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THE INFLUENCE OF GLOBALIZATION ON GDP GROWTH IN EASTERN EUROPE

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Abstract: This study examines the impact of economic, political, and social dimensions of globalization on GDP growth in 18 Eastern European countries from 1999 to 2019. Using a Fixed Effects (FE) model with quadratic terms, it captures both linear and nonlinear relationships, with a notable finding of a U-shaped relationship between Trade De Jure Globalization and GDP growth. This suggests that while early stages of trade policy liberalization may reduce growth, significant gains emerge at higher integration levels. The analysis reveals that, although trade activities contribute positively to GDP growth, financial integration appears to exert downward pressure, potentially reflecting the challenges Eastern European economies face in adjusting to financial liberalization. These results underscore the complexity of globalization's effects on economic performance in the region and the importance of considering both the nature and depth of globalization when formulating policy.

Key-Words: - Globalization, Economic Growth, Eastern Europe, Panel Data, Fixed Effects Model.
JEL Classification: - F43, F63, O52, C23

1. Introduction

Globalization has been a significant driver of economic, political, and social change worldwide, particularly influencing countries transitioning to market-oriented economies. It involves the intensification of cross-border interactions and the integration of economies, cultures, and governance structures (Stiglitz, 2002). Understanding how different dimensions of globalization impact economic growth is crucial, especially for Eastern European countries that have undergone significant transformations since the late 20th century.

Eastern Europe presents a unique case for analysis due to its transition from centrally planned economies to market-based systems. The region has experienced varying degrees of economic development, institutional reforms, and integration into the global economy. While globalization has the potential to stimulate growth through increased trade, investment, and technological diffusion, it may also pose challenges related to financial volatility and institutional capacity.

This study examines the impact of various dimensions of globalization—trade, financial, interpersonal, informational, cultural, and political—on GDP growth in 18 Eastern European countries from 1999 to 2019. By utilizing a Fixed Effects (FE) regression model with quadratic terms, the research captures both linear and nonlinear relationships while addressing methodological concerns such as cross-sectional dependence and multicollinearity. The distinction between de facto (actual flows) and de jure (policies facilitating flows) measures of globalization provides a nuanced understanding of how different facets influence economic performance.

2. Problem Formulation

While globalization's impact on economic growth is widely recognized, the differentiated effects of its various dimensions—economic, political, social, and cultural—remain under-examined in the context of Eastern European economies transitioning to market-oriented systems. Specifically, there is a need to disentangle the de facto (actual flows) and de jure (policies facilitating flows) components within these dimensions to capture both the tangible cross-border interactions and the regulatory frameworks that shape globalization's influence on GDP growth. This study investigates these complex interactions across 18 Eastern European countries from 1999 to

2019, employing a model that captures both linear and nonlinear relationships. By examining these multifaceted impacts, this research seeks to provide policy-relevant insights into how Eastern European economies can balance the benefits of globalization with the risks posed by rapid integration.

3. Literature Review

3.1 Trade Globalization

Trade globalization is a key driver of economic growth, facilitating market access and enabling countries to specialize based on comparative advantage. De facto trade globalization, referring to actual trade flows, has been linked to enhanced economic performance. Frankel and Romer (1999) demonstrated that increased international trade positively affects GDP growth. In Eastern Europe, Fidrmuc (2003) found that greater trade volumes allowed countries to access larger markets and import advanced technologies, boosting economic growth.

De jure trade globalization involves adopting trade policies and agreements that facilitate international commerce. Baier and Bergstrand (2007) showed that free trade agreements substantially increase trade volumes among member countries, positively impacting economic growth by reducing barriers and improving resource allocation. Hoekman and Djankov (1997) highlighted that policy reforms aligning with international trade standards helped firms improve production quality and expand exports to Western markets. However, while trade integration contributed to economic development, it did not fully address structural challenges needed for long-term competitiveness in Central and Eastern Europe.

3.2 Financial Globalization

Financial globalization encompasses the integration of a country's financial system with international markets. De facto financial globalization refers to actual financial flows, including foreign direct investment and cross-border lending. While financial openness can provide capital for investment and spur growth, it also carries risks. Levine (2001) posited that financial integration enhances growth by improving the efficiency of domestic financial markets, which in turn optimizes resource allocation, boosts productivity, and supports long-term economic development. However, Prasad et al. (2003) found that in countries with weak financial systems, financial globalization can increase volatility and susceptibility to crises, negatively affecting growth. Atoyan et al. (2012) observed that Eastern European economies became vulnerable to external shocks due to excessive reliance on foreign capital inflows.

De jure financial globalization involves policies that facilitate financial integration, such as liberalizing capital accounts. Kose et al. (2006) suggest that financial integration can support economic growth by improving capital allocation and enhancing risk-sharing mechanisms**.** Fries and Taci (2005) found that regulatory reforms and alignment with European Union financial standards positively impacted financial sector development in Eastern Europe.

3.3 Interpersonal Globalization

Interpersonal globalization pertains to the movement of people across borders and the exchange of ideas and cultures. De facto interpersonal globalization involves actual exchanges, such as migration and tourism, which can have mixed effects on growth. Remittances from migrants can support domestic economies (World Bank, 2020), but the emigration of skilled workers may reduce human capital and hinder growth (Beine et al., 2008b). Docquier and Rapoport (2012) emphasized that brain drain is a concern for Eastern European countries losing skilled labor.

De jure interpersonal globalization involves policies that facilitate or restrict movement. Mayda (2010) demonstrated that open migration policies increase labor mobility, potentially alleviating labor shortages in destination countries, with the implication being that they may exacerbate brain drain in origin countries. Beine, et al. (2008a) provide empirical evidence that policies facilitating emigration can exacerbate brain drain, leading to a negative impact on GDP growth in source countries. Their analysis of 37 developing nations demonstrates that increased migration flows are associated with a reduction in the domestic human capital stock, thereby supporting the hypothesis that emigration-facilitating policies may hinder economic growth.

3.4 Informational Globalization

Informational globalization refers to the flow of information and ideas, facilitated by advancements in information and communication technologies (ICT). De facto informational globalization involves actual access

to global information networks The OECD (2015) Digital Economy Outlook highlights that advancements in Information and Communication Technologies (ICT) significantly drive economic growth by fostering innovation and enhancing productivity across various sectors. The report underscores that increased access to global information through ICT adoption enables businesses and governments to implement innovative practices, thereby positively impacting GDP growth. Cieślik and Kaniewska (2004) demonstrate that increased telecommunications infrastructure in Poland was significantly associated with higher regional income levels.

De jure informational globalization encompasses policies promoting ICT infrastructure development. Röller and Waverman (2001) found that supportive telecommunications infrastructure—facilitated by conducive policies—positively impacts economic growth by enhancing connectivity. Rouvinen (2006) noted that supportive ICT policies, such as fostering competition among mobile operators and standardizing technologies, significantly enhance mobile telephony adoption. The study finds that increased connectivity through digital mobile telephony is positively associated with socio-economic factors, including GDP per capita and trade openness, especially in developing countries.

3.5 Cultural Globalization

Cultural globalization involves the exchange of cultural practices and ideas. De facto cultural globalization manifests through cultural exchanges, such as the international spread of media and literature. Scott (2006) suggested that agglomerations of creative industries, facilitate dynamic exchanges of expertise, fostering continuous innovation through temporary project-based networks. These localized clusters stimulate the broader creative economy, enhancing productivity and potentially contributing to regional economic growth. The European Commission (2010 argues that cultural exchanges serve as a catalyst for creativity and economic growth by fostering intercultural dialogue and stimulating demand for cultural products across borders. This document highlights the role of cultural and creative industries in driving innovation, supporting knowledge-based economies, and generating spill-over benefits in sectors like tourism and technology.

De jure cultural globalization pertains to policies supporting cultural industries and promoting international collaborations. Throsby (2010) suggests that cultural policies, especially those supporting intellectual property rights, contribute to economic benefits by fostering the creative industries' growth and innovation. By legitimizing culture within economic policy discussions, such policies can encourage sectoral expansion and productivity, positioning the creative economy as a valuable component of national development. UNESCO (2016) highlights the essential role of culture in fostering sustainable urban development, specifically through cultural heritage preservation and creative industries that yield economic benefits. The report asserts that well-crafted cultural policies can promote economic growth by stimulating innovation, drawing tourism, and generating employment opportunities, thus enhancing both urban sustainability and economic resilience.

3.6 Political Globalization

Political globalization refers to the increasing interconnectedness of political systems and international governance structures. De facto political globalization involves active participation in international organizations. Alesina and Dollar (2000) demonstrated that countries which politically align with major donor nations or adjust their voting patterns in global organizations like the UN tend to attract higher foreign aid flows. This pattern illustrates how de facto political globalization — manifesting through informal alignment rather than formal memberships or alliances — can increase resource inflows. By receiving aid through these political alignments, recipient countries benefit from economic resources that indirectly promote growth, underscoring the economic advantages of de facto globalization.

