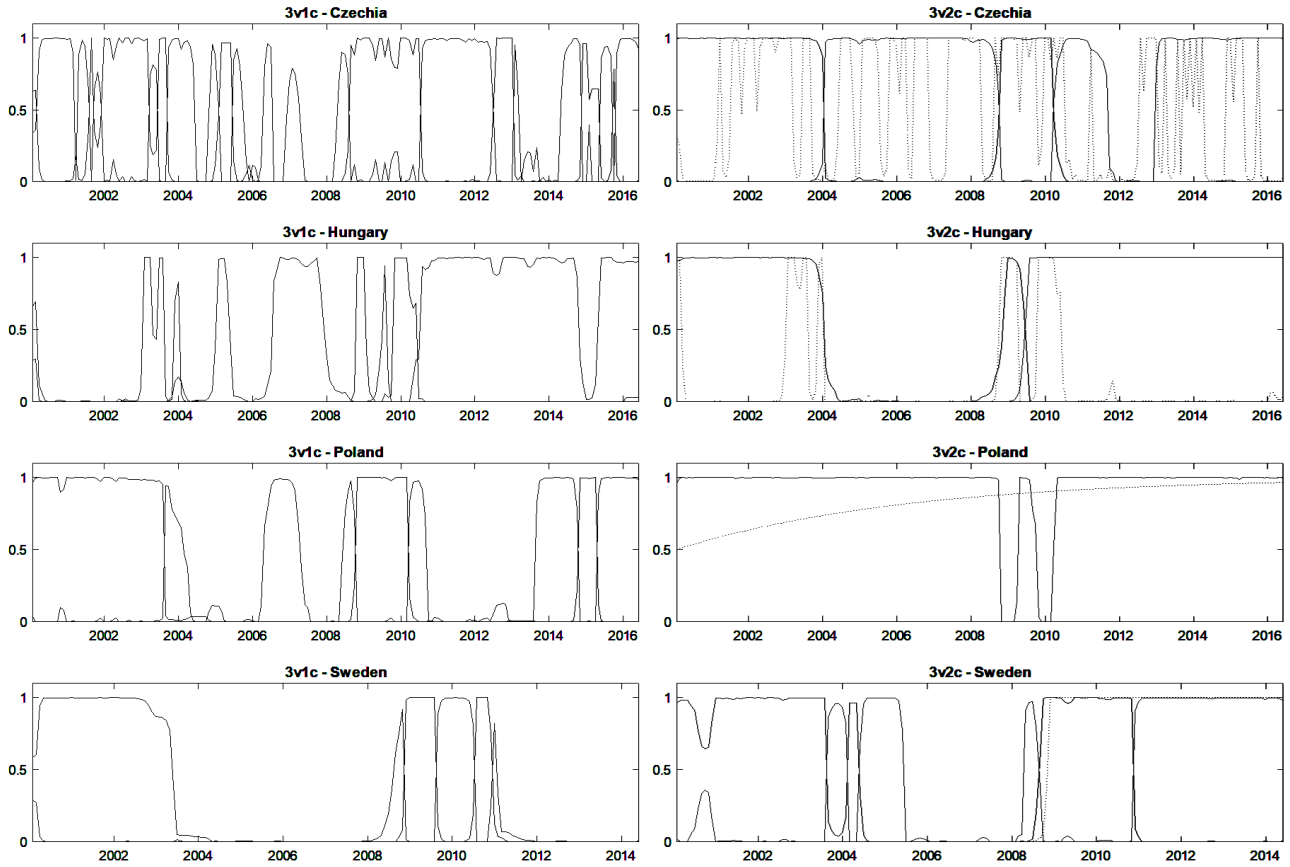


Figure 2. Probabilities of states estimated with the *3v1c* model and the *3v2c* model (the left and right panels, respectively)

Probabilities of states in variances are represented by solid lines (grey and black), probabilities of states in coefficients are represented by the dashed line.

Source: author's elaboration.

A closer look at the *3v2c* model results shows that, despite many attempts, degenerate probabilities for the coefficient changes prevented it from producing proper estimates. This inevitably leads to the conclusion that changes in the Polish MTM in the sample period were caused by switches in variances rather than in parameters.

The results for Sweden (see Figure 2), the last of the analysed countries, show that its economy was relatively stable. The main factor that affected the Swedish MTM was the GFC of 2008: 7–2011: 5. In those years, changes in the volatility of economic processes coinciding with a deep correction of economic entities' expectations brought about a structural change in the Swedish MTM. Some volatility spikes in economic processes are also noticeable in the early years of the sample period.

The above findings can be summed up as follows. In the crisis period, the Polish and partly Czech MTMs were affected by volatility swings, whereas in the Swedish and Hungarian MTMs, structural changes occurred. It would be interesting to determine why the MTMs of the analysed economies responded differently to the crisis. To this end, we shall assess the role of exchange rate pass-through, balance sheet effects caused by currency mismatches, and the procyclicality

of capital flows, as proposed in Part 2 of this article. This assessment will involve evaluating IRFs yielded by the respective models, enhanced by comparisons of additional statistical data.

This part of the analysis is based on the results obtained from models *3v2c* (Hungary and Sweden) and *3v1c* (Poland and Czechia), which were found to better fit the statistical data than the alternative specifications (Table 3). The IRFs come from regimes that prevailed during the financial crisis of 2008–2010. In Figure 2, the regimes are represented by a combination of solid and dotted black lines (for Poland and Czechia, they are marked by solid black lines). Due to the applied convention, all of the graphs present reactions to 1 p.p. positive shocks in each of the analysed variables.

According to the literature review in Part 2, the negative impact of changing expectations and economic sentiment during a crisis can be mitigated by the exchange rate pass-through, which causes a depreciation of exchange rates to induce favourable fluctuations in demand. To investigate this possibility, we will analyse the IRFs showing the exchange rates' response to a monetary policy shock and the industrial production's response to an exchange rate shock, as presented in Figure 3.

