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WYDZIAŁ EKONOMICZNO-SOCJOLOGICZNY Uniwersytet Łódzki

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The Reform of European Public Debt Regulations – an Opportunity and a Challenge for EU Member States

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Abstract

The article examines how the European Commission's proposal to reform the Stability and Growth Pact (SGP) in terms of the pace of public debt reduction may affect basic economic parameters, such as GDP, consumption and investment levels, as well as fiscal parameters like the scale of subsidies and taxation levels of production and goods. This analysis focuses on two groups of EU countries: those with public debt below 60% of GDP (Group 1) and those with public debt above 60% of GDP (Group 2).
In the first stage of the study, using Eurostat data from 1995–2022 and employing a fixed effects model, we show that in Group 1, the impact of public debt on economic growth is statistically significant (unlike in Group 2). In the second stage, we conduct a detailed analysis of the impact of public debt on basic macroeconomic parameters (GDP growth components) and fiscal policy in countries with high levels of public debt. We simulate both moderate and drastic variants for reducing public debt relative to GDP.
The results show that in these countries, debt reduction leads to a decrease in consumer spending, an increase in investments, and an increase in taxes on production and imports. Based on these results, we recommend that the SGP reform should prioritize a gradual reduction of the public debt-to-GDP ratio because implementing drastic solutions would require deep cuts in public spending and tax increases in a short timeframe. We also highlight the need to consider exceptional situations in which the SGP rules may be suspended, as was the case with the COVID-19 pandemic.

Keywords: public debt, economic growth, fiscal rules, correction mechanism Stability and Growth Pact

JEL: E62, H21, H60, O43

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Introduction

In 2020, the world experienced a supply and demand shock as a result of the COVID-19 pandemic. In 2022, the war in Ukraine caused by Russian aggression added to this negative trend. These events caused, directly or indirectly, a global recession and also revealed a completely new mechanism for the spread of threats damaging particular economies.

Before 2020, there were many economic studies based on risk scenarios, including the emergence of a supply-demand shock (Berg and Kirschenmann 2015), but they did not predict a complete stop of the global economy. In this context, there is a need to restore the tax system and monetary policy that hedge the functional risk of current and future generations (Raczkowski, Schneider, and Węgrzyn 2020).

The crisis caused by the COVID-19 pandemic, combined with the effects of the war in Ukraine, basically combines three crises: governance, economic, and migration (Bozorgmehr et al. 2020; Raczkowski and Postuła 2022). In response to these challenges, European Union (EU) countries have increased the scale of state intervention, most often financed through public finance sector deficits, which then translates proportionally into the growing public debt among EU members. EU countries were already struggling with public debt and economic insecurity long before the outbreak of the COVID-19 pandemic, which was considered risky, but efforts to reduce it were suppressed by immediate needs (Guiso et al. 2019). The negative consequences in this context are primarily driven by political actions (Battaglini, Nunnari, and Palfrey 2019) and extreme differences in competitiveness (Blundell-Wignall 2012).

The European Commission (EC), recognizing the need to involve Member States in mitigating the effects of crises while also fearing an uncontrolled increase in debt, tried to implement ad hoc decisions. This included suspending the need to adhere to fiscal rules and refraining from imposing fines on countries whose fiscal results – specifically public debt levels and financial sector deficits – exceeded the reference values. However, these measures were intended as temporary solutions and should not be applied permanently. Therefore, in November 2022, the EC proposed a reform of the Stability and Growth Pact (SGP) focusing on fiscal discipline, particularly regarding the pace of public debt reduction.

The article will assess the role of fiscal rules at the European and national levels in times of crisis based on a review of the literature. The aim is to examine how the EC's proposal for SGP reform in terms of the pace of reducing public debt in countries where it exceeds 60% of Gross Domestic Product (GDP) may affect basic economic parameters such as GDP, consumption and investment levels, as well as fiscal parameters like the scale of subsidies and the level of taxation of production and goods in these countries. We propose two possible changes to the SGP regarding excessive debt reduction in countries where it was higher than 60% of GDP and examine the impact of these proposals on selected economic and fiscal parameters.

The research was conducted using econometric models adapted to the input data published by Eurostat from the period 1995–2022, enabling forecasts for 2023–2025 for the categories under analysis. The study includes a review of the literature addressing the importance of including

escape clauses for fiscal rules in emergency situations within the SGP regulations, a topic that has become increasingly relevant in recent years.

Fiscal rules in times of crisis

The COVID-19 pandemic and the energy crisis caused by Russia's aggression against Ukraine, as well as the accompanying high inflation, have caused a serious economic shock that has a significant negative impact on the macroeconomic outlook of the whole world and specifically within the EU. The succession of negative events and the need to react quickly made it necessary to increase the involvement of Member States in the real economy, leading to a significant increase in public debt, which had already exceeded the reference values in many countries before these events. However, in 2022 there was a noticeable return to discussions on debt reduction and reinstatement of fiscal rules that had been suspended at both EU and national levels in many Member States.

Some economists warn that the current fiscal framework could lead to pro-cyclical and thus destabilizing fiscal policies, a problem that Southern European countries faced during the European debt crisis, which had repercussions throughout the EU. Therefore, the question remains whether the most appropriate solution is to return to the provisions of the Stability and Growth Pact introduced in 1997 as a framework for the fiscal policy of the EU, aimed at maintaining economic stability, sound public finances, reducing the budget deficit and public debt, and ensuring macroeconomic stability. Until recently, i.e., until 2023, the SGP was the basis for coordinating Member States' budgetary policies; it also aimed to prevent over-indebtedness and encourage the responsible management of public finances.

The SGP, which was introduced to ensure financial and fiscal stability in the EU, has long been criticized because of its ineffectiveness. There are several main factors that contribute to this failure. First, the SGP relies on limiting Member States' budget deficit to 3% of GDP and keeping public debt below 60% of GDP. However, many critics argue that these targets are arbitrary and do not consider the different economic and fiscal contexts of individual countries. In practice, many countries have not been able to meet these requirements, leading to continued violations of the rules.

Second, enforcement of the SGP regulations was insufficient. While the EC had the power to monitor and enforce these rules, there was often a lack of consistency in taking action against countries that violated the rules. There have been many instances where Member States evaded sanctions, undermining the credibility of the entire system. Third, the SGP focuses mainly on fiscal discipline, neglecting the aspects of economic growth and investment. The focus on reducing the budget deficit and public debt often led to a reduction in public spending, especially on investments, which are crucial for increasing competitiveness and economic development. This reduction in public spending may also have had a negative impact on social public services such as healthcare and education.

The lack of flexibility within the SGP made it unable to respond adequately to crises. During periods when Member States needed financial and fiscal support, the Pact did not provide enough

flexibility and customization. The applied approach did not account for crisis periods or cyclical changes in the economy. In times of recession, reducing public spending could deepen the crisis and hamper economic recovery. The lack of flexibility within the Pact made it impossible to respond appropriately to changing economic conditions.

Finally, the SGP is often criticized for its lack of coherence and coordination between Member States. There have been many instances where one country has implemented fiscal discipline measures while others have adopted a less stringent approach.

A proposal to reform European fiscal rules

Since the beginning of the COVID-19 pandemic and the war in Ukraine, the EU has supported national efforts to respond to these crises and mitigate the effects of the economic downturn. It freed up budgetary resources to fight the virus, activated the general escape clause in the SGP, used the full flexibility of state aid rules, and proposed a new instrument to help people stay in the labor market. In addition to measures taken by the European Central Bank and the European Investment Bank, the EU's response has provided more than half a trillion euros to support workers and businesses. On 27 May 2020, the EC presented a proposal to the European Parliament and the Council to establish a Recovery and Resilience Facility to provide substantial support for reforms and investments to strengthen Member States' economies.

The medium- to long-term effects of the COVID-19 pandemic and the war in Ukraine will significantly depend on how quickly Member States' economies recover, which in turn will be conditioned by the measures they take to mitigate the social and economic impact of the crisis – with the support of the EU. Member States should take advantage of the EU's recovery package to help finance key reforms and investments to increase the growth potential and resilience of the economy. This conclusion is confirmed by the data presented in Chart 1, which clearly indicates that the fiscal rules in force have become ineffective, making compliance difficult to achieve.

As a result, the ineffectiveness of the SGP solutions led to a loss of confidence in the EU's fiscal system and an increase in inequalities and unsustainable economic growth.

In response to major economic challenges such as high public debt, low economic growth, and pro-cyclical fiscal behavior, the EC has proposed a reform of the SGP. On 9 November 2022, it adopted a Communication on the directions of the SGP reform (European Commission 2022). The effect of the reform will be a simpler, more transparent, and effective SGP, with greater involvement of Member States and a realistic, gradual, and sustainable reduction of public debt. This will be accompanied by reforms at the national level and the allocation of public investment expenditures that will favor EU strategic priorities (Buti, Friis, and Torre 2022).

The new rules are intended to enable Member States to manage public debt more effectively, promote investment, and implement reforms that will contribute to a sustainable and gradual reduction of public debt. The reform also plans to strengthen the mechanisms for enforcing the rules of the Pact to ensure greater effectiveness and accountability among Member States. The SGP

reform envisions greater financial responsibility and effective management of public finances, which will be supported by increasing the role of Member States in decision-making.

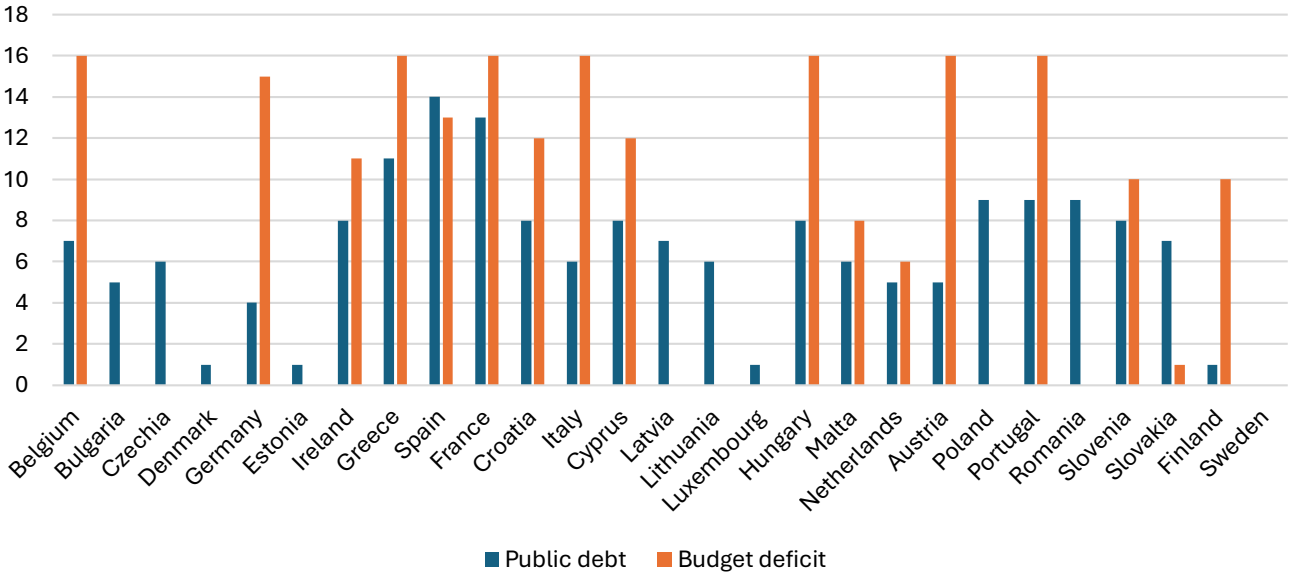

Chart 1. Number of years in which EU Member States' public debt exceeded 60% of GDP and the permissible level of budget deficit of 3% of GDP, 2007–2022

Source: own study based on data published by Eurostat n.d.

In addition, the SGP reform focuses on promoting investments and reforms that address today's challenges, such as transitioning to an ecologically sustainable economy and digital transformation. It is important that Member States' fiscal policy is consistent with the EU's priorities and objectives, ensuring sustainable economic growth.

Faced with the effects of the COVID-19 crisis and Russia's aggression against Ukraine, EU Member States are currently struggling with high levels of public debt and deficits. The revised framework aims to address this situation by simplifying fiscal rules and focusing on fiscal risk, which involves differentiating countries based on public debt challenges. It is important that Member States gradually, realistically and sustainably reduce high public debt-to-GDP ratios to ensure debt sustainability. Therefore, the 1/20 repayment rule per annum for the portion of public debt/GDP above 60% will be abolished. However, it is important to note that tailoring debt relief to the circumstances of individual Member States does not mean easing the regulations; rather, it emphasizes the effective enforcement of these rules.

The reform proposes that indebted Member States agree with the EC on a plan modeled on the Convergence Program. Under this plan, these countries commit to continuing the fiscal adjustment path for four years, or seven years for those countries with high levels of debt. At the same time, individual countries will implement reforms and investments to continue the green and digital transformation processes. The indicator taken into account will be net government spending, i.e., spending less interest on debt. The plan must be approved by the Council of the European Union based on its assessment. The excessive deficit procedure will remain in place, while the debt procedure will be strengthened and triggered when a country with debt exceeding 60% of GDP deviates from the agreed expenditure path.

The EC explained that the reference adjustment path aims to ensure a credible reduction of debt for countries with severe or moderate debt problems while also keeping the deficit below the reference value of 3% of GDP. To increase the effectiveness of the sanctions, the financial penalties will be reduced, while reputational sanctions will be strengthened. In addition, macroeconomic conditionality for the Structural Funds and the Recovery and Resilience Facility (on which the Convergence Programs depend) may result in the suspension of EU funding if Member States have not taken effective action to correct their excessive deficits. Failure to meet reform and investment commitments could lead to a more restrictive adjustment path and financial sanctions for euro area countries.

In April 2023, the EC presented another communication (European Commission 2023) in which it provided the Member States with guidelines for conducting and coordinating fiscal policy for 2024. Overall, fiscal policy in 2024, after the general escape clause is deactivated at the end of 2023, should ensure debt sustainability in the medium term and promote sustainable economic growth in all Member States through reforms and investments.

It is important to note that the existing SGP legal framework remains in effect while discussions about reforming the economic governance framework are ongoing. Therefore, not all elements of this reform were able to be introduced in 2024. Nevertheless, to smoothly start the functioning of the future set of EU fiscal rules and to address post-COVID realities, some elements from the Commission's reform directions can be incorporated now. In line with the Communication issued, all Member States were invited to indicate in their 2023 Stability and Convergence Programs how their budgetary plans would ensure compliance with the 3% of GDP reference value for deficits and achieve a realistic and sustainable reduction or maintenance of debt at a reasonable level in the medium term.

Member States that face significant or moderate public debt challenges are encouraged to set budgetary targets that ensure a credible and continuous debt reduction or maintain debt at a manageable level in the medium term. In addition, all Member States are invited to set budgetary targets that ensure that their deficits do not exceed 3% of GDP or fall below 3% of GDP over the period covered by the Stability or Convergence Program and credibly ensure that the deficit stays below 3% of GDP with unchanged policy in the medium term. Additionally, Member States are also invited to report in their Stability and Convergence Programs planned support measures for the energy sector, including their budgetary impact, when they would be phased out, and underlying assumptions regarding energy price developments.

Finally, Member States are encouraged to discuss in their Stability and Convergence Programs how their reform and investment plans, including those outlined in their Recovery and Resilience Plans, are expected to contribute to fiscal sustainability and sustainable and inclusive growth, in line with the criteria set out in the Commission's reform orientations.

Based on the presented Programs, the EC was ready to provide country-specific fiscal recommendations for 2024, in line with their own targets and assuming that the public debt ratio is on a declining path or remains at a prudent level and the budget deficit remains below the reference level of 3 % of GDP in the medium term. These recommendations were quantitative and provided qualitative guidance on investments and activities related to the energy sector,

in line with the criteria set out in the Commission's reform, while considering the existing provisions on the fiscal framework.

Such actions formed the basis for monitoring budgetary performance in the context of budgetary recommendations, starting with the draft budget plans of the euro area Member States for 2024, which were assessed by the EC in autumn 2023.

All Member States should continue to support nationally funded investments and ensure the effective use of the Recovery and Resilience Facility (RRF) and other EU funds, especially in the context of the green and digital transitions. Fiscal policy should support a double transition aimed at achieving sustainable and inclusive growth. The fiscal adjustment of Member States facing public debt challenges should not constrain investment; instead, they should involve a controlled increase in current nationally financed expenditure in proportion to medium-term growth. Member States should also consider the temporary nature of the non-repayable financial support provided under the RRF. The Commission will consider the need to maintain investments when monitoring budgetary performance in line with its budgetary recommendations.

The Commission's recommendations for individual Member States for 2024 also included guidelines on fiscal energy costs. In theory if wholesale energy prices remain stable and retail energy prices are lower, as projected, governments should gradually withdraw financial support for the energy sector, which will help reduce the budget deficit. Such actions would reduce fiscal costs, encourage energy saving, and enable the economy to adapt gradually and sustainably over time.

In February 2024, a political agreement was reached on new fiscal rules to help EU countries reduce their debt ratios. According to the new rules, the EC will provide specific recommendations to Member States whose public debt exceeds 60% of GDP or where public deficit exceeds 3% of GDP. The recommendations require the country to ensure that, by the end of the four-year fiscal adjustment period, public debt is likely to decline or remain at a reasonable level in the medium term. Countries with budget deficits above 3% will have to take action to reduce it by 0.5 percentage points within a year. Countries with higher deficits will face more stringent requirements. The new rules still require formal approval from the European Parliament and the EU Council.

Research method and presentation of results

In line with the article's objectives set out at the beginning, a detailed statistical analysis was conducted on EU Member States where the public debt-to-GDP ratio exceeded 60% in 2022, i.e., Austria, Belgium, Cyprus, Germany, Greece, Spain, Finland, France, Croatia, Hungary, Italy, Portugal, and Slovenia. The choice of these countries is directly related to the reform of the SGP, which is particularly significant for countries that consistently fail to meet this criterion described in the Maastricht Treaty. Data from the Eurostat database covering the period 1995–2022 were used for the analysis.

As the fiscal parameter covered by the new regulations in the draft SGP is the public debt-to-GDP ratio – already at record levels before the COVID-19 pandemic and further increased in 2022 – its impact on economic growth was first measured by the GDP indicator. Considering the earlier discussions in the article on the impact of public debt on GDP growth, we did not want to overlook this topic; therefore, in the first stage of the analysis, aggregate data for all EU countries were examined. The level of public debt was expressed in million euros, while GDP was expressed in nominal values. This parameter was prioritized due to concerns that high debt levels could threaten future growth prospects.

Our findings reflect the average impact of government debt on economic growth and show the complex relationship between debt spikes and economic growth. To analyze this relationship, a fixed effects model was used for two groups of EU Member States: one group that met the SGP's public debt criterion of less than 60% of GDP and the other group that did not (with public debt exceeding 60% of GDP).

The use of the fixed effects model to verify the impact of public debt on GDP growth is justified due to the characteristics of the study, which involved a panel with a relatively small number of units (EU member states) and a fairly long study period (1995–2022). Given that the fixed effects model assumes that differences between study units can be represented by different values of the constant in the model, it is possible to take into account the impact of all time-invariant specific factors for a specific unit under study.

In Member States where public debt relative to GDP was less than 60%, the study analyzed a panel with 101 observations, while for Member States with public debt above 60% of GDP, there were 115 observations. The results are shown in Tables 1 and 2.

Table 1. Results of research among EU countries with public debt below 60% of GDP and its impact on GDP growth using the fixed effects model

GDP growth	Coef.	Std. Err.	t	P > |t|	[95% Conf. Interval]	
Public debt in millions of euro	0.72	0.14	5.07	0.00	0.44	1.01
_cons	126 799.8	14 694.36	8.63	0.00	97 583.43	156 016.1

Source: own study based on data published by Eurostat n.d.

Table 2. Results of research among EU countries with public debt greater than 60% of GDP and its impact on GDP growth using the fixed effects model

GDP growth	Coef.	Std. Err.	t	P > |t|	[95% Conf. Interval]	
Public debt in millions of euro	0.05	0.05	1.01	0.33	–0.05	0.15
_cons	610 502.3	34 383.65	17.76	0.00	542 269.1	678 735.6

Source: own study based on data published by Eurostat n.d.

It is widely acknowledged that significant increases in public debt are usually accompanied by weaker economic growth and a persistent decline in output. However, this negative relationship does not always hold. Our results indicate that only in countries meeting the Maastricht criterion, i.e., with a public debt-to-GDP ratio of less than 60%, was the impact of this

parameter on economic growth statistically significant (p-value < 0.05). In countries with a public debt-to-GDP ratio higher than 60%, there was no statistically significant relationship between the increase in public debt and declining economic growth (p-value > 0.05).

Similar studies examining the impact of public debt have been conducted before, as researchers and policymakers were interested in explaining the potential impact of higher public debt-to-GDP ratios on growth (e.g., Reinhart, Reinhart, and Rogoff 2012; Panizza and Presbitero 2013). Reinhart and Rogoff (2010) made a significant contribution to the analysis of public debt to GDP ratio and economic development, basing their findings on an analysis of a long series of historical data. Their finding that a government debt-to-GDP ratio above 90% is clearly associated with a lower rate of economic growth sparked considerable debate, leading to calls from leading policymakers in the US and Europe for immediate fiscal consolidation measures to control public debt (Konzelmann 2014). The data they provided were used by several groups of researchers, who have supplemented their findings with newly constructed econometric tests, thereby expanding the body of research on the impact of public debt levels on economic growth (Kumar and Woo 2010; Herndon, Ash, and Pollin 2014; Pescatori, Sandri, and Simon 2014; Eberhardt and Presbitero 2015; Amann and Middleditch 2020).

Research results on the relationship between the level of public debt and economic growth – including the most cited articles – do not yield clear conclusions. Several studies provide evidence of a negative causal effect of higher public debt-to-GDP ratios on economic growth (Basu and Bundick 2017) and for the (close to) 90% threshold of public debt-to-GDP above which growth tends to decline (Caner, Grennes, and Koehler-Geib 2010; Checherita-Westphal and Rother 2012; Baum, Checherita-Westphal, and Rother 2013). Conversely, other studies confirm a negative relationship between initial levels of public debt and subsequent growth while arguing that the evidence supporting a causal relationship between GDP growth and public debt growth is weak at best (Panizza and Presbitero 2013; Ash, Basu, and Dube 2017).

In addition, several authors point to systematic differences in the (non-linear) effect of government debt on growth across countries, suggesting that there is no evidence of universal debt-to-GDP ratio thresholds above which growth slows down (Pescatori, Sandri, and Simon 2014; Eberhardt and Presbitero 2015; Égert 2015; Ash, Basu, and Dube 2017; Yang and Su 2018; Eberhardt 2019; Bentour 2021).

The two strands of research on the relationship between public debt and GDP growth do not provide a clear answer regarding the nature of their relationship. The first trend, which focuses on the non-linear relationship between public debt and economic growth characterized by an inverted U-shape, shows different impacts depending on the econometric model used. The second strand provides evidence that the impact of public debt on growth may vary depending on country-specific economic variables, such as the level of economic development, the occurrence of debt crises in an earlier period, or financial or institutional variables (Ghosh et al. 2013; Markus and Rainer 2016; Chiu and Lee 2017; Chudik et al. 2017; Gómez-Puig and Sosvilla-Rivero 2017; 2018). It is challenging to find publications that simultaneously examine non-linearity and heterogeneity in the relationship between public debt and economic growth, which makes it difficult to formulate clearer conclusions that account for both aspects affecting the research results.

Taking into account the presented considerations and the evident lack of a clear definition of the negative or positive impact of public debt on GDP, we conducted a more detailed analysis of the impact of public debt on the basic macroeconomic parameters (components of GDP growth) and fiscal policy in countries with high levels of public debt. We demonstrate the potential impact of the different rates of debt reduction mandated by the SGP regulations. We propose two variants for reducing public debt relative to GDP for EU Member States, which could result from the current and future regulations contained in the SGP:

1. Variant I assumes that Member States must reduce public debt relative to GDP by 1/20 of the surplus above 60% for the next four years (from 2022).
2. Variant II assumes that Member States must reduce public debt to GDP by the amount that exceeds 60%, allowing them to reach the 60% threshold over the next four years (starting in 2022).

As discussed earlier, it is important that establishing provisions requiring debt reduction does not lead to economic collapse and the introduction of significant changes in the socio-economic policy pursued so far, which will not be accepted by citizens and may lead to the inability to implement such a defined goal.

The explanatory variables used in the quantitative research were chosen based on a literature review and our expertise. Macroeconomic indicators were selected for the analysis, such as consumption and investment levels, as well as fiscal indicators, such as subsidies and the level of taxation of production and goods. The appropriacy of these variables is confirmed by analyses conducted by researchers such as Codogno et al. (2003), Ardagna, Caselli, and Lane (2007), Kumar and Baldacci (2010), Attinasi, Checherita, and Nickel (2011), von Hagen, Schuknecht, and Wolswijk (2011), Leão (2013), Gómez-Puig and Sosvilla-Rivero (2017).

The study used a linear model with fixed effects for the data from Eurostat databases for the period 1995–2022, although some variables had shorter time ranges. The choice of the model was dictated primarily by the type of data, as it estimated changes over time in characteristics common to selected European countries.

The linear model with fixed effects is expressed by the formula:

$$y_{it} = x_{it}^{'}\beta + \sum_{j=1}^{N}\alpha_j d_{ij} + \varepsilon_{it}, \tag{1}$$

where y_{it} – the endogenous variable, $x_{it}^{'}$ – the vector of exogenous variables, α_j – the intercept for the *j*-th variant of the random effect variable, d_{ij} – a binary variable that takes the value of 1 for $I = j$ (if the unit belongs to the *j*-th group), and 0 otherwise, ε_{it} – is a random quantity. The parameters of the model are estimated using the least squares method adapted for the presence of (artificial) binary variables. This estimator is known as the *least squares dummy variable* (LSDV).

Considering the intercept for each domain of the fixed effect makes it impossible to estimate the constant for the whole equation because the presence of a constant in time for each unit

would lead to strict collinearity with the d_{ij} variables and would make it impossible to identify the model.

The model assumes zero expected value and variance σ_{ε}^{2} for the random quantity, as well as the lack of autocorrelation.

The linear model with fixed effects over other models offers several advantages over other modeling approaches, including:

- control over the base effect (1),
- accounting for differences between units (2), and
- eliminating the influence of factors not considered (3).

The features indicated above mean that the base effect is the hypothetical value of the feature for the null vector of explanatory variables. By utilizing fixed effects, this base effect is different for each country (1).

The use of fixed effects makes it possible to observe and control the heterogeneity constant over time between research units during the analyzed periods. In practice, this means that each country is characterized by a different constant in the time series, which is a deterministic parameter that differs for individual countries (2).

The model is constructed with fixed effects based on the assumption that the heterogeneity arises from unobservable factors influencing the phenomenon being modeled, which are not included in the model. The country effects of these factors are often constant for each country and variable over time. In a fixed-effects model, it can be assumed that the effects of omitted individual factors are insignificant, but their combined effect is significant, as reflected by the constant variable in the model. Therefore, incorporating fixed effects increases the proportion of the explained variance while reducing the standard error.

As a result of conducting separate statistical calculations for each variable – namely, levels of consumption, investment, and taxation of production and goods in the Member States, as well as the scale of subsidies – the results presented in Charts 2–5 were obtained for both tested variants.

The results of our research using Variant 1 and Variant 2 lead to the conclusion that for all countries covered by the study, a decrease in public debt is associated with a decrease in consumption expenditure over time. However, in Variant 2, the decrease in consumption is much more dynamic.

If Variant 1 is implemented, Italy, Greece, and Hungary show the largest percentage reductions in public debt relative to their initial levels. Conversely, Germany and Slovenia experience the smallest impact on consumption reduction in percentage terms.

For Variant 2, the rate of consumption reduction is much faster in the analyzed period, with the greatest percentage effects observed in France, Spain, Belgium, Italy and Portugal.

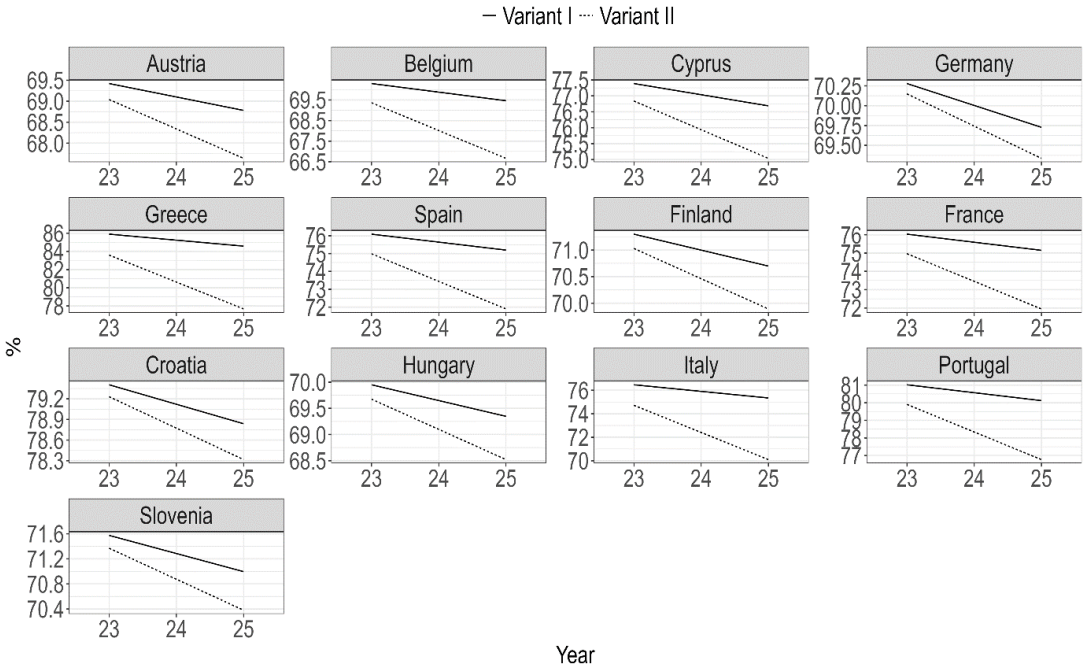

Chart 2. The impact of reducing public debt in Variant 1 and Variant 2 on consumption expenditure

Source: own study based on data published by Eurostat n.d.

The results clearly show that reducing public debt is associated with varying scales of reduction in consumption expenditure among the EU countries covered by the study. This finding is all the more important because previous research on the relationship between public debt and consumption produced ambiguous results. Sutherland (1997) presented a model of how fiscal policy affecting consumption can vary depending on the level of public debt. He noted that current generations of consumers are discounting future taxes because they may be dead when taxes are raised or when a larger population becomes available to pay those taxes. When debt reaches extreme levels, current generations of consumers know that there is a high probability that they will have to pay additional taxes, which may lead to a decrease in public debt.

On the other hand, modern intertemporal macroeconomics suggests that significant changes in net wealth are associated with changes in consumer spending (Lettau and Ludvigson 2001). Another point of view in the literature holds that public debt is irrelevant to private consumption, at least in a closed economy, because government bonds are both an asset for bondholders and a liability for taxpayers (Barro 1974).

More recent empirical research on the relationship between public debt and private consumption has produced mixed results. Peersman and Pozzi (2004) found that the excessive sensitivity of private consumption to current income in the US is positively correlated with public debt. Similarly, Pozzi, Heylen, and Dossche (2004) provided evidence for a panel of OECD countries. Hogan (2004) showed for 18 industrialized countries that if public consumption is reduced in response to a fiscal crisis (defined as high levels of debt), private consumption tends to increase.

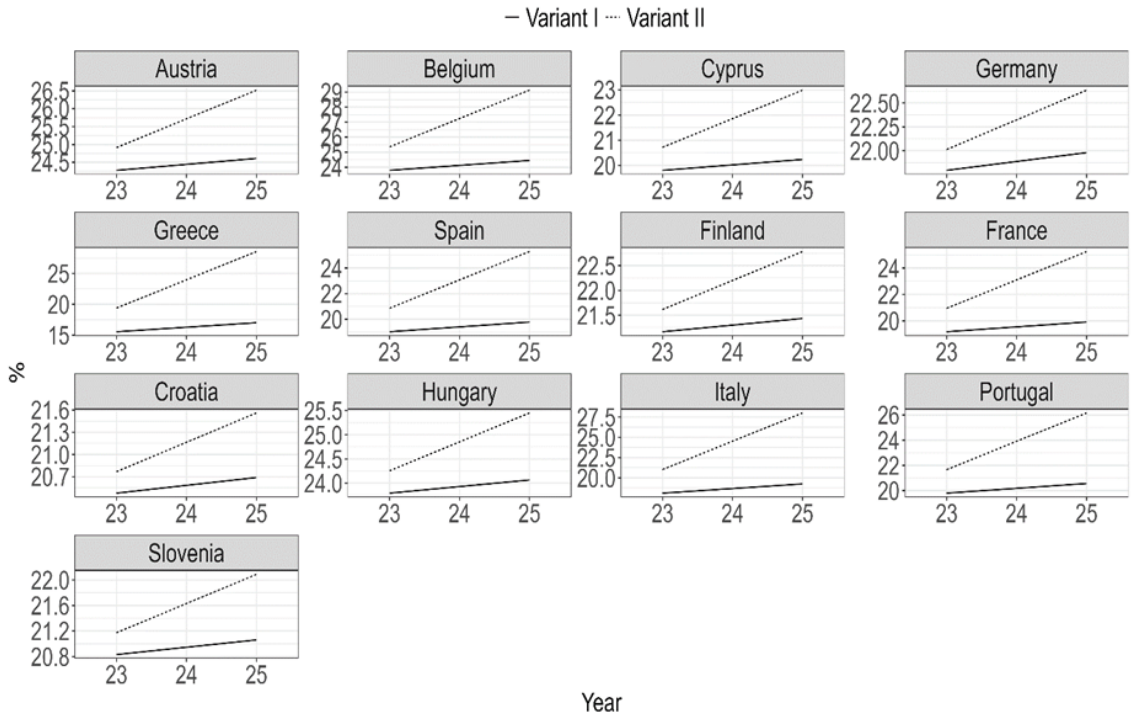

Chart 3. The impact of reducing public debt in Variant 1 and Variant 2 on investment spending

Source: own study based on data published by Eurostat n.d.

While the use of both variants results in an increase in investments in all countries covered by the study, Variant 2 achieves a higher level of investment more dynamically than Variant 1. Additionally, Variant 2 achieves a very large percentage increase in the value of investments in Greece, Belgium, Italy, Spain, France and Portugal, and a smaller effect in terms of growth dynamics for Germany, Finland, Croatia and Slovenia. Meanwhile, in percentage terms, for Variant 1, the greatest impact was found in Greece, while Slovenia saw the smallest impact.

Summing up, the results reveal opposing effects for Variant 1 and Variant 2. Specifically, both show that reducing public debt leads to a reduction in consumption while simultaneously increasing investment.

As Chart 4 shows, both variants brought benefits in the form of an increase in value. As a rule, Variant 2 brings a better effect and its value is similar for all countries. Notably, in Greece, Spain, Italy, and Portugal, the benefits of Variant 2 increase over time compared to Variant 1. In Germany, Finland, Croatia, Hungary and Slovenia, the dynamics of using both variants are similar in subsequent years in the four-year period under consideration, although Variant 2 brings better results in terms of value.

The increase in the amount of taxes in the analyzed period is linked to the correlation between greater investment and the reduction of public debt.

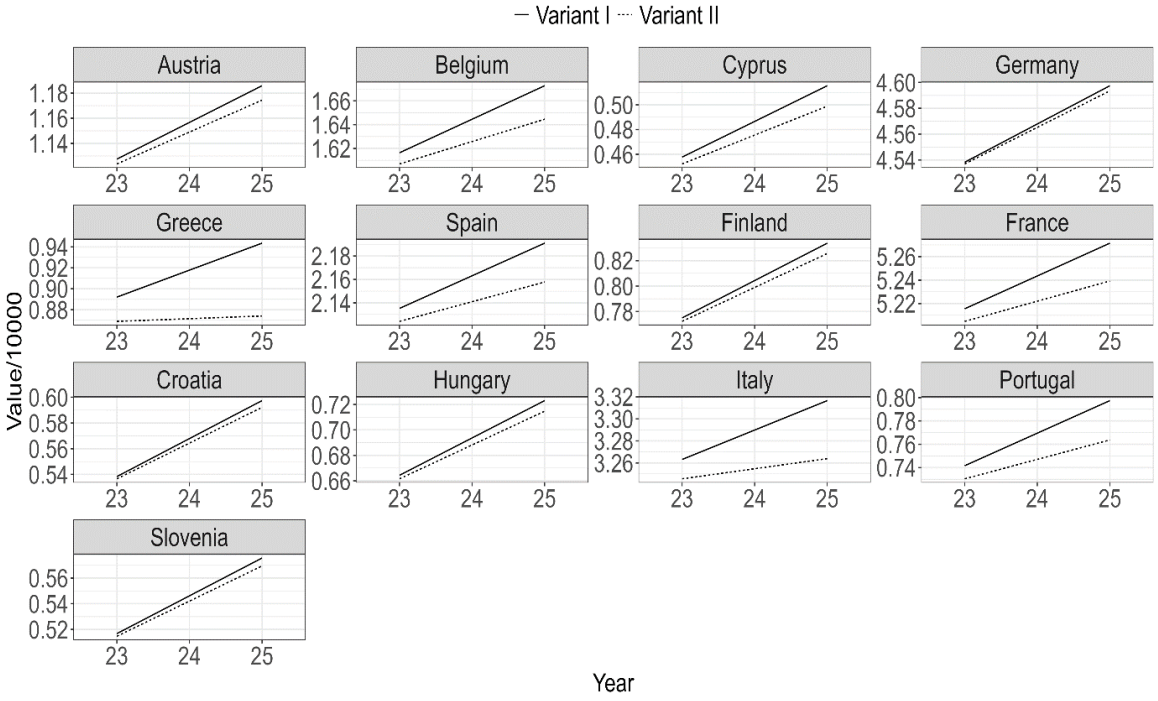

Chart 4. The impact of reducing public debt in Variant 1 and Variant 2 on taxes on production and imports

Source: own study based on data published by Eurostat n.d.

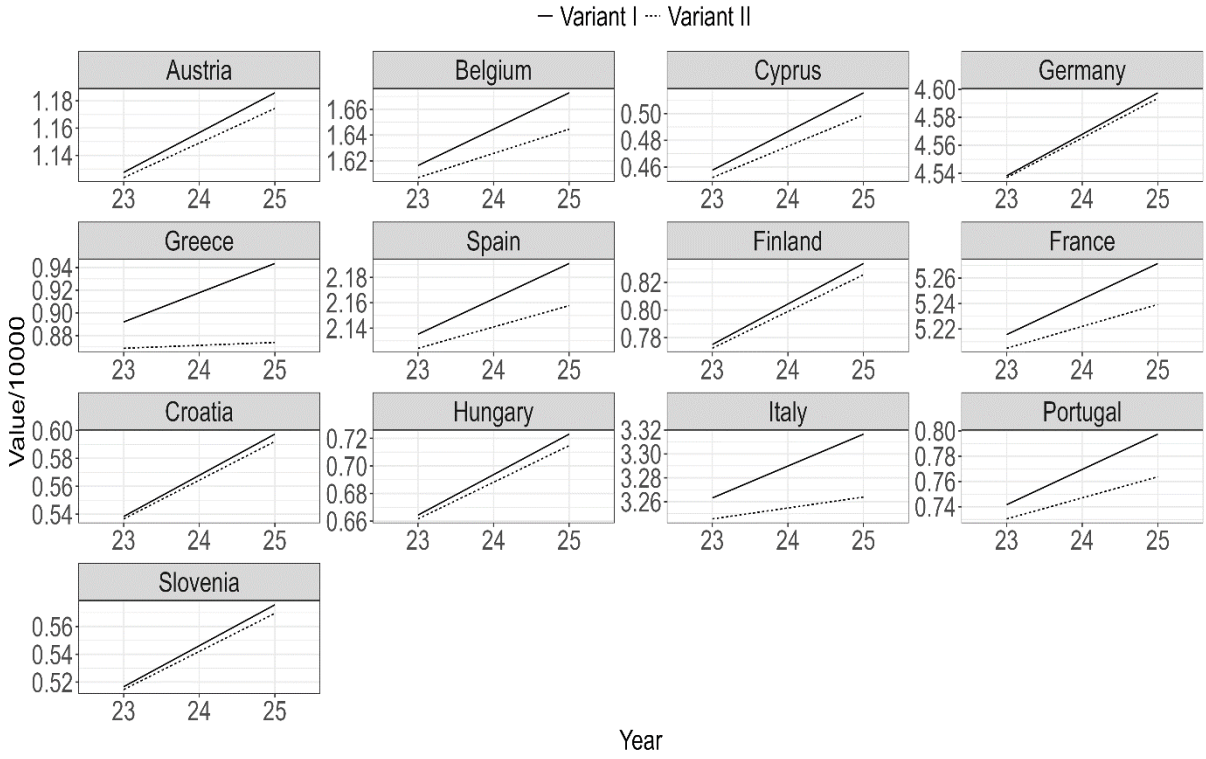

Chart 5. The impact of reducing public debt in Variant 1 and Variant 2 on the level of subsidies

Source: own study based on data published by Eurostat n.d.