De jure political globalization encompasses formal agreements institutionalizing international cooperation. A study by Dreher, et al. (2009) supports the idea that political de facto globalization, specifically through participation in international organizations, can foster economic growth by attracting international investment. The research indicates that temporary membership on the UN Security Council (UNSC) significantly increases the number of World Bank projects a country receives, as major World Bank shareholders use project allocation as a mechanism to encourage alignment with their strategic interests. Campos and Coricelli (2002) suggested that alignment with Western institutions, such as prospective membership in NATO and the EU, contributed to increased investor confidence in Eastern Europe.

4 Hypotheses

Based on the literature review, the following hypotheses are formulated:

H1a: Trade De Facto (TradeDF) has a positive effect on GDP growth. Increased actual trade flows enhance economic performance through market access and specialization.
H1b: Trade De Jure (TradeDJ) has a positive effect on GDP growth. Adoption of trade policies facilitates international commerce and efficiency.
H2a: Financial De Facto (FinancialDF) has a negative effect on GDP growth. Actual financial openness can increase volatility in countries with weak financial systems.
H2b: Financial De Jure (FinancialDJ) has a positive effect on GDP growth. Policies promoting financial integration enhance growth through efficient intermediation.
H3a: Interpersonal De Facto (InterpersonalDF) has a negative effect on GDP growth. Emigration of skilled workers may reduce human capital.
H3b: Interpersonal De Jure (InterpersonalDJ) has a negative effect on GDP growth. Policies facilitating emigration may exacerbate brain drain.
H4a: Informational De Facto (InformationalDF) has a positive effect on GDP growth. Access to global information enhances innovation.
H4b: Informational De Jure (InformationalDJ) has a positive effect on GDP growth. Supportive ICT policies promote connectivity and development.
H5a: Cultural De Facto (CulturalDF) has a positive effect on GDP growth. Cultural exchanges stimulate creative industries.
H5b: Cultural De Jure (CulturalDJ) has a positive effect on GDP growth. Cultural policies enhance economic benefits.
H6a: Political De Facto (PoliticalDF) has a positive effect on GDP growth. Participation in international organizations attracts investment.
H6b: Political De Jure (PoliticalDJ) has a positive effect on GDP growth. Political agreements strengthen institutions.

5 Methodology

5.1 Data Sources

This study employs panel data from 18 Eastern European countries spanning 1999 to 2019. Although complete data was available from 1998, the analysis begins in 1999 to effectively accommodate the lagged GDP growth variable in the model. The dataset concludes in 2019, deliberately excluding 2020 data to avoid potential distortions related to the economic impacts of the COVID-19 pandemic, which could introduce volatility unrelated to the typical dynamics of globalization and economic growth. The countries included are Albania, Belarus, Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Moldova, Montenegro, North Macedonia, Poland, Romania, Serbia, Slovakia, Slovenia, and Ukraine. The dependent variable is the annual GDP growth rate, sourced from the World Bank's World Development Indicators (World Bank, 2021). Independent variables are derived from the KOF Globalisation Index (Gygli et al., 2019), providing de facto (actual flows) and de jure (policies facilitating flows) measures for various dimensions of globalization, including trade, financial, interpersonal, informational, cultural, and political globalization. The structure of the KOF index is shown in the appendix.

5.2 Nonlinear Variables and Centering

Exploratory analysis indicated that certain variables might exhibit nonlinear relationships with GDP growth, prompting the inclusion of quadratic terms for selected variables in the Fixed Effects (FE) model. Specifically, squared terms were added for Lagged GDP Growth, Trade De Jure Globalization, and Political De Jure Globalization based on initial data patterns suggesting curvature. These variables were mean-centered before squaring to reduce multicollinearity between the linear and quadratic terms, following Aiken and West's (1991) approach. This centering enables clearer coefficient interpretation and improves the stability of the estimates.

5.3 Lagged Variable

To account for persistence in economic growth and mitigate potential autocorrelation, the analysis incorporates a lagged dependent variable, *LagGDPGrowth*, which represents the previous year's GDP growth rate. A quadratic term, *LagGDPGrowthSq* is included to capture possible nonlinear effects of prior growth on current growth, modeling the varying impact of past growth levels on present economic performance.

5.4 Fixed Effects

Country-specific fixed effects (α_i) and year-specific fixed effects (λ_t) are included to control for unobserved heterogeneity across countries and over time. The country fixed effects account for time-invariant characteristics unique to each country, while the year fixed effects capture global shocks or trends affecting all countries simultaneously.

5.5 Addressing Cross-Sectional Dependence and Autocorrelation

The Pesaran CD test indicated the presence of cross-sectional dependence (p-value = 0.0048). To address this, Driscoll-Kraay standard errors were used in the fixed effects model which are robust to cross-sectional dependence, heteroskedasticity, and autocorrelation.

5.6 Statistical Model

A Fixed Effects (FE) regression model was employed to control for unobserved heterogeneity across countries and over time. The FE model specification is as follows:

$$(1)\ GDPGrowth_{it} = \alpha_i + \lambda_t + \beta_1 LagGDPGrowth_{it} + \beta_2 LagGDPGrowthSq_{it} + \sum_{k=3}^{K} \beta_k X_{kit} + \epsilon_{it}$$

where:

$GDPGrowth_{it}$ is the GDP growth rate of country *i* at time *t*.
α_i represents country-specific fixed effects.
λ_t represents year-specific fixed effects.
$LagGDPGrowth_{it}$ is the lagged GDP growth rate.
$LagGDPGrowthSq_{it}$ is the mean centered square of the lagged GDP growth rate.
X_{kit} are the globalization variables and their squared terms where applicable.
β_k are the coefficients to be estimated.
ϵ_{it} is the error term.

6 Results and Discussion

The results indicate that LagGDPGrowth, TradeDJ, TradeDJSq, and FinancialDF have significant effects on GDP growth. Specifically, the positive coefficient for LagGDPGrowth suggests economic momentum, while the negative coefficient for TradeDJ alongside the positive coefficient for TradeDJSq indicates a U-shaped relationship between Trade De Jure Globalization and GDP growth—a key finding. The marginal significance of PoliticalDJ points to a potential positive impact of Political De Jure Globalization, whereas FinancialDF negatively affects GDP growth, highlighting the adverse effects of Financial De Facto Globalization. All other variables included in the model were found to be not significant, as summarized in the "Other Variables" row of Table 1.

Table 1: Fixed Effects Model Results

Variable	Coefficient	Std. Error	t-value	p-value	Significance
LagGDPGrowth	0.222	0.075	2.950	0.0079	Significant
TradeDJ	-0.467	0.173	-2.698	0.0138	Significant
TradeDJSq	0.0036	0.0014	2.621	0.0164	Significant
PoliticalDJ	0.476	0.253	1.880	0.0748	Marginally significant
FinancialDF	-0.084	0.034	-2.413	0.0256	Significant
Other Variables	—	—	—	—	Not significant
R-squared	0.62				
Adj R-squared	0.56				
Within R-squared	0.19				

Note: $p < 0.05$ (Significant), $p < 0.10$ (Marginally significant)

6.1 Interpretation of Significant Results

6.1.1 LagGDPGrowth

As expected, the positive and significant coefficient for the lagged GDP growth ($\beta = 0.222$, p = 0.0079) suggests that prior economic growth positively influences current growth rates. This reflects an economic

momentum effect, where previous growth increases the likelihood of continued growth. The quadratic term was not significant.

6.1.2 TradeDJ and TradeDJSq

The negative coefficient for Trade De Jure Globalization (β = -0.467, p = 0.0138) alongside a positive squared term (β = 0.0036, p = 0.0164) reveals a U-shaped relationship between trade policy liberalization and GDP growth. Early stages of trade policy adjustments may negatively impact GDP growth due to transitional costs. However, further liberalization eventually yields positive effects as increased trade flows and market integration benefits take effect.

6.1.3 FinancialDF

The negative and significant coefficient for Financial De Facto Globalization (β = -0.084, p = 0.0256) implies that actual financial openness adversely affects GDP growth. This may be attributed to increased vulnerability to external financial shocks and volatility, especially in economies with less developed financial systems and regulatory frameworks.

6.1.4 PoliticalDJ

The positive coefficient for Political De Jure Globalization (β = 0.476, p = 0.0748) though marginally significant, suggests potential benefits of political globalization policies for GDP growth. Despite not being statistically significant at the 5% level, this indicates that political integration can foster growth by improving institutional quality and attracting foreign investment.

5.1.5 Other Variables

The remaining globalization dimensions—Interpersonal, Informational, and Cultural Globalization—did not exhibit significant effects on GDP growth within this study. This suggests that these dimensions may not have a direct impact on economic performance in the Eastern European context during the period analyzed.