The graphs show that an expansionary (negative) monetary policy shock is followed by a depreciation of the real effective exchange rate in all four economies. This depreciation is strongest in Poland and much less pronounced in Sweden and Czechia. In Hungary, its impact is delayed, weak, and statistically insignificant. The other IRFs in Figure 3 show the reactions of industrial production to changes in the real effective exchange rates. As can be seen, the reactions are country-specific and consistent with predicted changes in MTMs during the crisis. Where the crisis caused structural changes in the MTM (Sweden and Hungary), the depreciation of exchange rates was followed by an insignificant decline in industrial production. In Poland and Czechia, whose MTMs changed in response to switches in the volatility of economic processes, the falling exchange rate was met with a positive reaction from industrial production. Given that the strength of the exchange rate pass-through depends on the reaction to both shocks, we can infer that the exchange rate pass-through was stronger in Poland than in Czechia.

As already mentioned, the benefits of the exchange rate pass-through in the sampled small open economies can be diminished by the balance sheet effects (due to a currency mismatch) and the effects of procyclical capital flows. Because both types of effects increase the demand for refinancing by private companies and government caused by the depreciation of domestic currency these effects are likely to contribute to a rise in interest rates.

The IRFs in Figure 4 show the reaction of interest rates to the real (effective) exchange rate shock in regimes that prevailed in crisis years. In Czechia, Poland and Sweden, the reaction of interest rates to the depreciation of the real effective exchange rates was not statistically significant. This implies that neither Poland nor Czechia, where the crisis only caused volatility changes, was affected by balance sheet effects related to a currency mismatch or procyclical capital flows.

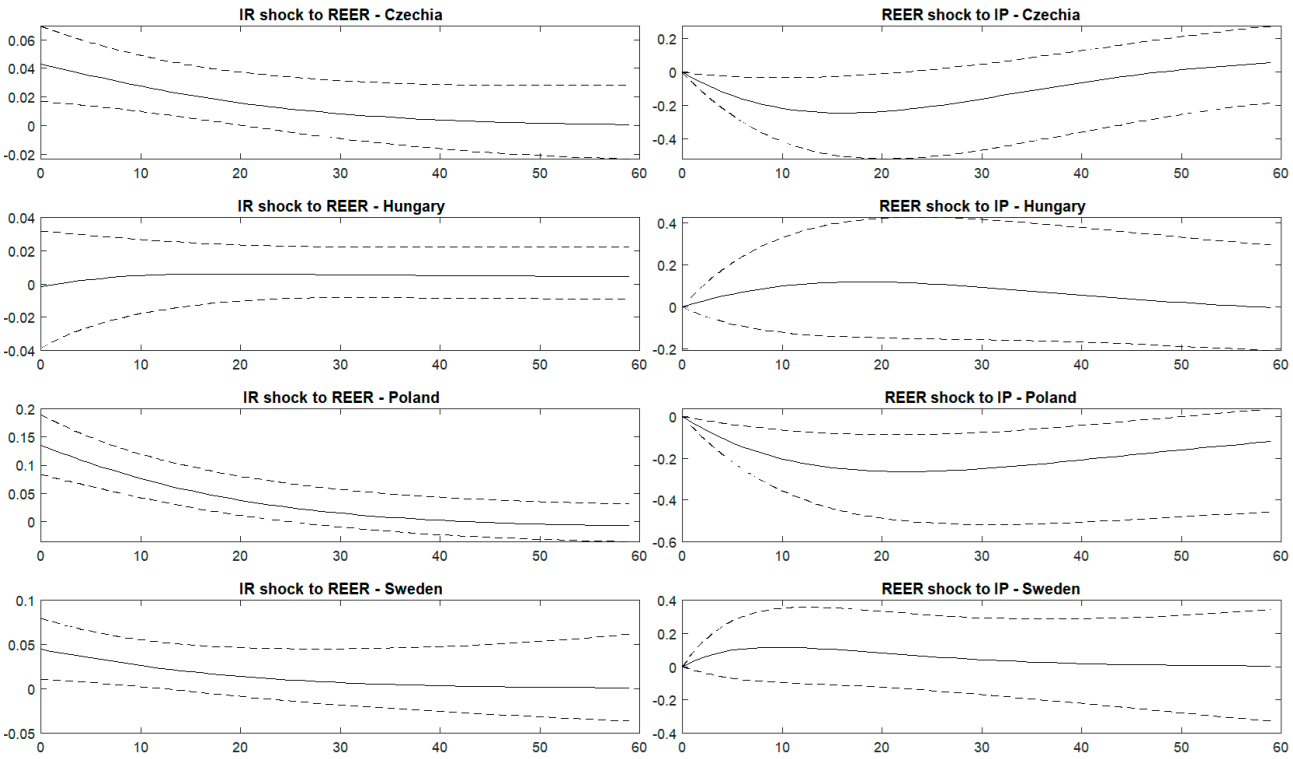


Figure 3. Exchange rate pass-through in the analysed economies (reactions to 1 p.p. positive shocks; the prevalent regime during the Great Recession)

Source: author's elaboration.

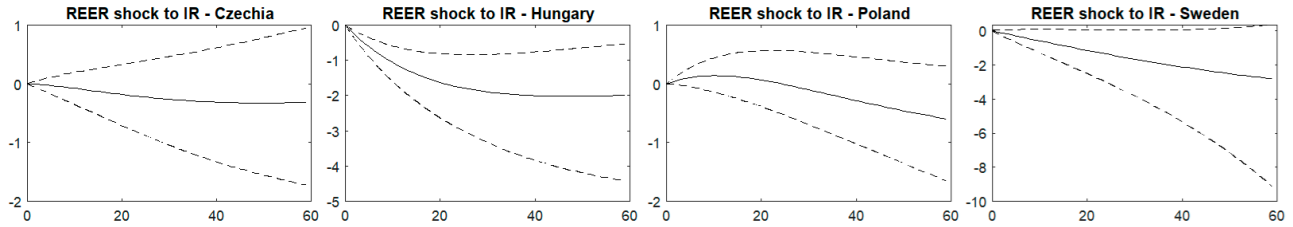


Figure 4. Reaction of interest rates to the appreciation of the real effective exchange rate (reactions to 1 p.p. positive shocks; regime dominating during the Great Recession)

Source: author's elaboration.