As Chart 5 shows, Variant 1 has a greater effect than Variant 2. In Greece, Italy, France, Spain, and Portugal, the beneficial impact of Variant 1 increases over time compared to Variant 2;

however, in terms of value, the differences are not significant. In Germany, Finland, Croatia, Finland, and Slovenia, the impact dynamics are similar over time, with Variant 1 showing a greater impact in terms of value.

The results showed for the first time that Variant 1 had a stronger impact than Variant 2 regarding the relationship between reducing public debt and the level of subsidies. However, the nature of this relationship is not straightforward. On the one hand, a faster pace of public debt reduction in Variant 2 should unlock more funds for subsidies. On the other hand, a slower pace of debt reduction may allow for a more rational allocation of smaller funds and greater liquidity in the grants awarded by Member States. Due to difficulties in interpreting these findings, further in-depth analyses are warranted.

The negative long-term impact of public debt on economic growth may be due to crowding out mechanisms: if public debt increases, budget deficits lead to higher interest rates, which may crowd out private sector investment. Our results confirm this approach because in Variant 2 the investment rate in the economy is more favorable (Chart 3).

Discussion

The SGP reform has elicited reactions highlighting the imperfections and flaws of the proposed solutions. One major concern is the EC's establishment of a time horizon for the debt path based on debt sustainability analysis. This analysis relies on accumulated government budgetary constraints and accounting identifiers to outline the direction of debt evolution. While the EC has indicated a four-year perspective, which may be extended to seven years, the calculations themselves are based on a ten-year perspective.

Since the debt-to-GDP path is influenced by three variables: the real interest rate on debt service, real income growth, and deficit ratios the Commission plans to adopt assumptions for forecasting these three variables as part of the reform. In addition, the EC proposes conducting a cost-benefit analysis to assess the credibility of these assumptions based on historical data. However, questions arise about the credibility of such an analysis because even now, in the current economic climate, it is difficult to make credible projections for the coming years. Historical values of indicators are not fully repeatable, and therefore, they are not reliable indicators for the future. In addition, this approach undermines the declared goal of restoring responsibility to Member States.

Although the four-year perspective is a step forward, critics argue that it is too short and could lead to demands for counter-cyclical budgetary adjustments at an early stage. In practice, this means that if economic growth slows down, Member States will be asked to cut spending. In response to these concerns, the Commission has proposed extending the duration to seven years, but with certain conditions. What is puzzling, however, is that these conditions extend beyond budgetary discipline. They also require supply-side reforms and "good" public investment. The rationale is likely to be that stimulating supply can help reduce the debt ratio. However, the combination of two different objectives – budgetary discipline and quality public performance – dilutes the original purpose of the Pact. For more than two decades, the SGP has failed

to achieve its intended budgetary discipline, and expanding its mission to boost the supply side will not necessarily make the task easier or increase the effectiveness of the Pact.

Once the debt path has been agreed, individual Member States will need to commit to it. The budget constraint that underlies the debt sustainability analysis clearly indicates that the primary budget balance is an appropriate tool. The EC's proposal requires governments to commit to "spending caps," which are essentially a "single operational indicator" designed to be simple and transparent. This ratio is defined as "net primary expenses, i.e., expenses minus any income appropriations and the exclusion of interest expenses and cyclical unemployment expenses." However, in practice, the indicator reflects the cyclically adjusted primary balance – a concept introduced in the previous reform of the SGP to allow automatic stabilizers to work. While it was theoretically a good idea, it did not bring the expected results. The Commission's proposed solution amounts to merely renaming and making minor modifications to this tool. The new ratio is neither simple nor transparent, and its introduction is likely to pose the same difficulties that undermined the use of a cyclically adjusted primary balance. Therefore, simpler solutions should be considered, such as clearly defining a target for reducing public debt relative to GDP to 60%, in accordance with Variant 2.

It is also important to mention independent fiscal institutions. In recent years, many Member States have put considerable effort into establishing these institutions to monitor and evaluate national budgets from preparation to final implementation. While their effectiveness is a separate topic, some have proven to be very effective. Therefore, it is puzzling that the Commission does not acknowledge this trend. EC support for national independent fiscal institutions, by supervising their independence, procedures and technical measures, could result in a new tool to establish budgetary discipline. Perhaps this oversight is lacking because such a solution would reduce the central role the Commission seeks for itself, thereby undermining the responsibility of the Member States.

Finally, we cannot overlook the financial and reputational sanctions that are part of the reform proposal. Law enforcement has been a notable weakness of the SGP. In the two decades of its existence, no sanctions have ever been imposed despite significant increases in public debt in many countries. Nevertheless, the Commission still mentions sanctions but less stringent ones. It remains uncertain whether this will actually result in the imposition of sanctions or merely reinforce the conviction of those in power that sanctions will not be imposed at all; even if they are imposed, they will be symbolic.

Conclusion

The EC has been trying for decades to implement solutions within the SGP and other legal regulations to ensure the stability of finances to ensure financial stability among Member States. Unfortunately, these efforts have not always proven to be effective, especially in light of additional external shocks such as the financial crisis, the COVID-19 pandemic, and the war in Ukraine. While research indicates that the effects of public debt growth can vary – sometimes positively and sometimes negatively – measures should be taken to limit its growth. This

raises the question of how the proposed reform of the SGP will affect selected economic and fiscal parameters in EU countries with high levels of public debt.

Our research did not provide solid evidence of a persistent negative impact of high public debt-to-GDP ratios; however, this does not mean that countries can sustain public debt at any level. Therefore, the EC's activities to reform the SGP are important. However, when formulating these reforms, it is essential to consider the feasibility of the solutions used and their potential for implementation by Member States. It is important that the new rules are followed and any sanctions for excessive debt levels are modified. Member governments may still face country-specific unsustainable levels of debt, particularly when interest payments rise significantly (Eichengreen et al. 2019). However, the meta-regression evidence suggests that, given the continued increase in government debt-to-GDP ratios due to the COVID-19 crisis in most countries, there is no urgent need to lower government debt levels to avoid hampering economic growth.

The analysis of the existing literature and research indicates that great care is needed when formulating universal recommendations for fiscal policy in response to high public debt-to-GDP ratios. Based on this understanding and the results of our research, we believe that the SGP reform should include solutions to reduce the public debt-to-GDP ratio gradually – such as a decrease by 1/20 of the excess over 60% – rather than implementing drastic measures, like reducing debt from 80% to 60% within four years. Such measures seem unrealistic as they would require deep cuts in public spending and tax increases in a short time, which would not be accepted by citizens in those countries. In addition, it is vital to define situations in which the rules will not be applied at the stage of formulating the provisions of the SGP to prevent complete suspension, as occurred during the COVID-19 pandemic. Our next research will focus on escape clauses from public debt rules that should be incorporated into the SGP.

The article examined how the EC's proposal for SGP reform regarding the pace of public debt reduction may affect specific economic parameters of countries with different levels of public debt to GDP. The results highlight significant opportunities for effective action in this area. Since reducing debt leads to decreased consumer spending and increased taxes on production and imports while simultaneously increasing investment levels, there is potential to develop and implement a combination of strategies that will achieve the desired economic goals. From this perspective, exploring how increasing investment in response to reduced public debt is particularly interesting because low investment levels are a significant problem for many EU countries, hindering their medium- and long-term development. This issue should also be considered within the framework of economic policies implemented by the Member States and also be the subject of further research due to the economic effects it may have.

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Reforma regulacji europejskich w zakresie długu publicznego – szansa i wyzwanie dla państw członkowskich UE

W kontekście planowanej reformy Paktu Stabilności i Wzrostu (PSW) autorzy artykułu podjęli próbę weryfikacji wpływu wybranych parametrów ekonomiczno-fiskalnych na stabilność finansową i fiskalną w krajach Unii Europejskiej. Przeprowadzone badania wykazały, że w przypadku krajów UE, w których dług publiczny w latach 1995–2022 przekroczył 60% PKB, reforma PSW przyniesie lepsze rezultaty w latach 2023–2025, jeśli zostaną zastosowane rozwiązania ograniczające relację długu publicznego do PKB na poziomie umiarkowanym, a nie drastycznym.
Celem artykułu jest zbadanie, jak propozycja Komisji Europejskiej dotycząca reformy PSW w zakresie tempa redukcji długu publicznego może wpłynąć na podstawowe parametry ekonomiczne, tj. PKB, poziom konsumpcji i inwestycji, a także parametry fiskalne, tj. skalę subsydiów i poziom opodatkowania produkcji i towarów w dwóch grupach państw UE: z długiem publicznym poniżej 60% w stosunku do PKB (pierwsza grupa) oraz z długiem publicznym powyżej 60% w stosunku do PKB (druga grupa).
Badanie przeprowadzone na podstawie danych Eurostatu z lat 1995–2022 oraz z wykorzystaniem modelu efektów stałych wykazuje w pierwszym etapie, że w pierwszej grupie krajów wpływ długu publicznego na wzrost gospodarczy jest statystycznie istotny (w odróżnieniu od drugiej grupy krajów).
W drugim etapie autorzy przeprowadzają szczegółową analizę oddziaływania długu publicznego na podstawowe parametry makroekonomiczne (składniki wzrostu PKB) oraz politykę fiskalną w krajach z wysokim poziomem długu publicznego, analizując na bazie przygotowanych symulacji umiarkowany oraz drastyczny wariant zmniejszenia przez nie długu publicznego w stosunku do PKB. Uzyskane wyniki pokazują, że w krajach objętych badaniem redukcja długu prowadzi do zmniejszenia wydatków konsumpcyjnych, zwiększenia poziomu inwestycji oraz wzrostu podatków od produkcji i importu.
Na podstawie osiągniętych wyników autorzy rekomendują, aby reforma PSW została ukierunkowana na redukcję relacji długu publicznego do PKB w tempie umiarkowanym, ponieważ implementacja rozwiązań drastycznych wymagałaby głębokich cięć w wydatkach publicznych i podwyżek podatków w krótkim czasie. Autorzy zwracają także uwagę na konieczność uwzględnienia wyjątkowych sytuacji, w których reguły PSW mogą być zawieszone, jak miało to miejsce w przypadku pandemii COVID-19.

Słowa kluczowe: dług publiczny, wzrost gospodarczy, reguły fiskalne, mechanizm korekcyjny, Pakt Stabilności i Wzrostu

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Foreign Direct Investment in Latvia and Serbia: A Comparative Analysis

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Abstract

The main purpose of this study is to compare foreign direct investment (FDI) patterns in Latvia and Serbia, examining underlying trends, institutional frameworks, and historical contexts that shape investment dynamics. By analyzing regulatory structures, incentive schemes, and investment structure and dynamics, we synthesize best practices and policy recommendations for fostering sustainable investment inflows in both countries.
The study employs a comparative case study approach to analyze institutional frameworks related to FDI, as well as the performance of foreign affiliates and the dynamics of FDI inflows in Latvia and Serbia, focusing on the period from 2010 to 2023. Utilizing descriptive statistical methods and data from central banks, national statistical offices, and international organizations, the research examines trends, structures, and origins of FDI, connecting them to historical contexts and institutional and economic factors. Despite their disparate historical contexts, both countries share a common thread in their transition toward market-oriented economies, marked by proactive policies aimed at attracting foreign investment. Our study shows how divergent approaches in integration and regulatory harmonization impact patterns, structures, and dynamics of foreign direct investment.
Our research proposes tailoring FDI frameworks and incentive policies to leverage the strengths and address weaknesses in Latvia and Serbia. For Latvia, expanding economic diplomacy and supporting existing foreign affiliates could enhance investment retention and attraction, particularly from non-European Union (EU) countries. For Serbia, policies should prioritize FDI in technology-intensive and high-value-added sectors, supported by digitalization, workforce development, and regulatory alignment with the EU.
The study provides a unique quantitative and qualitative comparison of factors that affect the FDI inflows, dynamics, and structure of those inflows in Latvia and Serbia, contributing to understanding the options of policymakers in transition economies for attracting investments and ensuring that they have positive effects on economic development.

Keywords: foreign direct investment, investment promotion, institutional quality, Serbia, Latvia

JEL: F21, O57, P27

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Introduction

Foreign direct investment (FDI), particularly when associated with technological progress, plays an important role in capital accumulation, serving as a catalyst for economic integration, development, and growth. This fundamental principle underscores why attracting foreign investment remains a prominent policy goal for most transition economies. This emphasis stems from recognizing the potential of FDI to introduce advanced technologies, managerial expertise, and access to global markets, thereby enhancing productivity and stimulating economic transformation. Consequently, policymakers in these transition economies, including Serbia and Latvia, prioritize the creation of a conducive investment climate and the implementation of targeted policies to attract foreign investors and stimulate FDI inflows.

FDI decisions are affected by many factors, such as tax incentives, access to consumers, labor costs, social climate, infrastructure, availability of a suitable labor force, the possibility of developing new consumer habits in the host country, simple and understandable regulations and other factors corruption (Krivins, Vilks, and Kipane 2024).

Undoubtedly, FDI can have positive effects on the host country, including improving the country's balance of payments, increasing productivity, transferring technology, addressing the problem of unemployment, improving the quality of the country's labor force, and developing new industries. However, the effect can be neutral or even negative in certain situations. Thus, attention should be paid to the different approaches of political parties to the issue of protecting foreign capital and investment. Ineffective government administration, a lack of development programs (Remeikiene et al. 2022), a lack of basic infrastructure in the host country, rapid change in political preferences, inconsistency of the state apparatus, deliberately or unwittingly cultivated antipathy towards foreign capital, potential risks of nationalization, and strong government economic intervention, can scare off foreign investment. Reducing bureaucratic procedures is also extremely important in the field of public procurement, which is also associated with foreign investments. On the other hand, foreign investment has great potential for aiding the integration processes of the host countries (Kastratović 2024).

The business environment of local government, local government's fiscal stress, land resources, and wealth are important determinants in attracting commercial investment (Wang, Sun, and Shi 2024). In addition, factors such as economic growth, pollution, trade, domestic capital investment, gross value-added, and the financial stability of the country can influence FDI decisions (Brkić, Kastratović, and Salkica 2021; Singh 2024).

The overarching objective of this study is to undertake a comprehensive examination of FDI patterns in Serbia and Latvia, with a particular emphasis on a comparative analysis. We frame our analysis around the main exploratory research question: How do Latvia and Serbia differ and align in the key factors that attract FDI, and how do these differences and similarities influence FDI patterns? To answer this question, we conducted a descriptive analysis of FDI patterns in the two countries, focusing on the period between 2010 and 2023.

By scrutinizing the investment landscapes of these two countries, the research sheds light on the underlying trends and major factors that have shaped foreign investment inflows over

time. Furthermore, the study seeks to delve into the institutional frameworks that govern foreign investment in each nation, thereby discerning the regulatory structures and policy frameworks that have influenced investment dynamics. The research also aims to elucidate how different historical contexts have shaped distinct investment frameworks and investment performances in Serbia and Latvia. Moreover, by comparing incentive schemes that are prevalent in both countries, the study identifies the best practices and policy recommendations that are conducive to fostering sustainable FDI inflows. Through this multifaceted analytical approach, the research seeks to contribute empirically grounded insights that could be of use for policy formulation aimed at optimizing FDI outcomes in Serbia and Latvia.

Literature review

In recent years, scholarly discourse on international investment has investigated the economic landscapes of both Latvia and Serbia. For instance, research into the impact of FDI in Latvia has highlighted its role in shaping the country's economic trajectory (Saksonova, Konovalova, and Savchina 2023). Meanwhile, analyses of entrepreneurship development in Serbia have investigated the key external factors that influence the country's business ecosystem (Jaško et al. 2023). Moreover, examinations of FDI in the Serbian energy sector have provided insights into the interplay between investment inflows and its economic growth (Pavlović et al. 2022). Similar insights are provided for foreign investment in other sectors, such as agriculture, where they were found to integrate it into the world economy (Kastratović 2023).

However, while existing research offers valuable insights into these countries' economic landscapes, it predominantly examines them within broader regional or thematic contexts. Studies often encompass multiple countries or regions, such as Europe as a whole, the European Union (EU), Central and Eastern European countries, the Baltic countries, or the Western Balkans (Margaryan, Terzyan, and Grigoryan 2020; Bilas and Franc 2022; Burlea-Schiopoiu, Brostescu, and Popescu 2023; Lubeniqi 2023). Despite the wealth of literature on foreign investment, there remains a notable gap in comparative studies specifically focused on transition economies adopting different strategies of economic transformation and integration. Latvia and Serbia pose a suitable case study for this endeavor. This underscores the contribution of our research, which seeks to fill this void by providing a comparative analysis of these two countries. By focusing on the distinct economic dynamics of Latvia and Serbia, our study offers nuanced insights into their investment landscapes and contributes to a deeper understanding of the factors that shape their economic trajectories.

We also compare the situation in Serbia and Latvia with pan-European and global practice. Therefore, we draw attention to several scientific articles that are related to modern trends, namely (1) the Green Deal and low-carbon innovations, (2) technology and infrastructure, (3) force majeure and other risks.

FDI has the potential to positively affect energy consumption (Shinwari et al. 2024). In this regard, it is also important that multilateral support from development banks in green public-private partnerships (PPPs) may help alleviate the cultural tightness impediment (Uzuegbunam 2024).

Regarding technology and infrastructure, modern research emphasizes that technological skills, similarities in technological skills, high-tech and innovative industrial activities, and access to finance between the recipient and investing countries positively influence FDI flows (Uttama 2024).

Recent research suggests that the investment risk system comprises three risk subsystems: operating cost, operating revenue, and government subsidy. Among these, the subsidy risk subsystem most significantly influences the IRSC (investment risk of social capital). Within the boundary risks, design risk and contractual risk are the most vital factors in preventing and controlling the IRSC (Sun et al. 2023). PPP projects that adopt contractual forms in which the private party takes more risks, awarded through competitive methods and benefitting from indirect government support programs, are characterized by a larger investment volume (Fleta-Asín and Muñoz 2023).

Considering the previously reviewed literature and the variety of topics on FDI, it is clear there are numerous channels through which the attraction and the effects of FDI can be considered in the comparative context. We base our analysis on comparing the institutional frameworks and historical contexts of using FDI as a vehicle of economic development in Latvia and Serbia, as well as some of the most widely anticipated economic effects of their inflows.

Methodology

We also compare the performance of foreign affiliates in Latvia and Serbia and how they affect their respective economies. This segment of the comparison is based on Inward Foreign Affiliates Trade Statistics. This novel statistical concept is based on structural business statistics and aggregates the performance of firm-level data for companies that have a significant and controlling interest in foreign capital.

We apply descriptive statistical methods to analyze trends, dynamics, structure, origins, and the relative significance of FDI in two countries. The data are graphically presented to facilitate comparisons between the two countries and to highlight major trends. The trends are connected to major historical and economic factors that influenced them, using historical methods to provide context. We also provide summary statistics to highlight the most important quantitative similarities and differences between Latvia and Serbia in terms of their FDI performances and general business environment.

The descriptive analysis focuses on inward flows of investment due to their greater development implications for host economies. We particularly emphasize the period between 2010 and 2023, during which both countries achieved similar levels of investment climate, making their performances in attracting FDIs comparable. The analysis is based on a case study approach that focuses exclusively on Latvia and Serbia. These two countries are compelling subjects for comparative analysis due to their similar historical contexts and transition processes despite the differing paces of transition and economic integration. These similarities and differences allowed us to isolate the effects of economic integration on FDI patterns.

We guide our exploration with general research questions related to the nature of the main patterns and dynamics of FDI inflows and the factors that contributed to their differences. Based on our findings, we identify the best practices and synthesize policy implications that the two countries could apply to improve FDI inflows.

In our analysis, we use data from various sources. Details on FDI inflows and their structure come from the databases of the Central Bank of Latvia (*Latvijas Banka*) and the Central Bank of Serbia (*Narodna Banka Srbije*). The data were supplemented with additional times series adapted from the UNCTADStat database of the United Nations Conference on Trade and Development. Finally, we consider additional sources for collecting data to compare the business environment of the two countries, including the Central Statistical Bureau of Latvia (*Centrālā statistikas pārvalde*), the Statistical Office of the Republic of Serbia (*Republički zavod za statistiku*), World Bank Doing Business Archives, Transparency International data, and World Intellectual Property Organization data.

Results and discussion

Both the Latvian and Serbian economies are open, service-based, and export-oriented. The tertiary sector is hugely important for both countries and among the key drivers of economic activity. Furthermore, both countries have been strongly affected by historical factors, as neither had developed market-oriented economies in the early 1990s. Thus, both underwent a thorough transition process. The transformation of their economic systems relied on foreign capital and the privatization of state-owned enterprises. In more recent history, both countries were similarly affected by the negative effects of the global economic environment during the period of the Global Financial Crisis and the COVID-19 pandemic, decreasing their gross domestic product. Lately, both countries have faced similar challenges related to an increasingly unstable global economic and political environment.

Both countries recognize the importance of FDI and have experienced substantial initial inflows of foreign capital through privatization. In these early stages, FDI inflows in both countries were considered an instrument for promoting the process of transition. FDI was an important source of capital for investment. However, in the past decade, Serbia has increasingly relied on foreign capital to finance investment, adopting this approach as a primary strategy to address the chronic scarcity of capital that this economy faces.

There are also notable differences between the two economies. Despite both countries sharing a similar economic background prior to the 1990s, Latvia went through the transition process more efficiently. The transition was considered completed in 2019, whereas, in Serbia, it is still ongoing. Serbia maintains more state-owned enterprises than Latvia, increasing the political influence over the local economy. In addition to initiating the transformation of the economic system, during the 1990s, Serbia underwent civil unrest, political instability, and economic isolation, culminating in war in 1999, which devastated the economy and halted the transition and integration of its economy into the global economy. The effects are evident in our comparative analysis,

particularly regarding outcomes related to accession to key regional trade integrations and global institutions for the two countries.

There are significant differences between the two countries in their current geopolitical positions and the results of their integration. Latvia successfully acceded to the EU and is a member of both the Organization for Economic Cooperation and Development and the World Trade Organization. Serbia's integration has been more sluggish, as it is still in the process of acceding to the European, while accession to the World Trade Organization has proven to be similarly challenging.

Differences in integration also reflect Serbia's comparatively lower levels of regulatory harmonization and lower levels of economic and political cooperation with EU member states. Another result of this is the more diversified approach Serbia takes in sourcing foreign capital and conducting trade, relying heavily on bilateral trade and investment agreements. This reflects differences in trade flow patterns between Latvia and Serbia. Latvia mostly engages in trade with the Baltic states and most of the developed European economies, such as Germany and Italy, all of which are EU member states. In contrast, besides significant trade flows with the EU member states, Serbia maintains trade relationships with signatories of the CEFTA 2006 agreements – China, Russia, and Turkey.

Differences in the speed of conducting and completing the transition also resulted in differences in public influence on the local economy between the countries. For instance, in Latvia, the privatization process is largely completed, with the remaining few state-owned enterprises playing a reduced role in the economy. While privatization in Serbia has been completed in many sectors, many state-owned or state-influenced enterprises still exist, particularly in the telecommunications, energy, and transportation sectors, maintaining considerable influence over the enterprises in the private sector.

Finally, differences in previously outlined contexts and factors led to significant differences in the development level of the two compared economies. Today, Latvia is considered a developed economy, with GDP per capita more than double that of Serbia. Meanwhile, Serbia is still considered a transition economy or a developing economy, depending on the classification used.

The two countries share relative attractiveness for FDI. Both have a well-established and conductive business, institutional, and regulatory environment, with each offering specific advantages to foreign investors. The attractiveness of each economy is, thus, dependent on the context of the specific investment project and the relative importance of various factors to foreign investors.

Despite their respective differences, both countries have well-integrated economies, maintaining strong cooperation with large economies. Using different channels, both countries offer market access to foreign investors, which goes significantly beyond their limited domestic markets. They offer good strategic positions to foreign investors, serving as a gateway between large economic regions. For instance, Latvia provides access to the EU and the member countries

of the Commonwealth of Independent States. Serbia is well-positioned in bridging developed member states of the EU with the economies in the Eastern Europe.

In both countries, there is a favorable investment climate that fosters foreign investment. Both countries have good labor market conditions that offer a relatively inexpensive, educated, and multilingual workforce, for example. They also offer a competitive tax system, although Latvia leads in this regard with one of the most competitive tax systems in Europe. For example, it is one of the rare systems that completely abolished taxing reinvested earnings. Both countries also have relatively well-developed infrastructure, which is important for supporting investment.

Active support of investments is present in both countries. Financing sources differ, however. Latvia relies heavily on funding from the EU, whereas Serbia redistributes its fiscal earnings to investors. For this reason, Serbia requires strong fiscal performance to maintain its current level of support. In both countries, policymakers make use of Special (Free) Economic Zones. In both cases, these zones cater to the specific needs of foreign affiliates and significantly facilitate their business. It is, therefore, unsurprising that in both countries, multinational enterprises concentrate their activities in these zones. Serbia currently has three times more active Special Economic Zones than Latvia, although this largely reflects the difference in size of the country.

There is a significant difference between Latvia and Serbia in terms of the extent to which their respective legislation is harmonized with international and, particularly, EU standards. Latvia, as an EU member state, has more harmonized legislation, imposing significantly fewer hurdles on multinational enterprises in adapting their activities to the local business environment. Although Serbia is in the process of regulative harmonization and actively conducts reforms, it still lacks the level of harmonization present in Latvia, imposing substantially higher adjustment costs on foreign investors.

Both countries face similar challenges in attracting FDI. These challenges are mostly related to the limited size of their domestic markets, underdeveloped capital markets, low levels of investment in research and development (R&D), an extensive shadow economy, regulatory constraints, and political factors. However, each country is affected by these challenges differently, and some factors contribute to lower FDI inflows more than others in the two contexts.

Notably, Latvia and Serbia both lag behind the most developed economies of Europe in terms of R&D investment, which stands at under 1% of GDP. In both cases, this restricts the development of innovation capacities in local enterprises, making them less attractive to foreign investors. In addition, limited investment in R&D contributes to technological lagging. While there is a noticeable trend of increasing investment in R&D in Serbia, it has still not reached the average level of developed economies.

Although both countries are challenged by political factors limiting higher FDI inflows, the nature of these factors differs. On one hand, in Latvia, the political factors are predominantly external. On the other hand, FDI inflows in Serbia are affected by both internal and external factors. Specifically, both countries are negatively affected by the increasingly unstable global economic environment and, in particular, the negative economic spillover effects of the war

in Ukraine, which increases the perception of regional instability for Eastern and South-Eastern economies in general. In addition to these external pressures, in Serbia, there is also considerable political influence on the local economy, as business decisions might be affected by political pressures.

The countries differ in terms of export diversification and dependence on specific markets of partner economies. Although both countries are reliant on the EU market, Latvia is more dependent. Serbia currently has a more diversified export market, but the ongoing integration processes could limit export possibilities to countries such as Russia and China in the future as the country adjusts its trade policy with that of the EU.

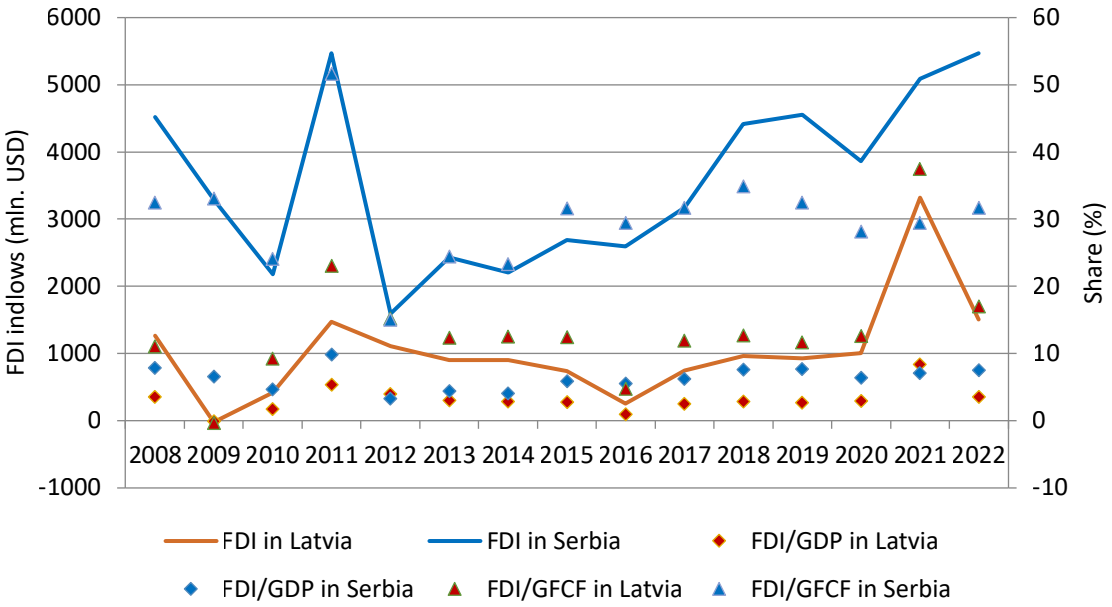

Chart 1. Comparison of Foreign Direct Investment dynamics

Source: authors' elaboration based on data from the United Nations Conference on Trade and Development 2024.

We provide a visualization of the comparison of FDI dynamics between Latvia and Serbia in Chart 1. These results indicate that Serbia consistently reports higher absolute inflows of FDI compared to Latvia. The average inflows in the observed period for Serbia are 3.56 billion USD annually, whereas the average inflows for Latvia stand at 1.03 billion. As differences in economy size could contribute to these different dynamics, we additionally consider relative indicators of FDI inflows, which control for gross domestic product in each country. The results of this additional analysis confirm the previously established pattern. In the observed period, there is a higher significance of FDI in the Serbian economy. Furthermore, the Serbian economy is more reliant on foreign capital in financing investment in general, which could either indicate its higher relative attractiveness to foreign investors or scarcity of alternative capital sources. However, if a longer time frame is considered, the results show greater foreign capital accumulation in Latvia. This is evidenced by the inward FDI stock per capita comparison, which indicates that this variable has a nearly double value in Latvia as in Serbia.

These results show that both countries navigated considerable challenges and demonstrated resilience in attracting FDI. However, differences in historical contexts, integration approach, and economic

policies contributed to differences in the dynamics of their FDI inflows. Although the dynamics of significant FDI inflows started with a delay in Serbia, both countries share a similar initial motivation for attracting FDI. Both countries sought to transition to a market-oriented economy, undergoing the processes of transition and privatization. Therefore, both countries laid out a favorable regulatory framework to attract foreign investment, and for Serbia, this even involved the positive discrimination of foreign investment between 2002 and 2015. In both countries, attempts to promote foreign investment yielded significant results, as evidenced by substantial and persistent inflows of FDI in the years following the establishment of favorable regulation.

Another common characteristic of FDI dynamics in Latvia and Serbia is that following the initial inflows related to privatization, the investment channels shifted towards greenfield investment projects, the reinvestment of earnings in the host country, and cross-border mergers and acquisitions of privately owned enterprises. However, for Serbia, this shift was delayed due to its unique situation in the 1990s. Another similarity in dynamics is related to the response to the Global Financial Crisis. Both economies were negatively affected by this event, and there were differences in the initial response of policymakers. For example, Latvia responded to the new challenge with prompt austerity measures, quickly regaining foreign investors' confidence, which supported the quick recovery of foreign investment dynamics. By contrast, Serbia delayed its response, resulting in a more unsteady recovery trajectory between 2008 and 2012. However, over the 2010s, both countries experienced gradual and steady growth in foreign investment. Another similarity in dynamics could be identified during the COVID-19 pandemic. The pandemic had a temporary negative impact on foreign investment inflows in both countries; uncertainties increased with lockdowns, while the growing logistical problems affected investment activity in general. Both economies also experienced a rebound in FDI inflows in 2021, and the robust growth in investment continued throughout the following years.

Some structural differences in FDI inflows in Latvia and Serbia are also worth considering. Both economies receive a significant portion of FDI from EU member states, as well as from the other countries of their respective geographic regions. The main difference is the comparatively higher level of diversification of foreign investment sources in Serbia. Specifically, there is an increasing presence of foreign capital originating from Asian economies, particularly China. By contrast, Latvia maintains a strong reliance on foreign capital originating from the EU, with Sweden playing a particularly pivotal role.

Latvia and Serbia employ distinct strategies in attracting FDI, with Latvia diversifying inflows across higher-value sectors and Serbia concentrating the inflows and leveraging its existing industrial strengths. Latvia exhibits a much higher concentration of foreign investment in professional scientific and technical services and the information and communication technology (ICT) sector compared to Serbia. Another difference is the much higher importance that the construction sector has for FDI in Latvia. The difference has been reduced over the past several years due to the ongoing real estate boom in Serbia, where there is a noticeable increasing trend of foreign investment inflows in the sector.

The manufacturing industry has significant inflows for FDI in both countries. In both cases, foreign affiliates in the sector are export-oriented, reflecting the countries' limited domestic market size.

In Serbia, the investment is directed more toward the automotive industry and in the consumption goods industry, where Serbia has a particularly strong comparative advantage. In Latvia, foreign investors focus on industries with somewhat higher value added. In both countries, foreign investment in the manufacturing sector has supported the formation of clusters. This has improved the potential for positive spillover effects of FDI and the establishment of linkages between foreign affiliates and indigenous firms, helping improve the overall competitiveness of the manufacturing industry.

Nonetheless, there are some differences in the nature of these agglomerations in Latvia and Serbia. For instance, in Serbia, the agglomerations are of an intra-industry nature, mainly present in the automotive industry and the related industries providing the inputs required for motor vehicle manufacturing. In Latvia, they are more geographic, with a wider range of industrial activity concentrated in the Riga and Pieriga regions.

Latvia and Serbia both experienced large inflows of FDI in financial sectors. Historically, this sector was attractive for investment due to lower levels of competition posed by the domestic financial institutions and consequential profitable opportunities. Serbia has specifically higher foreign investment in the retail, wholesale, and transport sectors, reflecting the country's comparative advantage for logistics, created through its strategic position and significant investment in infrastructure.

Foreign affiliates exhibit similar characteristics in both countries. In both cases, they disproportionately contribute to output, employment, and value-added. For instance, both countries report that approximately 20% of the workforce is employed by foreign affiliates. In both cases, the affiliates are important contributors to tax revenues, although it is more pronounced in Latvia. An interesting difference between the countries exists in terms of inactive foreign affiliates. In Latvia, 59% of registered foreign affiliates are not engaged in any economic activity, while the data suggest that the majority of foreign affiliates in Serbia are operational.

Table 1. Comparison of business environment

	Latvia	Serbia	Germany
FDI stock per capita (USD)	13,019	6,676	12,085
GDP per capita (USD)	17,340	6,534	43,566
Protection of minority investors	68	70	62
Corruption Perception Index	60	36	78
Global Innovation Index (rank)	37	55	8

Source: authors' elaboration based on data from the United Nations Conference on Trade and Development 2024, Transparency International 2024, and World Intellectual Property Organization 2024.

A more general comparison of the business environment in Latvia and Serbia can be made using the descriptive statistics in Table 1. Both countries are compared with Germany, which is widely considered a leading economy in the EU. The results of this part of our comparative analysis suggest that Latvia offers a more stable and business-friendly environment. For example, its economy is substantially more developed than Serbia's, evidenced by a GDP per capita that is more than twice

as large. However, both countries lag behind the most developed economies of the EU, although Latvia is fast converging in its income level, unlike Serbia.

Finally, our comparison reveals strong performances in innovation in Latvia. Although it lags behind the EU leaders, its performance is still relatively strong. Serbia, on the other hand, has a lower innovativeness score than Latvia, which is reflected by the previously described structure of FDI inflows.

The final part of our comparative analysis concerns the institutional framework for foreign investment. Both Latvia and Serbia have established frameworks that are conducive to FDI. Similarly, both are committed to providing a favorable business and investment environment, with dedicated institutions responsible for promoting investment, implementing incentive programs, facilitating administrative burdens on investors, and serving as one-stop shops. The regulatory framework in both countries is based on the national treatment of foreign affiliates. Companies are not discriminated against based on the origin of their capital, and the same regulatory conditions apply to domestic firms and foreign affiliates alike. Issues of expropriation are addressed transparently, and the regulatory framework guarantees fair treatment to investors. Both countries offer substantial fiscal and financial incentives for investment, particularly within Special Economic Zones.

There are also several differences between the regulatory frameworks of the two countries that should be mentioned. For example, in Latvia, foreign investors must meet specific sector-level prerequisites. In contrast, Serbia does not have such sectoral limitations, except for a legal provision that prohibits non-residents from owning agricultural land. Although both countries use financial measures to incentivize investment, the sources of financing differ. Latvia utilizes EU structural funds and the InvestEU program, whereas Serbia relies on its state budget, significantly limiting its capacity for financial incentivization investments. Finally, there is a noticeable difference in how each country guarantees protection for investors' interests in the future. Latvia is moving towards unified treatment of investors within the EU and abolishing bilateral investment treaties. Conversely, Serbia continues to rely heavily on bilateral investment treaties as a means of regulating investor rights and interests.

Conclusions

In this paper, we presented the results of a comparative analysis of the regulatory frameworks and patterns of FDI in Latvia and Serbia. We focused on the period between 2010 and 2023 and based our analysis on a descriptive approach, and our results provide a thorough comparison of the FDI patterns in these countries. We examined the underlying trends, institutional frameworks, and historical contexts that have shaped the investment dynamics in both countries. The results, thus, provide a detailed answer to our initial research question. Namely, they elucidate the differences and similarities between Latvia and Serbia in key factors that affect FDI patterns. The analysis also yielded interesting insights into the differences in approaches the two countries took in creating a conducive environment for FDI.

Our comparative study identified various similarities between Latvia and Serbia, both in terms of FDI patterns and the dynamics and their institutional and regulatory frameworks. The similarities and differences between the countries could have important implications for policymakers in those two countries specifically, but in some regards, more generally, in transition economies. Foreign investment frameworks and, particularly, incentive policies should be tailored to take advantage of the identified strengths and offset the identified weaknesses.

For Latvia, this means a wider reach of economic diplomacy in promoting the country as an attractive investment location, particularly to investing countries from outside the EU. Moreover, considering the specific problem of inactive foreign affiliates, Latvia's policymakers could evaluate the possibilities of providing full support to existing affiliates to maintain their operations following the initial investment.

For Serbia, policymakers could direct their activities towards increasing FDI inflows to more value-added activities. For instance, incentives policies could be adjusted to specifically target investment in more technology-intensive sectors or tie the incentives to investment in R&D and the transfer of technology rather than the absolute number of jobs created. Digitalizing the government and, generally, improving workforce competencies in using ICT, as well as innovation and entrepreneurship, could create the basis for the development of innovative sectors and make them attractive for FDI. The existing empirical evidence suggests that higher adoption of ICT in European countries improves the internationalization of enterprises (Kastratović and Bjelić 2022). Strengthening economic integration, harmonizing regulations with the EU, and adopting integration standards could greatly reduce the costs of compliance for foreign investors and provide them with better access to other markets, which could further improve inflows of FDI.

Foreign investment inflows were demonstrated to impact the creation of industrial clusters in Serbia, increasing the positive effects of agglomeration. This implies the importance of actively promoting strategically important investments. However, potential negative effects on market structure and competition must also be considered when designing such policies (Kastratović 2018).