6.2 Hypotheses Testing

Hypothesis H1b: Trade De Jure Globalization (TradeDJ) positively influences GDP growth. This hypothesis is partially supported. The U-shaped relationship indicates that initial increases in TradeDJ may negatively impact GDP growth, but beyond a certain level, the effect becomes positive.
Hypothesis H2a: Financial De Facto Globalization (FinancialDF) negatively influences GDP growth. This hypothesis is supported, as FinancialDF has a negative and significant coefficient.
Hypothesis H6b: Political De Jure Globalization (PoliticalDJ) positively influences GDP growth. This hypothesis is marginally supported, given the positive coefficient and marginal significance of PoliticalDJ.
Other Hypotheses: The remaining hypotheses are not supported, as the corresponding variables are not statistically significant.

The significant negative coefficient of TradeDJ and the positive coefficient of TradeDJSq confirm a U-shaped relationship between Trade De Jure Globalization and GDP growth. This suggests that at lower levels of trade policy liberalization, the impact on GDP growth is negative, possibly due to the costs associated with adjusting to new trade regimes and initial market disruptions. However, as trade policies become more liberalized beyond a certain point, the positive effects emerge, leading to enhanced GDP growth. This reflects the benefits of increased market access, economies of scale, technology transfer, and foreign investment that come with deeper integration into the global economy.

7. Policy Implications

The findings of this study offer valuable policy implications for Eastern European countries seeking to maximize globalization benefits. The negative impact of Financial De Facto Globalization on GDP growth suggests that policymakers should exercise caution when liberalizing financial markets. Strengthening financial institutions and implementing robust regulatory frameworks are essential to mitigate the risks associated with financial openness, such as exposure to external shocks and financial crises. By enhancing the resilience of the financial sector, countries can better manage capital flows and protect their economies from volatility.

The U-shaped relationship between Trade De Jure Globalization and GDP growth underscores the importance of strategic implementation of trade policies. Policymakers should be aware that initial liberalization

may entail adjustment costs and challenges, such as industry restructuring and increased competition for domestic firms. To navigate these challenges, governments should provide support mechanisms, including retraining programs, subsidies for affected industries, and investments in infrastructure. As trade policies mature and integration deepens, the positive effects on GDP growth become more pronounced. Therefore, sustained commitment to trade liberalization, coupled with supportive domestic policies, can enhance economic performance.

The marginally significant positive effect of Political De Jure Globalization indicates that political integration and cooperation may contribute to economic growth. Policymakers should continue to pursue international agreements and align domestic institutions with global standards. Engagement in international organizations and adherence to international norms can enhance institutional quality, promote stability, and attract foreign investment.

For other dimensions of globalization, such as Interpersonal, Informational, and Cultural Globalization, which did not show significant effects on GDP growth in this study, policymakers should note that these dimensions may not directly influence economic performance within this specific context. However, policies promoting these aspects might still yield substantial indirect benefits in other areas, for example contributing to quality of life, social cohesion, technological advancement, and cultural enrichment. Such non-economic impacts are valuable for broader social progress and integration, even if their effects on GDP growth are not directly measurable.

In summary, Eastern European countries should adopt a balanced approach to globalization. Careful management of financial openness, strategic implementation of trade policies, and active participation in political globalization can optimize the benefits of globalization and promote sustainable economic growth.

8. Conclusion

This study provides a comprehensive analysis of the impact of various dimensions of globalization on GDP growth in Eastern Europe, utilizing a Fixed Effects model to capture both linear and nonlinear relationships. The findings highlight the complexity of globalization's effects on economic performance in the region. The negative impact of Financial De Facto Globalization confirms the risks associated with financial openness in economies with less developed financial systems. The U-shaped relationship between Trade De Jure Globalization and GDP growth underscores the importance of a phased approach to trade policy, accounting for initial adjustment costs and recognizing the substantial long-term benefits of deeper integration. The marginally significant positive effect of Political De Jure Globalization suggests that political integration may offer potential growth benefits, meriting further examination.

These results emphasize the need for policymakers to carefully manage globalization processes, tailoring strategies to their country's specific context and developmental stage. By addressing the challenges and leveraging the opportunities presented by different dimensions of globalization, Eastern European countries can advance their economic growth and deepen integration into the global economy.

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Appendix - Structure of the KOF Globalisation Index

Globalisation Index, de facto	**Weights**	**Globalisation Index, de jure**	**Weights**
***Economic Globalisation*, de facto** Comprised of:	***33.3***	***Economic Globalisation, de jure*** Comprised of:	***33.3***
Trade Globalisation, de facto	*50.0*	*Trade Globalisation, de jure*	*50.0*
Trade in goods	38.8	Trade regulations	26.8
Trade in services	44.7	Trade taxes	24.4
Trade partner diversity	16.5	Tariffs	25.6
		Trade agreements	23.2
Financial Globalisation, de facto	*50.0*	*Financial Globalisation, de jure*	*50.0*
Foreign direct investment	26.7	Investment restrictions	33.3
Portfolio investment	16.5	Capital account openness	38.5
International debt	27.6	International Investment Agreements	28.2
International reserves	2.1		
International income payments	27.1		
***Social Globalisation*, de facto** Comprised of:	***33.3***	***Social Globalisation, de jure*** Comprised of:	***33.3***
Interpersonal Globalisation, de facto	*33.3*	*Interpersonal Globalisation, de jure*	*33.3*
International voice traffic	20.8	Telephone subscriptions	39.9
Transfers	21.9	Freedom to visit	32.7

International tourism	21.0	International airports	27.4
International students	19.1		
Migration	17.2		
Informational Globalisation, de facto	*33.3*	*Informational Globalisation, de jure*	*33.3*
Used internet bandwidth	37.2	Television access	36.8
International patents	28.3	Internet access	42.6
High technology exports	34.5	Press freedom	20.6
Cultural Globalisation, de facto	*33.3*	*Cultural Globalisation, de jure*	*33.3*
Trade in cultural goods	28.1	Gender parity	24.7
Trade in personal services	24.6	Human capital	41.4
International trademarks	9.7	Civil liberties	33.9
McDonald's restaurant	21.6		
IKEA stores	16.0		
***Political Globalisation*, de facto**	***33.3***	***Political Globalisation, de jure***	***33.3***
Embassies	36.5	International organisations	36.2
UN peace keeping missions	25.7	International treaties	33.4
International NGOs	37.8	Treaty partner diversity	30.4

(Gygli et al., 2019)

TWO MANIFESTATIONS OF THE MIDDLE-INCOME TRAP IN EAST-CENTRAL EUROPE

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Abstract: The paper attempts to reinterpret the concept of the middle-income trap and develops the theory of participation and self-effort. On this basis, the paper distinguishes two different types of middle-income traps. The exclusion trap, which is the result of a one-sided focus on the self-effort, and the vulnerability trap, which is the result of a one-sided focus on participation. The model argues that catching-up can be achieved when the participation and the self-effort are in harmony. The paper also uses this approach to analyse the middle-income trap in East-Central European countries, demonstrating the empirical validity of the theory. It associates socialist planned economies with the exclusion trap, while identifying the dependent market economy model that emerged after regime change with the vulnerability trap.

Keywords: middle-income trap, East-Central Europe, dependent market economy
JEL Classification: *O14, O52, P52*

1 Introduction

The middle-income trap (MIT), a common term in the economic literature, is mainly used to describe the situation of middle-income regions that get stuck in the catching-up process (Gill & Kharas, 2007; Kharas & Kohli, 2011; Eichengreen et al., 2013; Agénor, 2017). In this discourse, one of the most important examples is represented by the East Central European countries (Myant, 2018; Sőreg, 2018; Győrffy, 2022). However, the theoretical underpinnings of the middle-income trap concept have been the subject of considerable debate (see: Doner & Schneider, 2016; Bresser-Pereira et al., 2020; Csath, 2022).

This paper aims to contribute to this theoretical debate by approaching the middle-income trap from a new direction, thereby broadening the conceptual framework. In contrast to empirical views of the middle-income trap that focus on simple growth processes, this paper views MIT as a situation that arises from a disharmony between participation in the global division of labour and self-effort (a term that expresses the effort to create a country's own value-creating capabilities), and argues that an upward exit from the middle-income trap can be achieved through a harmony of participation and self-effort. Based on a delineation between participation and self-effort, the paper distinguishes two distinct types of middle-income traps - the exclusion trap and the vulnerability trap - thereby further developing the theoretical underpinnings of the concept.

An important motivation for redefining the middle-income trap is to make it more applicable for describing the challenges facing the East-Central European region. Consequently, post-socialist experiences play an important role in the model developed in this study. Moreover, the approach of participation and self-effort are used to analyse the situation in the post-socialist countries of East-Central Europe (Czechia, Hungary, Poland, Romania and Slovakia), thus proving the empirical validity of the theory formulated in the study.