Conversely, the IRF in Figure 4 confirms that in Hungary, the REER depreciation was followed by a statistically significant and relatively large increase in the interest rate. Therefore, either the balance sheet effects were active or capital flows became procyclical. Both situations may have been due to Hungary being the only country among the four analysed that experienced major fiscal sustainability problems during the sample period. Its debt-to-GDP ratio significantly exceeded the limit of 60% set in the Stability and Growth Pact of 2003, peaking at approximately 80% in 2010 (for a full fiscal sustainability analysis for the Visegrad countries see, e.g., Włodarczyk 2016). In a transition country, this combination of high public debt and limited financial resources may lead to relatively high absorption of foreign loans and debt service problems during a crisis.

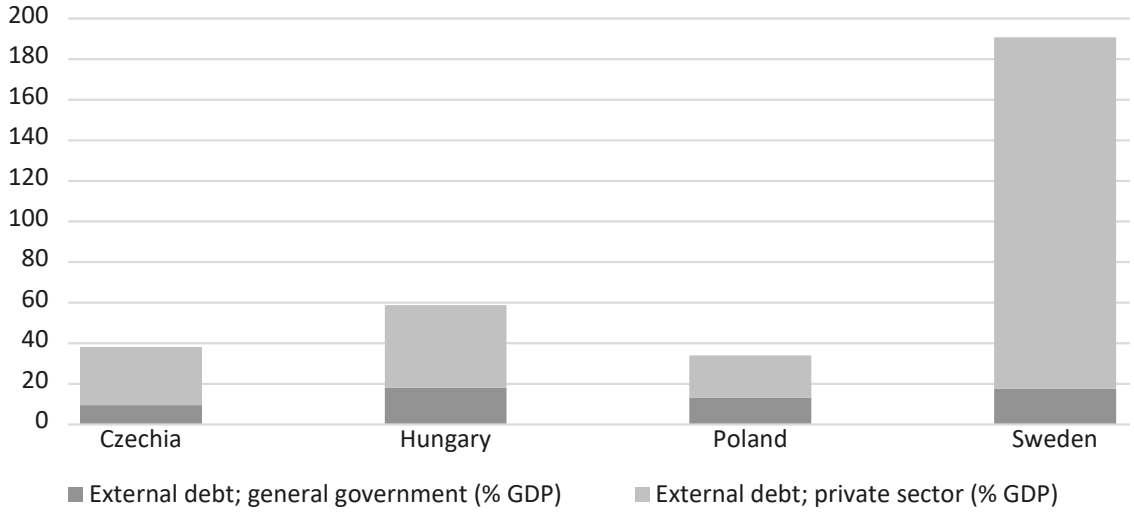


Figure 5. The structure of gross external debt in the analysed countries, 2016: Q3

Source: author's elaboration based on QEDS and OECD Data Explorer.

The data on the debt structure and the yields on 10-year government bonds provide the rationale for the proposed hypothesis. Figure 5 shows gross external debt in the analysed countries by source (in relation to GDP). The necessary data were derived from the World Bank's Quarterly External Debt Statistics (QEDS) and OECD Data Explorer. Due to the lack of earlier data, data from the third quarter of 2016 (the last sub-period in the sample) were used.

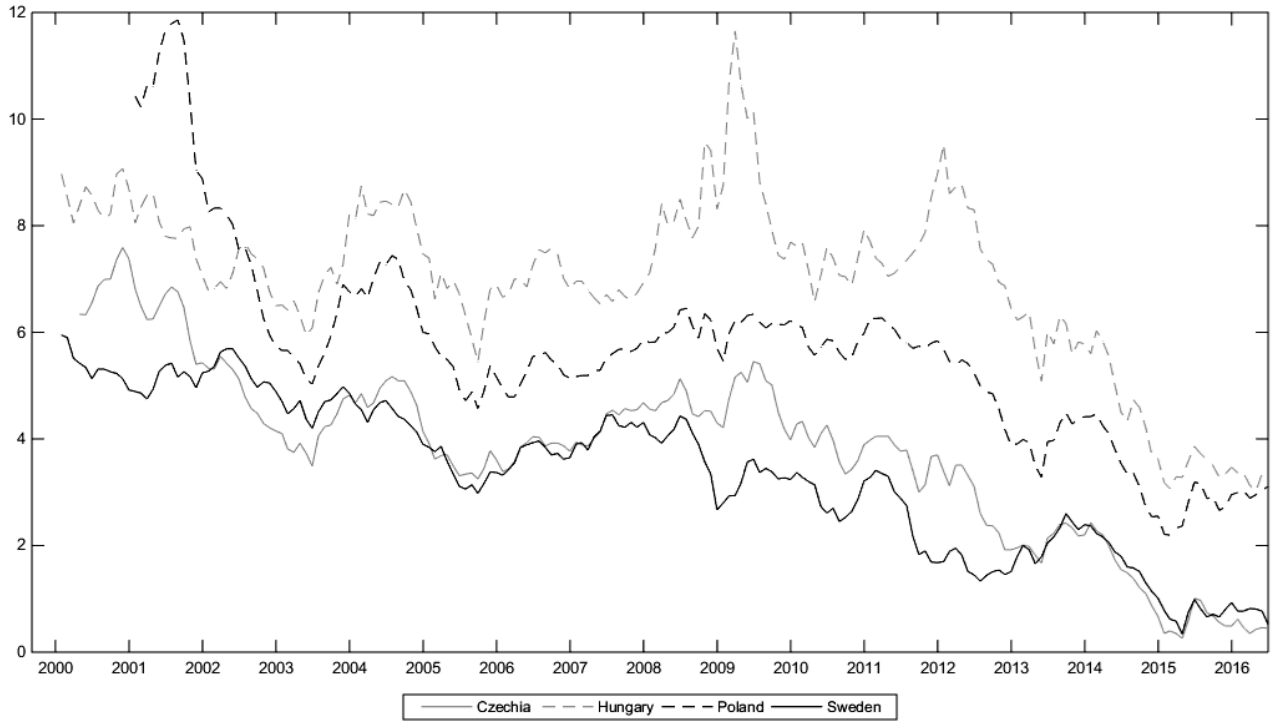


Figure 6. Yields on 10-year government bonds in the selected countries (%)

Source: author's elaboration based on OECD Data Explorer.