Our study contributes to the literature by synthesizing existing research on the role of FDI in economic integration and the development of transition economies while offering a novel comparative perspective on Latvia and Serbia. By analyzing the institutional and economic factors that influence FDI inflows, the study identified critical strengths and weaknesses in each country's approach. The examination of FDI patterns and dynamics improves our understanding of how historical and structural differences between these countries have shaped their ability to attract and sustain foreign investments.

The value-added of this study is its innovative use of foreign affiliates' trade statistics, enabling a more granular analysis that extends beyond macro-level FDI inflows to include the operational performance of foreign affiliates. This fine-grained approach allows for a detailed examination of how investment trends and foreign-owned companies react to institutional frameworks, incentive policies, and broader economic conditions. Moreover, by explaining the main causes behind specific changes in FDI flows and benchmarking their respective performances,

the paper provides insights for policymakers who can tailor incentive policies to specific contexts to inform policymakers and achieve their aims of sustainable investment and greater economic integration.

There are some limitations to our comparative study that must be acknowledged. Our comparative analysis was based on a limited sample. It is a case study of two countries, which allowed us to conduct a detailed exploration of patterns and dynamics related to foreign investment. However, some conclusions and implications might not be applicable to other countries, even if they share similar characteristics to Latvia and Serbia. Although our study provides insights into the best practices and causes of differences in FDI performances, these effects are difficult to quantify in our limited sample. Therefore, an interesting avenue for future research would be to consider the effects of various determinants that were found to be relevant in our comparative analysis of the dynamics and structure of FDI in countries of the Western Balkans and Baltic region.

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Bezpośrednie inwestycje zagraniczne na Łotwie i w Serbii: analiza porównawcza

Głównym celem badania jest porównanie bezpośrednich inwestycji zagranicznych (BIZ) na Łotwie i w Serbii, zbadanie leżących u ich podstaw trendów, ram instytucjonalnych i kontekstów historycznych wpływających na dynamikę tych inwestycji. Na podstawie analizy regulacji, programów motywacji oraz struktury i dynamiki inwestycji przedstawiono najlepsze praktyki i zalecenia w obszarze polityk, dotyczące wspierania zrównoważonego napływu inwestycji do obu krajów.

W badaniu zastosowano porównawcze podejście case study do analizy ram instytucjonalnych BIZ, wyników finansowych powiązanych podmiotów zagranicznych oraz dynamiki napływu BIZ do Łotwy i Serbii, koncentrując się na latach 2010–2023. Wykorzystując opisowe metody statystyczne i dane z banków centralnych, krajowych urzędów statystycznych i organizacji międzynarodowych, a także uwzględniając kontekst historyczny oraz czynniki instytucjonalne i ekonomiczne, zbadano trendy, strukturę i pochodzenie BIZ.

Pomimo odmiennych kontekstów historycznych oba kraje łączy sposób przejścia do gospodarki rynkowej, cechujący się proaktywną polityką mającą na celu przyciągnięcie inwestycji zagranicznych. Niniejsze badanie pokazuje, jak rozbieżne podejścia do integracji i harmonizacji w zakresie regulacji wpływają na wzorce, struktury i dynamikę bezpośrednich inwestycji zagranicznych.

Opracowanie zaleca dostosowanie ram BIZ i polityki motywacyjnej w celu wykorzystania mocnych stron i rozwiązania problemów w obszarze BIZ na Łotwie i w Serbii. Dla Łotwy zaleca się rozszerzenie dyplomacji gospodarczej i wspieranie istniejących oddziałów zagranicznych, co może zwiększyć retencję i atrakcyjność inwestycji, zwłaszcza z krajów spoza Unii Europejskiej. W przypadku Serbii polityka powinna priorytetowo traktować bezpośrednie inwestycje zagraniczne w sektorach zaawansowanej technologii i o wysokiej wartości dodanej, wspierane przez cyfryzację, rozwój siły roboczej i dostosowanie do regulacji UE.

Badanie przedstawia unikalne ilościowe i jakościowe porównanie czynników wpływających na napływ BIZ, dynamikę i strukturę tych napływów na Łotwie i w Serbii, przyczyniając się w ten sposób do zrozumienia możliwości decydentów w gospodarkach będących w okresie transformacji w zakresie przyciągania inwestycji i zapewnienia ich pozytywnego wpływu na rozwój gospodarczy.

Słowa kluczowe: bezpośrednie inwestycje zagraniczne, wspieranie inwestycji, jakość instytucjonalna, Serbia, Łotwa

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Poverty and Social Exclusion: Key Challenges for Sustainable Rural Development in the New European Union Member States between 2007 and 2022

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Abstract

Poverty has emerged as a significant global issue, impacting both urban and rural areas in developing countries. Its complex and multifaceted nature, encompassing profound economic, social, and psychological implications, has made addressing it even more challenging. Therefore, rural poverty is regarded as one of the most pressing challenges for achieving sustainable development within the European Union (EU). While the EU-15 countries (i.e., the "old" Member States) are relatively better positioned, rural poverty has remained a persistent issue in the "new" Member States, particularly in recent years. This study has examined the trends in rural poverty and social exclusion across the new EU Member States over the past 15 years. Using a data review methodology, it has analyzed rural poverty and exclusion trends from 2007 to 2022 in Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. The findings have revealed that Bulgaria, Croatia, Latvia, Lithuania, and Romania significantly lag behind the EU average in addressing rural poverty among the new member states.

Keywords: sustainable rural development, poverty, rural areas, European Union

JEL: I32, O18, Q01

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Introduction

Poverty has been a longstanding issue throughout history, and it has become a significant global concern due to economic, political, and social factors, particularly since the 18th century. The emergence of the welfare state as a result of economic development in developed countries has contributed to the reduction of poverty compared to developing nations. Through income support mechanisms designed for individuals in need, alongside access to essential services such as education and healthcare, as well as unemployment insurance, the welfare state has played a crucial role in mitigating the extent of poverty. These measures have helped to establish a more equitable socioeconomic structure, ensuring a higher level of social protection and economic stability within developed countries. Although numerous countries have achieved their growth targets in accordance with their socio-economic circumstances, it does not necessarily imply that the resulting revenue is distributed equitably among all members of society. Despite numerous attempts, poverty persists in rural areas, particularly in developing countries. The ramifications of poverty, which is a significant aspect of sustainable rural development, may manifest differently in rural settings. In addition to economic and socio-economic consequences, it can also give rise to social unrest and psychological effects. Consequently, the intricacy of poverty renders it an intractable challenge.

Sustainable rural development is a type of development that requires the integration of multiple aspects, including the economy, socio-economy, environment, society and governance, within rural areas. Given that agriculture is a fundamental aspect of rural life, the presentation of solutions in this area has become one of the basic stages of sustainable development. The European Union (EU) has adopted sustainable development by prioritizing people and accelerating development without disrupting socio-economic and environmental balances. The EU has been successful in reducing poverty in numerous countries through the implementation of targeted measures. However, challenges remain in many countries. Beyond economic and socio-economic difficulties, this situation represents a significant obstacle to sustainable rural development, particularly in rural areas of the "new" EU Member States (which joined after 2004) due to restricted access to education and health services.

The new Member States have continued to face challenges in addressing the rural disparities that have emerged. These challenges not only result in economic inequality but also impede individuals' integration into society through social exclusion. Given the multifaceted nature of poverty, it is essential to consider and examine various methodological aspects alongside the proposed solutions to eradicate poverty and social exclusion.

It is therefore important to emphasize and analyze the differences in methodological approach and the situation of poverty and social exclusion in rural areas in the new EU Member States. The aim of this study is to examine the EU's methodological approach to measuring poverty and social exclusion in sustainable rural development and to analyze the poverty and social exclusion situation of the new Member States with data from 2007 to 2022.

Clarification of terms and methodological framework

Poverty and social exclusion are two deeply intertwined phenomena that hinder individuals' progress and well-being. Poverty often leads to social marginalization due to limited resources and services, while social exclusion can also exist independently. Eradicating poverty requires a multifaceted approach that encompasses both social and economic policies, which makes measurement challenging due to its multifaceted nature (Kalinowski 2020). Poverty can be absolute (the lack of basic necessities) or relative (the lack of resources in comparison to society). Absolute poverty is more prevalent in developing countries and is measured by the number of people living below a fixed poverty line (Augère-Granier 2017). In order to address poverty and social exclusion, it is necessary to adopt a holistic approach that empowers individuals through economic empowerment, social inclusion, community engagement, and international cooperation.

One of the indices used to measure poverty is the Global Multidimensional Poverty Index-MPI (The United Nations 2023) which is calculated and analyzed by The United Nations and the University of Oxford. It is an international tool that assesses those living in severe deprivation in health, education, and living standard indicators, as well as multidimensional poverty. The MPI calculates a deprivation score for each individual based on the weighted number of deprivations children experience across ten indicators, such as developmental delay, school attendance, and access to basic amenities. Individuals with a deprivation score of 1/3 or above are considered to be multidimensionally poor. A country's overall MPI is calculated as its poverty rate (the proportion of multidimensionally poor individuals) multiplied by the average deprivation score among the poor. Lower MPI values indicate a reduction in the number of people in poverty or a reduction in the level of deprivation among the poor, reflecting progress in poverty reduction efforts.

The Multidimensional Poverty Measure-MPM (World Bank 2023) has been expanded to include a broader range of factors than traditional monetary poverty lines, such as access to education, basic infrastructure, and income below $2.15 per day (the international poverty line). This broader definition captures more people experiencing poverty, as not everyone living below the income line is deprived in non-monetary ways. The MPM demonstrates that nearly 40% of multidimensionally poor people would not be identified by income alone. It is of the utmost importance to recognize the additional impact of non-monetary factors such as education and infrastructure access when attempting to comprehend the complexity of poverty and to design effective policies that have improved overall well-being and break cycles of inequality.

The EU's relative poverty measure defines an individual as poor if their disposable income falls below 60% of the average income in the relevant member state. This approach recognizes differences in living costs across the EU and aims to identify those facing the greatest economic challenges in their own countries. However, this relative poverty measure presents challenges in directly comparing poverty levels between EU member states, particularly given the varying dynamics between urban and rural areas in each country. This can also lead to difficulties in accurately measuring poverty. Even if an individual's income falls below the established poverty line, their daily life may be more financially comfortable than that of a person living in extreme poverty in a less developed EU country.

This inherent limitation of the EU measure of relative poverty emphasizes the need to include additional contextual factors when assessing poverty levels in different regions (Kalinowski 2020).

The data generated by the EU is employed to provide detailed and objective observations regarding poverty and social exclusion. To identify and quantify the multifaceted indicators of poverty and social exclusion, Eurostat employs an approach that draws data from comprehensive surveys such as the Household Budget Survey (HBS) and the EU Statistics on Income and Living Conditions (EU-SILC). These surveys target representative samples across EU member states and some candidate countries. The approach itself focuses on individuals who are experiencing at least one of the following situations:

- "At-risk-of-poverty" describes individuals with an equivalized disposable income (after social transfers) below 60% of the national median equivalized disposable income. Equivalized income is used to account for income differences between different household sizes and compositions.
- "Very low work intensity" is defined as individuals living in households where working-age adults (18–64 years old, excluding students aged 18–24 years and retirees) worked less than 20% of their total potential during the previous 12 months.
- "Severe material and social deprivation" describe individuals who cannot afford at least six of 13 items personally and seven of 13 items as a household (Table 1).

Table 1. Severe material and social deprivation items

List of items at the household level	List of items at the individual level
Capacity to face unexpected expenses	Having an internet connection
Capacity to afford to pay for a one-week annual holiday away from home	Replacing worn-out clothes with new ones
Capacity to be confronted with payment arrears (on mortgage or rental payments, utility bills, hire purchase installments or other loan payments)	Having two pairs of properly fitting shoes (including a pair of all-weather shoes)
Capacity to afford a meal with meat, chicken, fish or vegetarian equivalent every second day	Spending a small amount of money each week on themselves
Ability to keep home adequately warm	Having regular leisure activities
Have access to a car/van for personal use	Getting together with friends/family for a drink/meal at least once a month
Replacing worn-out furniture	

Source: Eurostat 2023.

This study undertakes a detailed examination and analysis of data on rural poverty and social exclusion created by the EU for the new EU Member States between 2007 and 2022. The countries included in the study are Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. The study addresses specific research questions:

- What is the extent of the disparity in rural poverty between the new EU Member States and the EU-15?

- What is the magnitude of rural poverty and social exclusion in the new EU Member States?
- How does rural poverty contrast with urban poverty in the new EU Member States?
- What measures and strategies can be implemented to mitigate rural poverty in the new EU Member States?

Poverty and social exclusion in the new EU Member States

Poverty and social exclusion are complex socio-economic problems that stem from various factors, each with multiple potential remedies. Within society, diverse groups are vulnerable to these issues, each for distinct reasons. Poverty extends beyond mere financial scarcity; it encompasses a deprivation of the opportunities, essential services, and social integration enjoyed by others. Consequently, individuals may struggle with unemployment, precarious employment, limited educational access, financial constraints, and inadequate healthcare. Moreover, they may also experience shame, discrimination, social ostracism, and humiliation. These challenges are pervasive in disadvantaged urban and rural settings. These areas not only lack adequate infrastructure, but also insufficient transportation, cultural and recreational amenities, and social support systems. Consequently, poverty erodes individuals' resilience over time, exacerbating their isolation and further entrenching their predicament (Duffy 2020). This situation poses a significant obstacle to improving societal welfare.

Within the EU, a significant share of the population faces challenges of poverty and social exclusion. In 2022, an estimated 22%, or 95.3 million people, were considered at risk. This number remained relatively stable compared with 2021 (95.4 million people, 22% of the population), which shows that poverty and social exclusion remain one of the EU's major problems. Figure 1 shows the percentage of people at risk of poverty and social exclusion in EU Rural Areas between 2007 and 2022, according to Eurostat. In 2007, the average poverty and social exclusion rate for the EU-15 was 22.3%, while the new Member States had an average rate of 35.3%. By 2022, the rate had decreased to an average of 19.6% for the EU-15 and 26.7% for the new EU Member States. While both country groups experienced a significant decline, the new Member States remain approximately 4.6 percent above the EU average. No significant change has been observed in EU-15 countries over the last four years or in the new Member States over the last three years.

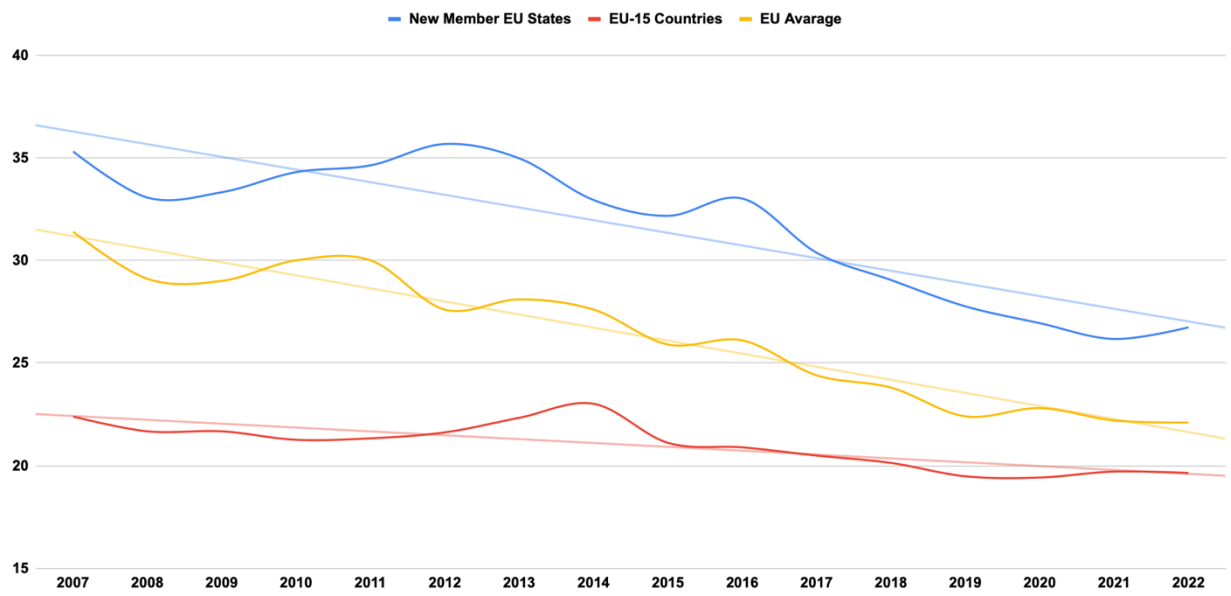

Figure 1. Persons at risk of poverty and social exclusion in European Union rural areas, 2007–2022 (%)
Source: author calculation based on Eurostat 2023.

The latest Eurostat figures from 2022 indicate that approximately 22% of both urban and rural populations experience poverty (Table 2). However, eastern EU countries are among the primary drivers of these averages. In 2022, Romania had the highest rate of rural poverty and social exclusion in the EU, with nearly half of the population at risk. Following Romania, the second most prominent country is Bulgaria, with a 40.5% poverty and social exclusion rate in rural areas. Croatia, Estonia, Hungary, Poland, Latvia, and Lithuania were all above the EU average in 2022. Poland had a poverty and social exclusion rate of 22.7% in rural areas, which almost matches the EU average. Conversely, the rates in Croatia, Slovakia, and Slovenia have poverty are lower than the EU average. Notably, Slovakia and Croatia have poverty and social exclusion rates in both rural and urban areas below the EU average, although rates are higher in urban areas than in rural areas.

Table 2. Persons at risk of poverty and social exclusion in the new EU Member States, 2022 (%)

Country	Rural areas	Towns and suburbs	Cities
EU	22.1	21.3	22
Bulgaria	40.5	32.1	23.5
Croatia	27.0	21.1	16.9
Czechia	11.2	13.2	12.3
Estonia	25	27	25
Hungary	23.8	18.1	13.5
Latvia	34.6	22.9	20.8
Lithuania	29.7	26.5	20.2
Poland	22.7	14.5	10.9
Romania	45.6	28.0	17.2

Country	Rural areas	Towns and suburbs	Cities
Slovakia	20.8	16.7	11.1
Slovenia	13.2	13.8	16.7

Source: Eurostat 2023.

In 2021, the European Commission unveiled The European Pillar of Social Rights Action Plan, designed to combat poverty through employment. The plan aims to lift 15 million people out of poverty and social exclusion, including at least 5 million children. Moreover, it prioritizes breaking the cycle of poverty by placing emphasis on children. It is centered on three primary domains: employment opportunities, access to the labor market, and ensuring fair working conditions. The report outlines three key objectives:

- The minimum employment rate target for individuals aged 20 to 64 is 78%.
- A reduction of at least 15 million individuals who are at risk of poverty and social exclusion.
- At least 60% of adults should participate in education annually by 2030.

The European Commission's Action Plan for the European Pillar of Social Rights aims to achieve a minimum employment rate of 78% for individuals aged 20 to 64 by 2030. One of the sub-goals is to reduce the gender employment gap by at least 50%. Additionally, it aims to increase the availability of early childhood education and care. The plan has included initiatives aimed at increasing employment participation among underrepresented groups, including the elderly, low-skilled individuals, persons with disabilities, and those in rural areas. Additionally, it targets basic digital skills for the 16–74 age group. It also sets goals for educational attainment: achieving at least a 40% completion rate of tertiary education for the 30–34 age group and encouraging at least 25% of adults to engage in lifelong learning.

A critical concern addressed by the European Pillar of Social Rights Action Plan is the NEET rate (Not in Education, Employment, or Training), a deeply concerning metric for young individuals across the EU. As per Eurostat (2022) figures, Romania has the highest NEET rate in the EU, at an average of 19.8%, followed closely by Bulgaria at 15.1%. Other countries with significant NEET rates include Croatia (13.3%) and Slovakia (12.3%). Meanwhile, Czechia (11.4%), Latvia (11.3%), Poland (10.9%), Hungary (10.8%), Lithuania (10.7%), and Estonia (10.6%) are below the EU average of 11.7% for 2022. Slovenia, at 8.4%, is the only country below 10%. Indeed, it is already below the EU's 2030 target of 9%.

A high NEET rate signifies disengagement and a lack of motivation regarding both employment and education. Failing to utilize the years between 15 and 29 productively heightens the risk of lifetime poverty. Factors that significantly contribute to the NEET rate include low educational attainment, disabilities, or immigrant backgrounds. Table 3 presents the NEET rates among individuals aged 15–29 in rural areas, towns and suburbs, and cities across the new EU Member States in 2022, as per Eurostat data. The average NEET ratio in rural areas averaged 12.6, whereas in cities, it is 10.9.

Romania has the highest NEET rate in rural areas at 27%, followed by Bulgaria (23.8%). In these two countries, approximately a quarter of young people are not in education, employment, or training, which is a concerning issue that requires attention. These countries also have the highest risk of poverty and social exclusion in rural areas. Conversely, Slovenia boasts the lowest NEET rate in rural areas among the new Member States, at 8%. Although the disparity between rural areas and cities is moderate on average across the EU, notable differences are observed in Bulgaria, Hungary, Lithuania, Poland, Romania, and Slovakia.

Table 3. NEET rate for 15–29-year-olds in the new EU Member States, 2022 (%)

Country	Rural areas	Towns and suburbs	Cities
EU	12.6	12.2	10.9
Bulgaria	23.8	17	9.3
Croatia	14.8	12.6	11.8
Czechia	11.9	12.1	10.3
Estonia	12.8	10.5	9.2
Hungary	15.9	10.5	5.4
Latvia	12.9	11.1	9.5
Lithuania	14	14.7	6.4
Poland	12.5	11.1	8.3
Romania	27	22	7.9
Slovakia	13.1	13.7	8.3
Slovenia	8	9.1	8.1

Source: Eurostat 2023.

The poverty alleviation mechanisms among EU member states vary. It is believed that the EU can effectively tackle this issue by involving all social stakeholders collectively. A unified and coordinated approach is necessary to make a substantial impact in reducing the percentage of individuals at risk of poverty and social exclusion (Copeland 2023).

Bulgaria

Rural areas in Bulgaria face numerous challenges, including physical and infrastructure issues, low employment rates, high youth unemployment, an aging population, poverty, and exclusion (European Commission 2011). The country faces challenges in addressing issues within the EU, particularly due to the significant number of rural areas (Petrov 2021, pp. 208–209). The process of generating new job opportunities in rural areas is progressing slowly and faces considerable challenges, consequently heightening the risks of poverty and social exclusion. This is largely attributed to limited job availability in villages and towns, compounded by the absence of stable, long-term employment prospects (Petkova, Draganova, and Jeleva 2017).

Figure 2 shows the rate of poverty and social exclusion in rural and urban areas in Bulgaria and the EU between 2007 and 2022. Between 2012 and 2021 there is a significant decrease in rural areas in Bulgaria. However, from 2021 onwards, there is a slight upward trend. In 2022, the rate

in rural Bulgaria remained well above the EU average and was the second highest after Romania. In contrast, the urban rate is 23.5%, only 1.5% higher than the EU average in 2022. It has increased slightly since 2020 due to the impact of the COVID-19 pandemic. In contrast to rural areas, the poverty and social exclusion rate in Bulgaria's urban regions decreased significantly after 2012, but less so in rural areas.

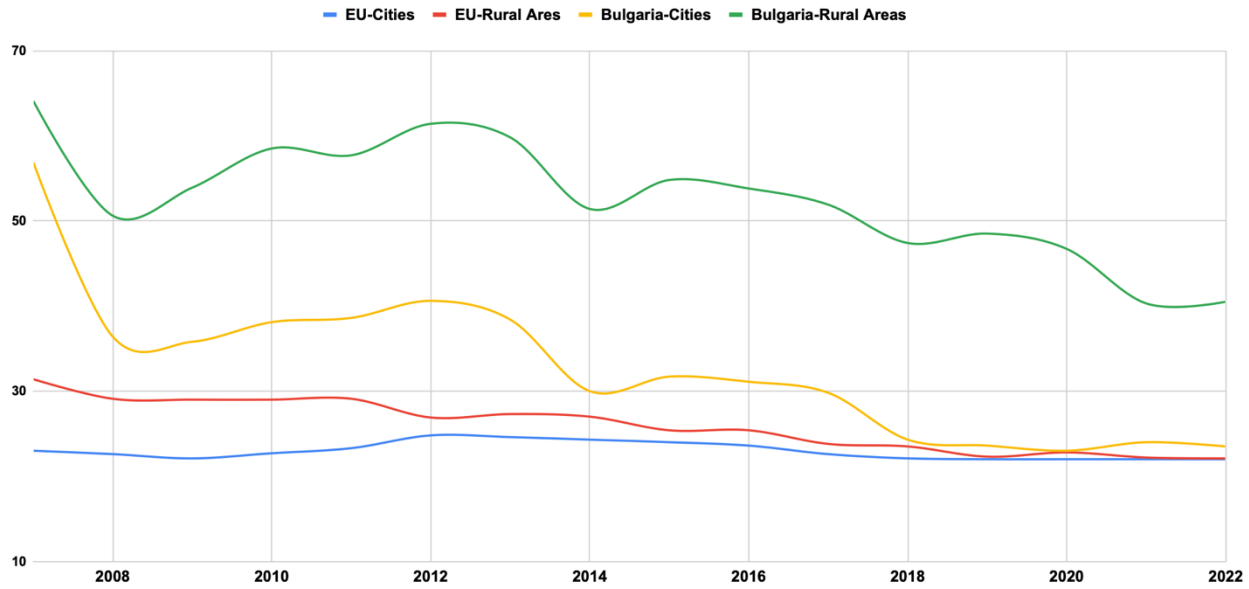

Figure 2. Persons at risk of poverty and social exclusion in Bulgaria, 2007–2022 (%)
Source: Eurostat 2023.

Croatia

Croatia is classified as a developed country for poverty, although it struggles with rural poverty and social exclusion in some areas. In particular, older people in rural areas in the eastern and southeastern regions of the country are vulnerable to poverty and social exclusion (Vučemilović 2022). Subsequently, the National Action Plan (2021) for the period 2021–2027 was developed and adopted to ensure continuity in the implementation of policies to combat poverty and social exclusion. In the plan, a National Allowance Program was developed to provide basic social protection for the elderly and to help reduce poverty and social exclusion of the elderly who do not earn an income. The plan has noted that young people are also at risk compared to older people. According to Eurostat data, Croatia ranks slightly above the EU average in NEET rates in rural areas in 2022.

Figure 3 presents the rate of poverty and social exclusion in rural and urban areas in Croatia and the EU between 2010 and 2022. While the rate in Croatia's rural areas fell steadily between 2010 and 2022, it remained above the EU average at 22%. The rate in urban areas was below the EU average after 2012 and remained below average in 2022, at 16.9%.

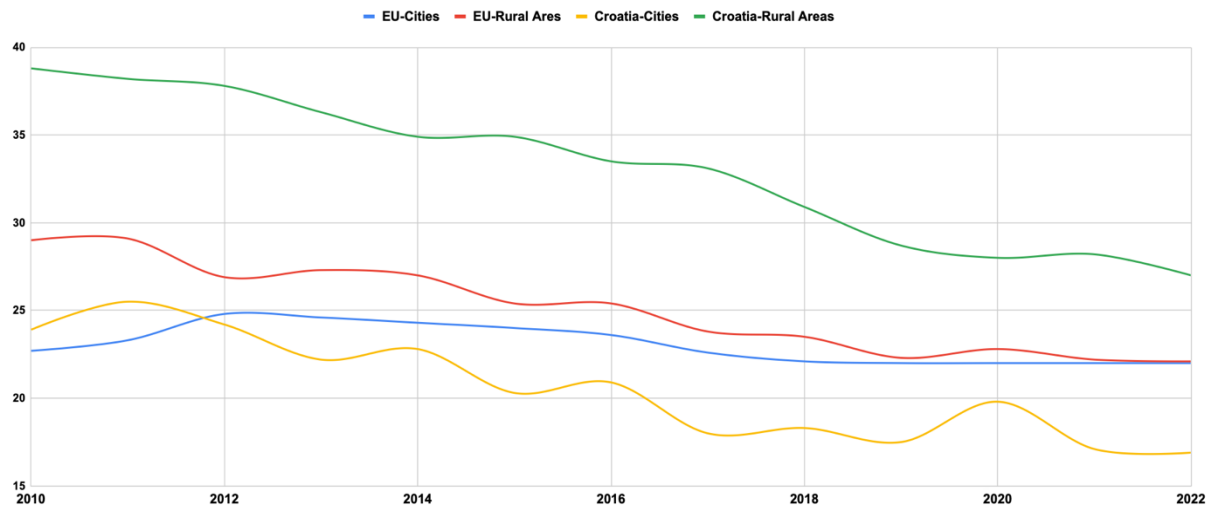

Figure 3. Persons at risk of poverty and social exclusion in Croatia, 2010*–2022 (%)

* The data in the Eurostat database start from 2010, unlike the other analyzed countries where they start in 2007.

Source: Eurostat 2023.

Czechia

Czechia is the best performer in terms of rural poverty among the new EU Member States, with an average rate of 11.8% of people at risk of poverty or social exclusion in 2022. Janský, Kalíšková, and Münich (2016) noted that Czechia is a sustainable country in terms of household disposable income.

Figure 4 shows the rate of poverty and social exclusion in rural and urban areas in Czechia and the EU between 2007 and 2022. The urban rate did not decrease significantly until 2016. While the rate in rural areas decreased after 2014, no decrease was observed in urban areas until 2016. However, after 2021, due to the impact of COVID-19, the rate increased in both urban and rural areas.

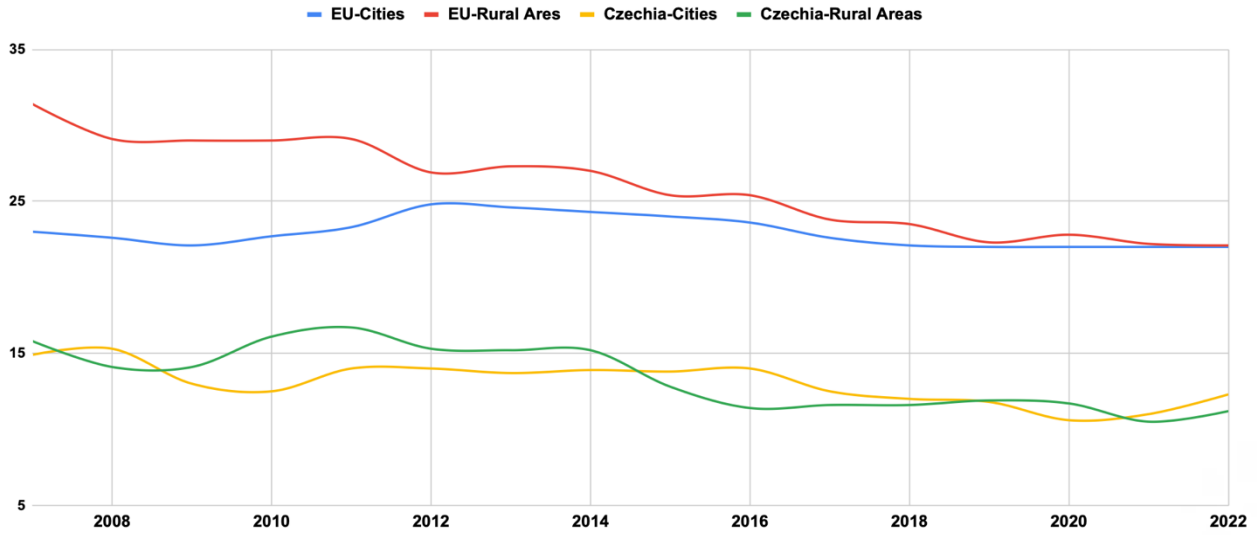

Figure 4. Persons at risk of poverty and social exclusion in Czechia, 2007–2022 (%)

Source: Eurostat 2023.

Estonia

The Eurostat data show that in Estonia, around a quarter of the population in rural areas was at risk of poverty and social exclusion in 2022. According to the Estonian Statistical Institute's 2022 data, the group most vulnerable to poverty are individuals over the age of 65 who live alone, with the highest rate of age poverty in the EU. Furthermore, poverty rates in southeastern and eastern Estonia are roughly double those in the capital, Tallinn.

Figure 5 gives the rate of poverty and social exclusion in rural areas and cities in Estonia and the EU between 2007 and 2022. In Estonia, the rural rate increased significantly after 2010, to 29.5%, before declining to 22.8% in 2021. However, the urban rate has been on an upward trend since 2008. Since 2021, there has been an increase in both rural areas and cities, exceeding the EU average; the COVID-19 pandemic likely also had an impact.

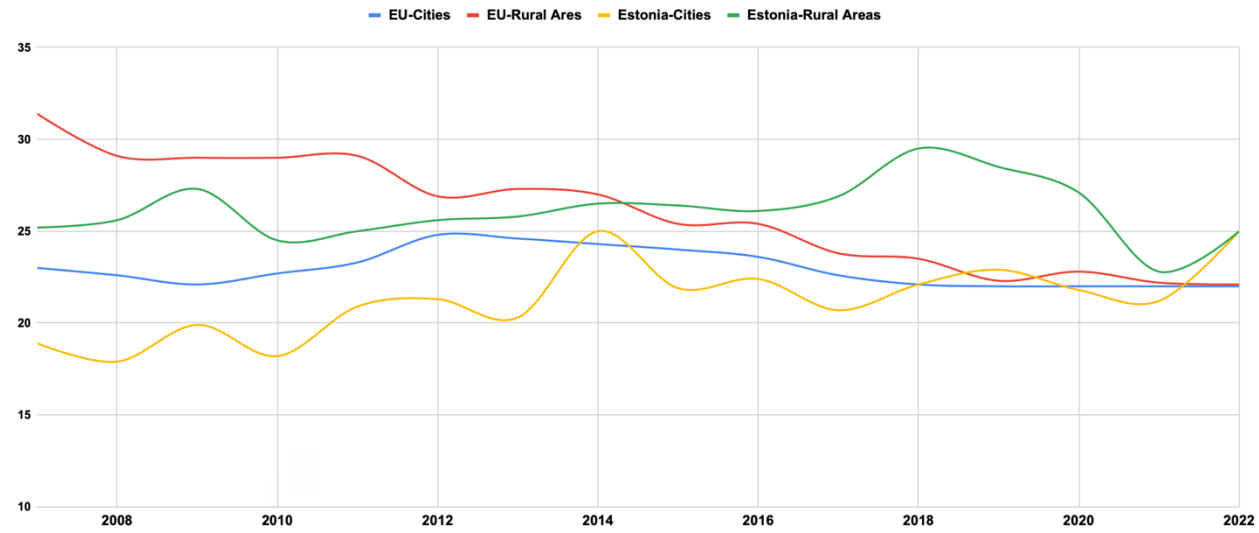

Figure 5. Persons at risk of poverty and social exclusion in Estonia, 2007–2022 (%)
Source: Eurostat 2023.

Hungary

According to Eurostat 2022 data, Hungary's poverty and social exclusion risk rate closely aligns with the EU average, standing at 23.8% in rural areas. While social assistance programs exist in rural regions, they predominantly target agricultural development, presenting a hurdle to enhancing the living conditions of rural inhabitants. Numerous households in rural areas find it challenging to cover their fundamental needs with their available financial resources, especially expenses beyond housing (Piwowar and Dzikuć 2021, p. 51).

Figure 6 illustrates the rate of poverty and social exclusion in rural areas and cities in Hungary and the EU between 2007 and 2022. In Hungary, the rate in both rural and urban areas increased until 2013, after which it decreased significantly. However, after 2020, the rate in rural areas increased slightly due to the COVID-19 pandemic. In 2022, the rate in rural areas was slightly above the EU average, although in cities, it was well below it.

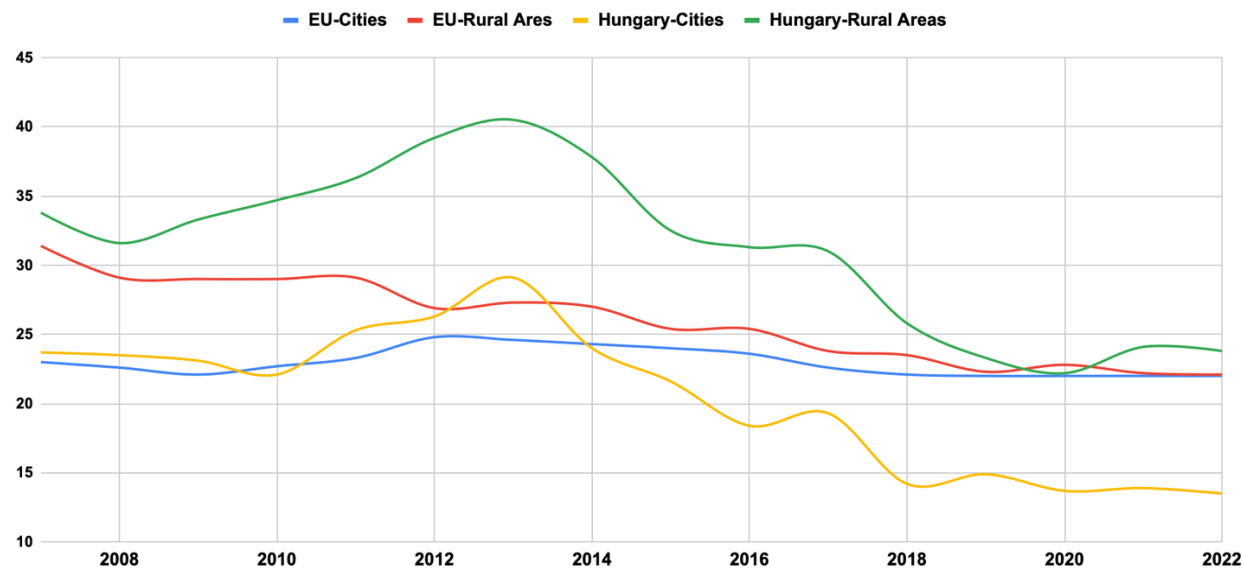

Figure 6. Persons at risk of poverty and social exclusion in Hungary, 2007–2022 (%)

Source: Eurostat 2023.

Latvia

According to 2022 Eurostat data, Latvia ranks third in terms of the risk of poverty and social exclusion in rural areas, following Bulgaria and Romania. In Latvia, social transfers are used in combination with pensions to address poverty. However, over the past fifteen years, there has been a convergence in the effectiveness of social transfers in reducing poverty between Scandinavia and the Baltic countries, except for Latvia, which has seen the lowest impact (Balvočiūtė and Šalkauskienė 2023, p. 26). This suggests potential inefficiencies in using social transfers to alleviate poverty there.

Figure 7 presents the rate of poverty and social exclusion in rural and urban areas in Latvia and the EU between 2007 and 2022. The rate in rural areas in Latvia started to decrease after 2013, but after 2020, it increased due to the impact of the COVID-19 pandemic. The urban rate began to decline after 2011 and fell below the EU urban average of 20.8% in 2022.

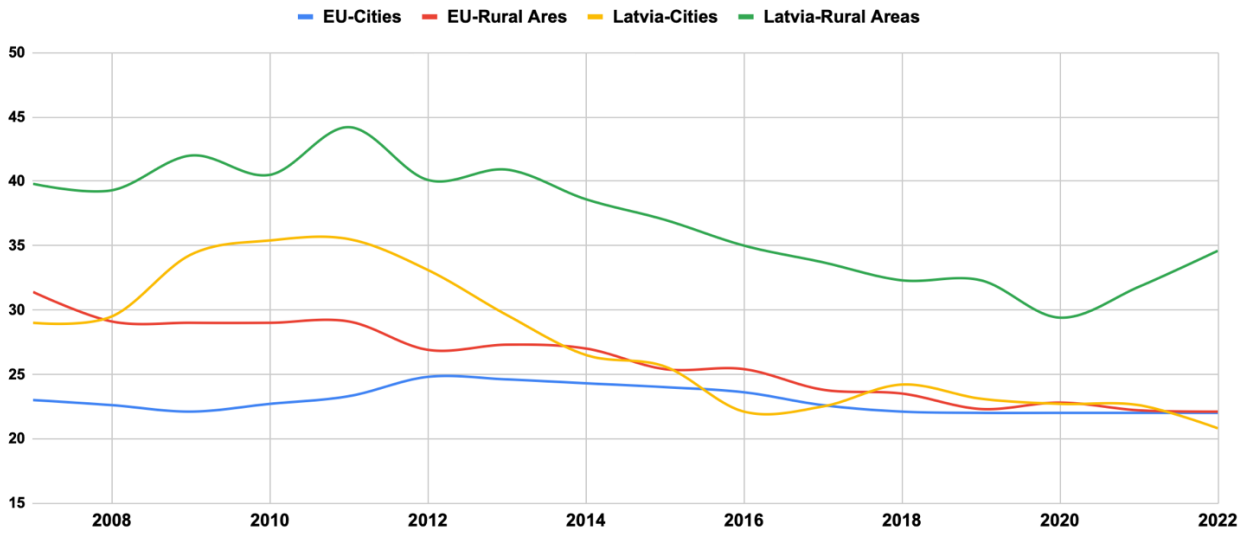

Figure 7. Persons at risk of poverty and social exclusion in Latvia, 2007–2022 (%)
Source: Eurostat 2023.