The paper is divided into four parts. The first part reinterprets the middle-income trap and outlines the model of participation and self-effort. The second part describes the methodology. In the third part, the theoretical model is used to illustrate the situation of East-Central European countries. The paper ends with a conclusion.

2 The Middle-income Trap: A Reinterpretation and Brief Literature Review

The concept of the middle-income trap is far from old in the literature, the first mention of it being associated with the study by Gill and Kharas (2007). Their main message was that middle-income countries face distinct challenges that cannot be solved by growth theories developed on the basis of low-income countries (Gill & Kharas, 2015). The main problem of middle-income countries is that they are no longer able to compete with low-income countries where wages are low, but they are not yet able to compete with developed countries either,

because they cannot switch from resource-based growth (relying on low labour costs) to productivity-based growth in time (Kharas & Kohli, 2011).

In this growth-focused approach, the middle-income trap is a sudden slowdown in growth following a period of stable catching-up (Agénor, 2017). Studies of the middle-income trap typically take two approaches: absolute and relative income analyses. Absolute approaches use absolute income data to assess a country's stagnation. For example, Eichengreen et al. (2013) and Ayiar et al. (2013) define the trap as a prolonged growth slowdown affecting middle-income countries, with Eichengreen et al. (2013) identifying a slowdown to a seven-year average growth of less than 3.5%. Relative studies, such as those by Agénor et al. (2012) and Im and Rosenblatt (2013), measure income convergence against a benchmark (usually the US) and are more appropriate for assessing convergence dynamics. While the studies by Im and Rosenblatt (2013) and Bulman et al. (2014) find no evidence of a trap, Robertson and Ye (2013) report that almost half of the 46 middle-income countries in their study remain trapped, suggesting mixed results across methodologies.

Nevertheless, there are many critics of this growth-oriented concept of the middle-income trap. Glawe and Wagner (2016) point out that empirical definitions are highly data-dependent and therefore difficult to compare, as different results can be obtained based on different datasets. However, the theoretical basis of the concept is also not adequate. Doner and Schneider (2016) consider the institutional and political economy foundations of the middle-income trap to be missing. They point out that moving beyond the middle-income status is only possible through intensive institution building, but the political conditions that facilitated the move to middle-income status hinder this institutional development. Moreover, Bresser-Pereira et al (2020) even question the theoretical validity of the middle-income trap concept. Using Latin America as an example, they show that it is not the middle-income trap but the liberalisation process that has plagued these countries since the 1980s.

Based on these critics, we undertake to reinterpret the mainstream growth-based approach to the middle-income trap. The starting point of our approach is an arbitrary middle-income country, which participates in the global division of labour, which includes factors to facilitate and hinder catch-up. These facilitating and hindering factors are grouped into production, consumption and institutional categories.

The most visible advantages of participation that facilitate catching-up are economic benefits on the production side. According to Milanovic (2019), specialisation along the global value chain (GVC) encourages developed countries to involve emerging economies in modern technologies. In addition, Mudambi (2008) points out that, due to increasing competition, developed countries standardise various upstream and downstream activities and outsource them to emerging economies. This process creates knowledge spillovers, which may help emerging countries catch up. Therefore, the economic benefits of the production side take the form of inflows of capital, technology and knowledge. In addition, participation in the global division of labour creates the opportunity for producers to compete internationally, which is essential to increase productivity.

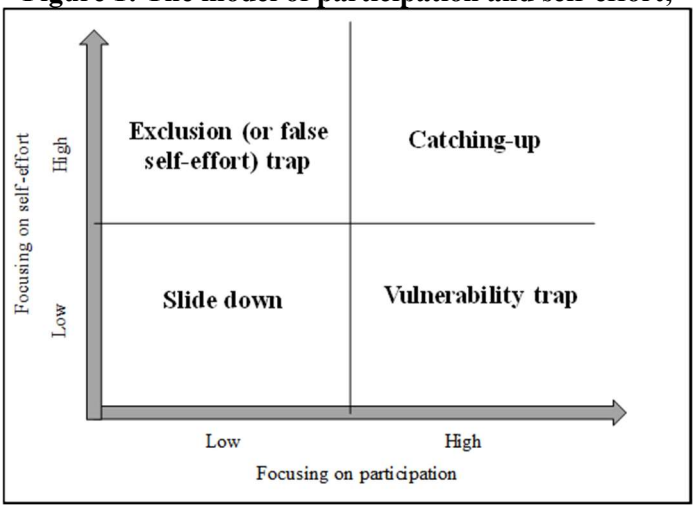
On the consumption side, the benefits of participating in the global division of labour should be sought in increased demand. As Kharas and Kohli (2011) point out, demand factors become important for development at the middle-income level. Participation will boost demand through capital inflows and new investments. While most domestic firms are unable to pay higher wages, foreign factories can (Doner & Schneider, 2016), which in turn helps to increase demand.

In addition, there are institutional benefits associated with participating in the global division of labour. An important reason for the middle-income trap is the weakness of institutions (Pruchnik & Zowczak, 2017). Poorly functioning institutions do not promote human capital growth and can exacerbate the middle-income trap. Participation creates opportunities for institutional development, as middle-income countries can adopt advanced institutional systems.

It is important to stress, however, that participation in the global division of labour also involves factors that act as barriers to catching up. The production aspects that hinder catching up can be divided into two main parts: unilateral relocation of the factors of production and unequal position in the global value chain. The first one represents the relocation of capital, labour and human capital, which mainly covers capital flight, emigration and brain drain, in the modern age (Arrighi, 1990). The second is equivalent to having a disadvantaged position in global value chains. Following Mudambi (2008) the manufacturing position of middle-income countries in the global value chain may become a hindering factor to their catching up. First, it represents a disincentive to investing in human capital, as relatively low skill levels are sufficient in production lines where high wages are paid (Agénor & Canuto, 2015). Secondly, it does not stimulate innovation either, as manufacturing positions are dominated by assembly, while R&D remains in headquarters (Mudambi, 2008). Thirdly, domestic firms become dependent and if the arrival of foreign capital does not lead to organic economic links between the domestic and foreign economies, a dual economic structure will be created (Hirschmann, 1957).

On the consumption side, an important factor hindering catching-up is a dualism in consumption patterns (Furtado, 1971). This is due to the fact that, as a result of the demonstration effect discussed in post-Keynesian development economics, groups in society empowered by participation will copy advanced consumption patterns, while traditional consumption patterns persist in lower segments of society, reinforcing a duality. (Szentes, 2005). This could also have a negative impact on the trade balance.

Figure 1: The model of participation and self-effort;



Source: own elaboration

There are also institutional disadvantages. Participation can have a significant disadvantage if formal institutions are adopted without taking into account local specificities. The literature on institutional economics suggests that the adoption of formal institutions is not an easy task due to path dependency. The contradiction between formal and informal institutions can hinder the catching-up process (Rosta, 2022). Following Doner and Schneider (2016), it is also clear that the necessary institutional reforms are hindered by tensions between interest groups arising from the dualism of production and consumption.

Without aiming to provide an exhaustive list, the following are the most important factors that facilitate and hinder the catching-up of a middle-income country in the global division of labour. Facilitating factors include technology, capital and knowledge transfer; increasing demand; political stability and institutional development; and the potential for competition and export markets. Hindering factors include: an unequal value chain position; emigration and capital flight; dualism in production and consumption; and institutional hindrances that may perpetuate the position.

In our view, middle-income countries should focus on two strategies simultaneously. On the one hand, they should continue to strengthen their participation in the international division of labour in order to achieve factors that facilitate their catching-up. This involves increasing their benefits from the international division of labour, which can be achieved through economic openness, integration into value chains, promotion of foreign capital and institutional convergence. On the other hand, they should neutralise any constraining factors, this is the self-effort strategy as it is called in this paper. Self-effort is the totality of efforts that a country needs to make to reduce the effects of emigration and brain drain and to be able to increase the economy's capacity to create value, thus paving the way for breaking out of the manufacturing position.

Putting together the elements discussed so far, we can say that a one-sided focus on participation or self-effort will not lead to catch-up. This is because, when only the strategy of participation is in the focus, facilitating factors will appear, but also hindering ones will inevitably emerge. This is called the vulnerability trap. At the same time, when only the strategy of self-effort is in the focus, hindering factors can be avoided, but the country will be completely void of facilitating factors; this is called the exclusion trap. We can also call it a false self-effort trap because real self-effort exists only in the case of participation, since the real extent of self-effort may only be revealed in the global division of labour, so self-effort without participation may prove to be an illusion. In these two cases, therefore, what you gain by focusing on one of the strategies is lost by the absence of the other.