The graph shows that Hungary had the highest general government external debt-to-GDP ratio (18%) and relatively high private sector external debt (40.8% of the country's GDP). These

numbers, as well as the relatively sharp rise in the long-term interest rates on Hungarian bonds (see Figure 6) between October 2007 and March 2009, seem to substantiate the hypothesis that Hungary was affected by an incident of balance sheet effects or procyclical capital flows that impaired the efficiency of monetary policy transmission during the crisis years.

In Sweden, the incident of balance sheet effects/procyclical capital flows was much less serious, despite changes in both volatility and parameters that occurred in the aftermath of the GFC. The increase in interest rates triggered by the depreciating exchange rate only bordered on statistical significance (see Figure 4), and the long-run interest rates did not go up during the crisis period (see Figure 6). However, it is possible that the extremely high external debt-to-GDP ratio, which amounted to 190% of Swedish GDP (mainly due to the debt of the private sector), created a situation where the depreciating exchange rate increased the principal nominal debt owed to non-residents. In such a scenario, the deterioration of economic entities' balance sheets is likely, making them postpone borrowing decisions until the situation improves or to file for bankruptcy. Whichever scenario prevailed, it made the monetary transmission in Sweden less effective.

Conclusion

The article analyses the impact of crisis-induced changes in general economic activity on the monetary transmission mechanism of the small open economies of Czechia, Hungary, Poland, and Sweden. The analysis spans the period from 2000: 1 through 2016: 5. To determine the nature of the changes, the goodness-of-fit of the Markov Switching Structural Bayesian Vector Autoregressive models was compared, specifically accounting for: 1) changes in the variances of economic processes, 2) changes in the coefficients of the estimated relationships, and 3) both types of changes simultaneously.

The study confirmed that, during the crisis years, changes took place in the volatility of economic processes in Poland and Czechia, whereas in Sweden and Hungary, structural changes in the MTM coincided with volatility changes. A closer examination of the four countries' MTMs shows that the main reason for their different responses was the role of the exchange rate pass-through mechanism. Where the mechanism was not fully blocked (Poland and Czechia), demand effects resulting from exchange rate fluctuations compensated for the lower responsiveness of internal demand, helping the monetary policy retain its effectiveness throughout the crisis. In countries where this effect did not occur (Hungary and Sweden), the period of economic downturn involved structural changes in the MTM and diminishing effectiveness of monetary policies. This leads to the conclusion that, in small open economies, the public authorities' ability to sustain the exchange rate pass-through may critically affect their ability to exercise monetary control during a crisis.

Acknowledgments

This paper was kindly supported by a grant from the National Science Centre, under Grant UMO-2012/07/N/HS4/02708. The data necessary to replicate the results of the paper are available in the Harvard Dataverse repository: https://doi.org/10.7910/DVN/W120UZ. The author is grateful to Professor Karim Abadir for his inspiring remarks that directed the author to the topic of this paper. He also wishes to acknowledge the valuable comments from the participants of the CM Statistics/CFE 2016 Conference in Seville, the 21st EBES Conference in Budapest, the EEA 43rd Annual Conference in New York, the 8th RCEA Macro-Money-Finance Workshop in Rimini, and the 44th Macromodels Conference in Wąsowo. Finally, he wishes to thank the participants of a seminar at the Department of Macroeconomics, University of Lodz.

References

Adler, G. (2008), *Original Sin and Procylical Fiscal Policy: Two Sides of the Same Coin?*, "IMF Working Paper", 209, https://doi.org/10.5089/9781451870671.001

Altig, D., Christiano, L.J., Eichenbaum, M., Lindé, J. (2011), *Firm-specific capital, nominal rigidities and the business cycle*, "Review of Economic Dynamics", 14 (2), pp. 224–247, https://doi.org/10.1016/j.red.2010.01.001

Aristei, D., Gallo, M. (2014), *Interest rate pass-through in the Euro area during the financial crisis: A multivariate regime-switching approach*, "Journal of Policy Modeling", 36 (2), pp. 273–295, https://doi.org/10.1016/j.jpolmod.2013.12.002

Bajo-Rubio, O., Maria-Dolores, R. (2011), *Exchange rate pass-through in the new member states of the European Union. Some explanatory factors*, "Ekonomia Economics", 2 (14), pp. 88–94.

Bernanke, B.S., Blinder, A.S. (1992), *The Federal Funds Rate and the Channels of Monetary Transmission*, "The American Economic Review", 82 (4), pp. 901–921, https://www.jstor.org/stable/2117350 (accessed: 5.02.2018).

Bernanke, B.S., Mihov, I. (1998), *Measuring Monetary Policy*, "The Quarterly Journal of Economics", 113 (3), pp. 869–902, https://doi.org/10.1162/003355398555775

Blanchard, O.J., Quah, D. (1989), *The Dynamic Effects of Aggregate Demand and Supply Disturbances*, "The American Economic Review", 79 (4), pp. 655–673, https://www.jstor.org/stable/1827924 (accessed: 5.02.2018).

Bloom, N. (2009), *The Impact of Uncertainty Shocks*, "Econometrica", 77 (3), pp. 623–685, https://doi.org/10.3982/ECTA6248

Bogusz, D., Górajski, M., Ulrichs, M. (2015), *Sztywna vs. elastyczna strategia bezpośredniego celu inflacyjnego w modelu optymalnej polityki pieniężnej dla Polski*, "Przegląd Statystyczny", 62 (4), pp. 379–396.

Boyarchenko, N., Haddad, V., Plosser, M.C. (2016), *The Federal Reserve and Market Confidence*, "Federal Reserve Bank of New York Staff Reports", 773.