Lithuania

Although Lithuania's national economy has grown and innovated, with Vilnius at the forefront, smaller cities and towns have not seen the same level of development as central regions. This is due to a lack of investment in infrastructure, as well as issues such as aging and migration, which have led to poverty in rural areas (Terleckaite 2020).

Figure 8 presents the rate of poverty and social exclusion in rural and urban areas in Lithuania and the EU between 2007 and 2022. Poverty and social exclusion rates in rural areas of Lithuania varied until 2018 but started to decrease after 2018. Nevertheless, the rate of 29.7% in 2022 is well above the EU average. Conversely, the urban rate increased significantly between 2008 and 2010 but then declined until 2020, following which the impact of the coronavirus pandemic was relatively less pronounced.

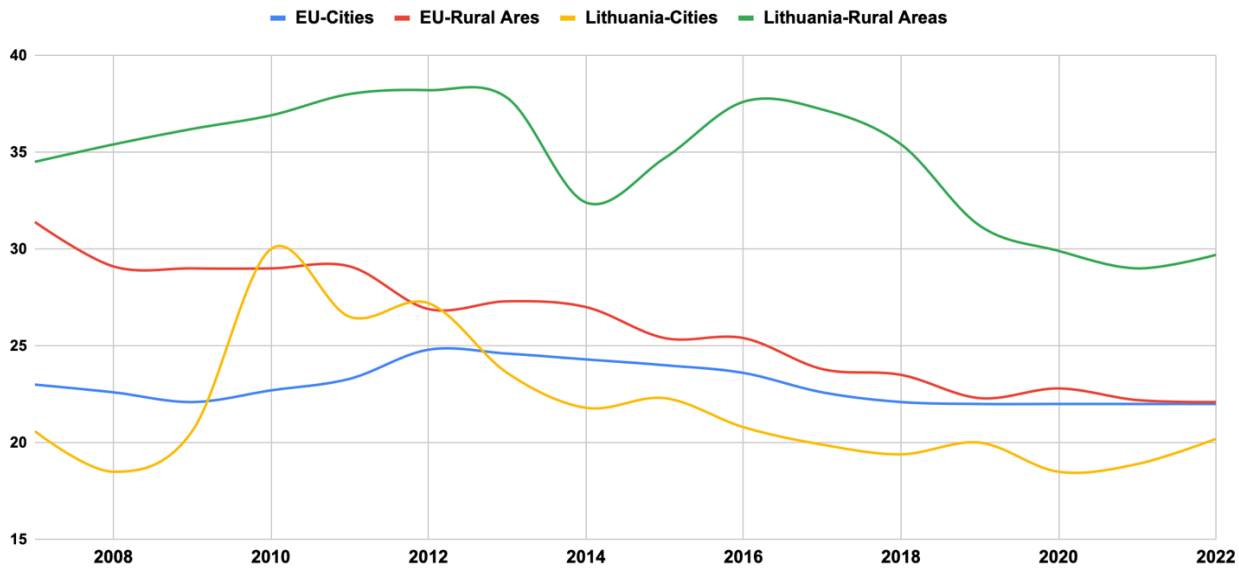

Figure 8. Persons at risk of poverty and social exclusion in Lithuania, 2007–2022 (%)
Source: Eurostat 2023.

Poland

Poland stands out among the new Member States for its low urban poverty and social exclusion rate, which stood at 10.9% in 2022, according to Eurostat. However, this positive picture is starkly contrasted by the situation in rural areas, where the rate surges to 22.7%, close to the EU average and similar to levels in Hungary and Slovakia. This disparity has highlighted the heightened risk of poverty and social exclusion faced by rural residents, particularly those living far from major cities and large towns. Additionally, rural poverty is more concentrated in northern and eastern regions (Kalinowski 2020).

Figure 9 presents the poverty and social exclusion rates in rural and urban areas in Poland and the EU between 2007 and 2022. Among the countries analyzed, Poland is notable as the only country that has continuously reduced its poverty and social exclusion rate in both its rural and urban regions. Between 2007 and 2020, there is a steady decline, with only sporadic small increases. In 2022, the urban poverty and social exclusion rate was 10.9%, almost half the EU average. In rural areas, it stands at 22.7%, which is close to the EU average.

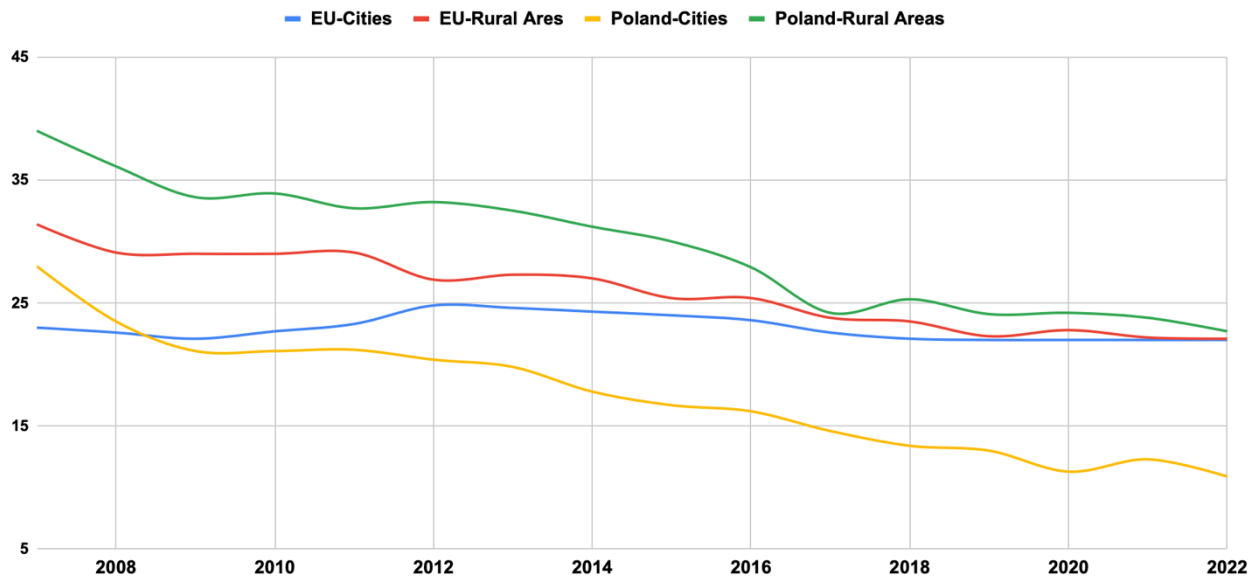

Figure 9. Persons at risk of poverty and social exclusion in Poland, 2007–2022 (%)
Source: Eurostat 2023.

Romania

Eurostat's 2022 data reveals that Romania has the highest rates of rural poverty, social exclusion, and NEETs among the new EU Member States, suggesting a persistent cycle of rural poverty. To break free, Romania requires a two-pronged approach: investing in high-quality education and ensuring equal access to primary education in rural areas. Simultaneously, fostering entrepreneurship awareness and attracting foreign investment to create job opportunities is necessary. Comprehensive plans focusing on education and job creation have represented significant steps toward breaking the cycle of rural poverty in Romania (Ulman and Dobay 2020).

Figure 10 shows the poverty and social exclusion rate in rural and urban areas in Romania and the EU between 2007 and 2022. In 2022, Romania had the highest rate in rural areas in the EU. It decreased between 2012 and 2018 when it started to rise again. As evident from the graph, there is a significant gap between rural and urban areas in Romania and compared to the EU average. Conversely, from 2013 until 2021, the rate in urban areas decreased, but it began to rise again due to the impact of the COVID-19 pandemic. Nonetheless, the urban poverty and social exclusion rate remains below the EU average.

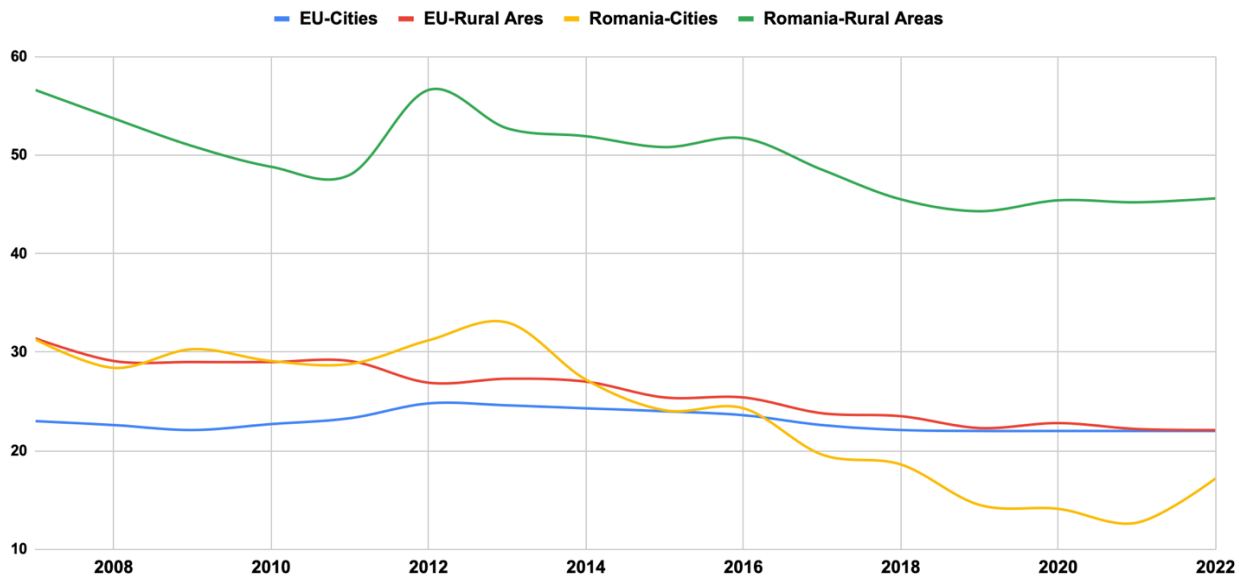

Figure 10. Persons at risk of poverty and social exclusion in Romania, 2007–2022 (%)
Source: Eurostat 2023.

Slovakia

Poverty remains a pressing issue in Slovakia, particularly in the eastern and southern regions. These areas are notably marked by a significant proportion of children and young individuals in the population, exacerbating the impact of poverty (Piwowar and Dzikuć 2021, pp. 46–47). Figure 11 presents the rate of poverty and social exclusion in rural and urban areas in Slovakia and the EU between 2007 and 2022. In rural Slovakia, the rate was above the EU average between 2007 and 2012 but fell between 2012 and 2020. After 2020, as a result of the COVID-19 pandemic, the rate increased in both rural and urban areas, although it remains below the EU average.

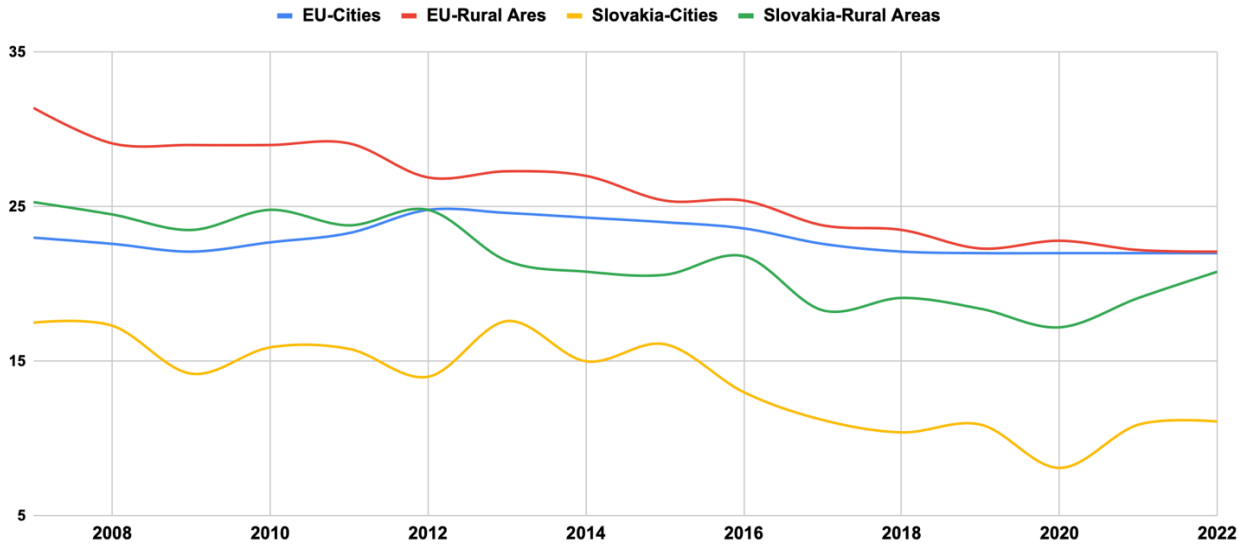

Figure 11. Persons at risk of poverty and social exclusion in Slovakia, 2007–2022 (%)
Source: Eurostat 2023.

Slovenia

Despite boasting the lowest rates of rural poverty and social exclusion in the new EU Member States (second only to Czechia) and the lowest NEET rate in the region's rural areas, Slovenia is not without its challenges related to poverty. The most vulnerable populations include elderly individuals, particularly women, those struggling with working poverty (wages below subsistence level), the unemployed, children and adolescents from low-income families, and single-person or single-parent households. Slovenia's financial social assistance programs, while supportive, fall short of improving living standards, perpetuating the very issue they aim to address – working poverty (EAPN Slovenia 2021, p. 20).

Figure 12 presents the rate of poverty and social exclusion in rural and urban areas in Slovenia and the EU between 2007 and 2022. In Slovenia, there was a correlation between poverty and social exclusion rates in rural and urban areas from 2007 to 2015. However, in 2018, while the poverty and social exclusion rate decreased in rural areas, it rose in cities. In 2022, the rate of poverty and social exclusion was 13.2% in rural areas and 16.7% in urban areas, still below the EU average.

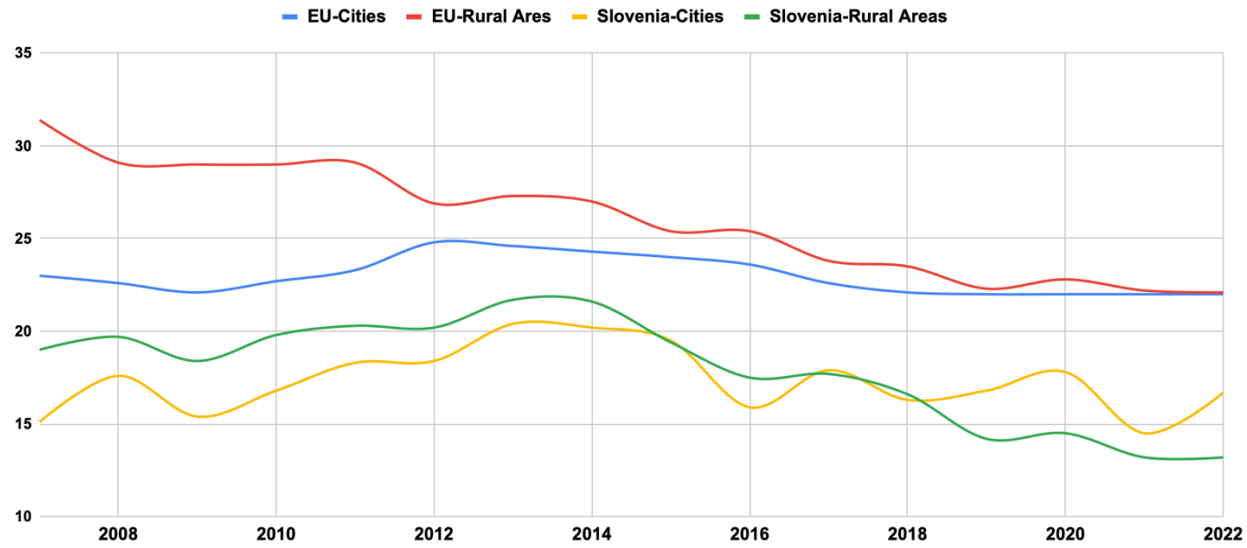

Figure 12. Persons at risk of poverty and social exclusion in Slovenia, 2007–2022 (%)
Source: Eurostat 2023.

Conclusion

The EU places significant emphasis on combating poverty as part of its sustainable development agenda, aiming to reduce it through various financial supports and projects. However, one-fifth of the population still struggles with poverty and social exclusion. Although poverty remains a challenge in urban areas, the new Member States exhibit significant disparities in poverty and social exclusion, particularly in rural areas.

Bulgaria and Romania have consistently recorded the highest rates of rural poverty and social exclusion within the EU. In Romania, almost one in two people in rural areas is affected by poverty and social exclusion, while in Bulgaria, the figure stands at 40%. Additionally, a substantial gap

persists between rural and urban areas in these two countries. Furthermore, the difficulties faced by young people in rural areas in accessing education and employment reflect the interconnected nature of these issues.

Following these countries, Lithuania and Latvia remain significantly above the EU average. This situation has fueled a vicious cycle, as low employment and education rates in rural areas have perpetuated poverty and intensified rural-to-urban migration.

Among the new Member States, Czechia has performed relatively well in terms of rural poverty and social exclusion compared to both the EU average and other new Member States. Slovenia has maintained lower poverty and social exclusion rates than the average, while these challenges have remained deeply entrenched in other countries. In Croatia, approximately one-third of the rural population is affected by poverty and social exclusion, although urban areas have performed slightly better than the EU average. In Estonia, however, one in four people in rural areas continues to experience poverty and social exclusion. Hungary, Slovakia, and Poland have maintained rates of rural poverty and social exclusion close to the EU average, indicating that a substantial proportion of their populations live in these conditions.

Given their shared socio-economic characteristics, the new Member States have had to adopt a comprehensive approach that considers the needs and priorities of all segments of society to achieve sustainable development. Therefore, developing inclusive solutions that benefit both rural and urban areas across multiple disciplines, including economics, socioeconomics, environmental studies, and sociology, is essential. At the core of this approach lies the promotion of regional awareness, the establishment of targeted financial support, and the development of employment opportunities for those in need. However, achieving this requires policies that are sensitive to the needs and demands of local communities while also preserving the region's natural resources.

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Ubóstwo i wykluczenie społeczne: kluczowe wyzwania dla zrównoważonego rozwoju obszarów wiejskich w nowych państwach członkowskich UE (2007–2022)

Ubóstwo stało się istotnym problemem globalnym, wpływającym zarówno na obszary miejskie, jak i wiejskie w krajach rozwijających się. Jego złożony i wieloaspektowy charakter, obejmujący głębokie konsekwencje ekonomiczne, społeczne i psychologiczne, sprawia, że jego zwalczanie jest niezwykle trudnym wyzwaniem. W związku z tym ubóstwo na obszarach wiejskich jest uważane za jedno z najpoważniejszych wyzwań dla osiągnięcia zrównoważonego rozwoju w Unii Europejskiej (UE). Chociaż kraje UE-15 (tzw. stare państwa członkowskie) znajdują się w relatywnie lepszej sytuacji, ubóstwo na obszarach wiejskich pozostaje palącym problemem w „nowych" państwach członkowskich, zwłaszcza w ostatnich latach. Niniejsze badanie analizuje trendy dotyczące ubóstwa na obszarach wiejskich oraz wykluczenia społecznego w nowych państwach członkowskich UE na przestrzeni ostatnich 15 lat. Wykorzystując metodę przeglądu danych, autorzy dokonują analizy trendów ubóstwa i wykluczenia społecznego w latach 2007–2022 w Bułgarii, Chorwacji, Czechach, Estonii, na Węgrzech, Łotwie, Litwie, w Polsce, Rumunii, na Słowacji i w Słowenii. Wyniki wskazują, że Bułgaria, Chorwacja, Łotwa, Litwa i Rumunia znacząco odstają od średniej unijnej pod względem zwalczania ubóstwa na obszarach wiejskich wśród nowych państw członkowskich.

Słowa kluczowe: zrównoważony rozwój obszarów wiejskich, ubóstwo, obszary wiejskie, Unia Europejska

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The Social and Economic Consequences of the First Year of Russia's Fullscale Invasion of Ukraine

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Abstract

This study aims to develop an analytical framework for understanding the social and economic outcomes of Russia's military invasion of Ukraine by studying its impact on the labor market and migration, the economy and trade, social capital, and volunteering in Ukraine. The main economic and social consequences include the following: the massive out-migration of refugees and internally displaced people; the change in demographic structure; the relocation and reopening of businesses and adapting to new conditions; the total collapse and de-industrialization of the occupied territories' economy; the interruption of supply chains; the reduction in trade volumes; the accumulation of social capital; and the development and spread of citizens' volunteer cooperation to solve urgent issues at the national and local community levels. This study is limited to the available data and the effects on Ukraine's economy and social sphere, excluding the impacts on the economies of European Union countries and the world economy in general.

Keywords: Ukraine, full-scale invasion, war, economy, refugees, volunteering, social capital

JEL: F22, F41, N34, N44, P24

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Introduction

A comprehensive study of war and its consequences on different areas of life remains unexplored. Theoretical discussions have not been developed, and there is a lack of scientific studies. Understanding these phenomena is crucial. Therefore, research in this field can provide important lessons from the history of warfare around the world.

Research on the economic consequences of military conflicts shows that wars adversely affect business and national and international economies in general. Moreover, interstate conflict limits the value of international trade (Maher 2015). Jacks (2011) demonstrated that increased taxation was seen in various states during wartime, persisting even in the post-war period, along with increased price fluctuations during wars. Simultaneously, a study in Sweden, the UK, and the US concluded that wartime tax reforms resulted in extraordinary inflation (Torregrosa-Hetland and Sabaté 2022). Surprisingly, some businesses, such as the media, war zone contractors, and the weapons industry, can benefit during wartime (Naseem et al. 2023).

The latest and largest war within Europe started on 27 February 2014, when Russian troops captured strategic sites across Crimea (Shuster 2014; Weaver 2015). Later, a pro-Russian government was installed, and on 16 March 2014, Crimea's independence was declared as a result of the Crimean status referendum (Somin 2014). The military invasion started shortly after Ukraine's Revolution of Dignity, which led to anti-revolution and pro-Russian protests in Donetsk and Luhansk. Thus, Russian-backed separatists seized Ukrainian government buildings and declared the Donetsk and Luhansk Republics (DPR and LPR) as independent states in April 2014 (Grytsenko 2014).

Simultaneously, Russia supported separatists with troops and weapons (Oliphant and Sabur 2015). In response to the military capture of territories, Ukraine launched a counter-offensive known as the Anti-Terrorist Operation in April 2014 (BBC News 2014a). In September of that year, Ukraine, Russia, the DPR, and the LPR signed the Minsk Protocol, a ceasefire agreement (BBC News 2014b). However, the Minsk Protocol failed, and heavy fighting resumed in January 2015. A new ceasefire agreement, Minsk II, was signed on February 12, 2015.

After the agreement, the war was called a frozen conflict, as the front line did not change, and Donbas remained a war zone (Tsvetkova 2015). However, in 2021, Russian forces amassed on Ukraine's borders (BBC News 2021), and on February 21, 2022, it officially recognized the DPR and LPR as independent states. It deployed troops to those territories (Gramer, Detsch and Mackinnon 2022), and shortly thereafter, on February 24, 2022, Russia began its full-scale invasion of Ukraine.

Thus, the following analysis focuses on underst anding the social and economic consequences of the first year of the full-scale invasion of Ukraine. In particular, this study addresses the following research questions:

What was the impact on the labor market and migration?

1. What was the impact on the economy and trade?
2. What was the impact on social capital and volunteering?

Discussion and results

Labor market and migration

During the period of the full-scale invasion of Ukraine, the labor market was significantly disturbed for many reasons. For instance, with the beginning of military action in February 2022, the number of jobs available fell dramatically, reaching just 15% of the pre-war labor market size (referenced as 100%) in March 2022. During that time, many businesses were forced to reorganize their operations, relocate within Ukraine or abroad, and change their areas of specialization. According to data from the State Statistics Service of Ukraine, in 2022, GDP decreased by 14.9% in the first quarter, 36.9% in the second quarter, 30.6% in the third quarter, and 31.4% in the fourth quarter compared to the previous year (State Statistics Service of Ukraine n.d.). As military battles became localized, market recovery began, allowing businesses located far away from conflict zones to reopen, continue their activities, and hire a labor force. Thus, in October 2022, the labor market size was around 72% of the pre-war labor market and was growing further, reaching 109% of the pre-war labor market in June 2023 (Samoiliuk and Levchenko 2024).

War has a direct impact on a country's demography through changes in the birth and death rates and migration, which are interlinked (Kulu et al. 2023). From the beginning of the war, the death rate among men increased significantly, while many women with children migrated from unsafe regions to safer areas abroad. Men aged 18–60 were prohibited from crossing the borders.

In general, a refugee's desire to return home after the war greatly depends on the structural and political conditions of the country of origin. Peace and security are not guaranteed immediately after the war ends, nor is there respect for human rights or political freedom (Zakirova and Buzurukov 2021). Therefore, socioeconomic reintegration concerns are extremely important in the decision-making process, including the speed of rebuilding infrastructure and the pace of economic recovery of the affected regions (Kugler et al. 2013). Thus, considering the current state of out-migration from Ukraine, there will be demographic challenges for years to come. Furthermore, long-term political and economic instability after the war can lead to further out-migration of family members who stayed in Ukraine as they seek to rejoin their families abroad (Kulu et al. 2023).

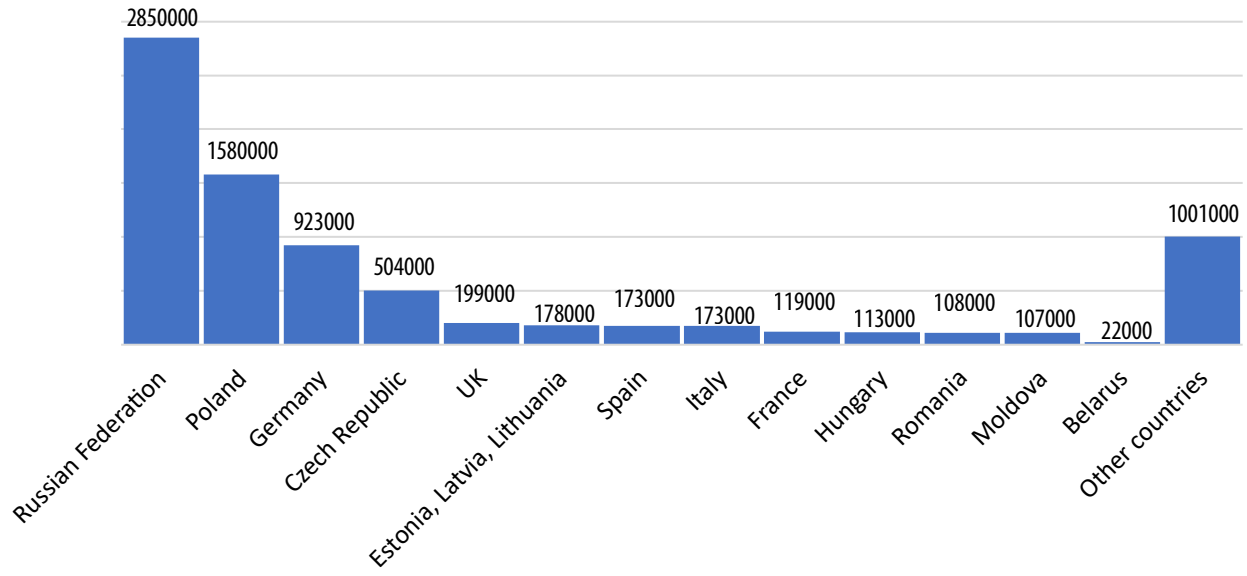

Figure 1. Destination of refugees from Ukraine

Source: own elaboration based on Eisele 2023.

Figure 1 shows the distribution of refugees from Ukraine: a large share of refugees going to the Russian Federation is made up of people from the territories neighboring the front line; thus, when escaping from the active fighting, there was no alternative but to cross the border with the Russian Federation. The second main destination of refugees, where more than 1.5 million people migrated, is Poland, which borders the western regions of Ukraine. Almost one million people migrated further to Germany.

The probability of refugees returning to their country of origin depends on the location of the current country of residence; if they are in neighboring countries, they are more likely to return than those who migrated far from their homeland (Al Husein and Wagner 2023). In addition, the presence of children increases the cost of returning, reducing the incentive to return (Klinthäll 2007).

As a rule, the out-migration of people is viewed negatively, as one country loses its human capital while the country of the final destination gains this capital. The main destination of refugees from Ukraine is the European Union (EU), where an aging population is a common issue, meaning that the share of the working-age population is decreasing while the share of the retired population is increasing, increasing the tax burden on the working population. Under these conditions, rapid and massive in-migration can fill the gap in the labor market and strengthen the financial system. Moreover, migrants increase their overall consumption by spending their previous savings (Vinokurov 2023). Based on the available data, 25–55% of refugees, who comprise 0.8% of the total labor force of the EU, are employed or actively seeking jobs. Furthermore, similar cases evidenced that out-migration is not seen as a crucial issue, as the labor market and the economy in general transform and adjust (Pishchulina and Yurchyshyn 2023).

As the majority of refugees are women and children, they require additional financial expenditures from the national budget. For instance, 560,000 children are registered in Poland

as refugees; thus, EUR 2.2 billion was used for their education and EUR 1.5 billion for their healthcare.

In addition to people moving from Ukraine as refugees, millions were displaced within the country, mostly from the eastern (70%) and southern regions (14%) to the western regions (Table 1).

Table 1. The origin of displaced people

Region of Ukraine	% of displaced people	Number of people
East	70	3,733,000
South	14	734,000
North	6	345,000
Kyiv	5	259,000
Central	3	151,000
West	2	130,000

Source: own elaboration based on International Organization for Migration 2023.

Thus, according to the available data (Figure 2), at the beginning of the full-scale invasion of Ukraine, more than six million people were forced to relocate because of military action. In April 2022, when military combat was concentrated mostly in the eastern regions, more than 7.5 million people were relocated, and almost three million people were able to return to their permanent place of residence. In the following months, the number of people who returned to their permanent place of living increased to around 5.5 million per month, while the number of displaced stayed at around 6.5 million people. Notably, in January 2023, the number of people who returned was greater than the number of displaced people.

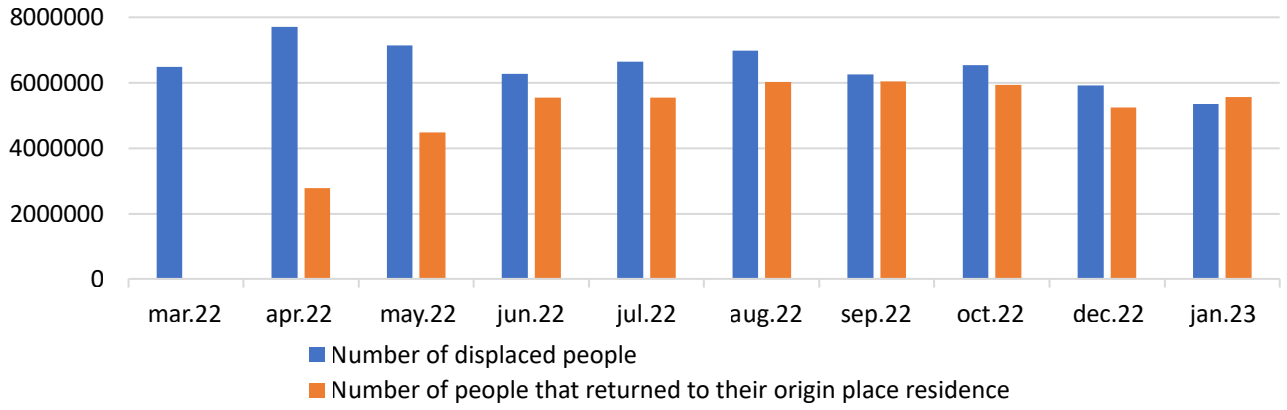

Figure 2. The number of displaced people and people who returned to their permanent place of residence

Source: own elaboration based on International Organization for Migration 2023.

While 64% of displaced people had lost their jobs, the rest were able to continue working remotely. Displaced people have lower competitive advantages in the labor market in their new place of residence, as they have lost their previously built social capital and connections, making it harder to find a paid job. Thus, the newly displaced people had to take low-paid jobs to survive, with former office workers now employed in unskilled positions. To address this issue,

the government has supported local businesses in areas where displaced individuals have settled by providing compensation for each employed person or offering preferential taxation. This approach helped stabilize the labor market, where the number of workers exceeded the needs of employers. In addition, displaced people were able to receive financial help from the state (Filipchuk and Syrbu 2022).

Ukrainian businesses faced unprecedented challenges, specifically at the beginning of the full-scale invasion when production and infrastructure facilities were destroyed or damaged. In response, some businesses relocated to safer regions; thus, more than 600 enterprises relocated to the western regions, 390 of which were able to reopen (Filipchuk and Syrbu 2022). Furthermore, international business activities were limited as the borders with Russia and Belarus were closed, ports were occupied, and the capacity of western borders was limited because of the massive movement of refugees; thus, previously established supply chains were disturbed.

In addition, as imports from Russia and Belarus were restricted, Ukrainian producers captured market share and substituted imported goods with domestic ones. However, a rapid reduction in household income decreased the demand for goods, resulting in lower sales for businesses. It is estimated that direct losses incurred by Ukrainian businesses due to the war amount to approximately USD 13 billion, with indirect losses exceeding USD 33 billion (Kyrychenko 2023). The massive out-migration of workers is seen as another issue for businesses, as there is a lack of qualified specialists available.

The negative social effects of these events should be considered when discussing the contraction of the labor market and forced displacement. According to a survey conducted by Info Sapiens (2023), the unemployment rate increased from 8.6% in February 2022 to 29.5% in March 2022, reaching 30.7% in May 2022. Although the situation slightly improved, with the unemployment rate dropping to 17.7% in May 2023, this figure remains significantly higher than the pre-war level.

At the same time, military battles interrupted the routine supply chains, leading to shortages of consumer goods and increased food insecurity among the population. By May 2023, 22.9% of respondents reported that they faced food insecurity, compared to approximately 11.4% in February 2022 (Info Sapiens 2023).

Economy and trade

During the active stage of the military conflict, the population was evacuated or forced to relocate, and businesses were not able to continue their commercial activities, resulting in a rapid contraction of the economy. In response to these challenges, foreign countries provided financial aid and other grants to stabilize and minimize financial losses of the economy. As of June 1, 2023, Ukraine had received USD 26.5 billion in additional financing, including USD 8.1 billion from the EU, USD 6.7 billion in domestic bonds, USD 6 billion from the USA, USD 2.7 billion from the International Monetary Fund, USD 1.8 billion from Canada, USD 0.5 billion from the World Bank, USD 0.5 billion from the UK, and USD 0.2 billion from Germany, Spain, Finland, Ireland, Switzerland, Belgium, Iceland, and Estonia (Ministry of Finance of Ukraine 2023).

In this context, in March 2023, the government of Ukraine increased budget spending to finance the army; thus, despite the shrinking economy, budget expenditures increased. Therefore, foreign financing was used to cover the budget deficit and debt repayments (Figure 3).

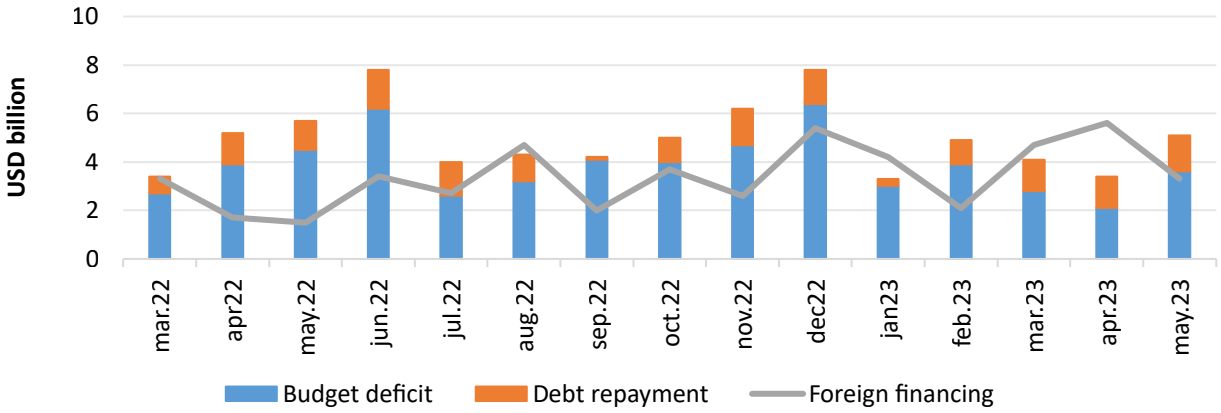

Figure 3. Data on the budget deficit, debt repayments, and foreign financing, billion USD

Source: own elaboration based on Ministry of Finance of Ukraine (2023); National Bank of Ukraine n.d.

Recent empirical research on the occupied territories reveals that Russia applies varied economic policies based on the assessed geostrategic and economic value of that territory, as well as the associated military and political costs of the conflict. Russia has demonstrated consistency in its occupation tactics, previously tested in Moldova, Georgia, and East Ukraine, including societal destabilization, population segregation, and violence (Malyarenko and Wolff 2018). The occupied territories are experiencing de-modernization as a result of the export of Russian political and economic institutions, which are more centralized than in Ukraine. Additionally, Russia purposely implements de-modernization policies to weaken the economic and political potential of the territory (Malyarenko and Kormych 2023).

Occupation policies vary across different territories. For example, in the self-proclaimed DPR and LPR, Russia implements an even more autocratic regime than in Russia itself, without even a semblance of parliamentarians, an independent judiciary, or free media (Marandici and Leşanu 2021). In particular, investments in DPR/LPR industry and infrastructure were minimal, amounting to approximately USD 8 billion over eight years. They were primarily used to pay pensions and salaries to members of government agencies, the army, the police, and education and healthcare workers. In contrast, investments in Crimea amounted to USD 24 billion between 2014 and 2021 (Kommersant 2022).

A survey conducted between February 8 and 18, 2014, showed that 41% of Crimea's residents were in favor of unification with Russia, compared with 33% in Donetsk, 24% in Luhansk and Odesa, 6% in Kyiv, and almost no support in the western regions (Paniotto 2017). Thus, the subsequent establishment of a more rigid autocratic political regime in the DPR/LPR can be understood as a means of maintaining control over these territories and their partly disloyal population.

The main economic consequences of the Russian occupation of the Ukrainian territories are: 1) the transfer of production assets such as capital, labor, land, and natural resources from

Ukraine to Russia; 2) the adaptation to the Russian economy and economic system, and the associated interruptions in the supply chains, which led to economic degradation through productivity and efficiency reduction; and 3) the out-migration of the occupied territories' labor force (Olekseyuk and Schürenberg-Frosch 2019).

Thus, there was a de-modernization of the occupied territories, as the data show that in 2017, the industrial output of the occupied territories of the DPR was three times lower than the government-controlled part of the Donetsk region; before the war, they were almost equal (Mykhnenko 2020).

Moreover, historically, many businesses located in Donbas had similar production technologies and product ranges as Russians, allowing them to compete in the international market. Therefore, to eliminate this competition, Russian investors took control of Ukrainian producers and brought them to bankruptcy by dismantling and selling equipment from the occupied territories or transferring technologically advanced enterprises to Russia while selling the remaining equipment for scrap (Decyk 2022).