We argue that a well-functioning industrial policy can find a harmony between participation and self-effort. In that case, a country is able to achieve the facilitating factors and avoid the hindering ones at the same time, therefore, it will be able to catch up. Moreover, there is also a fourth case, where a country is unable to focus on

any of the strategies, which, in our view, represents a slide-down to the periphery. The model is explained in Figure 1.

3 Methodology

Our paper presented a novel theoretical model for understanding the middle-income trap by distinguishing between the strategy of participation and self-effort. Using this model, we identified two distinct forms of the trap: the exclusion trap and the vulnerability trap. The main motivation for developing this model was to better capture the unique challenges faced by post-socialist countries. Therefore, in the next section we apply it to East-Central Europe, specifically examining the cases of Czechia, Hungary, Poland, Romania and Slovakia.

Our approach is a mixed-methods analysis, combining both qualitative and quantitative methods. We conduct a historical review, tracing regional development since the socialist period and using relevant literature to frame the trajectory of the middle income trap. We also conduct a descriptive statistical analysis using 13 selected indicators to provide a comprehensive overview of the region's position within the trap.

In line with our theoretical model, the participation strategy focuses on optimising the benefits of global integration, which can be achieved through openness to trade, integration into global value chains and the promotion of foreign direct investment. We measure participation strategy by tracking economic openness (trade as a share of GDP), FDI stocks, the share of global value chain trade and the contribution of foreign firms to value added. The self-effort strategy focuses on a country's ability to increase its value creating capabilities, mainly by increasing human capital, innovation and productivity growth of domestic firms. We measure this using R&D and education expenditure, the share of tertiary educated in the population, the Brain Dain Index, the share of science and technology workers, EIC innovation scores, patent applications, the share of innovative firms and the productivity gap between foreign and domestic firms. We calculated regional averages for these indicators, which are presented in the next section. We used 2018 as the end point, as this was the year available for each indicator. Germany, Austria and Sweden were used as reference countries. The indicators and their sources used to measure participation and effort are presented in Table 1 in the annexes.

4 Participation and Self-effort in East-Central Europe

Before the change of regime, the countries of East-Central Europe were part of the socialist bloc. The refusal to participate in the global division of labour and the pursuit of autarky were essential elements of the socialist system. In a region of small economies, total self-sufficiency was not possible, but a shift towards it was clearly visible in the Stalinist industrialisation programme (Berend, 1996). The need for autarky necessarily followed from the institutional mechanisms of a planned economy, because planning authorities determined needs together with production capacities, therefore, the emergence of some external capacity would have undermined the omnipotence of planning (Türei, 1997). The rejection of participation was also ideologically necessary, as socialist systems sought to break away from the world capitalist market, which they considered hostile, and to replace it with their own internal systems of division of labour. Although it is important to note, following Böröcz (1992), that socialist countries always remained economically dependent on the Western bloc and thus did not completely dismantled their economic ties; they nevertheless embodied a large-scale example of withdrawal from the global division of labour. This separation was further reinforced by the Western bloc's significant restrictions on access to technology in the region (Berend, 2009).

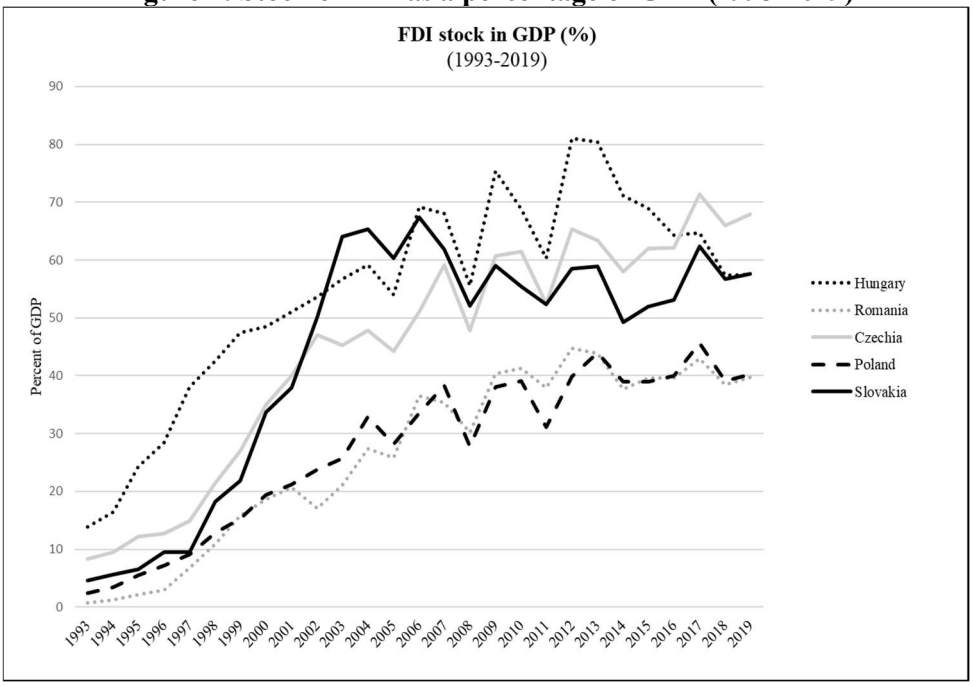
According to Milanovic (2019), the system of 'existing socialism' was an interim phenomenon that dismantled feudalism and laid the foundations for capitalism in peripheral states. Socialism was an alternative route to achieving capitalism, because semi-periphery states could not follow the Western path of development. In this perspective, socialism can be interpreted as a one-sided strategy of self-effort, which attempted to catch up by using instruments of a planned economy. However, the socialist attempt at modernisation was not successful, since, as Kornai (1992) describes, the inefficient mechanisms of the planned economy produced a chronic shortage economy, which clearly underperformed the Western economic system. In that period, therefore, post-socialist countries one-sidedly focused on self-effort by rejecting to participate; therefore, the middle-income trap can be interpreted as an extreme case of the exclusion (i.e. false self-effort) trap. This also means that the results achieved through the planned economy have in fact proved to be uncompetitive in the long run, the main reason for which, according to Kornai (2013), is the lack of innovation, which resulted from the institutional characteristics of the socialist system. Thus, the middle-income trap in this period mainly manifested in a lack of participation and the strategy of self-effort pursued to compensate for the lack of participation by relying on inefficient mechanisms of the planned economy.

However, from the 1970s, the gradual unwinding of the exclusion trap began, culminating in the change of regime, resulting in the final dismantling of the inefficient system of the planned economy. A full participation of post-socialist countries in the global division of labour could be launched. An important element of participation, the economic openness, and thus the unwinding of autarky, had already begun before the change of regime. According to Our World in Data (2023), economic openness (export plus import in GDP) in Romania increased from 5.29% in 1970 to around 39.45% in 1990. And the change of regime further accelerated this process: the average economic openness in the region was around 50.36% in 1990, rising to 96.16% in 2000, 118.63% in 2010, and reaching 139.1% in 2018. This growth was particularly strong in Slovakia, bringing the economic openness to 190.54% in 2018.

However, the transition from a planned economy was not smooth economically, as it led to a transformation crisis in the 1990s, albeit to varying degrees (Kornai, 1994), which triggered a major deindustrialisation process (Lux, 2017). The crisis was accompanied by a huge increase in unemployment and a significant fall in GDP (Kornai, 1994). Therefore, due to these effects, post-socialist countries were put into a difficult situation, which threatened social and economic disaster. Thus, a recovery from the crisis became a key priority for the region. The saviour of the region appeared in the form of foreign direct investment (FDI). For foreign capital, post-socialist countries proved to be an excellent field, owing to their good geographical location and relatively high skill levels, in addition to low wages (Berend, 2009). As Figure 2, based on UNCTAD (2023) data, shows, this process led to a significant increase in the stock of FDI in the region, which can be categorised as part of the participation strategy. While the regional average of FDI stock was around 6% of GDP in 1993, it increased to 51.5% of GDP in 2018. Since the mid-1990s, the stock of FDI has grown particularly fast in Hungary, reaching 81% of GDP in 2011. This level was followed, somewhat later, by an increase in the stock of FDI in the Czech Republic and Slovakia. Thus, the years following the change of regime witnessed a significant inflow of foreign capital into the region, which enabled a significant reindustrialisation from 1995 onwards (Lux, 2017).