Burstein, A., Eichenbaum, M., Rebelo, S. (2005), *Large Devaluations and the Real Exchange Rate*, "Journal of Political Economy", 113 (4), pp. 742–784, https://doi.org/10.1086/431254

Burstein, A., Neves, J.C., Rebelo, S. (2003), *Distribution costs and real exchange rate dynamics during exchange-rate-based stabilizations*, "Journal of Monetary Economics", 50 (6), pp. 1189–1214, https://doi.org/10.1016/S0304-3932(03)00075-8

Ca'Zorzi, M., Hahn, E., Sanchez, M. (2007), *Exchange Rate Pass-Through in Emerging Markets*, "ECB Working Paper", 739, https://doi.org/10.2139/ssrn.970654

Chari, V.V., Kehoe, P.J., McGrattan, E.R. (2005), *Are structural VARs with long-run restrictions useful in developing business cycle theory?*, "Journal of Monetary Economics", 55 (8), pp. 1337–1352, https://doi.org/10.1016/j.jmoneco.2008.09.010

Christiano, L.J., Eichenbaum, M., Evans, C.L. (1999), *Monetary policy shocks: What have we learned and to what end?*, [in:] J.B. Taylor, M. Woodford (eds.), *Handbook of Macroeconomics*, Vol. 1A, North-Holland, Amsterdam, pp. 65–148, https://doi.org/10.1016/S1574-0048(99)01005-8

Christiano, L.J., Eichenbaum, M., Evans, C.L. (2005), *Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy*, "Journal of Political Economy", 113 (1), pp. 1–45, https://doi.org/10.1086/426038

Christiano, L.J., Trabandt, M., Walentin, K. (2011), *DSGE Models for Monetary Policy Analysis*, [in:] B.M. Friedman, M. Woodford (eds.), *Handbook of Monetary Economics*, Vol. 3, North-Holland, Amsterdam–San Diego, pp. 285–367, https://doi.org/10.1016/B978-0-444-53238-1.00007-7

Chui, M.K.F., Kuruc, E., Turner, P. (2016), *A new dimension to currency mismatches in the emerging markets – non-financial companies*, "Bank of International Settlements Working Paper", 550.

Ciccarelli, M., Maddaloni, A., Peydro, J.-L. (2013), *Heterogeneous transmission mechanism: monetary policy and financial fragility in the eurozone*, "Economic Policy", 28 (75), pp. 459–512, https://doi.org/10.1111/1468-0327.12015

Corsetti, G., Pesenti, P., Roubini, N. (1999), *What caused the Asian currency and financial crisis?*, "Japan and the World Economy", 11 (3), pp. 305–373, https://doi.org/10.1016/S0922-1425(99)00019-5

Dahlhus, T. (2017), *Conventional Monetary Policy Transmission During Financial Crises: An Empirical Analysis*, "Journal of Applied Econometrics", 32 (2), pp. 401–421, https://doi.org/10.1002/jae.2524

Darvas, Z. (2013), *Monetary transmission in three central European economies: evidence from time-varying coefficient vector autoregressions*, "Empirica", 40, pp. 363–390, https://doi.org/10.1007/s10663-012-9197-4

Dąbrowski, M.A., Śmiech, S., Papież, M. (2015), *Monetary policy options for mitigating the impact of the global financial crisis on emerging market economies*, "International Review of Economics and Finance", 51, pp. 409–431, https://doi.org/10.1016/j.jimonfin.2014.12.006

Dąbrowski, M.A., Wróblewska, J. (2016), *Exchange rate as a shock absorber in Poland and Slovakia: Evidence from Bayesian SVAR models with common serial correlation*, "Economic Modelling", 58, pp. 249–262, https://doi.org/10.1016/j.econmod.2016.05.013

Debes, S., Gareis, J., Mayer, E., Rüth, S. (2014), *Towards a Consumer Sentiment Channel of Monetary Policy*, "Würzburg Economic Papers", 91.

Dobešová, A., Klepáč, V., Kolman, P., Bednářová, P. (2015), *Modelling of volatility in monetary transmission mechanism*, "AIP Conference Proceedings", 1648, https://doi.org/10.1063/1.4912941.

Eichengreen, B., Hausmann, R. (1999), *Exchange rates and financial fragility*, "NBER Working Papier", 7418, National Bureau of Economic Research, Cambridge, https://doi.org/10.3386/w7418

Eichengreen, B., Hausmann, R., Panizza, U. (2002), *Original Sin: The Pain, the Mystery, and the Road to Redemption*, https://repository.graduateinstitute.ch/record/286974?v=pdf (accessed: 8.10.2025).

Elbourne, A., Haan, J. de (2006), *Financial structure and monetary policy transmission in transition countries*, "Journal of Comparative Economics", 34 (1), pp. 1–23, https://doi.org/10.1016/j.jce.2005.11.004

Faust, J. (1998), *The robustness of identified VAR conclusions about money*, "Carnegie-Rochester Series on Public Policy", 49, pp. 207–244, https://doi.org/10.1016/S0167-2231(99)00009-3

Frankel, J. (2011), *Monetary Policy in Emerging Markets*, [in:] B.M. Friedman, M. Woodford (eds.), *Handbook of Monetary Economics*, Vol. 3, North-Holland, Amsterdam–San Diego, pp. 1439–1520, https://doi.org/10.1016/B978-0-444-53454-5.00013-X

Franta, M., Horvath, R., Rusnak, M. (2014), *Evaluating changes in the monetary transmission mechanism in the Czech Republic*, "Empirical Economics", 46, pp. 827–842, https://doi.org/10.1007/s00181-013-0699-0

Fry-Mckibbin, R., Zheng, J. (2016), *Effects of the US monetary policy shocks during financial crises – a threshold vector autoregression approach*, "Applied Economics", 48 (59), pp. 5802–5823, https://doi.org/10.1080/00036846.2016.1186792

Gordon, D.B., Leeper, E.M. (1994), *The Dynamic Impacts of Monetary Policy: An Exercise in Tentative Identification*, "Journal of Political Economy", 102 (6), pp. 1228–1247, https://doi.org/10.1086/261969

Górajski, M., Ulrichs, M. (2016), *Optymalne wrażliwe na ryzyko strategie polityki pieniężnej dla Polski*, „Bank i Kredyt", 47, pp. 1–32.