During the occupation, Russia financed territories through public sector salaries, pensions, welfare payments, and energy supply. Simultaneously, these occupied territories became sales markets for Russian food and mostly low-quality consumer goods. Therefore, investments and the development of local production were not of interest to Russia (Malyarenko and Kormych 2023).

Additionally, local occupation administrations orchestrated the total "nationalization" of Ukrainian banking infrastructure and its cash holdings, along with property belonging to state monopolies and private owners. This can be seen through the fifty-fold increase in food exports from Crimean ports following its occupation. Before the occupation, between March and June 2022, the volume of exports was approximately 462,200 tons of agricultural goods such as grains, oilseeds, vegetable oils, pulses, and proteins. In contrast, the overall export of comparable products in 2021 was only 8,000 tons (Quinn 2022).

Therefore, the economic organization under the occupational administration shows that territories are going through de-industrialization, marked by a significant shift towards a resource-based economy with undeveloped financial and credit systems.

Next, regarding the impact on trade, according to the Central Bank of Ukraine, the trade deficit increased from USD 0.1 billion in January 2022 to USD 3.2 billion in July 2022, reaching a peak of USD 4.3 billion in December 2022, as with the start of the full-scale invasion, the transportation channels were greatly disrupted (Figure 4).

Figure 4. The trade balance, USD billions

Source: own elaboration based on National Bank of Ukraine n.d.

Special attention should be paid to trade volumes through various means of transportation. According to the available related data (Figure 5), maritime transportation accounted for over 90% of total trade in 2021. However, with the onset of the full-scale invasion, all seaports were blocked, rendering maritime transportation impossible. As a result, from January to March 2022, trade dropped rapidly from USD 6.5 billion in the pre-war period (December 2021) to USD 0.5 billion. Starting in April 2022, trade was partially restored using rivers, railways, and trucks. Later, on July 22, 2022, the Black Sea Grain Initiative was signed in Istanbul, Turkey (United Nations 2022). This agreement guaranteed the safety of transportation by sea and led to an increase in trade volumes in the following months.

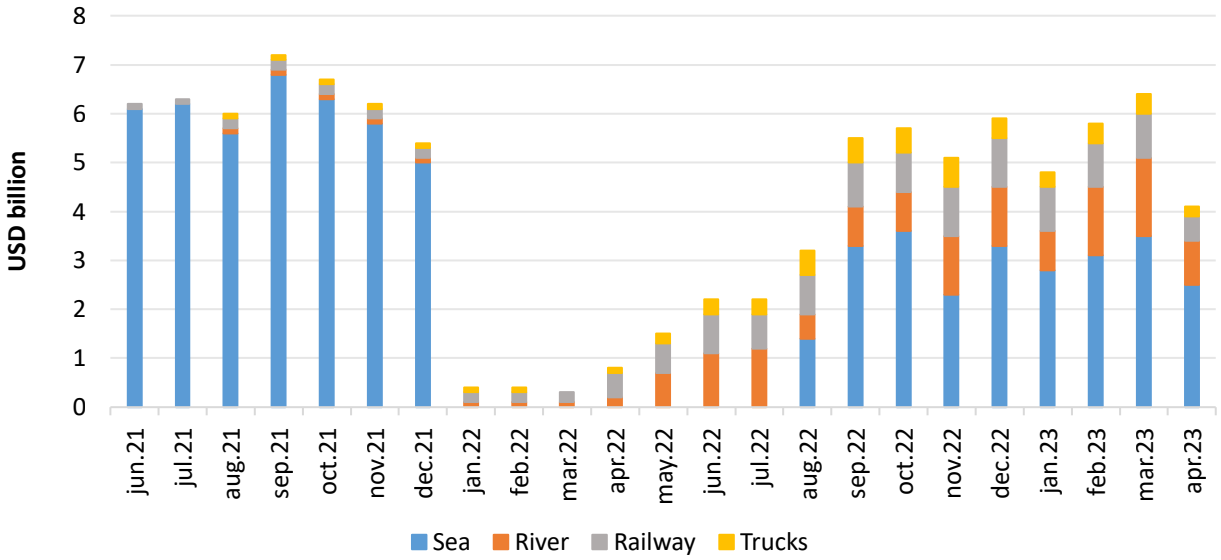

Figure 5. Trade volumes by mode of transportation, USD billions

Source: own elaboration based on Samoiliuk and Levchenko 2024

Recent studies have evidenced the persistent disruption of Ukraine's trade in agricultural products and base metals because of exporters' limited access to foreign markets. The empirical results show that exports from Ukraine decreased significantly by 47.3% from February to August

2022. It was also shown that Ukrainian exporters continued exporting higher-priced varieties while reducing exports of lower-valued products. Nonetheless, this disruption of exports from Ukraine has only a limited effect on the global market for most commodities, and the adjustment of the global market is driven by various price hikes depending on the product group and region (Fang and Shao 2022; Ahn, Kim, and Steinbach 2023; Bentley et al. 2023; Borin et al. 2023; Steinbach 2023).

Social capital and volunteering

Trust is considered to be the foundation of social capital and its accumulation. Therefore, changes in the public's trust in the main institutions illustrate social capital development at the country level. Thus, according to a survey conducted by the Razumkov Center between 2021 and 2023 (Figure 6), the overall trust in Ukraine's main state authorities increased. In particular, trust in the armed forces increased from 68.3% in 2021 to 95.8% in 2023, trust in the president increased from 36.2% in 2021 to 82.9% in 2023, and trust in the government increased from 21.5% in 2021 to 50% in 2023. These improvements stem from public satisfaction with the state's position, policies, and actions during Russia's full-scale invasion of the country. In addition, at the beginning of the full-scale invasion, there was a critical need for volunteer organizations to provide support and solve various issues in local communities. Volunteer organizations are considered a reliable way of solving issues at the local level; hence, the level of trust increased from 63.6% in 2021 to 87.9% in 2023.

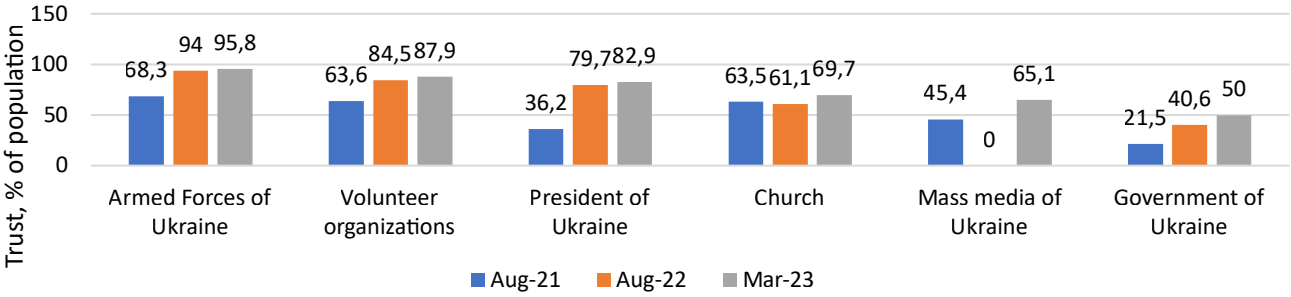

Figure 6. Trust in different institutions, %

Source: own elaboration based on Razumkov Center 2023.

As discussed before, as a result of the full-scale invasion, the economy was disturbed; thus, average household incomes fell dramatically, and many people lost their jobs as businesses were relocated or even closed down. In addition, there was a shock in the labor market caused by the rapid, massive out-migration of refugees. In this context, there was a need to collaborate to solve the essential problems of households with limited income and to support the defense forces with the necessary equipment. Consequently, many volunteering organizations were formed by neighbors with mutual goals and geographical location. The main aims of these organizations include dealing with pressing issues such as providing food banks to poor people, building heating shelters during the winter months when there were problems with electricity supplies throughout the country, organizing the evacuation of the elderly or people with disabilities, helping with paperwork for these vulnerable groups, and sharing and redistributing scarce goods, specifically at the beginning of the full-scale invasion. Additionally, the main sociological motivations for participating

in volunteer activities included patriotism, empathy, and a sense of self-worth. Patriotic feelings are extremely sensitive, especially in times of severe threat of hostile action (Reznik 2023).

In countries with a highly bureaucratic state sector, volunteering is seen as a way to react to issues quickly and directly, complementing the existing policies and procedures of governmental support. The development of volunteering activities also holds political significance, as involvement in volunteering fosters the formation of group identities and solidarities that can enhance awareness of political opportunities to influence the government, especially when there are critical differences between public and governmental priorities (Maier, Meyer, and Steinbereithner 2016).

In addition, survey results indicate that the likelihood of participating in volunteer activities increases with higher income levels (Figure 7). Moreover, wealthier people tend to help financially rather than physically. In general, there are no significant differences in participation levels in volunteering activities between respondents who reported having enough income for life and those who are more financially secure. Only the most disadvantaged Ukrainians have limited opportunities to participate in volunteering.

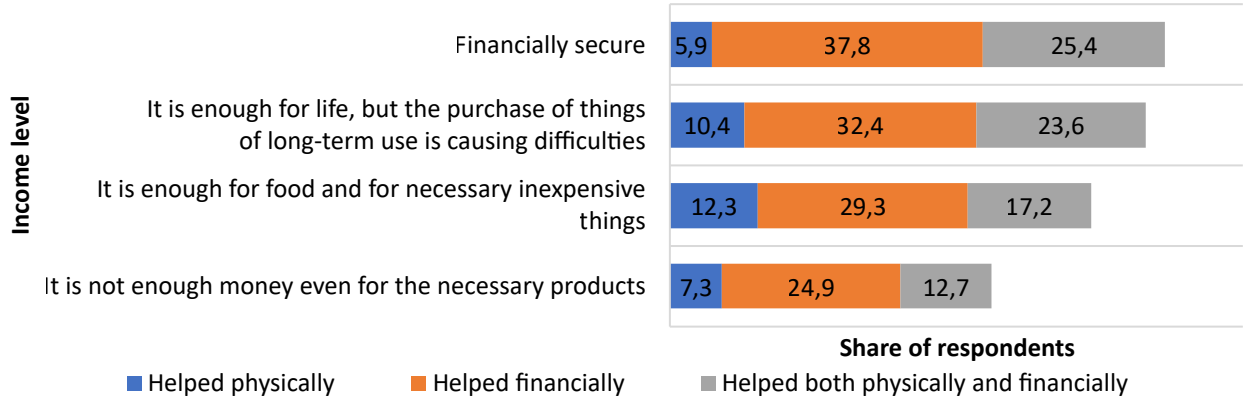

Figure 7. Participation in volunteer activities in different income groups, December 2022, %

Source: own elaboration based on Ilko Kucheriv Democratic Initiatives Foundation 2023.

There was also an obvious difference in how the analyzed groups assessed the Euromaidan events. Among those who viewed the events on the Maidan in late 2013 and early 2014 as a Revolution of Dignity – a just uprising of the people against the authoritarian government – a total of 68.2% were involved in volunteering activities. In contrast, among those who considered these events to be an illegal coup d'état, a seizure of power by a group of armed individuals, only 38.1% participated in various types of volunteering. Hence, those whose perceptions of the Euromaidan events align with the Russian narrative have formed a certain identity that does not foster resistance against the Russian invaders, at least through volunteering (Reznik 2023).

Accordingly, among the most crucial areas of activities of volunteering organizations are:

- Helping the military on the front line. The Defense Forces constantly need cars, ammunition, drones, thermal imagers, tactical medicine equipment, walkie-talkies, communication systems, and much more (Come Back Alive Foundation 2024; Serhiy Prytula Charity Foundation n.d.).

- Ensuring the work of humanitarian units: Food, clothing, medicine, and accommodation for internally displaced people (Dobro.ua. n.d.; Palyanytsya n.d.; SpivDiia n.d.).
- Information protection: countering disinformation and propaganda, blocking unreliable information sources, spreading true information through mass media, the Internet, and social networks, information protection, and cyber security (Anti-Crisis Media Center 2022).
- Helping the elderly, children, and those who have difficulty taking care of themselves. These people need food, medicine, moral support, communication, empathy, and attention (Children's Villages n.d.; Enjoying Life n.d.; UNICEF Ukraine n.d.).
- Helping animals: evacuating animals, providing shelters with everything necessary, and searching for new homes (Charity Fund Happy Paw n.d.; UAnimals n.d.).
- Reconstructing buildings: restoring damaged buildings to habitable conditions, clearing rubble, covering roofs, and replacing windows (Anti-Crisis Media Center 2022).
- Medical assistance: donating blood, working in medical facilities, lecturing on tactical medicine, and medical evacuation activities in hotspots (All-Ukrainian Association of Donors of Ukraine n.d.; Pirogov First Volunteer Mobile Hospital n.d.).
- Psychological help: free online consultations and help for people who are experiencing anxiety, panic attacks, or depressive states (Worth Living Foundation n.d.).
- Legal assistance: free legal consultations for people affected by the full-scale invasion, recording and documenting war crimes (UA.Support n.d.).

2022 marked a unique time for Ukrainian citizens, characterized by unprecedented involvement in volunteering activities. In the first months of the liberation struggle, the population felt mortal danger. Traditionally distrustful of state institutions, many individuals spontaneously engaged in various types of activities based on their capabilities and resources.

Conclusion

The main contribution of this study is the analysis of the economic and social consequences of the first year of Russia's full-scale invasion of Ukraine, thereby expanding the existing literature. The main economic consequences include the massive out-migration of refugees and internally displaced people, which directly limits the efficiency and size of the economy. Additionally, the demographic structure has changed significantly, as women with children make up the majority of migrants. Simultaneously, businesses were forced to relocate their production facilities. While the majority were able to reopen, a significant negative impact remains invisible as it occurs in the temporarily occupied territories. Specifically, these territories have experienced the total degradation and de-industrialization of the economy and the whole system, and they are now seen as resource suppliers to Russian industries. Production facilities and other properties of the temporarily occupied territories were effectively "nationalized" by Russia.

Trade has also been greatly affected as the supply chains were interrupted, imports from Russia and Belarus were limited, border capacity was insufficient to manage the massive migration

and transportation of goods, and maritime transportation of goods was limited as ports were blocked and occupied. However, maritime trade was partially restored following the agreement on the Black Sea Grain Initiative.

The social sphere has also been affected by the full-scale invasion, specifically through social capital formation caused by the increased trust in state authorities and the volunteer cooperation among citizens to solve urgent issues at both national and local community levels.

The findings of this study offer significant value to business managers by providing a comprehensive understanding of the potential economic and social impacts associated with crises and instability. This knowledge equips managers with the insights necessary to structure business operations with flexibility, enabling them to adapt effectively to external changes and mitigate potential negative consequences.

Furthermore, policymakers can also benefit from this study's insights, as it shows that the state's role is crucial during wartime and other conflicts. The flexibility and readiness of the state's sector and policy, in general, make a great difference in meeting and satisfying the public's economic and social needs and expectations during crises. Thus, to prevent widespread interruption during wartime and other conflicts, state priorities should be officially declared and followed during unforeseen crises.

Limitations and future studies

This research is limited to the available data, as the full-scale invasion of Ukraine is ongoing, and the economic and social situations are constantly changing. In addition, the study focused on the effects on Ukraine's economy and social sphere, excluding impacts on the economies of EU countries and the world economy in general. Therefore, future research opportunities include investigating the invasion's impact on the economic and social spheres of the EU and the world economies, analyzing the economic and social conditions of refugees and displaced people, and conducting related field studies. These areas of study would greatly contribute to our understanding of wartime economic dynamics.

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Społeczne i ekonomiczne konsekwencje pierwszego roku pełnoskalowej inwazji Rosji na Ukrainę

Niniejsze badanie ma na celu opracowanie ram analitycznych pozwalających zrozumieć społeczne i gospodarcze skutki inwazji wojskowej na Ukrainę poprzez zbadanie jej wpływu na rynek pracy i migrację, gospodarkę i handel, kapitał społeczny oraz wolontariat. Do głównych konsekwencji gospodarczych i społecznych zalicza się: masową migrację uchodźców i osób wewnętrznie przesiedlonych, zmianę struktury demograficznej, przenoszenie przedsiębiorstw oraz dalsze ponowne otwarcie i przystosowanie się do nowych warunków, całkowitą degradację i deindustrializację gospodarki terytoriów okupowanych, przerwanie łańcuchów dostaw, zmniejszenie wolumenu handlu, akumulację kapitału społecznego oraz rozwój i upowszechnianie wolontariackiej współpracy obywateli na rzecz rozwiązywania pilnych problemów na poziomie społeczności krajowej i lokalnej. Ponadto niniejsze badanie ogranicza się do dostępnych danych oraz wpływu na gospodarkę i sferę społeczną Ukrainy, z wyłączeniem wpływu na gospodarkę krajów UE i ogólnie gospodarkę światową.

Słowa kluczowe: Ukraina, inwazja na pełną skalę, wojna, gospodarka, uchodźcy, wolontariat, kapitał społeczny

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Capital Structure and Changes in Companies' Risk during the COVID-19 Pandemic in CEE Countries

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Abstract

The article examines the financial management of companies in the context of the COVID-19 pandemic, in particular, the relationship between their capital structure and risk changes during the pandemic. The study aims to determine how companies' total, systematic and idiosyncratic risks changed during the COVID-19 pandemic depending on their capital structure. It is based on a sample of companies listed on stock exchanges in Poland, Hungary, Romania and Bulgaria. The study uses a panel data regression model. In all countries analyzed, as well as the group of companies taken collectively, the COVID-19 pandemic positively influenced both total risk, as measured by the volatility of returns, and specific risk measured with the standard deviation of the residuals in Sharpe's single-index model. The extent to which both kinds of risk increased during the pandemic period appears to have been related to the level of excess leverage: more heavily indebted companies increased their risk more significantly. However, the impact of the pandemic on systematic risk measured with beta coefficients is more ambiguous. A plausible explanation for this result is given.

Keywords: capital structure, COVID-19, company risk, capital market

JEL: G10, G32, G33, I10

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Introduction

The COVID-19 pandemic had a significant impact on a number of areas of economic life, including financial markets. Numerous studies have explored the relationship between the pandemic and these markets, highlighting several key areas of interest. Research has focused on how stock markets reacted to pandemic-related phenomena (e.g., Arteaga-Garavito et al. 2020; Ashraf 2020; Chodnicka-Jaworska and Jaworski 2020; Gajdka and Szymański 2020; Liu, Wang, and Lee 2020; Abuzayed et al. 2021; Setiawan et al. 2021; Saif-Alyousfi 2022; Tai et al. 2022; Coskun et al. 2023; Mngonbiseni, Mabotho, and Matenda 2023), industry-level stock market reactions to such phenomena (e.g. Iyke 2020; Reilly 2020; Saadat, Rawtani, and Hussain 2020), and how the stock returns of companies with selected characteristics, such as size, ownership concentration reacted to the pandemic (e.g. Yan 2020).

Most of those studies on the relationship between COVID-19 and the financial markets concerned rates of return and stock price volatility, but their findings are ambiguous. This is because the situation in this area has changed in ways that can be either painful or beneficial for investors, with noticeable geographical, sectoral, and temporal differences. As a result, according to Dr. Marek Dietl, President of the Warsaw Stock Exchange (WSE), capital markets not only proved to be resistant to the COVID-19-induced crisis but even benefited from it. In his view, COVID-19 was, however surprising it may sound, beneficial for these markets (Werner-Woś 2020).

An issue that has received relatively little attention is the relationship between the pandemic and the financial management of companies, which unexpectedly found themselves in completely new situations characterized by increased uncertainty and operational risk. According to one frequently encountered approach, decisions related to the financial management of listed companies concern three basic issues: which assets should be funded with available capital, how ongoing projects should be financed, and what should be done with any generated financial surplus. This article focuses on the second of these issues, namely the method of financing, in particular, the capital structure.

The main problem to be analyzed is the relationship between companies' capital structures and changes in the risk associated with their stock during the pandemic. Similar issues have already been researched in relation to American (see Huang and Ye 2021) and Polish (see Gajdka and Szymański 2021) companies, but it has not yet been analyzed from a broader, international perspective. In our article, we analyze the relationship between the capital structure of companies and three types of stock risk – total risk, systematic risk, and specific risk – in four Central and Eastern European (CEE) countries: Poland, Hungary, Bulgaria and Romania, during the COVID-19 pandemic.

The study is important for both financial theory, as it addresses new aspects of capital structure theory and economic practice, as it explores how financing policies can be used to manage corporate risk in times of crisis.

Capital structure and enterprise risk

In modern capital structure theory, which is one of the most important issues in corporate finance, there are several basic trends. The oldest of these is the Modigliani and Miller (1958) (MM) approach, which suggests that, in a perfect market, a company's capital structure does not affect its value. However, when accounting for taxes in the economy, the benefits resulting from the tax shield imply that a company's value increases with the amount of debt it incurs (Modigliani and Miller 1963).

The second approach, known as the trade-off approach, suggests that as debt levels increase, there are both benefits (e.g., the tax shield) that increase the company's market value and costs (e.g., bankruptcy costs or agency costs) that diminish it. In this context, a company's market value is maximized when the optimal capital structure is achieved – specifically when the marginal benefits of debt equalize the marginal costs of debt (see, for example, Kraus and Litzenberger 1973).

The third key concept is the pecking order theory. According to this reasoning, it is difficult to define an optimal capital structure for companies; instead, we can determine the order in which they will seek funds as new investment projects arise (Myers and Majluf 1984). In such a situation, companies will first use internal sources (e.g., profit and depreciation), followed by debt, then debt that is convertible into shares, and finally, equity obtained from external sources, such as issuing new shares.

Finally, the last approach, called market timing (see Baker and Wurgler 2002), suggests that the structure of financing largely depends on the economic situation in the financial markets. Thus, during periods when shares are relatively expensive, companies are likely to raise funds by issuing these financial instruments. Conversely, when debt instruments are relatively expensive, companies will raise funds by issuing debt. In the latter case, changes in the economic situation in the financial markets, which causes a change in the prices of financial instruments, have a decisive role in determining the capital structure. All of these approaches are related to the risk analysis of a company's operations.

In the MM approach, an increase in debt under perfect market conditions keeps the total risk of the company's operations unchanged, i.e., the weighted average cost of capital does not change, although the cost of equity increases. In an economy with taxes, however, an increase in debt leads to a decrease in the weighted average cost of capital, despite an increase in the cost of equity. According to the pecking order theory, the order in which funds are obtained is determined by the uncertainty in the valuation of financial instruments. Therefore, internal funds, which are the easiest to value, are used first, followed by bonds, and finally, equities.

According to the trade-off approach, as already mentioned, a company's market value is maximized when it achieves an optimal capital structure. Financing with debt beyond this optimal level increases the bankruptcy risk of the company in such a way that the market value of the company decreases while increasing asset risk and the weighted average cost of capital. On the other hand, if a company operates with a lower-than-optimal debt level, incurring debt can increase its value, as the benefits from the growing tax shield are higher than the increase in costs associated with a higher probability

of bankruptcy. In this scenario, the company's market value increases while asset risk and the weighted average cost of capital decrease. In other words, companies with sub-optimal debt levels have greater opportunities to undertake debt-financed investment projects (Marchica and Mura 2010). This situation also provides listed companies with better financial liquidity and security in the event of a cash flow shortage, which can be more easily supplemented with borrowed capital.

However, as Jensen (1986) noted, low debt may lead to an increase in agency costs resulting from the conflict between shareholders and the management board. This is because managers who are not forced to make high interest repayments and capital installments may have access to larger financial resources that are not always used for the benefit of the owners. However, as Kesten (2010) points out, this issue tends to diminish during an economic crisis. Managers are then, in their own interest, less inclined to waste resources, focusing on ensuring operational stability in difficult conditions. In this situation, it can be argued that the significance of agency costs decreases during crises.

During a crisis, such as the one caused by COVID-19, the need for external financing increases as cash flow from business activities decreases, often significantly during this period. Suddenly forced to slow down their activities, companies must acquire funds to ensure financial liquidity. According to Halling, Jin, and Zechner (2020), the bond market has become significantly more active since the outbreak of the COVID-19 epidemic, and according to Li, Strahan, and Zhang (2020) and Acharya and Steffen (2020), as the pandemic grew, bank lending increased.

However, this does not mean that all companies have equal access to these financing options. The ability of companies to borrow from capital markets or banks varies. For example, companies with relatively lower indebtedness have a greater capacity to incur debt, which provides them with higher financial flexibility. Thus, they are able to finance new investments with more borrowed funds (Marchica and Mura 2010). Therefore, maintaining a low debt ratio ensures a greater ability to service debt and raise new funds, which is sometimes referred to as increasing financial flexibility. This advantage is particularly beneficial during market downturns. According to Fahlenbrach, Rageth, and Stulz (2020), companies with high financial flexibility lost less market value than those with low financial flexibility as a result of the COVID-19 pandemic. In other words, companies with relatively more debt are exposed to higher risk than those with less debt because leverage is typically significantly positively correlated with stock return volatility (see Black 1976; Christie 1982; Schwert 1989).

This relationship shows that, regardless of changes in the weighted average cost of capital, equity risk should increase with increasing debt during the pandemic. It can be expected that the scope of these changes will be affected by the capital structure of companies. In this context, an important yet relatively poorly described issue in the literature is whether the share risk changed in a way depending on the capital structure during the COVID-19 pandemic and whether it concerned all basic types of equity risk, i.e systematic and unsystematic stock risk. In light of the above considerations, the following hypothesis is tested in the article:

"The COVID-19 pandemic caused a relatively greater increase in the risk of more leveraged firms".

To be more precise, this hypothesis is restricted to total risk and idiosyncratic (specific, unsystematic) risk. Based on theoretical arguments, one cannot predict changes in systematic risk, as measured by beta coefficients, during the pandemic and how changes in systematic risk relate to debt ratios. A plausible explanation is that the pandemic increased risk across the entire economy. In this scenario, although companies' risk – measured by the volatility of their stock returns – can be higher, the increase relative to market risk might be insignificant or even result in a decline in their beta coefficients. Such observations were noted in the US market by Huang and Ye (2021). By definition, the beta coefficient for the whole market is 1; therefore, while some companies experience a rise in their betas, others might experience a decrease.

In the research described below, this hypothesis will be tested on a sample of public companies from four CEE countries: Poland, Hungary, Bulgaria and Romania.

Methodology

Sample

The sample consisted of 753 companies listed on the Warsaw Stock Exchange (Poland, 539 firms), the Budapest Stock Exchange (Hungary, 26 firms), the Bucharest Stock Exchange (Romania, 130 firms) and the Bulgarian Stock Exchange (58 firms), sourced from the Refinitiv database. We have not included companies from Czechia or Slovakia because there were too few listed companies over the entire analyzed period. When screening for companies, organizations from the financial sector and those for which complete information was not available were omitted.

The sample spanned from the beginning of 2018 to the end of 2021, which corresponds to two years before and during the COVID-19 pandemic. However, the values of some variables come from 2015–2017.

Risk measures

The total, systematic, and idiosyncratic risks of companies were assessed using their stock returns. In keeping with Favara (2016) and Huang and Ye (2021), total risk was measured by the standard deviation of 36 rolling monthly share returns, while systematic risk was assessed using the beta coefficient (β_i) estimated from the Sharpe single index model, written as:

$$r_{it} = \alpha_i + \beta_i \times r_{mt} + \varepsilon_{it}, \tag{1}$$

where r_{it} – the return on the i-th stock in period t, r_{mt} – the market return (the rate of return of an index), ε_{it} – a random term (residual). The beta estimation is performed using 36 monthly rates of return. Lastly, idiosyncratic risk is represented by the standard deviation of the residuals ε_{it}.

Optimal capital structure and excess leverage

To show the relationship between the capital structure and changes in equity risk during the pandemic, the study included the "Excess leverage" variable, which considers the concept

of the optimal capital structure. The concept is defined as the proportion of debt and equity capital that maximizes a company's market value (Gordon 1962; Solomon 1963; Brennan and Schwartz 1978). The literature offers several methods for determining the optimal capital structure. One method, described by Shyam-Sunder and Myers (1999), recommends using the historical average debt-to-equity (D/E) ratio (see, e.g., Rudnicki 2017), which is frequently used for testing capital structure theory. While more sophisticated methods are available, this approach was selected for this study. The optimal capital structure of the companies was determined using a debt ratio calculated from data from 2015, 2016 and 2017. Excess leverage was defined as the difference between the actual debt ratio and the optimal debt ratio.

Model

In line with other research on companies' capital structure during the pandemic (e.g., Albuquerque et al. 2020; Ding et al. 2020; Huang and Ye 2021), this study used control variables such as company size (Size), the market-to-book value ratio (MTB), and return on assets (ROA). The COVID-19 pandemic was represented by a dummy variable that had a value of 1 for the years 2020 and 2021 (the years of the pandemic) and 0 for 2018 and 2019.

The following model (2) was estimated:

$$Risk_{it} = \beta_0 + \beta_1 \times COVID + \beta_2 \times Excess_{it-1} + \beta_3 \times Excess_{it-1} \times COVID +$$

$$+\beta_4 \times Optimal_i + \beta_5 \times Size_{it-1} + \beta_6 \times ROA_{it-1} + \beta_7 \times MTB_{it-1}. \quad (2)$$

This model was estimated separately with three different dependent variables: total risk, systematic risk and idiosyncratic risk.

The key variable in this model is $Excess_{it-1} * COVID$, which reflects the joint impact of the COVID-19 pandemic and excess leverage on risk. If β_3 is statistically significant and positive then more leveraged firms were characterized by a higher level of risk during the pandemic.

Model parameters were estimated using data spanning from the beginning of 2018 to the end of 2021, which corresponds to two full years before the pandemic and two years during the pandemic. To estimate the companies' optimal capital structure, data from 2015 to 2017 were used. The model variables are described in Table 1.

Table 1. Model variables

Variable	Description
Panel A: dependent variables	
Total risk (Risk)	The standard deviation of 36 rolling monthly rates of return
Systematic risk (Risk)	A beta coefficient calculated using the Sharpe model and the 36 rolling monthly rates of return.
Idiosyncratic risk (Risk)	The standard deviation of Sharpe model residuals (calculated with 36 rolling monthly rates of return).
Panel B: independent variables	
COVID	A dummy variable taking a value of 1 for the pandemic year and 0 for the previous years
Excess	The difference between the actual and optimal debt ratios
Excess * COVID	Joint impact of COVID-19 and excess debt ratio on company risk
Optimal	Optimal debt ratio calculated as an average for 2015–2017
Size	The natural logarithm of total assets
ROA	Return on assets represented by the net profit to asset ratio
MTB	The market value to book value ratio

Source: authors' elaboration.

The VIF (Variance Inflation Factor) test was used to check for collinearity between dependent variables. The debt ratio was not included as an independent variable due to its strong collinearity with the excess debt ratio. White's test was used to check for heteroskedasticity. Heteroskedasticity and autocorrelation consistent (HAC) estimators were used to deal with this problem.

The Breusch-Pagan and Hausman tests were used to determine if fixed effects or random effects should be included in the model. In the fixed effects model, the variable "Optimal" was excluded as it remained stable over time for the particular companies to which fixed effects were applied.

Results

The tables below present the parameters of two kinds of models: the pooled-OLS (Ordinary Least Squares) model (which does not account for individual effects of companies) and either the fixed effects or random effects model, based on the results of the Breusch-Pagan and Hausman tests. In all tables, statistical significance at 0.001, 0.01, and 0.05 is denoted by ***, **, and *, respectively.

Table 2 presents the results for all companies pooled in one sample and Tables 3 to 6 – separately for individual countries.

Table 2. Total risk, systematic risk, and idiosyncratic risk, all companies

	Total risk		Systematic risk		Idiosyncratic risk	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
Const	0.4542***	0.0540*	−0.8313***	−2.956***	0.4760***	0.0719**
COVID	0.0275***	0.0267***	0.1621***	0.1484***	0.0221***	0.0214***
Excess	−2.070	−9.12e-06	−8.73e-05	−4.73e-05	−2.33e-05	−1.11e-05
Excess*COVID	0.0001***	7.54e-05**	−0.0007*	6.22e-05	0.0002***	7.61e-05**
Optimal	0.0005***	–	−0.0009	–	0.0005***	–
Size	−0.016***	0.0042***	0.0662***	0.1735***	−0.0171***	0.0033**
ROA	0.0003	0.0002	−0.0011	−0.0001	0.0003	0.0002
MTB	−2.46e-05**	−5.42e-05***	−0.0003***	−0.0002***	−5.6e-05**	−5.6e-05***

Source: authors' elaboration.

The coefficients for the "COVID" variables are positive and statistically significant for all three types of risk: total risk, systematic risk, and idiosyncratic risk, indicating that the COVID-19 pandemic increased companies' risk levels. Notably, the scale of this increase in total risk and idiosyncratic risk appears to be driven by the level of overleverage, as evidenced by the positive and statistically significant coefficients for the "Excess*COVID" variables.

Additionally, higher-valued companies with higher market-to-book ratios tend to experience lower risk of all types, while bigger companies appear to be associated with higher risk throughout the analysis period (according to the models with fixed effects).

Table 3. Total risk, systematic risk, and idiosyncratic risk, Poland

	Total risk		Systematic risk		Idiosyncratic risk	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
Const	0.6845***	0.0490	−0.9762***	−2.0732***	0.7216***	0.0656**
COVID	0.0422***	0.0393***	0.2267***	0.2206***	0.0355***	0.0326***
Excess	−4.91e-05***	− 7.78e-06	−7.95e-05	−0.0001	−5.38e-05***	−9.69e-06
Excess*COVID	3.44e-05	8.18e-05**	0.0007**	7.09e-05	2.93e-05	8.26e-05**
Optimal	0.0001***	–	0.0009*	–	0.0001**	–
Size	−0.0284***	−0.0051***	0.0757***	0.1335***	−0.0303***	0.0043
ROA	0.0006*	0.0001	−0.0005	0.0004	0.0007**	0.0001
MTB	−2.97e-05	−6. 02e-05***	−0.0003	−0.0003***	−3.15e-05	−6.12e-05**

Source: authors' elaboration.

In Poland, which comprises the largest group of companies (over 70% of those studied), the results are quite similar to those obtained for the full sample of companies. The COVID-19 pandemic had a positive impact on all types of risk, and the extent to which total risk and idiosyncratic risk increased due to the pandemic seems related to the level of excess leverage – more heavily indebted companies increased their risk more. Once more, companies with higher

market-to-book ratios tend to experience lower risk of all types. Company size was positively linked with systematic risk (beta coefficients) but negatively associated with total risk. This negative relationship between size and idiosyncratic risk was only confirmed with the pooled-OSL model, not with the fixed effects model.

Table 4. Total risk, systematic risk, and idiosyncratic risk, Hungary

	Total risk		Systematic risk		Idiosyncratic risk	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
Const	−0.1722***	0.1136	−1.8125***	−3.5372***	−0.1346***	0.3062*
COVID	0.0265***	0.0155***	0.2275***	0.1613***	0.0208***	0.0107***
Excess	−0.0517	0.0227	−0.8870***	−0.5120***	−0.0464	0.0245
Excess*COVID	0.0961**	−0.0120	1.0055***	0.5401***	0.0924***	−0.0131
Optimal	0.1308***	–	0.8311***	–	0.1204***	–
Size	0.0056***	−0.0014	0.0737***	0.1698***	0.0041***	−0.0094
ROA	−0.3271**	0.1757**	−0.7552	0.2518	−0.3568***	0.1723**
MTB	0.0116***	−0.0029***	0.0154**	−0.0096	0.0121***	−0.0037***

Source: authors' elaboration.

In Hungary, represented by only 26 companies, once more, the COVID-19 pandemic appears to have stimulated all three types of risk, as indicated by the positive and statistically significant coefficients for the "COVID" variable. However, there is less evidence that this increase in risk was related to excess leverage. While the coefficients for "Excess*COVID" variables are positive and statistically significant for systemic risk in both the pooled-OLS and the fixed effects model, they are statistically significant only in the pooled-OLS model for total risk and idiosyncratic risk. A similar conclusion can be drawn for company size and its impact on risk. Higher market valuation of companies (market-to-book ratio) is negatively related to total risk and idiosyncratic risk but not to systematic risk. What is more, return on assets seems to be positively linked to both total risk and idiosyncratic risk.

Romania is the only country where random effect models were estimated instead of fixed effects due to the results of the Breusch-Pagan and Hausman tests. The results show that the COVID-19 pandemic had a positive impact on total risk and idiosyncratic risk and that it influenced risk more significantly for more heavily indebted companies. Conversely, the pandemic had a negative impact on systematic risk, but again, the scale of this reduction was higher for more indebted companies. This finding aligns with arguments presented in the previous section: although companies' risk – measured by the volatility of their stock returns – was higher, the increase relative to market risk may have been insignificant or even resulted in declining betas.

Table 5. Total risk, systematic risk, and idiosyncratic risk, Romania

	Total risk		Systematic risk		Idiosyncratic risk	
	OLS	Random effects	OLS	Random effects	OLS	Random effects
Const	0.2714***	0.1052**	−2.3232***	−0.7636	0.3334***	0.1708***
COVID	0.0079***	0.0089***	−0.0241	−0.0277**	0.0060***	0.0071***
Excess	0.1232***	0.0270***	0.5073***	−0.0989	−0.1272***	0.0195***
Excess*COVID	0.1057***	0.0138**	−0.8632***	−0.2446***	0.1060***	0.0156**
Optimal	0.0710***	0.1324***	−0.5391***	−0.9985***	0.0759***	0.1344***
Size	−0.0107***	−0.0030	0.1499***	0.0749**	−0.0141***	−0.0066**
ROA	−0.1064***	−0.0585***	0.6757	0.4010**	−0.1179*	−0.0739***
MTB	−1.43e-05	2.40e-05***	0.0001	0.0002***	−1.50e-05*	−2.53e-05***

Source: authors' elaboration.

It is important to note that the sample of companies under study does not cover the whole stock market due to limitations in data availability for the whole analysis period. Because the beta for the whole market is 1, some companies may have experienced declines in their betas while others saw increases. The results for size, return on assets, and market-to-book value are quite mixed.

Table 6. Total risk, systematic risk and idiosyncratic risk, Bulgaria

	Total risk		Systematic risk		Idiosyncratic risk	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
Const	1.1104***	1.0755***	−6.3492***	−21.750***	1.1582***	0.9848***
COVID	0.0152***	0.0251***	0.1344***	−0.1154***	0.0123***	0.0211***
Excess	0.0735***	0.0038	1.4789***	0.5576***	−0.0706***	0.0052
Excess*COVID	−0.0750	0.0497***	−0.9470	−3.1318***	−0.0903*	0.0293**
Optimal	0.2412***	–	−1.9937***	–	0.2402***	–
Size	−0.0595***	−0.0515***	0.4173***	1.2106***	−0.0621***	−0.0466***
ROA	1.0841**	0.2290***	−17.325***	−9.1615***	1.0376**	0.1963***
MTB	−0.0050***	−5.0e-05	0.0137**	0.0024	−0.0050***	−3.68e-05

Source: authors' elaboration.

The main results for Bulgaria are quite similar to those obtained for Romanian companies. The COVID-19 pandemic had a positive impact on total risk and idiosyncratic but a negative effect on systematic risk. The pandemic influenced risk more significantly for more heavily indebted companies. Additionally, returns on assets appear to be positively related to both total risk and idiosyncratic risk but negatively associated with systematic risk. The opposite conclusions can be drawn for company size and its impact on risk.

Conclusion

The outbreak and subsequent waves of the COVID-19 pandemic resulted in a huge increase in the risk associated with business activities, which is reflected in increased stock price fluctuations. This finding was also confirmed by the research results presented in this article. In all four countries analyzed separately, as well as in the combined group of companies from these countries, the pandemic had a positive impact on total risk, as measured by the volatility of returns, and on specific risk, measured using the standard deviation of the residuals in Sharpe's single-index model.

Importantly, the extent to which both kinds of risk increased due to the pandemic appears to be related to the level of excess leverage: more heavily indebted companies increased their risk more, which confirms the hypothesis outlined in the article. The impact of the pandemic on systematic risk measured by beta coefficients is more ambiguous. In the overall group of companies and in Poland and Hungary treated separately, the impact of the pandemic on the average beta coefficients was positive and increased with the level of leverage. In contrast, in Romania and Bulgaria, the relationship was negative.