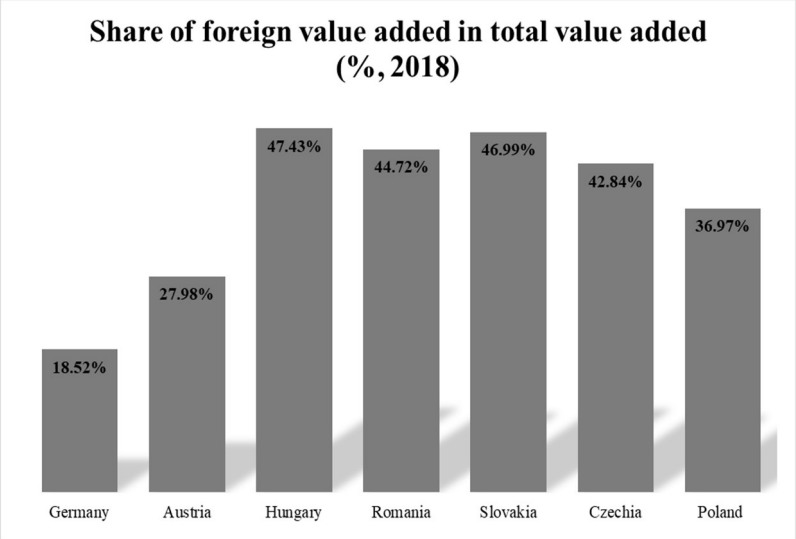
The growth in the stock of FDI in the region has been accompanied by a gradual increase in participation in global value chains. Based on World Bank data (2023), the share of GVC-related trade in the region's total trade volume averaged less than 40% in 1995 (37,02%), but rose to more than 55% in 2018 (55,16%). Of course, there were significant regional differences, with the share in Hungary reaching 60.25% in 2018 and in Romania increasing from 31.41% in 1995 to 43.16% in 2018. Thus, the strengthening of the participation strategy provided an opportunity for the countries of the region to become involved in global value chains as a result of the globalisation process that unfolded in the 1990s. As a result, there has been a specialisation in manufacturing activities (Lux, 2017). Studies on global value chains confirm this specialisation in manufacturing, with Kordalska and Olczyk (2023) arguing that Central and Eastern European countries have become 'factory economies' as opposed to Western European 'headquarters economies'.

Figure 2: Stock of FDI as a percentage of GDP (1993-2019)



Source: UNCTAD (2023)

Figure 3: Share of foreign value added (2018)

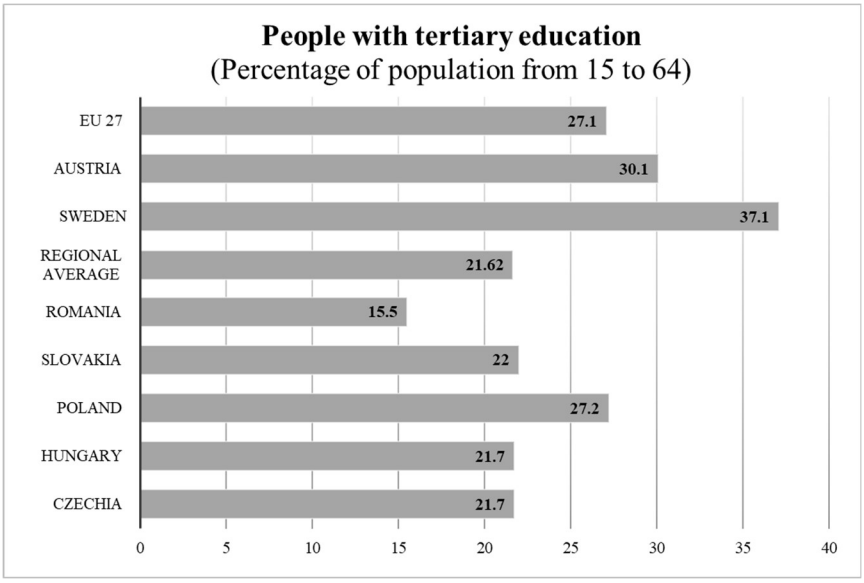


Source: Eurostat (2023a)

After the change of regime, the success of the participation strategy led to the emergence of a new economic model in post-socialist countries, which replaced the former socialist planned economy and is called in literature, following an influential article by Nölke and Vliegenthart (2009), the dependent market economy. Under this economic model, the comparative institutional advantage lies in carrying out assembly and manufacturing work and attracting foreign capital related to it. The dependent model is about increasing the benefits of participation, and, therefore, relies heavily on the technologies and knowledge of foreign companies. This is illustrated by the fact that, by 2018, foreign companies produced 44% of the total added value, on average, in the region, and this proportion was particularly high (around 47%) in some countries such as Hungary and Slovakia (Eurostat, 2023a). This reflects an extremely extensive presence of foreign companies in the region, as the proportion is much lower in countries such as Germany and Austria (Figure 3). Despite the emergence of nationalist rhetoric against FDI dependence after the 2008 crisis, economic nationalist governments in East-Central Europe have continued to promote FDI-led growth through EU regional investment aid (Medve-Bálint & Éltető, 2024).

The dependent market economy model is based on a one-sided participation and the neglect of self-effort, and is thus strongly exposed to the middle-income trap (Myant, 2018). The region is built on low-added-value, low-knowledge assembly and standardised tasks (Boda, 2021), and is structured according to the interests of foreign direct investments (FDI) that secure them (Nölke & Vliegenthart, 2009). The model is essentially about attracting foreign capital investments, which leads to the emergence of a competition state. This means that countries compete with each other to create even better conditions for capital inflows, a process resulting in low wages, low taxes and flexible regulations (Drahokoupil & Piasna, 2019). But a negative tax competition makes it difficult to increase government spending on education and R&D, which is an important element of self-effort strategy. The level of funding for these two sub-systems in the region is below that of developed countries based on Eurostat (2023b). In the case of education, the regional average is 4.32% of GDP in 2018, compared to 6.9% in Sweden and 4.8% in Austria. The gap is particularly large in Romania, where only 3.1% of GDP was spent on education in 2018. The gap for R&D is even more dramatic, with the regional average at 0.62% of GDP in 2018, around a third of the level in Sweden and Austria (1.8%).

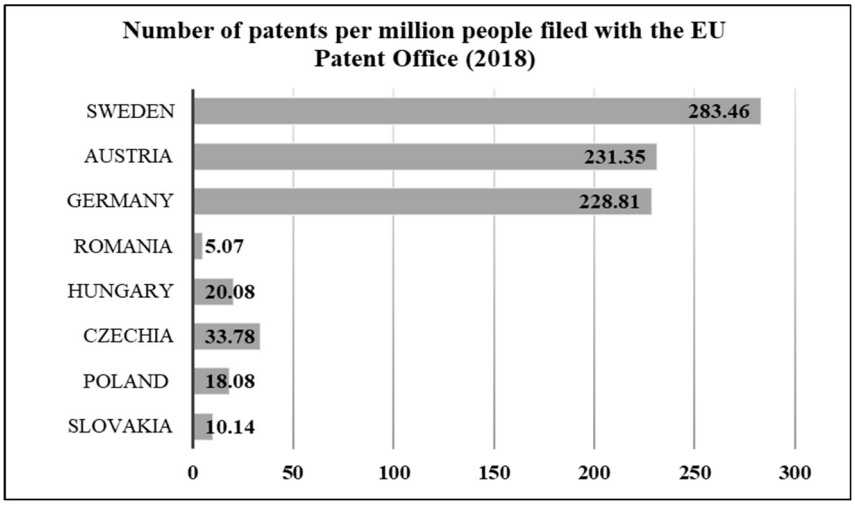
Figure 4: People with tertiary education (2018)



Source: Eurostat (2023c)

The underfunding of education in a competition state leads to skills levels of human capital lagging behind those of developed countries. This is further reinforced by the subordination of education to foreign capital, resulting in a shift towards vocational training to serve assembly factories (Nölke & Vliegenthart, 2009). Furthermore, specialisation in manufacturing does not make citizens interested in developing their human capital, as the sectors dominated by the highest paying foreign capital do not require such high skills. All this leads to a significant gap in terms of human capital in the region. This is shown by the fact that in 2018, the proportion of people with tertiary education in the population was 21.62% on average, with these countries positioned below the EU27 average and well below Sweden's level of over 37% (Eurostat, 2023c). The EU average is exceeded only in Poland as shown in Figure 4. The gap in terms of human capital is also reflected in the fact that in 2018, on average, 17.74% of the employed worked in the most skill-critical technology and science sectors, well below the rates of 24.2% in Austria and 32.3% in Sweden (Eurostat, 2023d). The development of human capital is made even more difficult by the problem of brain drain. The emigration of high-skilled people is reinforced by a dependent market economy model that is based on low wages. Based on the FS brain-drain and emigration index (2023), the region is significantly exposed to brain-drain. In 2018, the region had an average score of 3.6, higher than the score of 1.2 for Austria or Sweden. The Czech Republic is the least exposed to emigration (2.5), while Romania is the most exposed to it (4.2).