Hausmann, R., Panizza, U. (2003), *On the determinants of Original Sin: an empirical investigation*, "Journal of International Money and Finance", 22 (7), pp. 957–990, https://doi.org/10.1016/j.jimonfin.2003.09.006

Hubrich, K., Tetlow, R.J. (2015), *Financial stress and economic dynamics: The transmission of crises*, "Journal of Monetary Economics", 70, pp. 100–115, https://doi.org/10.1016/j.jmoneco.2014.09.005

IMF (2015), *Central and Eastern Europe: New Member States (NMS) Policy Forum 2014. Selected Issues Paper*, "International Monetary Fund Country Report", 098, https://doi.org/10.5089/9781484321393.002

Jansen, N., Potjagailo, G., Wolters, M.H. (2015), *The Monetary Policy during Financial Crises: Is the Transmission Mechanism Impaired?*, "Kiel Working Paper", 2005.

Kapuściński, M. (2017), *The Role of Bank Balance Sheets in Monetary Policy Transmission: Evidence from Poland*, "Eastern European Economics", 55 (1), pp. 50–69, https://doi.org/10.1080/00128775.2016.1255559

Kapuściński, M., Łyziak, T., Przystupa, J., Stanisławska, E., Sznajderska, A., Wróbel, E. (2014), *Monetary policy transmission mechanism in Poland. What do we know in 2013?*, "Narodowy Bank Polski Working Paper", 180.

Kass, R.E., Rafferty, A.E. (1995), *Bayes Factor*, "Journal of the American Statistical Association", 90 (430), pp. 773–795, https://doi.org/10.1080/01621459.1995.10476572

Keynes, J.M. (1936), *The General Theory of Employment, Interest and Money*, McMillan and Co. Ltd., London.

Kim, S., Roubini, N. (2000), *Exchange rate anomalies in the industrial countries: A solution with a structural VAR approach*, "Journal of Monetary Economics", 45 (3), pp. 561–586, https://doi.org/10.1016/S0304-3932(00)00010-6

Krugman, P. (1999), *Balance Sheets, the Transfer Problem, and Financial Crises*, "International Tax and Public Finance", 6, pp. 459–472, https://doi.org/10.1023/A:1008741113074

Kulikov, D., Netsunajev, A. (2016), *Identifying Shocks in Structural VAR models via heteroskedasticity: a Bayesian approach*, "Bank of Estonia Working Paper", 8.

Lanne, M., Lütkepohl, H., Maciejowska, K. (2010), *Structural vector autoregressions with Markov switching*, "Journal of Economic Dynamics and Control", 34 (2), pp. 121–131, https://doi.org/10.1016/j.jedc.2009.08.002.

Leduc, S. (2010), *Confidence and the Business Cycle*, "Federal Reserve Bank of San Francisco Economic Letter", 35.

Leroy, A., Lucote, Y. (2015), *Heterogeneous monetary transmission process in the Eurozone: Does banking competition matter?*, "International Economics", 141, pp. 115–134, https://doi.org/10.1016/j.inteco.2015.01.006

Łyziak, T., Przystupa, J., Stanisławska, E., Wróbel, E. (2011), *Monetary Policy Transmission Disturbances During the Financial Crisis. A Case of an Emerging Market Economy*, "Eastern European Economics", 49 (5), pp. 75–96, https://doi.org/10.2753/EEE0012-8775490504

Mehl, A., Reynaud, J. (2005), *The Determinants of 'Domestic' Original Sin in Emerging Market Economies*, "European Central Bank Working Paper", 560, https://doi.org/10.2139/ssrn.863946

Mirdala, R. (2014), *Exchange Rate Pass-through to Consumer Prices in the European Transition Economies*, "Procedia Economics and Finance", 12, pp. 428–436, https://doi.org/10.1016/S2212-5671(14)00364-5

Myšková, K., Hampel, D., Dobešová, A. (2013), *Impulse-response analysis of monetary policy – Visegád group countries case*, "Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis", 61 (7), pp. 2561–2567, https://doi.org/10.11118/actaun201361072561

Nalban, V. (2016), *Sentiment-Driven Asymmetries in Romanian Monetary Policy Transmission*, "Eastern European Economics", 54 (3), pp. 251–270, https://doi.org/10.1080/00128775.2016.1149036

Netsunajev, A. (2013), *Reaction to technology shocks in Markov-switching structural VARs: Identification via heteroscedasticity*, "Journal of Macroeconomics", 36, pp. 51–62, https://doi.org/10.1016/j.jmacro.2012.12.005

Peersman, G. (2004), *The Transmission of Monetary Policy in the Euro Area: Are the Effects Different Across Countries?*, "Oxford Bulletin of Economics & Statistics", 66 (3), pp. 285–305, https://doi.org/10.1111/j.1468-0084.2004.00080.x

Przystupa, J., Wróbel, E. (2014), *Asymmetry of the Exchange Rate Pass-Through. An Exercise on Polish Data*, "Eastern European Economics", 49 (1), pp. 39–51, https://doi.org/10.2753/EEE0012-8775490103

Przystupa, J., Wróbel, E. (2016), *Modelling monetary transmission in less developed emerging markets: the case of Tunisia*, "Bank i Kredyt", 47, pp. 395–434.

Rosoiu, A. (2015), *Monetary Policy and Time Varying Parameter Vector Autoregression Model*, "Procedia Economics and Finance", 32, pp. 496–502, https://doi.org/10.1016/S2212-5671(15)01423-9

Silvia, J., Iqbal, A. (2011), *Monetary Policy, Fiscal Policy, and Confidence*, "International Journal of Economics and Finance", 3 (4), pp. 22–35, https://doi.org/10.5539/ijef.v3n4p22

Sims, C.A. (1972), *Money, Income and Causality*, "American Economic Review", 62, pp. 540–552.

Sims, C.A. (1980), *Comparison of Interwar and Postwar Business Cycles: Monetarism Reconsidered*, "American Economic Review", 70 (2), pp. 250–257.