This discrepancy can be explained by the fact that an increase in risk across the entire economy – reflected in the increase in the volatility of stock returns – did not necessarily lead to an increase in market risk measured by betas. While some companies may have experienced rising betas, others may have experienced a decline. Therefore, theoretically, it is impossible to predict the direction of change in the average beta of the analyzed companies.

The control variables used in the models also appear to influence risk. In the pooled sample of all companies, as well as in Poland and Hungary analyzed separately, higher-valued companies with higher market-to-book ratios experienced lower risk of all types. Conversely, lower-valued companies appear to be more risky. In Bulgaria, market valuation appears to be unrelated to risk, while in Romania, the results are more complex. In the pooled sample, larger companies appear to be more risky throughout the analysis period; however, when examining individual counties separately, the results are mixed. Similarly, for the return on assets and its impact on risk, the results are inconclusive.

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Struktura kapitału a zmiany ryzyka spółek w czasie pandemii COVID-19 w krajach Europy Środkowo-Wschodniej

W artykule rozpatrywana jest problematyka zarządzania finansami spółek w kontekście pandemii COVID-19. W szczególności badany jest związek między strukturą ich kapitału a zmianami ryzyka w czasie pandemii. Celem opracowania jest określenie, jak zmieniało się ryzyko całkowite, systematyczne i specyficzne spółek w czasie pandemii COVID-19 w zależności od ich struktury kapitałowej na próbie spółek notowanych na giełdach w Polsce, na Węgrzech, w Rumunii i w Bułgarii. W badaniu wykorzystano panelowy model regresji danych. We wszystkich krajach analizowanych oddzielnie, a także we wspólnej grupie spółek pandemia COVID-19 miała pozytywny wpływ na ryzyko całkowite mierzone zmiennością stóp zwrotu, a także na ryzyko specyficzne mierzone odchyleniem standardowym reszt w modelu jednoindeksowym Sharpe'a. Stopień, w jakim oba rodzaje ryzyka wzrosły w wyniku pandemii, jest powiązany z poziomem nadmiernej dźwigni finansowej: bardziej zadłużone spółki w większym stopniu zwiększają swoje ryzyko. Bardziej niejednoznaczny jest wpływ pandemii na ryzyko systematyczne mierzone współczynnikami beta. W artykule podano wiarygodne wyjaśnienie tego wyniku.

Słowa kluczowe: struktura kapitału, COVID-19, ryzyko spółki, rynek kapitałowy

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The Nexus between CO_2 Emissions and Health Expenditure – Causality Evidence from Selected CEE Countries

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Abstract

Greenhouse gas emissions, primarily carbon dioxide (CO_2), influence climate change and have a significant impact on public health. The relationship is a subject of interest to many researchers. However, the situation of Central and Eastern European (CEE) countries is not sufficiently explored in this context. Thus, this study examines the linkages between CO_2 emissions and health expenditures in 11 CEE countries. The empirical findings obtained using Kónya's bootstrap panel Granger causality test show that CO_2 emissions and health expenditures are related in most CEE countries. Notably, a bidirectional relationship in the bootstrap panel Granger causality test is found for Croatia, Romania, and Slovakia. In contrast, the relationship was revealed to be insignificant in Bulgaria, Lithuania, Poland, and Slovenia. The results are significant and contribute to the existing literature. The findings allow us to issue policy recommendations to intensify efforts to control pollution, particularly CO_2 emissions, especially in Croatia, Romania, and Slovakia, as well as in the countries where at least unidirectional effects from CO_2 emissions to health expenditures were observed (e.g., Estonia, Hungary, and Latvia).

Keywords: causality, CO_2 emissions, health expenditure, Central and Eastern European countries, quality of life

JEL: C20, H51, I10, Q53

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Introduction

Nowadays, one of the most important challenges for many economies is environmental change. These changes influence various aspects of the social and economic situations in many countries, impacting human life and health. One of the most threatening risks to health is environmental degradation, primarily caused by greenhouse gas emissions, particularly CO_2 (Ahmad et al. 2018; Wang et al. 2018).

Our literature review, which covered single countries as well as panels of countries, provided mixed results regarding the causality between CO_2 emissions and health expenditures (see, e.g., Wang et al. 2019a; 2019b; Erdogan, Kirca, and Gedikli 2020; Ganda 2021; Li et al. 2022). However, Central and Eastern European (CEE) countries have yet to be subjected to deeper analysis. Thus, this study aims to investigate the causal relationship between CO_2 emissions and current health expenditures in 11 CEE countries (Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia).

The motivation for this research comes from the importance of environmental issues in the development strategies of many economies. Additionally, the role of health status and social development further influences this motivation. The background of this study is informed by observations of the available data, which indicate that the countries under analysis recently have experienced an increase in health spending and a reduction in CO_2 emissions, as illustrated in Figure 1 and Figure 2.

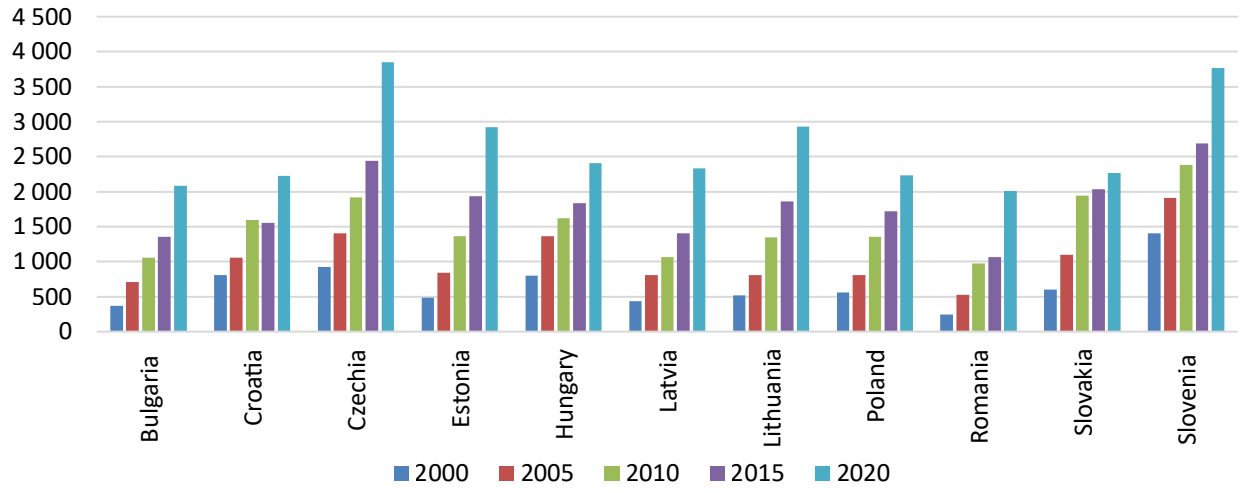

Figure 1. Current health expenditure per capita, PPP (current international $)

Source: own work based on World Bank n.d.

Figure 1 demonstrates that current health expenditures per capita in these 11 CEE countries are relatively similar and show a consistent upward trend over the years. However, there have been notable differences among the countries over time. For instance, Slovenia and Czechia consistently exhibited the highest health expenditures per capita in 2000, 2005, 2015, and 2020. Conversely, Romania and Bulgaria consistently had the lowest expenditures in the same years. Despite these differences, the health expenditures per capita for the remaining countries are generally close to the average for the group.

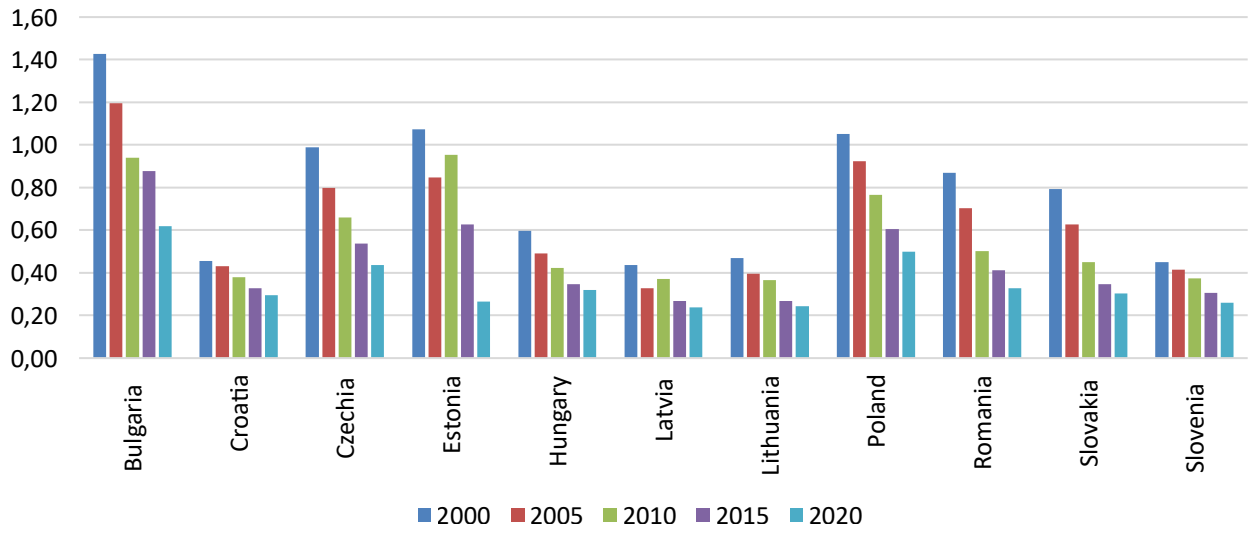

Figure 2. The size of CO_2 emissions (kg per 2015 US$ of GDP) in the analyzed countries

Source: own work based on World Bank n.d.

The group is also very close to each other in terms of CO_2 emissions. As Figure 2 illustrates, CO_2 emissions in these countries have been decreasing since 2000. The countries with the lowest emissions in 2000 were Latvia, Slovenia, and Croatia, although the situation changed slightly in other years, with Latvia, Lithuania, and Slovenia having the lowest CO_2 emissions in 2005, 2010, 2015, and 2020. Among the 11 countries, Bulgaria, Estonia, and Poland had the highest emissions in 2000, 2005, 2010, and 2015. However, by 2020, the ranking had changed slightly, with Bulgaria, Poland, and Czechia having the highest CO_2 emissions. The CO_2 emissions of the other countries are quite close to the group average and similar to each other.

From the literature review presented in Section 2 and considering the data above, it can be assumed that the links between CO_2 emissions and health expenditures may interact simultaneously. CO_2 emissions, as a risk to human health, influence health spending. Conversely, increased awareness of the importance of health status for well-being and economic growth can mitigate environmental degradation.

Considering the above, the main goal of this study is to examine the nexus between health expenditures and CO_2 emission levels in the selected CEE countries. This objective is explored through causality analysis, contributing four substantial insights to the literature. Firstly, this investigation provides new perspectives on the directional impact of health expenditures on CO_2 emissions and vice versa in 11 CEE countries. Secondly, a range of diagnostic tests is employed to validate the results. Thirdly, Kónya's (2006) bootstrap panel Granger causality test is used to explore the causal relationships between the two analyzed variables. Lastly, the study examines the following combined causality effects: (i) from CO_2 emissions to health expenditures and (ii) from health expenditures to CO_2 emissions.

The structure of the paper is as follows. Section 2 provides an extensive literature review, while Section 3 contains information about the data and methodology. The results of the study are presented in Section 4, while Section 5 concludes.

Literature review regarding the relationship between CO_2 emissions and health expenditure

CO_2 emissions are seen as an influential factor in health status. In this context, air pollution has a detrimental impact on public health spending. The link between measures of environmental degradation and public health spending has been examined in a wide range of studies, although the results were mixed. The literature review shows that the relationship between air pollution and health spending is often analyzed within the broader context of causality involving health, environmental degradation, and GDP growth, among others (see, e.g., Mujtaba and Shahzad 2021; Dritsaki and Dritsaki 2023; Vyas, Mehta, and Sharma 2023).

Akbar et al. (2021) used a panel VAR model to analyze the relationship between health expenditure, CO_2 emissions, and the Human Development Index (HDI) in 33 OECD countries, including Latvia, Lithuania, Slovenia, Slovakia, and Poland, from 2006 to 2016. Their methods allowed them to conclude that there is a bidirectional causal relationship between health expenditure and carbon dioxide emissions in OECD countries. This positive relationship indicates that CO_2 emissions significantly increase health expenditures.

Mujtaba and Shahzad (2021) analyzed data from 2002 to 2018 for 28 OECD countries to examine the relationship between environmental (air) pollutants, economic growth, renewable energy, and public health. Their panel VECM model results revealed long-run relationships between these variables. The FMOLS estimates indicated significant and positive effects of CO_2 and nitrous oxide emissions on health expenditure. Similar findings regarding the positive relationship between gas emissions and health spending for countries outside the OECD were highlighted by Chaabouni and Saidi (2017), Khoshnevis Yazdi and Khanalizadeh (2017), Akbar et al. (2021), and Saleem (2022), among others.

Wang et al. (2019a) analyzed the situation in 18 OECD economies over the period 1975–2017. They investigated the relationship between real GDP per capita, real health expenditure per capita, and CO_2 emissions using a bootstrap autoregressive distributed lag (ARDL) cointegration model. The outcomes generally presented mixed results. However, they revealed bidirectional causality between health expenditure and CO_2 emissions specifically for New Zealand and Norway.

In another study, Wang et al. (2019b) analyzed the relationship between a set of variables, including CO_2 emissions and health expenditures, focusing on Pakistan from 1995 to 2017. They employed the autoregressive distributive lag (ARDL) model and found a significant dynamic relationship. Based on their results, they concluded that there is a short-term causal relationship between health expenditure, CO_2 emissions, and economic growth, which also holds in the long run. They identified bidirectional Granger causality between CO_2 emissions and health spending, although, in the short term, causality was found to be unidirectional – from CO_2 emissions to health spending.

Bilgili et al. (2021) examined the nexus between public and private healthcare expenditure, economic growth, and pollution emissions for 36 Asian countries from 1991 to 2017. They explored the environmental Kuznets curve in Asian economies using advanced analyses such as

the quantile regression method, FMOLS, and GMM approaches. Their findings indicated that both public and private health expenditures contribute to reducing CO_2 emissions. Notably, the study suggested that private health spending has a larger effect in reducing emissions compared to public health spending.

Ganda (2021) analyzed the situation in five BRICS countries from 2000 to 2017, focusing on CO_2 emission determinants. The study utilized two regression models: one based on aggregated health expenditure and another based on disaggregated health expenditure. The Dumitrescu–Hurlin panel Granger causality test was employed to analyze causality. The results revealed bidirectional causality between CO_2 emissions and health expenditure, with more detailed insights provided for three disaggregated categories of health spending: current, private, and domestic. However, the study found that the nexus between external health expenditure and CO_2 emissions was insignificant.

Apergis, Bhattacharya, and Hadhri (2020) presented interesting findings in their study analyzing a group of 178 countries from 1995 to 2017. The countries were categorized into four income groups: low, low-middle, upper-middle, and high-income. The study examined the long-run dynamics between environmental pollution and health spending, alongside income levels and health expenditures. Overall, the study found positive estimated elasticities for the relationship between CO_2 emissions and health spending. Specifically, a 1% increase in CO_2 emissions was associated with a 2.5% increase in health spending across the full sample. Upon disaggregation, the highest elasticity was observed in low-income countries at 2.9%. High-income countries also exhibited a high elasticity at 2.6%, while upper-middle-income countries had a slightly lower elasticity at 2.3%. The lowest elasticity was found in low-middle-income countries, which stood at 1.2%. These results highlight similarities between low-income and high-income countries in terms of their response to CO_2 emissions impacting health spending.

Yahaya et al. (2016) applied panel cointegration analysis to investigate the situation across a panel of 125 developing countries from 1995 to 2012. The study focused on the relationship between health expenditure per capita and a set of explanatory variables, including environmental quality. The authors identified a long-run relationship between per capita health expenditure and all explanatory variables. Specifically, they highlighted the significant explanatory effect of CO_2 emissions. Their findings indicated that both long-run and short-run outcomes confirm the increasing impact of air pollutants on per capita health expenditure over time.

Dritsaki and Dritsaki (2023) utilized data from G7 countries spanning the period 2000–2018 to examine the relationship between per capita healthcare expenditures, per capita CO_2 emissions, and per capita gross domestic product (GDP). Employing Dumitrescu and Hurlin's causality test, they identified a unilateral causality from per capita greenhouse gas emissions towards per capita health expenditure across all G7 countries. They concluded that CO_2 emissions significantly affect health expenditures in the most advanced economies, namely Canada, Germany, France, the United Kingdom, Italy, Japan, and the United States.

Ullah et al. (2019) analyzed the nexus between trade liberalization, CO_2 emissions, population growth, industrial production, and healthcare expenditures in China from 1990 to 2017.

The causality test indicated a unidirectional link between CO_2 emissions and health spending, specifically showing causality from CO_2 emissions to health spending. This suggests that emissions tend to increase healthcare expenditures. Additionally, Ecevit et al. (2023) examined the effects of globalization, economic growth, greenhouse gas emissions, and population aging on health expenditures using data from 12 emerging market economies between 2000 and 2018. Their empirical analysis included causality tests, revealing a bidirectional causality between carbon emissions and health expenditure.

Some empirical evidence suggests nonsignificant or negative correlations between CO_2 emissions and health spending variables (Yahaya et al. 2016; Alimi, Ajide, and Isola 2020; Erdogan, Kirca, and Gedikli 2020). For instance, Erdogan, Kirca, and Gedikli (2020) used a panel causality test to investigate the relationship between CO_2 emissions and health-related expenditure in five BRICS countries and Türkiye from 2000 to 2016. The study found that the relationship between healthcare expenditure and CO_2 emissions was not statistically significant in the analyzed countries, except for China. Specifically, in China, they identified a one-way positive causal relationship between health expenditures and CO_2 emissions.

Li et al. (2022) provided analyses for four BRICS countries using data from 2000 to 2019 to examine the correlation between health expenditures, CO_2 emissions, and GDP fluctuations. The study utilized autoregressive distributed lag (ARDL) models. The causality analysis yielded mixed results. In Brazil, in the short term, CO_2 emissions were found to have a one-way impact on health expenditure, while in China, health expenditure had a one-way impact on CO_2 emissions. In India, a two-way causal relationship between CO_2 emissions and health expenditure was identified.

Zaidi and Saidi (2018) revealed a negative correlation while investigating the interaction among environmental pollution, health expenditure, and economic development in sub-Saharan African countries from 1990 to 2015. They evaluated the effects of environmental pollution (CO_2 emissions and nitrous oxide emissions) on health expenditure and economic growth across these countries. The results indicated a negative long-run relationship between CO_2 emissions and nitrous oxide emissions with health spending, covering both public and private expenditures. The estimated elasticities showed that a 1% increase in CO_2 emissions would decrease health spending by 0.066%, while a 1% increase in nitrous oxide emissions caused a more substantial decrease of 0.577% in health expenditure. The effect was particularly pronounced in the case of CO_2 emissions. Causality analysis revealed a bidirectional relationship between health spending and CO_2 emissions. The main conclusion drawn was that, in the long run, carbon dioxide emissions were negatively associated with health expenditures.

Alimi, Ajide, and Isola (2020) analyzed the causal relationship between environmental quality (measured by CO_2 emissions per capita in metric tonnes) and healthcare expenditure in 15 ECOWAS (Economic Community of West African States) countries over the period 1995–2014. The dependent variable, health expenditure, was analyzed in three specifications: national healthcare expenditure, public healthcare expenditure, and private healthcare expenditure. The methods employed revealed a significant positive impact of carbon emissions on public and national healthcare expenditure. However, the relationship between environmental pollution and private healthcare expenditure was found to be insignificant.

Data and methodology

The literature extensively demonstrates a causal relationship between CO_2 emissions and health expenditure, confirmed by numerous studies. In contrast to the existing research, this study investigates the causal link between CO_2 emissions and health expenditures across 11 Central and Eastern European countries that are members of the European Union. To achieve this objective, an econometric analysis was conducted using the bootstrap panel Granger causality test. This section provides a detailed description of the data, followed by an explanation of the methodology used. Finally, empirical findings derived from the analysis are presented and discussed.

Table 1. Data description

Variables	Description	Period	Data type	Source
CO_2	CO_2 emissions (kg per 2015 US$ of GDP)	2000–2020	Panel Data	World Bank n.d.
HE	Current health expenditure per capita, PPP (current international $)			

Source: own work.

As Table 1 shows, the analysis utilized two distinct variables: CO_2 (CO_2 emissions, kg per 2015 US$ of GDP) and HE (current health expenditure per capita, PPP, current international $). The panel data utilized in this study was sourced from the World Bank (n.d.) and covers the period 2000–2020. The study focuses on 11 CEE countries that are members of the European Union: Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. The period of the study was determined by data availability, and all variables underwent logarithmic transformations for our econometric analysis.

It is hypothesized that the causality relationship between CO_2 emissions and health expenditure may vary across countries that exhibit similar levels of development in these variables. Therefore, an empirical examination was conducted using the bootstrap panel Granger causality test, which offers country-specific causality test results. This approach allows for a nuanced analysis of how CO_2 emissions and current health expenditures per capita interact within different country contexts.

In the empirical part of this study, a panel data model was constructed to forecast the causality relationship between the variables. The model can be formulated as:

$$CO_{2it} = \alpha_{1i} + \alpha_{2i} HE_{it} + u_{it}, \quad (1)$$

where: i stands for the countries (i = 1, 2, …, 11), t denotes time period (t = 2000, …, 2020), α_{1i} is the constant term, and α_{2i} is the parameter of health expenditure that expresses the effect of CO_2 emissions. The panel data model used in this current study is based on Kónya's (2006) bootstrap panel Granger causality test.

There are several compelling reasons to choose this method for our empirical analysis. First and foremost, it eliminates the need for pre-tests. Many panel causality tests require preliminary investigations into stationarity and the presence of cointegration among variables. However, our

chosen method bypasses these initial requirements. Another significant advantage is its ability to accommodate cross-sectional dependence, making its assumptions more realistic for our study context. Lastly, the method incorporates panel heterogeneity, allowing us to derive specific results for each country in the panel (Kar, Nazlıoğlu, and Ağır 2011, p. 688). This feature enables comparative analysis across countries, enhancing the depth of our findings.

The analysis using Kónya's bootstrap panel Granger causality test involves two important stages. The first stage involves assessing the validity of cross-sectional dependence and panel heterogeneity conditions for the entire panel. Pesaran (2004) notes that cross-sectional dependence refers to the correlation among cross-sections. In the second stage, the panel Granger causality relationship between variables should be estimated for each country using the Seemingly Unrelated Regression Equation (SURE) method developed by Zellner (1962).

Pesaran (2004) also addresses Breusch and Pagan's (1980) contributions with proposed Lagrange Multiplier (CD_{LM1}) test statistics:

$$CD_{LM1} = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}^2. \tag{2}$$

As shown in Equation (2), the Lagrange Multiplier (LM_1) test statistic provides the asymptotic chi-square distribution with N(N – 1)/2 degrees of freedom. In this equation $\hat{\rho}_{ij}$ represents the sample estimate of the pairwise correlation of the residuals. The null hypothesis (H_0) states that there is no cross-sectional dependence, while the alternative hypothesis (H_1) asserts there is cross-sectional dependence for at least one pair. The hypotheses may be written for this test as follows:

$H_0: \ \mathrm{cov}(u_{it}, u_{kt}) = 0$ for all t and $i \neq t$,

$H_1: \ \mathrm{cov}(u_{it}, u_{kt}) \neq 0$ for at least one pair of $i \neq t$.

The CD_{LM1} test statistic is generally used when $T \to \infty$ and N remains constant. However, when N is large, the CD_{LM1} statistics may be limited. For this reason, Pesaran (2004) proposes the following CD_{LM2} test statistics:

$$CD_{LM2} = \sqrt{\frac{1}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}(T\hat{\rho}_{ij}^2 - 1). \tag{3}$$

According to Pesaran (2004), CD_{LM2} is suitable for testing the hypothesis of cross dependence even when both N and T are large ($T \to \infty$ and $N \to \infty$) (T > N). Additionally, Pesaran (2004) also introduced the following simpler alternative CD test statistic:

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right). \tag{4}$$

The CD test statistic applies in cases where N (the number of cross-sections) is high and T (the number of periods) is relatively low. It relies on pairwise correlation coefficients rather than their squares, as in the CD_{LM1} statistic. However, when there are concerns regarding

the significance levels of groups, these two test statistics may not suffice to reject the null hypothesis. To address this, Pesaran, Ullah, and Yamagata (2008) proposed an alternative test:

$$CD_{LMadj} = \sqrt{\left(\frac{2T}{N(N-1)}\right)}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\frac{(T-k)\hat{\rho}_{ij}^2 - \mu_{Tij}}{\sqrt{\nu_{Tij}^2}}. \quad (5)$$

The CD_{LMadj} test statistic is called the bias-adjusted LM statistic with asymptotic standard normal distribution for the cases where both T→∞ and N→∞. In this case, μ_{Tij} and ν_{Tij}^2 refer to the mean and the variance of (T – k) $\hat{\rho}_{ij}^2$, respectively.

As previously mentioned, in Kònya's bootstrap panel Granger causality test method, another consideration after identifying cross-sectional dependence is controlling for slope homogeneity (or panel heterogeneity). For this purpose, the method proposed by Swamy (1970) is often preferred, but it can only be applied when T is greater than N (T > N). To extend Swamy's method to larger panels, Pesaran and Yamagata (2008) developed another test, which is shown in the following equation:

$$\tilde{S} = \sum_{i=1}^{N}\left(\hat{\beta}_i - \hat{\beta}_{WFE}\right)' \frac{x_i' M_\tau x_i}{\tilde{\sigma}_i^2}\left(\hat{\beta}_i - \hat{\beta}_{WFE}\right), \quad (6)$$

where: $\hat{\beta}_I$ represents the pooled OLS estimator, $\hat{\beta}_{WFE}$ denotes the weighted and fixed effect pooled estimator, M_τ, is the identity matrix, and $\tilde{\sigma}_I^2$ indicates the estimator of σ_I^2. Pesaran and Yamagata (2008) also introduced a standardized version of this test statistic, expressed as follows:

$$\tilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right). \quad (7)$$

Based on Equation (7), when $\sqrt{N}/T \to \infty$, the null hypothesis ($H_0: \beta_i = \beta$; for all i,) tests the assumption that "slope coefficients are homogeneous when $(N,T) \to \infty$" against the alternative hypothesis ($H_1: \beta_i = \beta_j$; for $i \neq j$), which posits that "slope coefficients are heterogeneous". Additionally, In the meantime, Pesaran and Yamagata (2008) proposed a bias-adjusted test statistic, denoted as $\tilde{\Delta}_{adj}$, to use in smaller samples. The adjusted test statistic is shown in Equation (8) as follows:

$$\tilde{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{it})}{\sqrt{var(\tilde{z}_{it})}}\right). \quad (8)$$

As noted by Kar, Nazlıoğlu, and Ağır (2011), once the cross-section dependence and slope homogeneity tests have been conducted and the required conditions are satisfied, the panel Granger causality relationship between variables should be examined. The Wald test statistics and bootstrap critical values are determined using the SURE method developed by Zellner (1962).

Kónya (2006) presented the following two sets of Equations (9) and (10) based on the SURE method:

$$Y_{N,t} = \alpha_{1,N} + \sum_{j=1}^{ly_N} \beta_{1,N,j} Y_{N,t-j} + \sum_{j=1}^{lx_N} \gamma_{1,N,j} X_{N,t-j} + \varepsilon_{1,N,t} \tag{9}$$

and

$$X_{N,t} = \alpha_{2,N} + \sum_{j=1}^{lx_N} \beta_{2,N,j} Y_{N,t-j} + \sum_{j=1}^{ly_N} \gamma_{2,N,j} X_{N,t-j} + \varepsilon_{2,N,t}. \tag{10}$$

In the context of this study's data, in Equations (9) and (10), Y represents CO_2 emissions, X represents health expenditure, t denotes the period, and N indicates the number of countries. Parameters α, β, and γ denote common factors, and ε signifies the disturbance. The outcome of this test will yield four possible causal relationships:

- A unidirectional Granger causality relationship from CO_2 to HE ($\gamma_{1,i} = 0$ and $\beta_{2,i} \neq 0$ for each i),
- A unidirectional Granger causality relationship from HE to CO_2 ($\gamma_{1,i} \neq 0$ and $\beta_{2,i} = 0$ for each i),
- A bidirectional Granger causality relationship between CO_2 and HE (if $\gamma_{1,i} \neq 0$ and $\beta_{2,i} \neq 0$ for each i),
- No Granger causality relationship between CO_2 and HE (if $\gamma_{1,i} = 0$ and $\beta_{2,i} = 0$ for each i).

Empirical findings

The diagnostic tests begin with an examination of cross-sectional dependence. Since T > N in this study, it is necessary to focus on the results of CD_{LM1}, CD_{LM2}, and CD_{LMadj} test statistics when assessing the results of cross-sectional dependence. Tables 2 and 3 show the results of these test statistics.

Table 2. Cross-sectional dependence test results (based on model)

		CD_{LM1}	CD_{LM2}	CD	CD_{LMadj}
Model	Statistics	198.475***	13.680***	1.007	1.155
	Probability	0.000	0.000	0.157	0.876

Note: *** denotes significance at the 0.01 level.

Source: own work.

As shown in Table 2, the null hypothesis, which states there is no cross-sectional dependence for the forecast panel model, was rejected based on the results of the CD_{LM1} and CD_{LM2} test

statistics. This finding indicates the presence of cross-sectional dependence within the established panel model and suggests its suitability for the bootstrap panel Granger causality test method.

Table 3. Cross-sectional dependence test results (based on variables)

		CD_{LM1}	CD_{LM2}	CD	CD_{LMadj}
CO_2	Statistics	91.072***	3.439***	−2.122**	1.595*
	Probability	0.002	0.000	0.017	0.055
HE	Statistics	74.414**	1.851**	−1.483*	3.131***
	Probability	0.042	0.032	0.069	0.001

Note: ***, **, and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively.

Source: own work.

The findings presented in Table 3 are significant as they reject the null hypothesis of no cross-sectional dependence for CO_2 and health expenditure (HE) at the series level. The consistent results of the CD_{LM1}, CD_{LM2}, and CD_{LMadj} test statistics affirm the suitability of the series for the test method and provide insights into the presence of cross-sectional dependence within the series. These results are crucial as they indicate that shocks in CO_2 and HE in the CEE countries also affect other countries. Table 4 presents the results of the slope homogeneity tests alongside the cross-sectional dependence tests.

Table 4. Slope homogeneity test results

		$\tilde{\Delta}$	$\tilde{\Delta}_{adj}$
Model	Statistics	2.141**	2.304**
	Probability	0.016	0.011

Note: ** denotes significance at the 0.05 level.

Source: own work.

The results of the slope homogeneity test indicate that the panel causality relationship between CO_2 and health expenditure (HE) may vary across countries. This is because the null hypothesis, which assumes homogeneity of slope coefficients, was rejected at the 5% significance level for the panel model. These results, along with the findings from the cross-sectional dependence test, which are prerequisites for Kónya's (2006) bootstrap panel Granger causality test, align as expected. With these conditions met, the bootstrap panel Granger causality relationship between CO_2 and HE was examined, and the findings are presented in Tables 5 and 6.

According to these tables, the null hypothesis suggesting no causality relationship from CO_2 to health expenditure (HE) is rejected, revealing a unidirectional causality from CO_2 to HE in Estonia, Hungary, and Latvia. This finding suggests that reductions in CO_2 emissions could positively impact health expenditures in these three countries, as changes in CO_2 emissions appear to influence health expenditures. Conversely, the null hypothesis indicating no causality relationship from HE to CO_2 is rejected, showing a unidirectional causality from HE to CO_2 in Czechia.

Table 5. Bootstrap panel Granger causality test results (H_0 : $CO_2 \nrightarrow HE$)

Countries	Wald statistics [EC]	Bootstrap critical values		
		1%	5%	10%
Bulgaria	8.850	41.786	24.296	17.592
Croatia	**4.454*** **[0.090]**	**15.092**	**6.097**	**4.119**
Czechia	10.374	49.485	28.050	20.800
Estonia	**7.288*** **[0.079]**	**17.558**	**8.667**	**6.528**
Hungary	**9.340**** **[0.049]**	**20.624**	**9.020**	**5.933**
Latvia	**24.931***** **[0.006]**	**15.619**	**9.171**	**6.603**
Lithuania	42.881	229.895	147.611	122.518
Poland	3.671	19.709	10.875	7.879
Romania	**6.672*** **[0.093]**	**19.587**	**9.399**	**6.314**
Slovakia	**4.537*** **[0.080]**	**9.953**	**5.537**	**3.793**
Slovenia	84.925	152.271	109.511	91.615

Note: ***, **, and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively. Statistically significant estimates are bolded. [EC] = Estimated coefficients. Critical values obtained from 10,000 replications.

Source: own work.

Table 6. Bootstrap panel Granger causality test results (H_0 : $HE \nrightarrow CO_2$)

Countries	Wald statistics [EC]	Bootstrap critical values		
		1%	5%	10%
Bulgaria	11.598	53.555	29.935	20.923
Croatia	**20.953*** **[0.058]**	**42.982**	**22.285**	**16.206**
Czechia	**16.466**** **[0.046]**	**29.915**	**16.091**	**10.783**
Estonia	17.384	49.569	32.453	23.628
Hungary	8.388	38.913	21.646	15.774
Latvia	9.963	40.242	19.910	13.312
Lithuania	34.243	173.633	131.000	110.622
Poland	6.571	40.196	18.101	12.478
Romania	**32.722**** **[0.031]**	**46.040**	**27.212**	**18.944**

Countries	Wald statistics [EC]	Bootstrap critical values		
		1%	5%	10%
Slovakia	**24.898** [0.046]**	**39.401**	**22.844**	**15.407**
Slovenia	24.623	202.096	129.856	100.848

Note: ***, **, and * denote significance at the 0.01, 0.05 and 0.10 levels, respectively. Statistically significant estimates are in bold. [EC] = Estimated coefficients. Critical values obtained from 10,000 replications.

Source: own work.

Unlike the other countries, the relationship direction between CO_2 and HE in Czechia is reversed, indicating that health expenditures have a decisive effect on CO_2 emissions in this country. Furthermore, a bidirectional causality relationship between CO_2 and HE has been identified in Croatia, Romania, and Slovakia, where CO_2 emissions and health expenditures mutually influence each other, with both variables acting as cause and effect. These empirical findings are summarized in Figure 3.

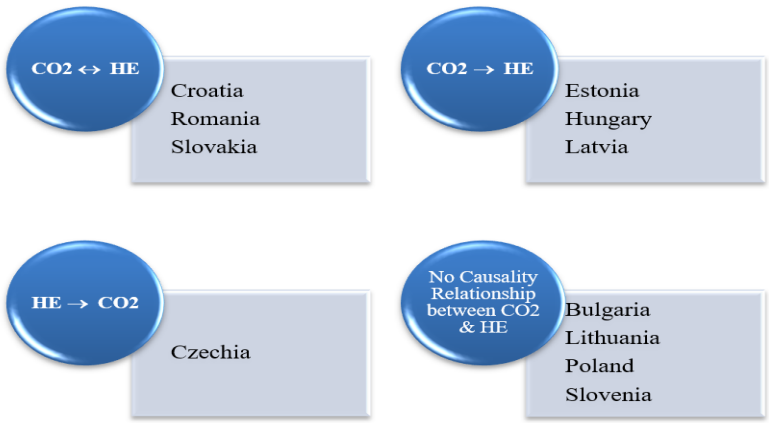

Figure 3. Causality between variables

Source: own work.

Based on these findings, the role and significance of health expenditures should be carefully considered when governments formulate policies aimed at reducing emissions. In contrast, no causal relationship was observed between CO_2 emissions and health expenditures in Bulgaria, Lithuania, Poland, or Slovenia. The unique situation in these four countries, which differ from those of the others, warrants detailed discussion in future research.

Conclusions

The rise in health expenditures and improvements in life expectancy have prompted countries to increase their healthcare budgets. This trend has been particularly pronounced in many countries following the COVID-19 pandemic, including those in Central and Eastern Europe. According to Jakovljevic, Vukovic, and Fontanesi (2015), South and Eastern European economies have shown strong performance in terms of life expectancy and health outcomes. Despite occasional setbacks in health outcomes, these countries have maintained a long-term growth trajectory in health expenditures. CEE

countries have also been active in implementing various strategies to enhance healthcare spending, similar to other developing and emerging economies. For instance, Nica et al. (2023) reported that Poland has increased the budget allocated to the National Health Fund and introduced tax incentives for healthcare professionals to bolster health expenditures. In Romania, efforts have focused on improving healthcare efficiency through the introduction of a new payment system for healthcare providers. Meanwhile, Bulgaria has expanded its healthcare network by increasing the number of doctors and constructing new hospitals in remote areas. It would also be advantageous to align these advancements in health expenditures with efforts to address climate change and the rise in greenhouse gas emissions.

This paper analyzed the relationship between CO_2 emissions and current health expenditures in 11 CEE countries from 2000 to 2020 using Kónya's (2006) bootstrap panel Granger causality test method. The study yielded varied but important results. Consistent with the findings, Croatia, Romania, and Slovakia exhibited a bidirectional causal relationship between CO_2 emissions and health expenditures, while Estonia, Hungary, and Latvia showed a unidirectional effect of CO_2 emissions on health expenditures. In Czechia, the direction was reversed, with health expenditures influencing CO_2 emissions. The findings suggest that environmental degradation, specifically through carbon dioxide emissions, significantly impacts health expenditures in half of the countries studied. Therefore, a key policy recommendation is to prioritize measures to reduce CO_2 emissions in these economies. Conversely, Bulgaria, Lithuania, Poland, and Slovenia showed insignificant relationships between CO_2 emissions and health expenditures. Further research is recommended to explore the underlying reasons for these findings in greater depth.

Beyond the specific results, the study underscores the importance of reevaluating health and environmental policies in CEE countries. The analysis presented in this study is very important both in terms of showing the current situation of the 11 CEE countries in terms of CO_2 emissions and health expenditures and in terms of understanding how the variables influence each other (which varies by country). The findings are valuable and may stimulate further academic discussion. The economic costs of environmental degradation on public health, overall health outcomes, national well-being, and economic growth warrant heightened attention from policymakers. Thus, there is a pressing need for policies aimed at environmental protection and the reduction of greenhouse gas emissions.

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Związek między emisją CO_2 a wydatkami na zdrowie – analiza krajów Europy Środkowo-Wschodniej

Emisje gazów cieplarnianych (głównie dwutlenku węgla – CO_2) wpływają na zmiany klimatyczne, co oddziałuje na zdrowie publiczne. Celem artykułu jest zbadanie powiązań między emisją CO_2 a wydatkami na zdrowie w 11 krajach Europy Środkowo-Wschodniej (CEE) z wykorzystaniem wariantu testu przyczynowości Grangera, opracowanego przez Kónya. Próba czasowa obejmuje dane roczne od 2000 do 2020 roku. Badania empiryczne dostarczają zróżnicowanych wyników. Dwukierunkową zależność stwierdzono w przypadku Chorwacji, Rumunii i Słowacji, podczas gdy na przykład w Bułgarii, na Litwie, w Polsce i Słowenii powiązanie było nieistotne. Zalecenia polityczne obejmują podjęcie wysiłków w zakresie kontroli zanieczyszczeń, w szczególności emisji CO_2 w Chorwacji, Rumunii, Słowacji, jak również w Estonii, na Węgrzech i Łotwie, a więc w krajach, gdzie oszacowano przynajmniej jednokierunkowy wpływ emisji CO_2 na wydatki na zdrowie.

Słowa kluczowe: przyczynowość, emisja CO_2, wydatki na zdrowie, kraje Europy Środkowo-Wschodniej, jakość życia

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The Impact of Foreign Aid on Foreign Direct Investment in Emerging Markets

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Abstract

This study explores the influence of foreign aid on foreign direct investment (FDI) in emerging markets using panel data analysis methods (fixed effects, fully modified ordinary least squares (FMOLS), and ordinary least squares (OLS)) with data from 2004 to 2019. It also examines whether financial development is a channel through which FDI is influenced by foreign aid in emerging markets using the same econometric estimation methods. Fixed effects and FMOLS indicate that foreign aid significantly improves FDI. However, contrary to the available literature, FMOLS and pooled OLS indicate that financial development significantly reduces FDI. The interaction between foreign aid and financial development did not show a significant impact on FDI across all three panel methods. Pooled OLS analysis shows that human capital development significantly enhances FDI. Furthermore, all the panel methods indicate that employment and infrastructure development positively influence FDI. Emerging markets also need to implement employment, human capital, and infrastructure development-enhancing policies and strategies to attract more and significant FDI inflows. They also need to implement policies that encourage the inflow of foreign aid to boost FDI. Future research should focus on estimating the optimal level of foreign aid needed to attract significant FDI into emerging markets.