Figure 5: Number of patents per million people filed with the EU Patent Office (2018)



Source: Eurostat (2023e)

In a dependent market economy, funding innovation, as well as education, becomes more difficult. This is also attributable to a harmful tax competition, but the phenomenon of duality in economy also plays a role. Foreign companies have their innovation centres in their home countries, so innovation comes from outside. And it is much more profitable for domestic companies to become suppliers to foreign companies, rather than undertaking risky innovation processes by themselves. As a result, the proportion of innovative companies lags significantly behind that of developed countries, with 28.86% of companies, on average, in the region being considered innovative between 2016 and 2018, compared to 62.6% in Austria and 67.8% in Germany (Eurostat, 2023f). The low proportion of innovative firms and economic duality make innovation difficult, and domestic innovation processes become imitating in nature (Nölke & Vliegenthart, 2009). It is no coincidence that the region is among the worst performing Member States in the European Union, according to the European Innovation Framework (2023), which summarises a number of innovation-related indicators (the scale is: 0-1). The region scored an average of 0.3 points in 2018, less than half of Austria's score of 0.64 and Sweden's 0.69. The Czech Republic is the only country where innovation reaches a score of 0.4 The innovation gap is also clearly visible from the number of patents filed with the European Patent Office (Eurostat, 2023e). In 2018, the average number of patents per million people in the region was 17.43, compared to 231.4 in Austria (Figure 5).

Economic duality is also an important phenomenon in the region, which also negatively affects innovation. This duality is reflected in the large labour productivity gap between domestic and foreign firms, which shows the weakness of the domestic economy. Of course, large foreign companies are also more efficient than small domestic companies in developed countries, but this duality is prominent in the region, with foreign companies being 2.17 times more productive, on average, than domestic ones in 2018 (Eurostat, 2023a).[1] This duality was strongest in Hungary (2.58), while the ratio was only 1.46 in Austria.

In summary, the dependent market economy model, which evolved after the change of regime, has achieved significant successes in terms of participation strategy, which is reflected in economic openness, large inflows of foreign capital and integration into global value chains. However, the success of the participation strategy does not remedy the fact that the region is lagging behind in terms of self-effort, which is also cemented by the institutional characteristics of the dependent market economy model and the structural characteristics of an economy specialised in assembly positions. Based on the model of participation and self-effort, we thus identify the dependent market economy with the vulnerability trap.

5 Conclusion

This study has attempted to reform the mainstream approach to the middle-income trap. By identifying the strategy of participation and self-effort, we have been able to distinguish two distinct types of middle-income traps: the vulnerability trap and the exclusion trap. Our approach provides the missing theoretical foundations of the middle-income trap, and thus goes beyond empirical views of the concept. The model draws attention to the fact that it is not enough to rely on self-effort or participation to catch up, but that it is the consistency of internal efforts and external opportunities that counts, meaning that the model can capture both global circumstances and domestic economic policies. It distinguishes between two types of trap and shows that there is no universal middle-income trap. It also points out that the middle-income trap can manifest itself differently in different historical periods.

The empirical validity of our theoretical model was tested on the case of the East-Central European region. In our analysis, we found that the region has historically been caught in a persistent middle-income trap of varying manifestations. The socialist planned economy was identified as an extreme example of the exclusion trap, which was gradually dismantled from the 1970s onwards. The success of the participation strategy, however, masked the fact that in the meantime sufficient self-effort had not been developed, so that after the regime change the dependent market economy model emerged, which was considered as a form of the vulnerability trap. The main message of this study for the region is that, in order to promote catching-up, it should go beyond the one-sided strategy of participation and find a more harmonious cooperation between participation and self-effort. The critical challenge is how the region can strengthen its strategy of self-effort while maintaining and building on the benefits of the high level of participation achieved. We argue that the key to meeting this challenge is to develop human capital, stimulate innovation, reduce economic duality and create a successful state industrial policy (Ricz, Sallai & Sass, 2023; Trautmann & Vida, 2021).

[1] Here, the regional average excludes Poland. Data for Poland could distort the results because of the difference in methodology.

Our study offers many opportunities for further research. The application of the model of participation and self-effort is justified in regions other than East Central Europe, and it may also be worthwhile to link it to historical phases in the world economy. Furthermore, East-Central Europe is worthy of further analysis, including the mapping of regional diversity in terms of participation and self-effort.

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Annexes - Table 1: Indicators of participation and self-effort, description of indicators, and sources of data

	Related	Indicator	Description	Source
Participation	Economic opennes	**Trade Opennes**	The sum of a country's exports and imports as a share of that country's GDP (in %).	Our World in Data. (2023) Trade openness (1950-2019). available at: https://ourworldindata.org/grapher/trade-openness?time=earliest, accessed 27 April 2023.
	Integration into the global value chains	**GVC related trade**	GVC related trade in total trade (%)	World Bank. (2023) GVC related trade % gross trade (calculated based on Tiva). GVC Trade Table. World Integrated Trade Solution. available at: https://wits.worldbank.org/gvc/gvc-trade-table.html, accessed 28 April 2023.
	Inflows of foreign capital	**FDI Stock**	FDI Stock in % of GDP	UNCTAD. (2023) Foreign direct investment: Inward and outward flows and stock, annual. available at: https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx, accessed 28 April 2023.
		Foreign value added	Share of foreign value added in total value added (%)	Eurostat. (2023a) Foreign control of enterprises by economic activity and a selection of controlling countries (from 2008 onwards). available at: https://ec.europa.eu/eurostat/databrowser/view/FATS_G1A_08/default/table?lang=en, accessed 28 April 2023.
Self-effort	Human capital and innovation	**Education and R+D expenditures**	Expenditure as a percentage of GDP	Eurostat. (2023b) General government expenditure by function (COFOG). available at: https://ec.europa.eu/eurostat/databrowser/view/GOV_10A_EXP/default/table?lang=en, accessed 28 April 2023.
	Human capital	**People with tertiary education**	Percentage of total population (15-64)	Eurostat. (2023c) Population by educational attainment level, sex and age (%) - main indicators. available at: https://ec.europa.eu/eurostat/databrowser/view/EDAT_LFSE_03/default/table?lang=en, accessed 28 April 2023.
		Persons employed in science and technology	Percentage of total population (15-74)	Eurostat. (2023d) HRST by category, sex and age. available at: https://ec.europa.eu/eurostat/databrowser/view/HRST_ST_NCAT/default/table?lang=en , accessed 28 April 2023.
		Human Flight and Brain Drain Index	Index point (the lower the better)	Fragile State Index (2023)
	Innovation	**EU Innovation Scoreboard**	Summary Innovation Index	EIS. (2023) European innovation scoreboard. available at: https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en , accessed 18 March 2023.
		Patent applications to the EPO	Per million inhabitants	Eurostat. (2023e) Patent applications to the EPO by country of applicants and inventors (2004 and onwards; source: EPO) available at: https://ec.europa.eu/eurostat/databrowser/view/PAT_EP_TOT/default/table?lang=en, accessed 28 April 2023.
		Enterprises with innovation activities	Percentage of all enterprises	Eurostat. (2023f) Enterprises with innovation activities during 2016 and 2018 by NACE Rev. 2 activity and size class. Community innovation survey. available at: https://ec.europa.eu/eurostat/databrowser/view/INN_CIS11_INACT/default/table?lang=en, 29 April 2023.
	Economic duality	**Economic duality**	Labour productivity of foreign companies compared to domestic companies	Eurostat. (2023a) Foreign control of enterprises by economic activity and a selection of controlling countries (from 2008 onwards). available at: https://ec.europa.eu/eurostat/databrowser/view/FATS_G1A_08/default/table?lang=en, accessed 28 April 2023.

Source: own elaboration

THE SECOND-GENERATION ASIAN TIGERS: SPECIFIC POLICIES TO STIMULATE TRADE IN ENVIRONMENTAL GOODS[1]

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Abstract: The five countries considered the Asian Tigers of the second generation, namely Malaysia, Indonesia, Thailand, the Philippines and Vietnam, have embarked on ambitious policies to achieve carbon neutrality in the next decades. Among these policies, those influencing trade have the potential to further green their economies. The index of comparative advantage in environmental goods and also trade in environmental goods as a share of total exports indicate that Malaysia is better prepared for export than the other four, while Thailand, Indonesia, and Vietnam are more inclined towards imports of environmental goods. Even if trade data do not reflect the trade flows of recent years, the available information emphasizes evident progress in the case of Malaysia, as well as new strategies and policies for a sustainable future for all the countries analysed.

Key-Words: trade in environmental goods, comparative advantage in environmental goods, sustainable trade policies, second-generation Asian Tigers
JEL Classification: F10, F13, F18

1. Introduction

Three decades ago, it started the debate between environmentalists and the trade community (specialists, exporters, importers) regarding the impact of trade liberalization on environmental quality. Environmentalists state that trade liberalization exacerbates environmental issues as it leads to more production, more resource depletion, and more pollution (Thompson & Strohm, 1996; Neumayer, 2000). By contrast, the trade community points to the increases in income due to trade and simultaneously to increases "in the demand for environmental quality that typically accompany higher income" (Thompson & Strohm, 1996). The reconciliation between international trade and the environment has not been achieved yet.