Sims, C.A. (1986), *Are Forecasting Models Usable for Policy Analysis?*, "Federal Reserve Bank of Minneapolis Quarterly Review", 10 (1), pp. 2–16, https://doi.org/10.21034/qr.1011

Sims, C.A., Zha, T. (2006a), *Does Monetary Policy Generate Recessions?*, "Macroeconomic Dynamics", 10 (2), pp. 231–272, https://doi.org/10.1017/S136510050605019X

Sims, C.A., Zha, T. (2006b), *Were There Regimes Shifts in U.S. Monetary Policy?*, "American Economic Review", 96 (1), pp. 54–81, https://doi.org/10.1257/000282806776157678

Sims, C.A., Wagonner, D.F., Zha, T. (2008), *Methods for inference in large multiple-equation Markov-switching models*, "Journal of Econometrics", 146 (2), pp. 255–274, https://doi.org/10.1016/j.jeconom.2008.08.023

Stock, J.H., Watson, M.W. (2002), *Has the Business Cycle Changed and Why?*, [in:] M. Gertler, K. Rogoff (eds.), *NBER Macroeconomics Annual 2002*, Vol. 17, MIT Press, Cambridge, pp. 159–230, https://doi.org/10.1086/ma.17.3585284

Stock, J.H., Watson, M.W. (2012), *Disentangling the Channels of the 2007–2009 Recession*, "Brookings Papers on Economic Activity", 1, pp. 81–130, https://doi.org/10.1353/eca.2012.0005

Uhlig, H. (2005), *What are the effects of monetary policy on output? Results from an agnostic identification procedure*, "Journal of Monetary Economics", 52 (2), pp. 381–419, https://doi.org/10.1016/j.jmoneco.2004.05.007

Włodarczyk, P. (2016), *Fiscal sustainability of the Visegrad Group countries in the aftermath of global economic crisis*, "Lodz Economics Working Papers", 2/2017.

Woźniak, T., Dromaguet, M. (2015), *Assessing Monetary Policy Models: Bayesian Inference for Heteroskedastic Structural VARs*, "University of Melbourne Working Papers Series".

Appendix 1. Data descriptive statistics

Table A1. Data descriptive statistics

Czechia							Hungary						
Variables	IP	CPI	IR	REER	ESI	BCI	Variables	IP	CPI	IR	REER	ESI	BCI
Obs.	197	197	197	197	197	197	Obs.	197	197	197	197	197	197
Mean	3.48	2.21	2.14	1.94	1.24	0.13	Mean	4.35	4.56	7.18	1.30	0.91	0.14
Median	4.57	1.92	2.04	1.85	1.82	0.26	Median	5.85	4.63	7.48	0.58	−0.43	0.22
St. Dev	6.69	1.72	1.61	5.51	11.81	2.40	St. Dev	8.54	2.82	3.13	6.30	13.07	2.04
Min	−21.64	−0.42	0.20	−9.17	−45.36	−7.77	Min	−29.68	−1.49	0.91	−12.02	−41.66	−5.63
Max	14.90	7.28	5.40	21.86	35.37	6.54	Max	19.65	10.26	13.30	16.95	41.24	5.61
Poland							**Sweden**						
Variables	IP	CPI	IR	REER	ESI	BCI	Variables	IP	CPI	IR	REER	ESI	BCI
Obs.	197	197	197	197	197	197	Obs.	181	181	181	181	181	181
Mean	5.06	2.69	6.14	0.63	0.47	0.10	Mean	0.08	1.28	2.49	−0.49	0.30	0.06
Median	5.01	2.40	4.69	0.81	2.43	0.21	Median	0.74	1.15	2.18	0.16	2.03	0.47
St. Dev	5.47	2.50	4.65	8.78	10.30	1.39	St. Dev	7.18	1.25	1.38	5.66	12.56	2.61
Min	−14.39	−1.30	1.56	−23.72	−39.86	−4.85	Min	−26.16	−1.89	0.12	−15.94	−30.75	−5.72
Max	19.57	10.79	19.84	21.78	27.24	2.92	Max	13.22	4.28	5.13	11.12	33.74	5.82

Exogeneous variables		
Variables	Oil	$REER_{EU}$
Obs.	197	197
Mean	5.59	−0.28
Median	4.19	0.58
St. Dev	32.75	6.02
Min	−67.12	−14.85
Max	106.96	14.69

The data expressed in 12-month log-differences. IP – Industrial Production, CPI – Consumer Price Index, IR – Interest Rate, REER – Real Effective Exchange Rate, ESI – Economic Sentiment Indicator, BCI – Business Confidence Indicator.

Source: author's elaboration.

Appendix 2. Robustness checks

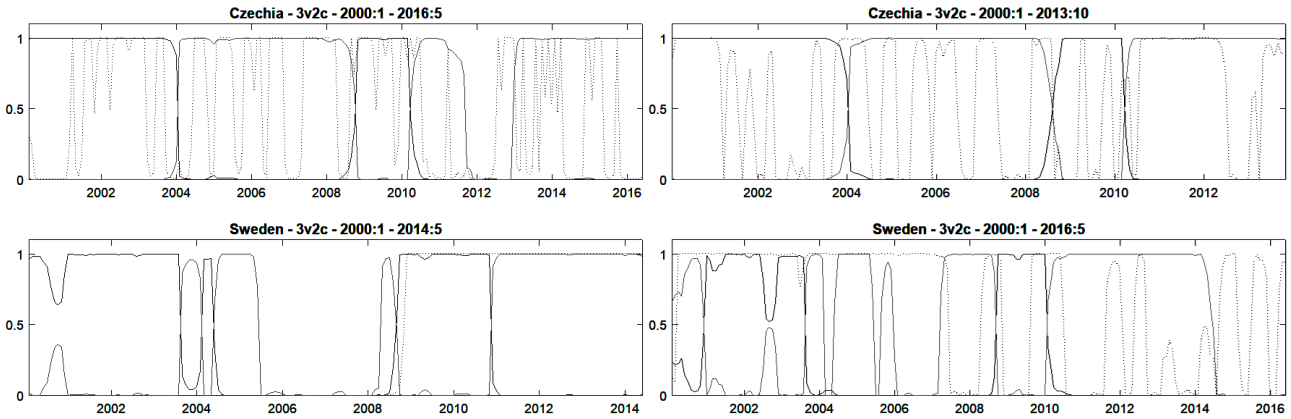


Figure A1. Probabilities of states estimated for varying sample lengths

Probabilities of states in variances presented by solid lines (grey and black), probabilities of states in coefficients presented by dashed line.