Keywords: foreign direct investment, foreign aid, emerging markets, panel data

JEL: C23, F21, F35, P2

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Introduction

Despite conclusive evidence regarding foreign aid-led growth, the influence of foreign aid on foreign direct investment (FDI) remains a contentious subject in finance and economics. Kimura and Todo (2010) noted that foreign aid attracts FDI through its ability to improve the investment climate of the host country. By contrast, Arellano et al. (2009) argued that foreign aid crowds out FDI by increasing the supply of tradable goods while reducing the price of non-tradable goods. Hence, the influence of foreign aid on FDI is mixed, inconclusive and far from exhaustive.

Empirical research on the foreign aid-led FDI discourse has yielded diverse results, which are grouped into five broad categories: (1) Foreign aid positively influences FDI. (2) Foreign aid negatively influences FDI. (3) Foreign aid and FDI affect each other. (4) Foreign aid indirectly influences FDI through various channels. (5) The relationship between foreign aid and FDI is insignificant and negligible. Several research questions arise from the literature review: Does foreign aid influence FDI? Is the influence direct or indirect? If the influence is indirect, does financial development affect the impact of foreign aid on FDI, especially in emerging markets? These questions are addressed in this paper. These mixed, divergent and inconclusive in the existing empirical literature highlight the need for continued research in this area.

Previous empirical studies are also characterized by methodological weaknesses. Many studies do not address endogeneity in the FDI function (e.g., Beladi and Oladi 2006; Annageldy 2011; Dastidar 2013; Garriga and Phillips 2014; Pham 2015; Dash, Gupta, and Khandelwal 2024). Additionally, the possibility that the relationship between foreign aid and FDI operates through indirect channels was overlooked (e.g., Karakaplan, Neyapti, and Sayek 2005; Beladi and Oladi 2006; Kapfer, Nielsen, and Nielson 2007; Selaya and Sunesen 2008; Asiedu, Jin, and Nandwa 2009; Annageldy 2011; Garriga and Phillips 2014; Quazi et al. 2014; Pham 2015; Amusa, Monkam, and Viegi 2016; Ulrika 2016; Michael 2018). A significant portion of the data used is often outdated (e.g., Karakaplan, Neyapti, and Sayek 2005; Beladi and Oladi 2006; Kapfer, Nielsen, and Nielson 2007; Selaya and Sunesen 2008; Asiedu, Jin, and Nandwa 2009; Annageldy 2011; Garriga and Phillips 2014; Quazi et al. 2014; Pham 2015; Amusa, Monkam, and Viegi 2016; Ulrika 2016; Michael 2018). Finally, the dynamic characteristics of the dependent data were frequently ignored (e.g., Beladi and Oladi 2006; Annageldy 2011; Dastidar 2013; Garriga and Phillips 2014; Pham 2015; Dash, Gupta, and Khandelwal 2024). This study seeks to fill these gaps.

This is the first study to exclusively focus on the effect of foreign aid on FDI in emerging markets, a region often overlooked in previous research. Unlike prior research with outdated, this analysis uses the most recent available data. This study is unique because it uses panel data, whilst the majority of previous research employed time series data. Finally, this study investigates the channels through which foreign aid influences FDI, in contrast to existing studies.

The remainder of this paper is organized as follows: Section 2 provides a review of the relevant literature. Section 3 details the research methodology and discusses the results. Section 4 presents the conclusion of the study.

Literature review

The influence of foreign aid on FDI can be understood through three theoretical rationales. First, foreign aid attracts foreign direct investors by enhancing the investment climate in the host country (Kimura and Todo 2010). By reducing the perceived investment risk associated with the recipient country, foreign aid makes it more appealing to companies from donor countries (Kimura and Todo 2010). Additionally, foreign aid often introduces business practices, norms, rules, and institutions that facilitate the transmission of information regarding the recipient country's business environment to companies based in the donor country (Kimura and Todo 2010, p. 482). Second, Arellano et al. (2009) argued that foreign aid pushes up the supply of tradable products and decreases the price of non-tradable products, crowding out FDI.

Third, there are specific channels through which foreign aid influences FDI (Kimura and Todo 2010). One such channel is the positive infrastructure effect, where improvements in social and economic developmental infrastructure in the host country enhance the positive influence of foreign aid on FDI. A positive financing effect is when the financial sector of the foreign aid-receiving country easily allows profit repatriation by the foreign direct investors (Arellano et al. 2009). Conversely, a rent-seeking effect can occur when foreign aid in the host country negatively influences FDI and economic growth by promoting unproductive rent-seeking behaviour (Harms and Lutz 2006). Lastly, a Dutch disease effect may occur when foreign aid distorts the allocation of resources between non-tradable and tradable economic sectors, thereby hindering FDI (Arellano et al. 2009).

The following table summarizes the empirical literature on the role that foreign aid plays in FDI.

Table 1. Foreign aid led FDI hypothesis (Empirical literature)

Author(s)	Unit of analysis	Methodology	Results
Karakaplan, Neyapti, and Sayek (2005)	Developing nations	Panel data analysis	The foreign aid-led FDI inflows hypothesis was confirmed.
Beladi and Oladi (2006)	Developing countries	Multiple regression analysis	Foreign aid crowded FDI in both the short and long runs.
Kapfer, Nielsen, and Nielson (2007)	Developing nations	Fixed effects	Aggregate foreign aid had no significant influence on FDI in developing countries. However, foreign aid aimed at infrastructure development had a significant causal effect on FDI in developing countries.
Selaya and Sunesen (2008)	Developing nations	Generalized methods of moments	Foreign aid into complementary inputs attracts FDI, whilst foreign aid into physical capital had a crowding out effect on FDI.
Asiedu, Jin, and Nandwa (2009)	Sub-Saharan Africa and low-income countries	Generalized methods of moments	Overall, foreign aid had a deleterious influence on FDI.
Kimura and Todo (2010)	Developing nations	Gravity-equation method	An insignificant influence of foreign aid on FDI was observed in developing countries.

Author(s)	Unit of analysis	Methodology	Results
Ndambendia and Njoupouognigni (2010)	Sub-Saharan African countries	Dynamic fixed effects and pooled mean group estimator	In the context of Sub-Saharan African countries, economic growth was significantly enhanced by the complementarity between foreign aid and FDI.
Annageldy (2011)	Central Asia	Seemingly unrelated regressions (SUR)	Regional results observed that (1) FDI was enhanced by foreign aid and (2) FDI and foreign aid complemented each other. Country-level analysis indicates that foreign aid enhanced FDI only in Tajikistan and Kyrgyzstan. The overall conclusion is that countries characterized by low levels of economic growth experience higher levels of foreign aid-induced FDI.
Wang and Balasubramanyam (2011)	Vietnam	Multiple regression analysis	Foreign aid and FDI complemented each other in the economic growth process. In other words, foreign aid enhanced FDI's efficacy in enhancing development and growth in Vietnam. The Vietnam data showed that foreign aid significantly attracted FDI during the period under study.
Dastidar (2013)	Developing nations	Panel data analysis	Foreign aid was observed as an exogenous factor that positively affected FDI in developing countries.
Garriga and Phillips (2014)	Post-conflict countries	Panel data analysis	Foreign aid that is geographically motivated attracted FDI into post-conflict countries.
Quazi et al. (2014)	South Asia and East	Feasible generalized least squares (panel estimation method)	The positive influence of foreign aid on FDI was found to be significantly positive across all countries.
Pham (2015)	Vietnam	Ordinary least squares	In Vietnam, in the short term, the influence of foreign aid on FDI was negligible. However, in the medium-term to long-term, the influence was more pronounced and significant.
Amusa, Monkam, and Viegi (2016)	Sub-Saharan Africa	Panel data estimation	The study noted that foreign aid aimed at boosting productive infrastructure enhanced FDI in sub-Saharan Africa. Foreign aid channeled toward socio-economic infrastructure had a positive but non-significant influence on FDI in Sub-Saharan Africa.
Ulrika (2016)	Middle-income developing countries	Multiple regression analysis	A positive influence of foreign aid on FDI was confirmed in both the short and long runs. This is possible through foreign aid's ability to mitigate market failures that trigger investment shortages in developing markets.
Michael (2018)	Africa	System generalized methods of moments	The positive influence of foreign aid on FDI in Africa was confirmed.

Author(s)	Unit of analysis	Methodology	Results
Quazi et al. (2019)	African countries	Feasible generalized least squares (Panel estimation method)	Foreign aid significantly attracted FDI in Africa. Using disaggregated data, bilateral aid had a negligible impact on FDI, whilst multilateral aid's positive influence on FDI was significant and more pronounced.
Addison and Baliamoune-Lutz (2020)	Latin America, Caribbean nations and Sub-Saharan Africa	Generalized methods of moments	Foreign aid was found to have crowded out FDI in countries with higher levels of human capital development. In most Sub-Saharan countries, the complementarity between foreign aid and social cohesion reduced FDI inflows. Foreign aid had a significant, positive influence on FDI inflows in the Caribbean region but a negative impact in Sub-Saharan Africa and Latin America.
Aluko (2020)	African countries	Panel data analysis	African countries characterized by developed institutional quality and financial sectors experienced significant levels of foreign aid-led FDI inflows.
Younsi, Bechtini, and Khemili (2021)	African countries	Fixed effects and system generalized methods of moments	The study found that foreign aid and FDI significantly complemented each other in promoting economic growth in African countries. The same study observed that domestic investment, foreign aid, and FDI all had a complementarity influence on economic growth.
Ono and Sekiyama (2023)	63 major donor-receiving countries from France, Japan, the United States, Germany and the United Kingdom	Generalized methods of moments	Foreign aid from Germany, the United Kingdom and Japan into major recipient countries promoted FDI when energy, transport, finance, and telecommunications infrastructure is developed.
Slesman (2023)	Cambodia	Autoregressive Distributive Lag (ARDL)	In the long run, donor-specific aid and aggregate development aid from the United Nations Development Programme (UNDP) and Australia attracted FDI into Cambodia. European aid into Cambodia crowded out FDI in the short run. Donor aid from the United States, France, and Japan had an insignificant positive or no influence on FDI in Cambodia.
Dash, Gupta, and Khandelwal (2024)	South Asian countries	Panel data analysis	In the long run, foreign aid reduced domestic investment but promoted both FDI and financial development.
Tian (2024)	Developing countries	Panel data analysis	A decline in foreign aid led to a significant drop in the inflow of FDI. The results imply that foreign aid-led FDI inflow is confirmed in this study.

Author(s)	Unit of analysis	Methodology	Results
Wang and Fillat-Castejon (2024)	African countries	Panel data analysis	The significant positive influence of institutions and foreign aid on FDI was confirmed in African countries. On the other hand, foreign aid that was influenced mainly by political considerations was confirmed to have had a deleterious influence on FDI.

Source: author's elaboration.

The empirical research summarized in Table 1 reveals a wide range of varied, divergent, conflicting, and mixed findings regarding the relationship between foreign aid and FDI. The literature supports several perspectives, including the foreign aid-led positive FDI, foreign aid-led negative FDI, feedback effect, channel perspective, and the neutral view.

Furthermore, the studies presented in Table 1 are characterized by differing methodological weaknesses. Some failed to address endogeneity issues, others relied on outdated datasets, and some research completely disregarded the dynamic nature of the FDI data. Additionally, other studies focused solely on individual countries or economic groupings but not those from emerging markets. These inconsistencies highlight significant gaps in the foreign aid-led FDI literature that need to be addressed, prompting our research on the subject matter.

Based on the literature review, the null and alternative hypotheses are formulated as follows:

- Null Hypothesis 1: Foreign aid significantly enhances FDI in selected emerging markets.
- Alternative Hypothesis 1: Foreign aid does not significantly enhance FDI in selected emerging markets.
- Null Hypothesis 2: Financial development is a channel through which FDI is influenced by foreign aid in selected emerging markets.
- Alternative Hypothesis 2: Financial development is not a channel through which FDI is influenced by foreign aid in selected emerging markets.

Research methodology

Sample data and variables

The study used panel data ranging from 2004 to 2019 to investigate the foreign aid-FDI nexus in selected emerging markets (Brazil, Colombia, Indonesia, Poland, Thailand, Turkey, and Greece). The time was carefully chosen because it is within this timeframe that most emerging markets experienced rapid economic growth and development. These seven emerging markets were selected because of data availability considerations for all the critical variables employed. The variables used for this study include foreign direct investment, foreign aid, financial development, human capital development, income inequality, infrastructure development, unemployment and trade openness. The data for these variables was obtained from publicly viewable databases (World Bank development indicators, the International Monetary Fund and International Financial Statistics), which are also reputable, consistent and reliable.

Empirical models

The general model specification of this study is captured by Equation 1 below, which designates foreign direct investment (FDI) as the dependent variable and foreign aid (FAID) as the independent variable. The model also includes several control variables: financial development (FIN), income inequality (INEQ), unemployment (UNEMP), human capital development (HCD), infrastructure development (INFR) and trade openness (OPEN). The selection of these control variables is informed by various empirical studies, including but not limited to Beladi and Oladi (2006), Selaya and Sunesen (2008), Quazi et al. (2014), Amusa, Monkam, and Viegi (2016), Ulrika (2016), Quazi et al. (2019), Addison and Baliamoune-Lutz (2020), Younsi, Bechtini, and Khemili (2021), Slesman (2023), and Tian (2024).

$$FDI = f(FAID, FIN, HCD, INEQ, INFR, UNEMP, OPEN). \quad (1)$$

Table 2. Theory discussion of control variables

Variable	Rationale	Expected sign
Financial development	According to Ezeoha and Cattaneo (2012), the productivity of foreign capital is enhanced by the development of financial markets. Domestic and foreign financial markets alleviate entry and exit constraints for foreign investors, thereby promoting FDI in both the short and long run (Kaur, Yadav, and Gautam 2013).	+
Human capital development	High levels of human capital development indicate a highly skilled, healthy, and educated workforce, which attracts direct foreign investors as a locally available potential workforce can easily and quickly adapt to new technology (Craigwell 2012). Dunning (1980) argues that developed human capital reduces labor costs, making host countries more attractive to foreign firms.	+
Income inequality	Consistent with Brozen (1958), high levels of unemployment, income inequality and poverty may signal high levels of macroeconomic instability in the host country, thereby dissuading potential foreign direct investors.	-
Infrastructure development	Richaud, Sekkat, and Varoudakis (1999) noted that increased infrastructure development not only attracts FDI but allows countries to enjoy the benefits of FDI inflows, often referred to as spillover effects. Estache and Fay (2010) argued that developed infrastructure reduces investment costs, lowers sunk costs, and enhances private capital durability.	+
Unemployment	Blanchard (2011) argued that higher levels of unemployment can attract foreign direct investors due to lower labour costs and a readily available workforce. Conversely, Brozen (1958) argued that high unemployment may signal macroeconomic instability, which could deter potential foreign direct investors.	+/-
Trade openness	Denisia (2010) argued that a government policy of trade openness is a locational advantage for FDI. In addition, Denisia (2010:108) suggests that the eclectic paradigm hypothesis identifies trade openness as an economic locational advantage of FDI. However, high levels of trade openness may reduce the need for international firms to establish operations in foreign countries as they can easily access these international markets more cheaply through exporting. Thus, trade openness may have mixed effects on FDI.	+/-

Source: author's elaboration.

The proxy for foreign aid in this study is net official development assistance and official aid received as a percentage of GDP. Income inequality is represented by the GINI coefficient, whilst

FDI is measured by net FDI inflows as a ratio of GDP. The Human Capital Development Index is the proxy for human capital development. Financial development is measured by domestic credit to the private sector as a ratio of GDP, and trade openness is represented by the total of exports and imports as a ratio of GDP. Infrastructural development is proxied by the percentage of individuals using the Internet, whilst unemployment was measured as the total unemployment rate as a percentage of the total labour force. The selection of these proxies is consistent with prior empirical research (Garriga and Phillips 2014; Michael 2018; Dash, Gupta, and Khandelwal 2024; Wang and Fillat-Castejon 2024) on a similar subject matter.

The econometric representation of the FDI function is summarized in Equation 2.

$$\begin{aligned} \text{FDIit} = \beta_0 + \beta_1 \text{AIDit} + \beta_2 \text{FINit} + \beta_3 \left(\text{FAIDit} \cdot \text{FINit}\right) + \beta_4 \text{HCDit} + \\ + \beta_5 \text{INEQit} + \beta_6 \text{INFRit} + \beta_7 \text{UNEMPit} + \beta_8 \text{OPENit} + \mu + \varepsilon. \end{aligned} \tag{2}$$

Consistent with the findings of Harms and Lutz (2006), Arellano et al. (2009), and Kimura and Todo (2010), who argued that foreign aid influences FDI through various channels available in the host country, Equation 2 included the complementarity variable (FAID x FIN). The latter was included in Equation 2 to investigate if financial development, as argued by Arellano et al. (2009), is a channel through which foreign aid influences FDI in emerging markets.

To estimate Equation 2, three panel data analysis methods were employed: Fully Modified Ordinary Least Squares (FMOLS), fixed effects and pooled ordinary least squares (OLS). These panel estimation approaches are suitable because they (1) control for individual country-specific effects, (2) are ideal for analysing panel data, and (3) facilitate the isolation of the impact of time-varying variables.

Discussion of the results

As shown in Figure 1, net FDI inflows for Brazil decreased from 2.71% of GDP in 2004 to 1.89% in 2009. They then rose to 3.57% in 2014 and further increased to 3.68% in 2019. Colombia's net FDI inflow increased from 2.66% of GDP in 2004 to 3.46% in 2009. They rose further to 4.24% in 2014 and slightly increased again to 4.32% in 2019.

Greece's net FDI inflows declined from 0.89% of GDP in 2004 to 0.83% in 2009 and increased to 1.15% in 2014. They rose further to reach a peak of 2.44% in 2019. Indonesia's net FDI inflows grew from 0.74% of GDP in 2004 to 0.90% in 2009 and then rose significantly to 2.82% in 2014. They then declined to 2.23% in 2019. Poland's net FDI inflows fell from 5.44% of GDP in 2004 to 3.19% in 2009. They increased slightly to 3.65% in 2014, and then declined again to 2.82% in 2019. Thailand's net FDI inflows dropped from 3.39% of GDP in 2004 to 2.28% in 2009, decreased further to 1.22% in 2014, and continued their decline to reach 0.88% in 2019.

As illustrated in Figure 2 below, foreign aid for Brazil decreased from 0.027% of GDP in 2004 to 0.022% in 2009. It then experienced a slight increase to 0.037% in 2014, before declining again to 0.015% in 2019. Colombia's foreign aid remained stable at 0.022% of GDP from 2004 to 2009, followed by a marginal drop to 0.020% in 2014, and then increased to 0.024% in 2019. Foreign aid for Greece rose from 0.006% of GDP in 2004 to 0.014% in 2009, further increasing to 0.017% in 2014, before experiencing a decline to 0.007% by 2019.

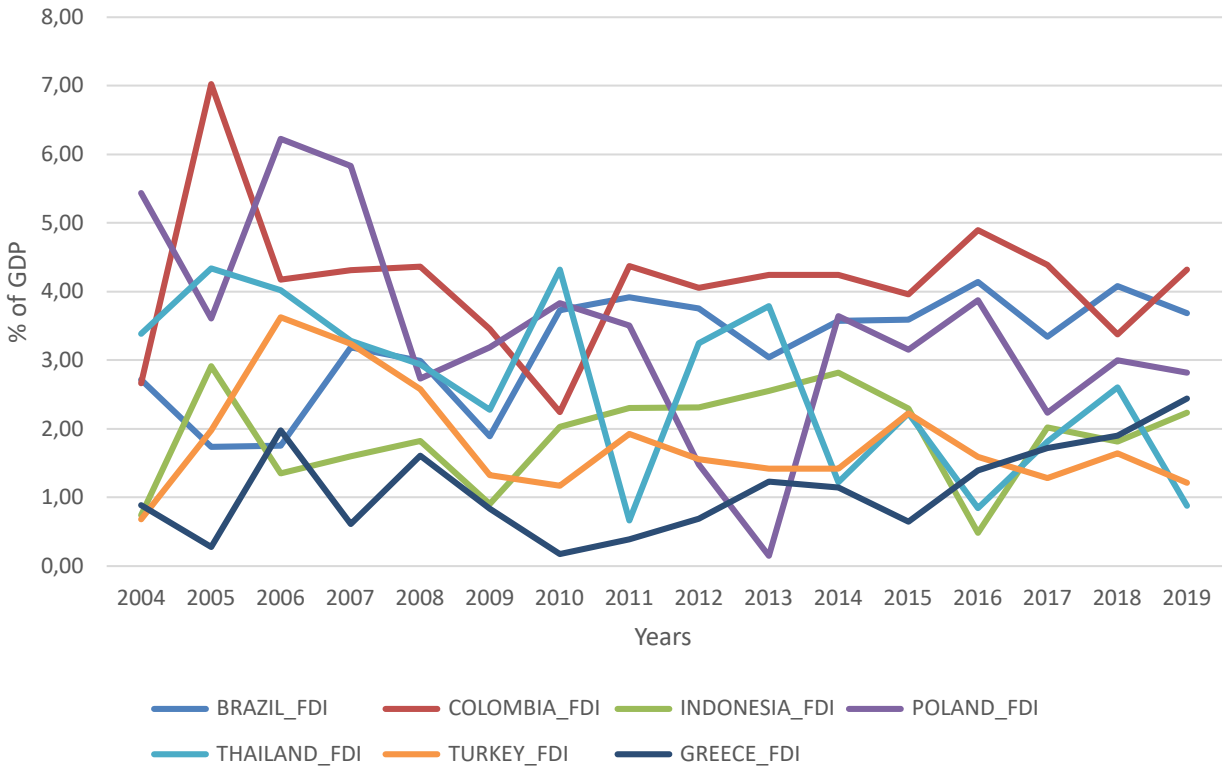

Figure 1. Net foreign direct investment trends for selected emerging markets

Source: author's own analysis based on data from World Development Indicators

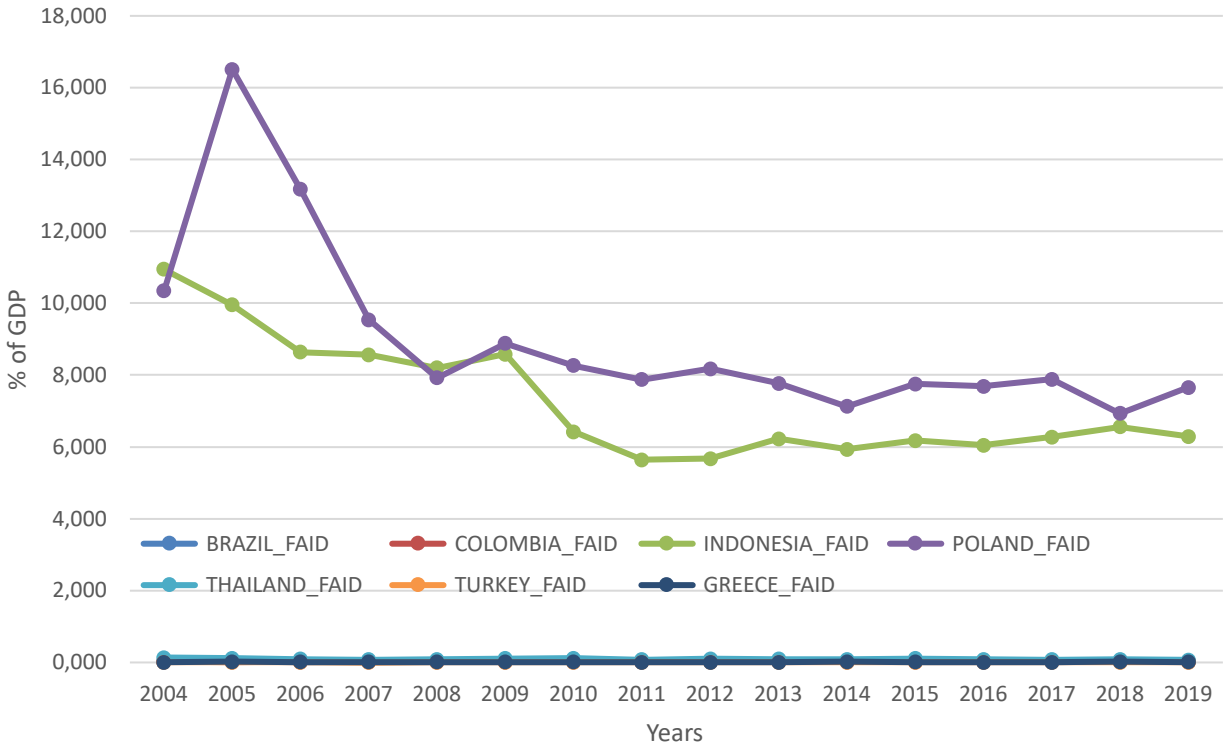

Figure 2. Foreign aid trends in selected emerging markets

Source: author's own analysis based on data from World Development Indicators

Foreign aid for Indonesia declined from 10.947% of GDP in 2004 to 8.58% in 2009. It further decreased to 5.93% in 2014 before experiencing a slight recovery, rising to 6.29% in 2019. Poland's foreign aid fell from 10.34% of GDP in 2004 to 8.88% in 2009, continued to decline to 7.13% in 2014, and then increased slightly to reach 7.65% by 2019. Thailand's foreign aid decreased from 0.132% of GDP in 2004 to 0.106% in 2009, followed by a further decline to 0.088% in 2014, and ultimately dropped to 0.067% by 2019. Turkey's foreign aid inflow remained constant at 0.002% of GDP between 2004 and 2009, increased slightly to reach 0.003% in 2014, and maintained that level through the subsequent five-year period until 2019.

As Table 3 below shows, there is a non-significant positive relationship between FDI and foreign aid, whilst financial development is significantly related to FDI. Additionally, a non-significant negative relationship was observed between: (1) human capital development and FDI, (2) unemployment and FDI, and (3) trade openness and FDI. Infrastructure development is positively related to FDI, but this relationship is non-significant. Lastly, a significant negative relationship exists between FDI and income inequality. There are no issues with multi-collinearity, in line with Stead (2007), as no correlation values exceed 0.70.

Table 3. Correlation study

	FDI	FAID	FIN	HCD	INEQ	INFR	UNEMP	OPEN
FDI	1.00							
FAID	0.09	1.00						
FIN	0.29***	−0.42***	1.00					
HCD	−0.06	0.18*	0.16	1.00				
INEQ	−0.44***	−0.50***	−0.30***	−0.43***	1.00			
INFR	0.02	−0.08	0.24**	0.55***	−0.10	1.00		
UNEMP	−0.11	−0.07	−0.11	0.43***	0.01	0.35***	1.00	
OPEN	−0.05	0.13	0.66***	0.19**	−0.58***	0.03	−0.40***	1.00

Note: *, ** and *** denote 10%, 5% and 1% levels of significance, respectively.

Source: author

According to Table 4, there are outliers present in the dataset. For example, the data for financial development and trade openness are characterized by a range exceeding 100. Additionally, the infrastructure development dataset is the only one which is negatively skewed, indicating that the data are not normally distributed. Except for the FDI data, the Jarque-Bera test results for all other variables have a probability of zero, further confirming that the data are not normally distributed. To address econometric problems such as outliers, multi-collinearity, and abnormal distribution, the study adopted Aye and Edoja's (2017) strategy of natural logarithm transformation of all data sets before conducting panel stationarity tests.

Table 4. Descriptive study

	FDI	FAID	FIN	HCD	INEQ	INFR	UNEMP	OPEN
Mean	2.60	2.34	63.37	0.78	41.52	41.49	8.85	63.09
Median	2.49	0.03	51.47	0.76	39.35	41.53	8.73	51.87
Maximum	7.03	16.51	149.37	0.94	56.50	80.44	27.47	140.44
Minimum	0.15	0.002	22.20	0.64	29.70	2.60	0.25	22.11
Standard. deviation	1.39	3.86	35.33	0.08	8.08	21.02	5.64	33.28
Skewness	0.42	1.36	1.01	0.30	0.60	– 0.06	1.03	0.95
Kurtosis	2.93	3.74	2.86	2.08	1.87	1.86	4.77	2.78
Jarque-Bera	3.32	36.94	18.99	5.56	12.74	6.18	34.61	16.95
Probability	0.19	0.00	0.00	0.06	0.00	0.05	0.00	0.00
Observations	112	112	112	112	112	112	112	112

Source: author

The hypothesis that the dataset is integrated of order 1 is supported by the results in Table 5, facilitating panel co-integration.

Table 5. Panel stationarity tests (Individual intercept)

Level stage	Levin, Lin, and Chu (2002)	Im, Pesaran, and Shin (2003)	ADF (Augmented Dick Fuller)	PP (Phillip Perron)
LFDI	– 2.9852***	– 2.3160**	26.3181**	52.5660***
LFAID	– 6.0487***	– 3.5669***	38.8603***	32.5113***
LFIN	– 4.2295***	– 1.4617*	22.0507*	21.3922*
LHCD	– 2.7008***	– 1.9740**	23.7276**	42.2435***
LINEQ	– 1.9419**	– 0.3406	13.0924	13.1353
LINFR	– 7.1360***	– 3.3920***	46.2103***	101.8460***
LUNEMP	– 1.7288**	– 0.1957	12.4244	9.2482
LOPEN	– 1.3098*	0.2852	12.2551	14.8320
First difference stage				
LFDI	– 7.8499***	– 7.3190***	72.2204***	161.349***
LFAID	– 7.1797***	– 7.3805***	71.8231***	109.493***
LFIN	– 7.2172***	– 4.1937***	126.2173***	107.2638***
LHCD	– 12.4664***	– 10.6153***	102.295***	162.187***
LINEQ	– 2.0799**	– 2.6980***	30.4301***	61.0979***
LINFR	– 4.9298***	– 3.4005***	36.7302***	52.6493***
LUNEMP	– 2.8804***	– 2.1466**	25.985**	39.6495***
LOPEN	– 7.5527***	– 5.7434***	57.7916***	120.276***

Note: *, ** and *** denote 10%, 5% and 1% levels of significance, respectively.

Source: author

The alternative hypothesis that there is no long-run relationship in the FDI model was rejected (see Table 6).

Table 6 is the Kao's (1999) approach to panel co-integration.

Table 6. Panel co-integration tests

Series	ADF t-statistic
FDI FAID FIN HCD INEQ INFR UNEMP OPEN	–1.3797**

Note: ** denotes a 5% significance level

Source: author

The relationship between foreign aid and FDI yielded mixed results. Both fixed effects and FMOLS estimations indicate that foreign aid significantly contributed to FDI inflows. However, the pooled OLS results showed an insignificant effect. These results generally support the Kimura and Todo (2010)'s argument that foreign aid enhances the investment climate of the host country, thereby attracting FDI.

Conversely, the pooled OLS and FMOLS models indicate that financial development significantly reduced FDI. These results contradict Kaur, Yadav, and Gautam (2013) hypothesis that domestic and foreign financial markets ease entry and exit constraints for foreign investors, thereby promoting FDI. Meanwhile, the fixed effects model revealed a non-significant negative effect of foreign aid on FDI.

The negative impact of the complementarity variable (FAID x FIN) on FDI was insignificant across all three econometric methods. This suggests that the negative influence of financial development on FDI was more pronounced than the positive influence of foreign aid on FDI. This is in line with Arellano et al. (2009), who attribute such outcomes to the Dutch disease effect, i.e., when foreign aid negatively affects FDI by distorting the allocation of resources between non-tradable and tradable economic sectors.

Human capital development yielded mixed results. FMOLS found an insignificant positive effect on FDI, whilst pooled OLS indicates a significant positive effect. This supports Craigwell's (2012) assertion that developed highly skilled, healthy, and educated workforces attract direct foreign investors because they can easily and quickly adapt to new technology. Conversely, fixed effects show that FDI was significantly reduced, potentially indicating that foreign investors do not like to engage in markets with higher salaries associated with developed human capital.

Income inequality significantly improved FDI across all three econometric approaches, supporting the hypothesis that workforces in a country associated with high income inequality and unemployment readily accept lower salaries, thereby attracting foreign investors. This contradicts Brozen's (1958) argument that income inequality and unemployment signal macroeconomic instability, deterring foreign investors.

Infrastructure development had a significant positive influence on FDI under the pooled OLS and the FMOLS models, aligning with Estache and Fay (2010), who argue that infrastructure

reduces investment costs, lowers sunk costs, and enhances private capital durability. By contrast, fixed effects indicate that it non-significantly attracted FDI in emerging markets.

Unemployment had a significant negative impact on FDI across all three models, reinforcing Brozen's (1958) view that unemployment reflects economic instability. Trade openness showed an insignificant positive influence in all three panel approaches, confirming Denisia's (2010) hypothesis that the location advantage of direct foreign investment includes trade openness.

Table 7. Impact of foreign aid on income inequality – Main data analysis

	FMOLS		Fixed effects		Pooled OLS	
	Co-efficicent	t-statistic	Co-efficicent	t-statistic	Co-efficicent	t-statistic
FAID	0.37*	1.8100	0.65*	1.8267	0.47	1.6206
FIN	–0.14***	–3.3014	–0.71	–1.3012	–0.84***	–4.0215
FAIDFIN	–0.15	–1.5555	–0.12	–1.3895	–0.13	–1.6441
HCD	0.41	1.6204	–0.28*	–1.8073	0.62**	2.0118
INEQ	0.39***	3.3275	0.61*	1.8673	0.47***	4.8346
INFR	0.14**	2.5621	0.36	0.8196	0.41***	3.3858
UNEMP	–0.03***	–3.6004	–0.35*	–1.9669	–0.53***	–4.9722
OPEN	0.05	1.2284	0.54	1.6321	0.22	1.2888
Adjusted R-squared 0.5503 F-statistic 117.09 Prob (F/-statistic) 0.0000			Adjusted R-squared 0.5382 F-statistic 27.19 Prob (F-statistic) 0.0000		Adjusted R-squared 0.5716	

Note: *, ** and *** denote 10%, 5% and 1% levels of significance, respectively.

Source: E-Views

Conclusion

This study explored the influence of foreign aid on FDI in emerging markets using panel data analysis methods. It also investigated whether financial development is a channel through which foreign aid influences FDI.

The analysis reveals that foreign aid significantly enhances FDI under the fixed effects and FMOLS estimations. However, contrary to the available literature, financial development significantly reduces FDI according to FMOLS and pooled OLS results. The complementarity variable showed no significant effect on FDI in emerging markets across all three panel methods. Human capital development significantly enhanced FDI, according to the pooled OLS. Furthermore, employment and infrastructure development were also found to increase FDI across all the panel methods.

These findings offer valuable insights for emerging markets, enabling them to implement policies that will encourage the inflow of foreign aid to attract significant FDI inflows. Additionally, the results underscore the importance of implementing strategies that foster employment,

human capital, and infrastructure development to further attract significant FDI inflow into their economies.

Future research should focus on determining the threshold level of foreign aid necessary to attract significant FDI inflows in emerging markets.

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Wpływ pomocy zagranicznej na bezpośrednie inwestycje zagraniczne na rynkach wschodzących

W artykule zaprezentowano wynik badania wpływu pomocy zagranicznej na bezpośrednie inwestycje zagraniczne (BIZ) na rynkach wschodzących przy użyciu metod analizy danych panelowych – metody efektów stałych, w pełni zmodyfikowanej metody najmniejszych kwadratów (FMOLS) i zwykłej metody najmniejszych kwadratów (OLS) – na podstawie danych z lat 2004–2019. Zbadano również, przy użyciu tych samych metod szacowania ekonometrycznego, czy rozwój finansowy jest kanałem, za pośrednictwem którego pomoc zagraniczna na rynkach wschodzących wpływa na BIZ. Metoda efektów stałych i FMOLS wskazują, że pomoc zagraniczna ma znaczący pozytywny wpływ na BIZ. Jednak inaczej niż wynikałoby z dostępnej literatury, FMOLS i pooled OLS wskazują, że rozwój finansowy znacznie ogranicza BIZ. Interakcja między pomocą zagraniczną a rozwojem finansowym nie wykazała znaczącego wpływu na BIZ we wszystkich trzech metodach panelowych. Analiza pooled OLS pokazuje, że rozwój kapitału ludzkiego znacznie zwiększa BIZ. Co więcej, wszystkie metody panelowe wskazują, iż zatrudnienie i rozwój infrastruktury pozytywnie wpływają na BIZ. Rynki wschodzące muszą również wdrażać polityki i strategie sprzyjające zatrudnieniu, kapitałowi ludzkiemu i rozwojowi infrastruktury, aby spowodować większy i znaczący napływ bezpośrednich inwestycji zagranicznych. Muszą również wdrożyć politykę, która będzie zachęcać do napływu pomocy zagranicznej w celu zwiększenia bezpośrednich inwestycji zagranicznych. Przyszłe badania powinny koncentrować się na oszacowaniu optymalnego poziomu pomocy zagranicznej niezbędnej do przyciągnięcia znacznych BIZ na rynki wschodzące.

Słowa kluczowe: bezpośrednie inwestycje zagraniczne, pomoc zagraniczna, rynki wschodzące, dane panelowe

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The Impact of Banking Sector Performance on Economic Growth: A Case Study of Selected Countries of Central and Eastern Europe

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Abstract

This study explores the complex relationship between banking sector performance and economic growth in Central and Eastern European (CEE) countries. Given the banking sector's prominent role within the CEE financial system, our research examines its potential as a driver of economic growth using a fixed-effects panel regression model, focusing on four key variables: non-performing loans, total capital ratio, return on assets, and the ratio of bank assets to GDP. Granger causality tests further assess the directional nature of this relationship. Contrary to prevailing assumptions, the findings reveal no significant direct impact of banking sector performance on economic growth across the CEE region. Instead, the results of the Granger causality indicate that economic growth significantly bolsters the banking sector's development, suggesting an inverse causality. These results offer valuable insights for policymakers, indicating that efforts to stimulate banking sector growth may benefit from prioritising economic development. The study contributes to a nuanced understanding of the CEE context, emphasizing the unique interplay between economic growth and banking sector development in post-transition economies.

Keywords: banking dector, economic growth, fixed effects panel regression, Granger causality, financial geography, CEE countries

JEL: C58, E60, G21, O11, O16

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Introduction

Background

Economic growth is one of the crucial areas of research (Berg 2016). It is considered through the prism of many factors, such as access to resources, the quality of institutions, the level of infrastructure development, the quality of education, the number and demographic structure of the population, political stability and many others (Kuciński 2015). Nowadays, financial capital plays an increasingly important role in studying the rate of economic growth and development. Consequently, within examining economic expansion, there is increasing recognition of the importance of incorporating variables related to the financial aspects – such as direct foreign investment (FDI) inflows (Alfaro et al. 2010; Azman-Saini, Law, and Ahmad 2010; Almfraji and Almsafir 2014) and the development of financial markets (especially including capital markets and the banking sector) – into empirical studies (Odedokun 1996; Levine, Loayza, and Beck 2000; Qamruzzaman and Wei 2018). Additionally, the debate on the impact of the financial system structure (bank-based versus market-based) on economic growth has a long history (Levine 2002) but with no clear answers.

Our study focuses on the banking sector, which is implicated by banks' dominant role in the Central and Eastern European (CEE) financial system (Kruszka 2012; Stawasz-Grabowska 2020). Our research concentrated on 11 economies from the CEE region. Following Niedziółka et al. (2023), we included the following countries in the CEE group: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. Although studies on the banking sector-growth nexus that use cross-country data are challenging to interpret due to the diversity of historical experiences, cultural norms, and institutional contexts (Silva, Tabak, and Laiz 2021), we assumed that due to the geographical proximity and similar transformations of the CEE countries, a focus on these countries is justified.

This region presents a unique tapestry of financial restructuring, not marked by a gradual evolution but rather by a revolutionary overhaul in banking practices to align with EU standards. This dynamic transformation posits the CEE banking sector as a fascinating case for examining the direct effects of banks' performance on economic trajectories. The region's experience encapsulates a swift integration into global financial systems, the liberalisation of financial services, and the rapid adoption of the EU's banking rule book. Such dynamic shifts offer an interesting research area, extending the significance of this study beyond regional borders to the broader framework of financial geography. The primary objective of our research remains to assess the impact of the banking sector's performance on economic growth in CEE countries.

Furthermore, in a region characterised by a rapid transition from centrally planned to market economies, the banking sector's influence on economic growth is not just a matter of academic inquiry but also a crucial policy issue. After all, the results of our study provide input for considering whether it becomes crucial in emerging economies to implement policy solutions to accelerate the development of the banking sector or instead to focus on ensuring its stability in order to avoid negative feedback loops between the banking sector and economic growth, as a result of the materialisation of systemic risks.

Considering differences in CEE countries' economics, our methodological approach employs the panel regression model with fixed effects, allowing us to control for unobservable heterogeneity (Petkovski and Kjosevski 2014) and provide precise estimations of the banking sector's impact on economic growth. We focus on four key banking variables: non-performing loans (NPL), total capital ratio (TCR), return on assets (ROA), and the ratio of bank assets to GDP – to delineate their contributions to economic growth (measured by GDP growth ratio). Our econometric model is complemented by Granger causality tests, which give insights into the relationships' directionality. The analysis uses quarterly data from Q1 2011 to Q3 2023, covering the post-2007–2008 financial crisis period and capturing the banking sector's response to major disruptions, including COVID-19 and the war in Ukraine. Our preliminary findings challenge the traditionally held belief that a well-performing banking sector is a crucial requirement for economic growth. Instead, the data from CEE countries reveal a more intricate scenario where economic growth may boost the development of the banking sector.

Banking sector as a driver for boosting economic growth – literature review

Banks' multifaceted roles in the financial system constitute a core subject of inquiry in theoretical economics and finance (Berger, Molyneux, and Wilson 2015). Banks directly foster entrepreneurship and job creation by providing necessary financial support, thereby contributing to the country's GDP growth. On the other hand, banks are instrumental in accumulating savings from individuals and companies, transforming them into investments in productive ventures (Ribaj and Mexhuani 2021). By offering secure savings mechanisms, banks assure depositors of the safety of their funds (which is reinforced by the deposit guarantee institution). This security encourages the public to save more, providing banks with the capital to finance investment projects. The transformation of savings into investments is a critical process that fuels economic development by directing funds towards sectors with high growth potential.

Furthermore, banks play a crucial role in international trade by providing various financial instruments that facilitate transactions, manage risks, and finance exports and imports. Moreover, banks also support foreign direct investment (FDI) by offering multinational companies the financial services needed to invest in foreign countries. This not only helps in the transfer of technology and skills but also promotes economic growth by creating new jobs and enhancing productivity. This may suggest that the importance of the banking sector should also be assessed through the contribution of FDI to economic growth. Moreover, by facilitating payments and settlements, banks enhance the efficiency of financial transactions, reducing the cost and time involved.

The above implies that many studies confirm the positive impact of banking sector performance on economic growth (Ferreira 2008; Akpansung and Babalola 2011; Rahimzadeh 2012; Jokipii and Monnin 2013). Moreover, focusing on studies of the impact of banks on economic growth, some authors have highlighted the importance of bank efficiency, emphasising that state-owned banks are characterised by worse efficiency indicators than private banks and that foreign banks perform worse than domestic banks (Poshakwale and Qian, 2011). The literature also includes studies on the impact of financial institutions on economic growth conducted between countries in a particular geographical region, such as the ASEAN countries (Haini 2020). The positive

– and statistically significant – impact of financial institutions on economic growth has been confirmed in this group of countries. Additionally, studies of European Union (EU) countries highlight the positive impact of an effectively functioning and stable banking sector on the national economy (Bayar, Borozan, and Gavriletea 2021).

While the banking sector has traditionally been considered an important driver of economic growth, a more critical examination reveals that its significance may be overstated, particularly in the context of CEE countries. CEE economies often exhibit a heavy reliance on bank financing, which can lead to vulnerabilities, especially during financial crises. An over-concentrated banking sector can create systemic risks if banks face liquidity shortages or insolvency issues. Furthermore, excessive dependence on banks may stifle the development of alternative financing sources, such as capital markets, which are crucial for diversifying funding sources and reducing vulnerability to banking sector shocks (Próchniak and Wasiak 2017).

Thus, when examining the relationship between the banking sector and the economy, some authors focus on the negative feedback between the banking sector and the public finance sector and, thus, economic development (Stawasz-Grabowska 2020). A fragile banking sector not only threatens the enduring stability of an economy but can also spark a financial crisis, potentially precipitating broader economic turmoil (Mhadhbi, Terzi, and Bouchrika 2020). Additionally, Caporale et al. (2014) pointed out that the economically less developed EU countries (including CEE) have an underdeveloped financial market (particularly in terms of depth), and thus, the impact on economic growth is limited.

As highlighted by Ehlers and Villar (2015), significant shifts have been observed in the asset structure of the banking sector within transition economies. While the overall leverage of the banking sector has not markedly increased, the destinations of its credit allocations have undergone considerable transformation. An increasing proportion of banking loans are directed towards households, notably mortgage loans. This evolution suggests that the traditional role of banks as primary financiers of investments may be changing, thereby indicating that credit value might not be the most accurate variable for depicting the impact of banks on economic growth. Given this trend, the financing of households through both mortgage and consumer loans is becoming a more prominent function of the banking sector, potentially altering its contribution to economic growth.

Moreover, the banking sector's traditional focus on collateral-based lending may not be well-suited to financing innovation, particularly in high-tech and start-up sectors. These sectors often lack the tangible assets required for collateral, making it difficult for them to secure bank loans. This financing gap can hinder economic growth by limiting the development and expansion of innovative enterprises, which are critical drivers of competitiveness and growth in modern economies.

A body of research, including that by Hall and Lerner (2009), discusses the challenges of financing innovation in the banking-centric financial systems – which are specific features for CEE financial markets. Kjosevski's (2013) fixed-effects panel model showed that bank credit allocated to the private sector and the margin between lending and deposit interest rates do not speed up

economic growth in 16 transition countries in Central and Southeast Europe. Therefore, even in Southeast European countries, there are discrepancies in research on the topic of the importance of banks in economic growth and development. Some studies indicate a positive impact of the banking sector on economic growth in the CEE region (Zeqiraj et al. 2020), as well as in individual countries in the region (Węgrzyn 2023).

Despite globalisation, the significance of banks diverges substantially across various economies (Berger, Molyneux, and Wilson 2015, Chapter 2). This disparity underscores the need to examine the impact of banks on economic growth within diverse contexts and – especially – diverse geographical regions. Nevertheless, a significant portion of research concentrates on advanced economies. However, emerging and developing economies remain relatively underexplored in this field (Sensarma and Bhattacharyya 2016; Reddy et al. 2023).

Methods and data

Methods

To date, researchers have often successfully used fixed-effects panel models to study the importance of the banking sector in the context of country growth and development (Koivu 2002; Song, Chang, and Gong 2021). Despite Wachtel's (2001) scepticism about the appropriateness of using a fixed effects model to explore the relationship between financial sector development and economic growth – arguing that fixed effects overshadow the analysis due to greater inter-country differences than temporal changes – we believe its application is justified. This stance is especially valid in the context of transition economies, where, contrary to Wachtel's observation, banking sectors have evolved rapidly, leading to significant temporal variations in financial development (Koivu 2002).

The rationale for using a fixed-effects model lies in the unobservable heterogeneity between countries in the CEE region, particularly concerning macroprudential policies that influence factors such as the capital ratio (TCR). We conducted a Hausman specification test to confirm the validity of the fixed-effects panel model. It provided a p-value < 0.0001. Consequently, we opted for the fixed effects model over the random effects model for our analysis, as it provides a consistent estimation by controlling for unobservable heterogeneity across countries.

Researchers have also utilised dynamic panel regressions with lagged values of the explanatory endogenous variables as instruments (Caporale et al. 2014). Such methods are able to control endogeneity and measurement error not only of the banking variables but also of other explanatory variables. Taking this into account, we chose a dynamic panel regression model (balanced panel) with fixed effects, which was used for analogous studies by Ferreira (2008) and Kjosevski (2013), among others. Importantly to explain economic growth, one of the explanatory variables – GDP growth – was also lagged. We used autocorrelation analysis to select the lag of this variable.

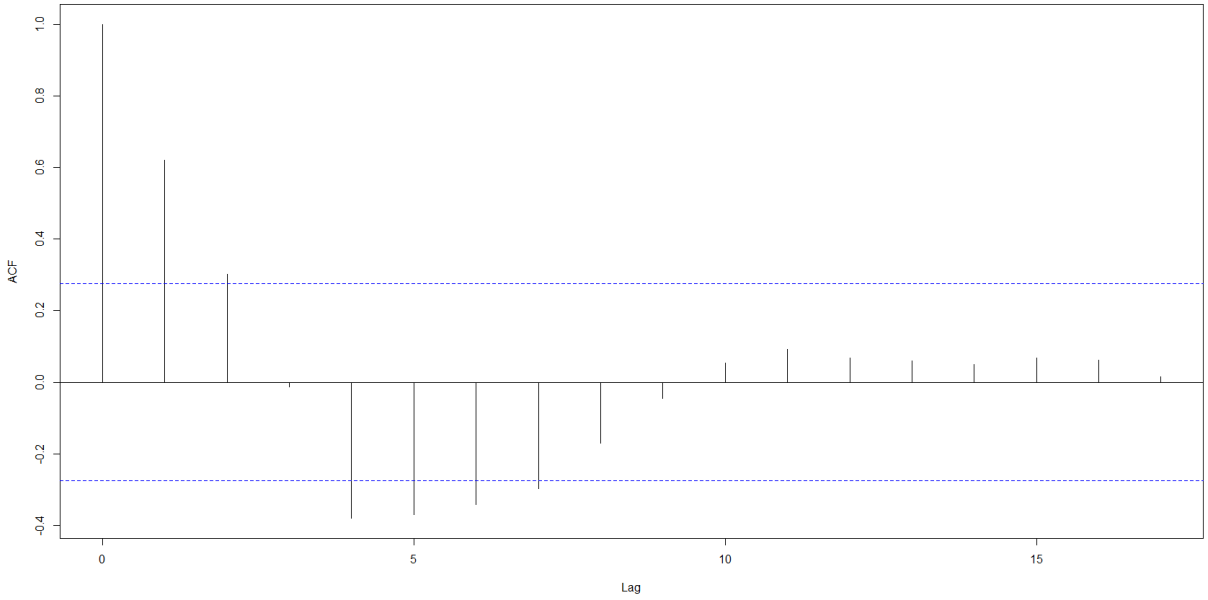

Figure 1. ACF for the GDP variable

Source: own elaboration in R.

Figure 1 illustrates the autocorrelation function (ACF) for the Gross Domestic Product (GDP) series. It exhibits the degree to which the current value of GDP is correlated with its past values, with various lags. Notably, the autocorrelation at lag 1 is substantially high, suggesting a strong positive correlation between GDP and its immediate past value. This significant autocorrelation justifies the inclusion of one lag of GDP in a panel model with fixed effects to capture the immediate temporal dependency, thereby enhancing the model's explanatory power for the current GDP based on its previous value.

Additionally, the autocorrelation at lag 4 is also noticeable, albeit negative. This could indicate a seasonal effect or a cyclical pattern in the GDP data, where the GDP shows an inverse relationship with its value four periods earlier. Including the fourth lag can help control for quarterly seasonality effects in annual data or capture cyclical dynamics in the case of quarterly data. This inclusion refines the model by accounting for any regular pattern or cyclicality that manifests every four periods, ensuring that the model better understands the underlying trends in GDP. Considering that, we decided to include the first and fourth lags of GDP as a dependent variable in a fixed-effects panel model. In conclusion, the study uses a dynamic panel data model with fixed effects to ascertain the determinants of GDP growth. The model is specified as:

$$\begin{aligned} \mathrm{GDP}_{it} = {} & \beta_1 \mathrm{GDP}_{it-1} + \beta_2 \mathrm{GDP}_{it-4} + \beta_3 \mathrm{IND}_{it} + \beta_4 \mathrm{BanktoGDP}_{it-1} + \beta_5 \mathrm{TCR}_{it-1} + \\ & + \beta_6 \mathrm{ROA}_{it-1} + \beta_7 \mathrm{NPL}_{it-1} + \beta_8 \mathrm{COVID}_{it} + \beta_9 \mathrm{WAR}_{it} + u_i + \varepsilon_{it}, \end{aligned} \quad (1)$$

where:

- $\beta_1, \beta_2, \ldots, \beta_9$ are the coefficients that correspond to each independent variable,
- $_i$ represents the cross-sectional unit (country) in panel data,
- $_t$ represents time measured in quarters,

- u_i represents the unobserved individual-specific effect,
- ε_{ti} represents the error term.

Endogeneity (reverse causality, where real economy development drives changes in the banking sector) is a significant issue in research into the banking sector's importance for economic growth (Berger, Molyneux, and Wilson 2020). Some authors have attempted to establish the impact of the banking sector on economic growth, obtaining a two-way causal relationship (Gaffeo and Mazzocchi 2014; Song, Chang, and Gong 2021). On the other hand, inverse relationships between banking sector performance and economic growth have also been observed (Awdeh 2012). Thus, we used the Granger causality test in our study to confirm the existence of such two-sided causality. In formal terms, if variable X Granger-causes variable Y, the past values of X contain information that helps predict Y:

$$Y_{it} = \alpha_i + \sum_{j=1}^{n} \beta_{ij} Y_{i,t-j} + \sum_{j=1}^{n} \gamma_{ij} X_{i,t-j} + \varepsilon_{it}, \quad (2)$$

We employ the Dumitrescu and Hurlin modification. Unlike traditional time series Granger causality tests that examine the relationship within a single time series, it is designed to work with cross-sectional data that span multiple countries over time. Thus, the issue of Granger causality is explored through a panel-based testing procedure that accounts for heterogeneity (Gaffeo and Mazzocchi 2014).

Description and analysis of the data

Reddy et al. (2023) suggest that several indicators, including domestic credit, return on equity (ROE), and total capital ratio (TCR), which reflect the operational and financial performance of banks, correlate with GDP growth. Koivu (2002) believes that increases in credit do not seem to accelerate economic growth. Zidan (2019) also concludes that the relationship between banks' credit and GDP growth is weak. Moreover, Petkovski and Kjosevski (2014) researched Central and Southeast European countries, and the results show that banks' credit is negatively related to economic growth. Other authors have also published studies indicating that the banking sector's development hurts the state's economic growth rate (Saci et al. 2009; Narayan and Narayan 2013). Other studies propose replacing loans with a measure representing the ratio of bank assets to GDP, which also considers possible bank investments in securities, including government bonds (Węgrzyn 2023). Taking that into account, we decided to use the GDP to bank assets ratio instead of the bank's credit. Furthermore, to assess how banks' profitability is linked to the rate of economic growth, we have included the return on assets (ROA) variable in our study.

According to Creel, Hubert, and Labondance (2015), the instability of the banking sector has a negative impact on a country's economy. Thus, following Ferreira (2008), we have included the following variables to measure the stability of the functioning of the banking sector: TCR (which shows the ratio of own funds to banks' risk exposures) and non-performing loans (NPLs) (which show the share of NPLs in the sector's total loans).

Furthermore, researchers studying economic growth have often included FDI inflows in their models (Acquah and Ibrahim 2020). Taking this into account, we also included this

explanatory variable in the model. In addition, we propose adding numerous other control variables to the model that are commonly used to study the determinants of economic growth, such as the unemployment rate, Consumer Price Index (CPI), and industrial production (Próchniak 2011). Evaluating the directional coefficients of these variables will assess the robustness of the model. Finally, recognising that the global COVID-19 pandemic and the war in Ukraine (Węgrzyn and Topczewska 2023) negatively impacted the European economy, these two dummy variables were also included in the model. All data used for the analysis is quarterly and covers the period from Q1 2011 to Q3 2023. A detailed summary of the variables used in the study is provided in Table 1.

Table 1. Data details

Variable	Description	Source
GDP	Gross Domestic Product growth [%], calculated as the percentage change in real GDP compared to the same period of the previous year.	National Statistical Institutes
CPI	Consumer Price Index (CPI) measures the weighted average changes (percentage year-on-year growth) in the prices of consumer goods and services purchased by households in the economy.	National Statistical Institutes
IND	Industrial Production Index (IPI) measures the volume of output produced by industrial enterprises. The percentage change [%] is the standardised unit of measurement used.	National Statistical Institutes
UNEM	Unemployment rate [%], defined as the number unemployed as a percentage of the labour force.	National Statistical Institutes
FDI_to_GDP	This indicator represents the percentage [%] of net foreign direct investment flows into a country relative to its nominal GDP.	OECD
ROA	Return on assets (ROA) provides information on bank profitability relative to total assets [%].	International Monetary Fund (IMF)
BanktoGDP	Percentage ratio [%] of bank assets at the end of the quarter to national GDP (extrapolated from quarterly data).	International Monetary Fund (IMF)
NPL	Non-performing loans ratio [%] refers to the proportion of loans that are in default or close to being in default to the total amount of loans. These loans do not earn income, and full payments are no longer anticipated, or payment of principal or interest is 90 days or more overdue, or the maturity date has passed without full payment.	Central Banks
TCR	This indicator represents the percentage share of regulatory capital to risk-weighted assets [%].	Central Banks
COVID	A dummy variable used to determine the impact of the COVID-19 pandemic on economic growth rates. From Q1 2020 until quarantine restrictions were withdrawn in the particular country, the variable's value was 1. In other periods, the variable's value was 0.	–
WAR	A dummy variable used to determine the impact of the war in Ukraine on economic growth rates. The variable took the value of 1 from Q1 2022 to Q3 2023 for countries neighbouring the Russian Federation. In other cases, the variable was equal to 0.	–

Source: own elaboration.

In the next step, we tested the stationarity of the panel variables using the Levin-Lin-Chu (LLC) and Im-Pesaran-Shin (IPS) tests. Given that only one control variable – inflation (CPI)

– was found to be a non-stationary series, we decided not to include it in the model. The remaining variables were included in the modelling and tested with the Granger causality test for panel data.

Table 2. Levin-Lin-Chu (LLC) and Im-Pesaran-Shin (IPS) tests for stationarity

Variable	Levin-Lin-Chu Unit-Root Test		Im-Pesaran-Shin (IPS) Unit-Root Test	
	t-stat	p-value	t-stat	p-value
GDP	– 9.3	<0.0001***	– 11.0	<0.0001***
IND	– 9	<0.0001***	– 11	<0.0001***
CPI	0.46	0.7	– 0.83	0.2
UNEM	– 2.1	0.02*	– 0.27	0.4
FDI_to_GDP	– 19	<0.0001***	– 18	<0.0001***
BanktoGDP	– 2.2	0.02*	– 1.7	0.04*
NPL	– 4.4	<0.0001***	– 0.81	0.2
TCR	– 4.2	0.0002***	– 1.7	0.04*
ROA	– 4.9	<0.0001***	– 4.5	0.0001***

Note: *p < 0.05, ** p < 0.01, *** p < 0.001.

Source: own elaboration in R, based on data presented in Table 1.

Finally, based on the selected data, a graphical summary was prepared (using a map) showing the average level of economic growth over the analysed period, as well as variables such as bank assets to GDP, TCR, and NPL levels at the end of Q3 2023.

As Figure 2 shows, the fastest average quarterly growth rates were in Poland, Lithuania (3.44%) and Romania (3.41%). In contrast, the economies of Estonia (135.2%), the Czech Republic (133.2%) and Hungary (123.4%) had the relatively largest banking sector (Bank assets to GDP). Romania (65.3%), Latvia (68.9%), and Lithuania (80.1%) had the smallest banking sectors. Nizam et al. (2020), in their research on a group of 63 countries, noted that the positive impact of the banking sector on economic growth is evident once a certain threshold of the financial sector inclusion in a country is exceeded. However, as the data on the banking sector's asset-to-GDP ratio show, countries in the CEE region are very different in this respect, which may dampen the effect of the banking sector's positive impact on economic growth. The TCR ratio ranged from 19% (Hungary) to 23.3% (Croatia). The wide divergence in the NPL ratio level is also worth noting. Poland had by far the highest level (5.66%), well ahead of Bulgaria (2.71%) and Croatia (2.66%). In contrast, Estonia (0.17%), Lithuania (0.58%) and Slovenia (0.7%) had the lowest NPL level.

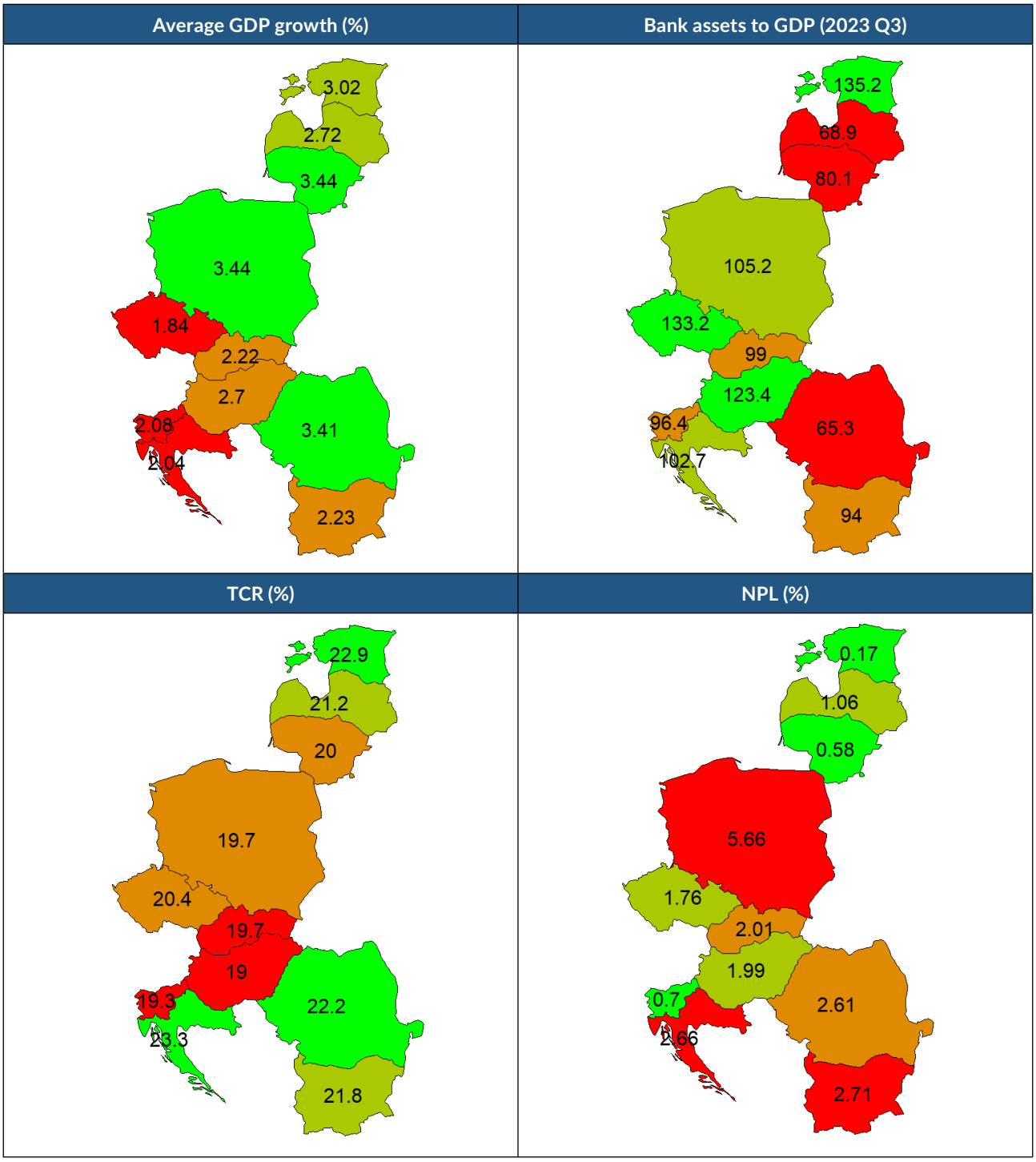

Figure 2. Summary of selected data for individual CEE countries (Q1 2011 – Q3 2023)

Source: own elaboration in R, based on data presented in Table 1.

Results and discussion

Before characterising the coefficients for the individual variables, it is worth pointing out the relatively high level of explanatory power of GDP growth by the explanatory variables (R-squared 0.755, Adjusted R-squared 0.745). Moreover, the F-statistic for the model confirmed its statistical

significance. Nevertheless, in our panel data analysis, we have observed the presence of heteroscedasticity (Wald test p-value = 0.02) and autocorrelation (Durbin-Watson test p-value < 0.0001, Breusch-Godfreya p-value 0.0001) within the residuals. Although it is common in panel models, this occurrence can lead to inefficiencies and inaccuracies in standard errors and, consequently, the test statistics and confidence intervals. To rectify this and increase the results' reliability, we have employed the Driscoll-Kraay standard error correction, renowned for its robustness in heteroskedasticity and autocorrelation within panel data models.

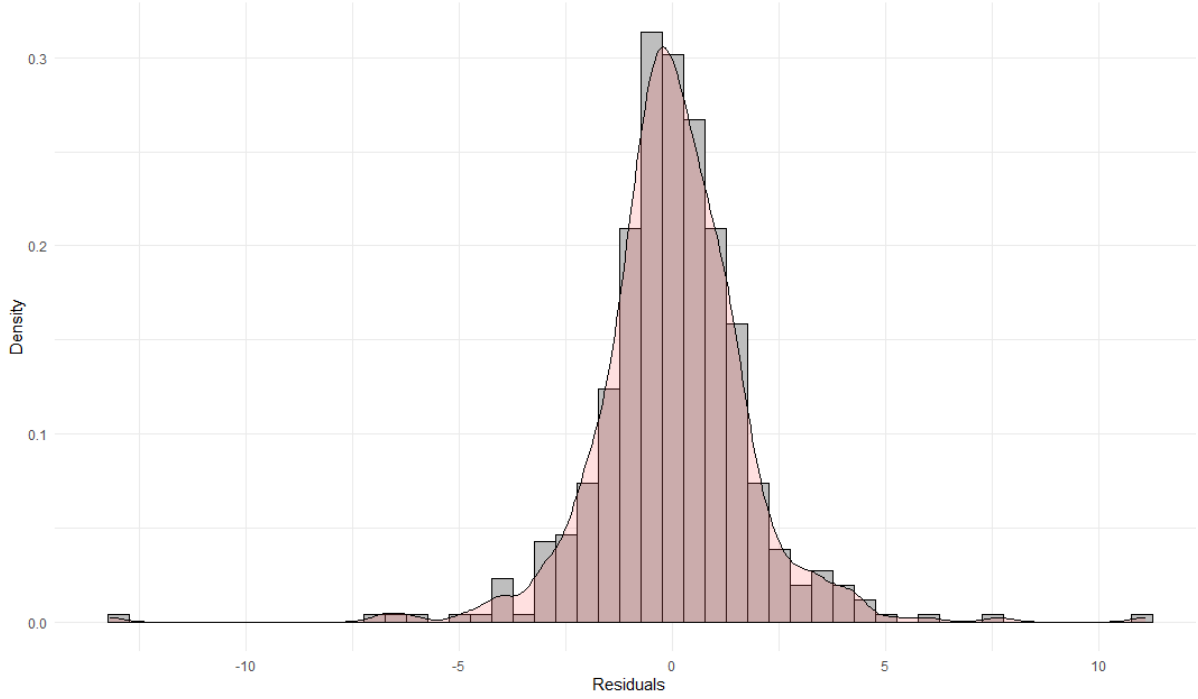

Figure 3. Histogram of the model residuals

Source: own elaboration in R, based on data presented in Table 1.

The histogram of model residuals overlayed with a normal distribution curve reveals a bell-shaped symmetry that closely aligns with the properties of a Gaussian distribution. Due to single outliers, the Anderson-Darling test showed a non-normal distribution of the residuals. Nevertheless, based on graphic analysis, the centrality of the residuals around the zero mark, combined with the unimodal and seemingly symmetrical nature of the distribution depicted in the plot, lends credence to the assumption of normality for the purposes of our study.

Moreover, the comparison of actual and projected GDP growth levels in the cross-sectional analysis (Figure 4) and in the time-series analysis by country (Figure 5) confirms the good fit of the model. However, some differences between the model fit for individual CEE countries become apparent. Thus, we observed the weakest fit for Lithuania and the best fit for Poland.

Figure 4. Actual vs Predicted GDP growth by country

Source: own elaboration in R, based on data presented in Table 1.

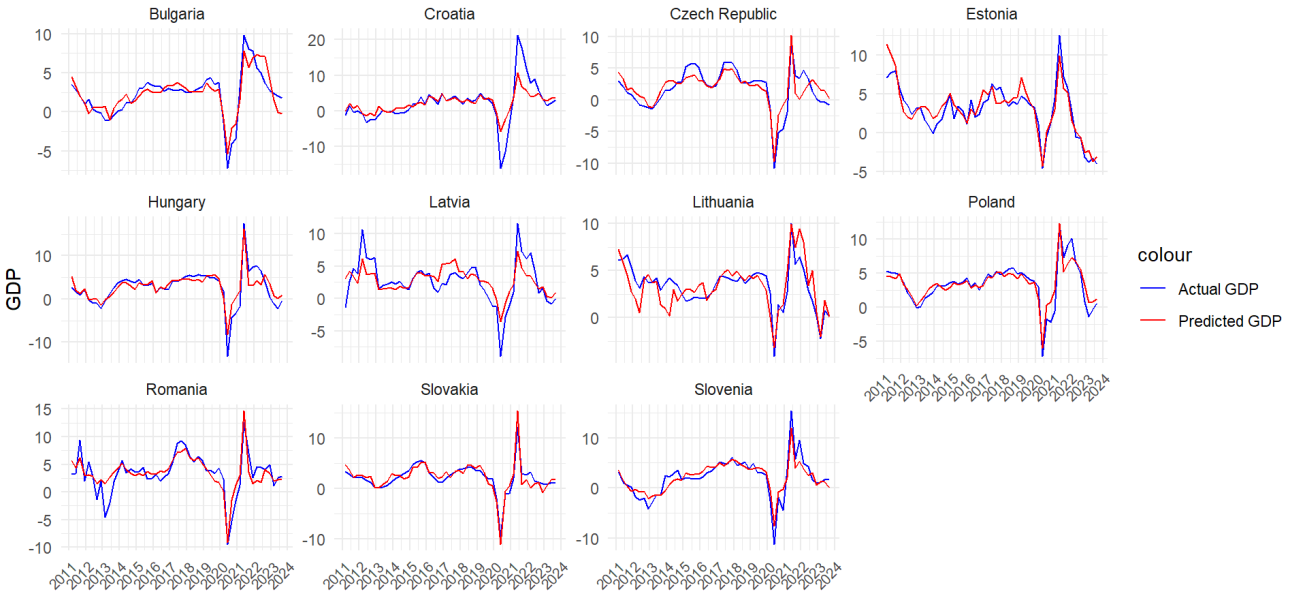

Figure 5. Actual vs Predicted GDP growth by country over time

Source: own elaboration in R, based on data presented in Table 1.

Given the quarterly intervals of the data used for modelling (which was driven by the availability of GDP data), we proposed using quarterly lags l(1) of the control and banking variables in the model (with the exception of the IND variable, which showed a much better fit without delays). Summary results of the dynamic panel model with fixed effects are presented in Table 3.

Table 3. Results of panel model with fixed effects

Variables	Coefficients	p-value	Driscoll-Kraay corrections p-value
GDP(1)	0.4635	<0.0001***	<0.0001***
GDP(4)	−0.2064	<0.0001***	<0.0001***
IND	0.2946	<0.0001***	<0.0001***
FDI_to_GDP(1)	0.0056	0.125	0.0016**
UNEM(1)	−0.0568	0.281	0.4166
BanktoGDP(1)	0.0004	0.950	0.9431
TCR(1)	0.0281	0.471	0.3020
ROA(1)	0.2583	0.038*	0.0708
NPL(1)	−0.0831	0.025*	0.1974
COVID	−1.3850	<0.0001***	<0.0001***
WAR	−0.3837	0.327	0.4017

Note: *p < 0.05, ** p < 0.01, *** p < 0.001.

Source: own elaboration in R, based on data presented in Table 1.

In analysing the impact of individual variables on GDP growth rates in CEE countries, lagged GDP growth emerged as a significant factor, with GDP(1) showing a positive impact and GDP(4) showing a negative impact on current GDP growth. In addition, a significant positive impact on growth was recorded for the IND variable. These findings align with Tongurai and Vithessonthi (2018), who also demonstrated that the development of the banking sector has no impact on the development of the industrial sector, with a relatively high share of industry in the economic structure of the CEE countries compared to more developed Western European countries. The lack of influence may weaken the banking sector's power to influence GDP growth in transition economies.

Furthermore, the directional coefficients of the other control variables confirm the quality and substantive interpretative validity of the model. We observed a positive impact of foreign investment inflows on economic growth (statistically significant), a negative impact on unemployment (statistically insignificant), and a highly negative impact of the dummy variables (statistically significant for COVID-19 and statistically insignificant for the war in Ukraine).

The direction of the coefficients of the banking variables was also in line with expectations. Nevertheless, according to the model results, only ROA(1) and NPL(1) have a statistically significant impact on GDP (positive and negative impact, respectively). However, after the Driscoll-Kraay adjustment, none of the banking variables was statistically significant at alpha = 0.05. A relatively low p-value (0.0708) was recorded only for ROA(1). The ROA results are noteworthy when contrasted with the observations of Poshakwale and Qian (2011) and Mensah et al. (2012), who highlighted a positive and significant relationship between bank operating efficiency and economic growth. Additionally, Botrić and Slijepčević (2008) suggested a relationship between

banking sector efficiency and economic growth in CEE countries. This raises the possibility that Granger causality tests may be warranted as, in theory, it is economic growth that influences the efficiency of the banking sector.

Table 4. Panel Granger causality test results, with Dumitrescu and Hurlin modification

Variables cause GDP			GDP cause variables		
Variable (lag)	t-stat	p-value	Variable (GDP lag)	t-stat	p-value
BanktoGDP(1)	– 0.26	0.8	BanktoGDP(4)	4.1	< 0.0001***
TCR(1)	– 1.3	0.2	TCR(4)	5.1	< 0.0001***
ROA(1)	– 0.88	0.4	ROA(3)	– 1.9	0.06
NPL(1)	– 1.7	0.1	NPL(1)	2	0.05*

Note: *p < 0.05, ** p < 0.01, *** p < 0.001.

Source: own elaboration in R, based on data presented in Table 1.

The results of the Granger test (Table 4) indicate that, at a significance level of alpha = 0.05, no banking variable is a cause of economic growth in the CEE economies. This was true for both the one-lag variable (used in the model) and second-, third- and fourth-order lags. The lowest p-value was recorded for the NPL variable, which had a p-value of 0.1. Conversely, the test confirmed that economic growth was the cause of almost all banking variables (with only ROA showing a p-value of 0.06, which was not significant at the adopted level).

Despite the lack of confirmation of an unequivocally positive and statistically significant impact of the banking sector on economic growth in the CEE region, as indicated by both the panel model and the Granger causality test, our study does align with the findings of many other researchers (Demirguc-Kunt and Detragiache 2000; Deidda and Fattouh 2002). These authors also highlighted the positive and significant impact of banks on economic growth rates in more advanced economies. Furthermore, it is important to recognise how many factors can affect economic growth rates. Thus, it would be beneficial to extend the adopted model or propose additional variables, including demographic factors (Kozlovskyi et al. 2020) and social expenditures (Govdeli and Karakuş Umar 2021).

Conclusions

In conclusion, while the banking sector has historically played a critical role in economic growth in highly developed economies, its significance to economic growth for CEE countries needs to be revised. Challenges in the CEE region, such as overreliance on bank financing, a shift in the structure of loans from corporate investment loans to mortgage and consumer loans, a potentially limited impact on innovation, and the rise of alternative financial sources (for example, European funds) suggest a need for a more nuanced understanding of the relationship between banking sector development and economic growth.

Future research must establish what determines the positive and significant impact of banking sector performance on economic growth and what distinguishes highly developed economies

from those in transition in this respect. As Piątkowski (2019) argued, institutions, including solid and effective financial market supervision or robust monetary policy, play a key role in economic development. This underscores the importance of including qualitative factors, such as institutional performance, political stability, and the concept of path dependence concerning the development of the banking sector in studies examining the importance of the financial market within a country.

The primary objective of this study was to examine the relationship between banking sector performance and economic growth in the CEE region. By using a fixed-effects panel regression model and Granger causality tests, we gained a nuanced understanding of this relationship, highlighting the inverse causality where economic growth supports banking sector development rather than vice versa. The added value of this analysis lies in providing policymakers with insights into how prioritising economic development may indirectly strengthen the banking sector within the unique context of post-transition CEE economies.

Furthermore, as the literature review shows, even the economic growth of countries located in the same geographical region can be affected differently by financial development, including the banking sector or capital market. For example, Liu and Hsu's (2006) model demonstrated that individual financial variables, such as investment inflows relative to GDP or the size of the financial sector, affected East Asian economies (i.e., Japan, South Korea, and Taiwan) differently. This highlights the need for a more individualised approach to researching the impact of the financial sector on the economic growth of countries and regions.

Our results confirm Luintel et al.'s (2008) observation that in studies on the impact of the financial market on economic growth, cross-country data should not be pooled. Therefore, it is advisable to extend the existing research by constructing individual models for each CEE country to determine the impact of the financial market on economic growth in a more individualised way. This is warranted, given that some researchers have identified a positive relationship between the banking sector and the economy in selected CEE countries (Węgrzyn 2023).

The need for such research is further highlighted by the relatively small number of studies examining the relationship between the importance of financial markets (beyond just the banking sector) and economic development in the economies of the CEE region. However, this research should be enriched by considering the characteristics of the economic and political conditions of a given country, which may have an impact on the effectiveness of financial markets in promoting growth. An additional valuable area of research is how financial and economic crises distort financial market transmission channels for economic growth and development. It would be helpful to identify differences in this regard between individual countries to find potential solutions to mitigate the negative impact of crises on the ability of financial institutions to support businesses and, indirectly, the national economy.

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Wpływ sektora bankowego na wzrost gospodarczy. Studium przypadku wybranych krajów Europy Środkowo-Wschodniej

Niniejsze badanie opisuje i wyjaśnia złożony związek między funkcjonowaniem sektora bankowego a wzrostem gospodarczym w krajach Europy Środkowo-Wschodniej (CEE). Mając na uwadze kluczową rolę sektora bankowego w systemie finansowym regionu CEE, autorzy badają potencjał tego sektora jako czynnika napędzającego wzrost gospodarczy, wykorzystując model regresji panelowej z efektami stałymi. W badaniu skoncentrowano się na czterech kluczowych zmiennych: kredytach zagrożonych (NPL), łącznym współczynniku kapitałowym (TCR), stopie zwrotu z aktywów (ROA) oraz relacji aktywów bankowych do PKB. Testy przyczynowości Grangera dodatkowo oceniają kierunkowy charakter tej relacji. Wbrew powszechnym założeniom wyniki nie potwierdzają istotnego bezpośredniego wpływu sektora bankowego na wzrost gospodarczy w regionie CEE. Zamiast tego wyniki testu przyczynowości Grangera wskazują, że to wzrost gospodarczy znacząco wspiera rozwój sektora bankowego, sugerując odwrotną przyczynowość. Wyniki te dostarczają cennych wskazówek dla decydentów politycznych, sugerując, że działania na rzecz rozwoju sektora bankowego mogą odnieść większy sukces przy priorytetowym traktowaniu rozwoju gospodarczego. Badanie to wnosi istotne zrozumienie specyfiki regionu CEE, podkreślając unikalną interakcję między wzrostem gospodarczym a rozwojem sektora bankowego w gospodarkach posttransformacyjnych.

Słowa kluczowe: sektor bankowy, wzrost gospodarczy, regresja panelowa z efektami stałymi, przyczynowość Grangera, geografia finansowa, kraje Europy Środkowo-Wschodniej