Source: author's elaboration.

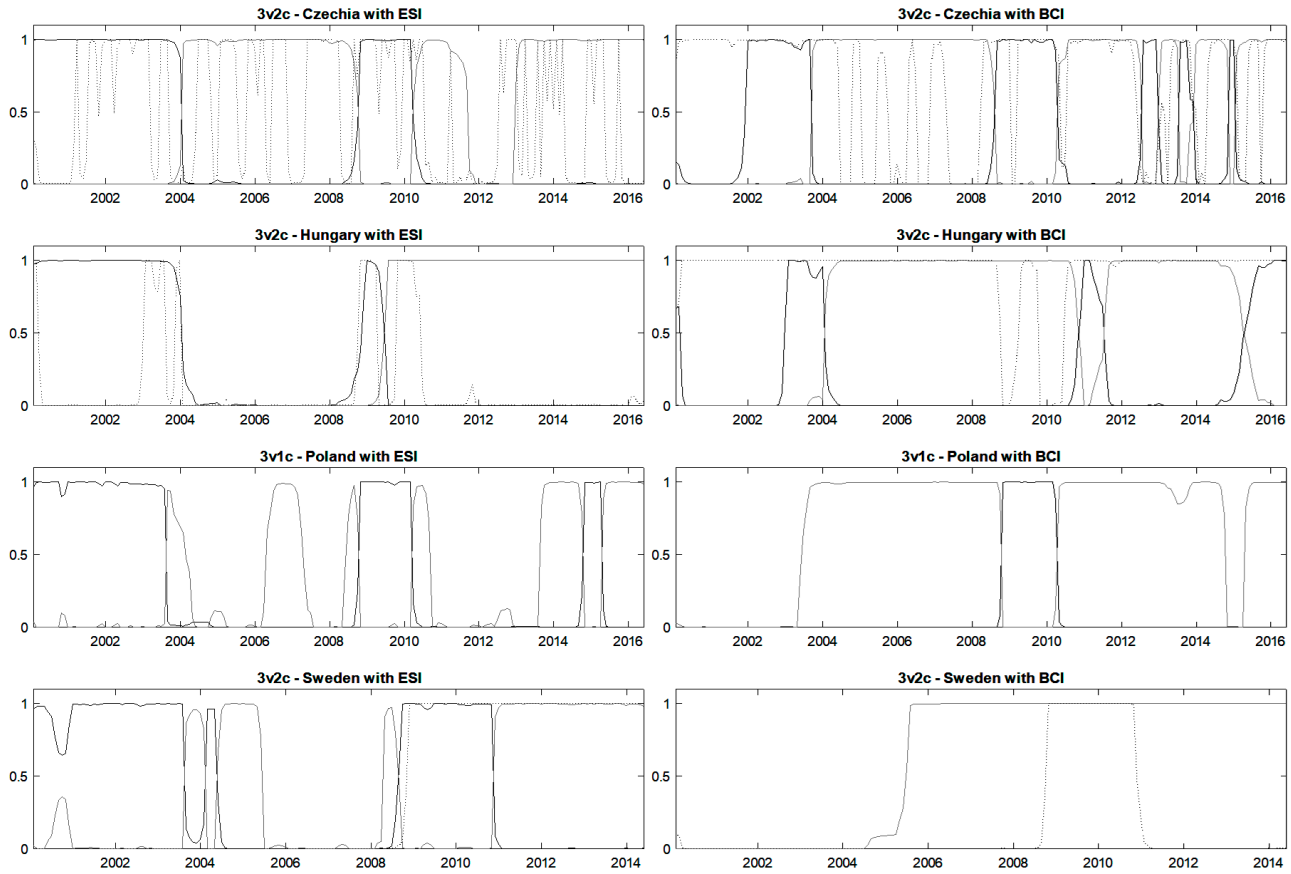


Figure A2. Probabilities of states estimated for the models specified with ESI and BCI

Probabilities of states in variances presented by solid lines (grey and black), probabilities of states in coefficients presented by dashed line.

Source: author's elaboration.

Zmiana wariancji czy asymetria? Mechanizm transmisji monetarnej w małych, otwartych gospodarkach europejskich w czasie kryzysu finansowego

W artykule przeprowadzono analizę wpływu wywołanych kryzysem zmian w aktywności gospodarczej na mechanizm transmisji monetarnej w małych gospodarkach otwartych Czech, Węgier, Polski i Szwecji w okresie od stycznia 2000 do maja 2016 roku. W badaniu wykorzystano strukturalne bayesowskie modele wektorowej autoregresji z przełączaniem Markowa (MSBSVAR).
Wyniki wskazują, że w krajach, w których kanał transmisji kursu walutowego jest stosunkowo słaby (Węgry i Szwecja), zmianom wariancji procesów gospodarczych w okresie kryzysu towarzyszyła zmiana wartości współczynników mechanizmu transmisji monetarnej, co w sposób negatywny wpływało na skuteczność polityki pieniężnej. Zmiany tego typu nie były obserwowane w Polsce i w Czechach, gdzie kanał transmisji kursu walutowego nie został całkowicie zneutralizowany. Wyniki sugerują, że wysiłki władz publicznych w małych gospodarkach otwartych, mające na celu utrzymanie kanału transmisji kursu walutowego, mogą mieć decydujący wpływ na ich zdolność do utrzymania skuteczności polityki pieniężnej w okresie kryzysu.

Słowa kluczowe: mechanizm transmisji monetarnej, kryzys gospodarczy, mała gospodarka otwarta, strukturalne bayesowskie modele wektorowej autoregresji z przełączaniem Markowa (MSBSVAR)