It is evident that trade is accompanied by both positive income effects and negative effects from economic expansion, but whether the balance is positive or negative has not been demonstrated. It is obvious that it is necessary to reconcile two values that are "absolutely essential to the well-being of mankind: protection of the environment and international free trade" (Schoenbaum, 1997).

The Asian Tigers of the second generation - Malaysia, Indonesia, Thailand, the Philippines and Vietnam (AT-5) – are a relevant case study to demonstrate this reconciliation. Trade in environmental goods (EGs) supports national efforts for the just energy transition towards a green economy. Simultaneously, specific measures to stimulate the economy through green technology, to boost sustainable industries, and significantly reduce pollution are an evident impetus to trade in EGs, which generates a virtuous circle.

2. Literature review

The current increase in trade in EGs is part of the solution and also a new argument in favor of more positive effects generated by trade liberalization than negative effects. That is why the opportunity to relaunch negotiations to liberalize trade in environmental goods (started in 2014 under the auspices of the World Trade Organization WTO, but stalled in 2016) is more important than ever.

[1] This paper further capitalizes on the author's doctoral thesis "The place and role of the Asian Tigers in international trade at the end of the 20th century and the beginning of the 21st century". It is also a part of the author's contribution to the study "International trade in environmental goods and services", coordinators Claudia Baicu and Georgeta Ilie, Institute for World Economy, Romanian Academy, 2024.

"Environmentally friendly goods" are defined as products that are "designed to use fewer resources or emit less pollution than their traditional counterparts" (UNCTAD, 2023). Even if their shares in global trade and GDP are still low (IMF, 2024a), one can remark the rapid increase of trade flows and the expanding role of the state in environmental policy, stimulating the adoption of environmental technologies and joint bilateral, regional and international cooperation initiatives (WTO, 2023).

The AT-5 have distinguished themselves as active promoters of sustainable trade policies. Either individually or as part of the Association of Southeast Asian Nations (ASEAN) or as signatories of bilateral trade agreements, they adopted specific measures to stimulate trade in environmental goods. However, opening up in the multilateral framework of the World Trade Organization (WTO) is the best way to invigorate trade in EGs. Bacchetta et al. (2022) and WTO (2022) underscore that environmental goods continue to face significant trade barriers. This trade accounted only for around 4.4% of global trade in 2020. Tariffs applied on an illustrative list of environmental goods range from around 1.4% in high-income countries (none of the AT-5 countries belongs to this category) to 7.3% in low-income countries, while non-tariff measures for environmental goods are substantial and tend to be higher for high-income countries than for middle- and low-income countries.

Among the general priorities of the AT-5 it stands out that of developing capacity for production of EGs and trade in EGs, especially related to decreasing pollution, sustainable battery production and even electric vehicles (particularly in Indonesia and Thailand), access to clean water and sanitation, waste management and recycling (International Trade Administration, 2024).

This paper focuses on specific measures adopted by AT-5 in order to stimulate the green transition, with impact on trade in environmental goods. As this is a heterogeneous group, policies implemented differ from country to country and in spite of similarities, the effects are not the same. Indonesia is the largest economy of the group, with a GDP in current prices of around USD 1,475 billion (ranking the 16th worldwide), followed at a great distance by the others with sizes between USD 445-550 billion: Thailand, the Philippines, Vietnam and Malaysia (IMF, 2024b). Four of the AT-5 are among the first 20 countries in the hierarchy according to population size: Indonesia (4th), the Philippines (14th), Vietnam (16th) and Thailand (20th), while Malaysia is only the 44th. The paper presents also the situation of trade flows in EGs, the index of the comparative advantage in EGs and also trade in EGs as share of total exports and imports for AT-5. International organizations such as the Asia-Pacific Economic Cooperation (APEC), or the Organization for Economic Cooperation and Development (OECD) together with Eurostat endorsed various lists of EGs for trade liberalization. The OECD-Eurostat list was completed in 1998 and published in 1999, with EGs being divided into three groups: A. Pollution Management, B. Cleaner Technologies and Products and C. Resources Management (Steenblik, 2005). Negotiations for the Environmental Goods Agreement under the auspices of the WTO started in 2014, however they collapsed in 2016 as it could not be reached a compromise on the EGs definition. None of the AT-5 was among the 18 participants representing 46 members of the WTO, in contrast to the first four Asian Tigers (Hong Kong-China, Korea, Singapore and Taiwan-China), which took part in the negotiations. The AT-5 countries are members of the APEC and committed to reduction of tariffs on EGs, according to the list of 54 EGs for trade liberalization endorsed in 2012. The APEC EGs list was the first one put into practice around the world and at the end of 2021, the APEC announced its plan to expand it (Mao et al., 2023).

3. Methodology

This paper is based on a qualitative analysis in order to achieve its main objective, namely to investigate key policies which stimulate trade in EGs at the level of AT-5. The effects of these policies are more indirect than direct, however there are evident relationships between such initiatives and trade in EGs. The main data are those published by the International Monetary Fund (IMF) (2024a), namely the Climate Change Indicators Dashboard, and those provided by the World Bank Group (2024), related to trade in EGs. The index of comparative advantage in environmental goods is a useful measure of the relative advantage/disadvantage of the AT-5.

The analysis is structured as follows. Section 4 reveals that Malaysia is competitive in trade in EGs and is the only one in this position among the AT-5. Trade in EGs has been indirectly stimulated by policies, plans, and roadmaps related to green growth. Section 5 focuses on policies related to EGs in Thailand, Vietnam, Indonesia and the Philippines. Section 6 presents the case study of electric vehicles in Thailand, Indonesia, Vietnam and Malaysia. Section 7 concludes.

4. Malaysia, competitive in trade in environmental goods

Following a period characterized by a market-driven approach to promoting green growth, characterized by encouraging private sector participation in renewable energy (RE) without a proper regulatory framework, in 2009 were introduced in Malaysia non-market-based policy instruments. Those were motivated by the need to eliminate the market failures (such as the abuse of monopsony power, arbitrary or incomplete pricing of inputs and information asymmetry). Public interventions followed, however it is still needed (1) the development of the Malaysian trade capacity, as the domestic demand is too small to sustain the sector and (2) a stronger framework where environmental and trade policies are mutually supportive (Paramasua et al., 2019).

In the 12th Malaysian Plan, "environment" is mentioned more than 300 times. The Twelfth Plan is aligned to the 2030 Agenda, representing Malaysia's commitment in implementing the 17 sustainable development goals (SDGs) (Economic Planning Unit, 2021). The first National Policy on Climate Change, published in 2009 (the same year when the National Green Technology Policy was launched), was followed nearly 15 years later by the National Climate Change Policy 2.0. It reaffirms Malaysia's commitment to achieving the climate pledges, including reaching net-zero greenhouse gas (GHG) emissions by 2050. "It aligns with recent strategic initiatives, such as the National Energy Transition Roadmap (NETR), which promotes a just energy transition towards a green economy, and the New Industrial Master Plan (NIMP) 2019-2030, which drives technological innovations and investments for climate action" (Ministry of Natural Resources and Environmental Sustainability, 2024). Emissions reduction through carbon market mechanisms is gaining traction in ASEAN. As Malaysia assumes the ASEAN chairmanship in 2025, at national level is emphasized even more intensely than usually the importance of cross-border collaboration for further progress and development in this field (S&P, 2024). At the same time, Malaysia's Climate Change Act is expected at the beginning of 2025 (S&P, 2024). In the National Energy Policy 2022-2040, renewable energy plays a central role (Economic Planning Unit, 2022).

Trade in environmental goods is not mentioned in these policies, plans, and roadmaps. Nevertheless, facilitating trade in environmental goods and services is a tool for climate action (ECORYS, 2023).

At the same time, the increase of trade in EGs has been stimulated by a host of determinants, including: tariff reductions, stronger environmental awareness, implementation of environmental policies and regulatory reforms, enforcement of government regulations to protect the environment, progress in developing alternative energy sources and energy-efficient goods, and high international oil prices (Kuriyama, 2021). Among the AT-5, Malaysia has the second lowest average MFN tariff per economy, according to the APEC List of Environmental Goods: 0.8%, as compared to 0.4% in Vietnam, 1.3% in the Philippines, 1.9% in Thailand, and 5.2% in Indonesia (Kuriyama, 2021). In a survey conducted by the APEC Business Advisory Council (ABAC), Malaysia is the first in the preferences of respondents exporting EGs, with a share of around 24% (ABAC, 2023).

The following Chart reflects the *index of comparative advantage in environmental goods* (Box 1) for AT-5 until 2019, the most recent year for which data are available. Only Malaysia recorded a relative advantage in environmental goods between 2015 and 2019.

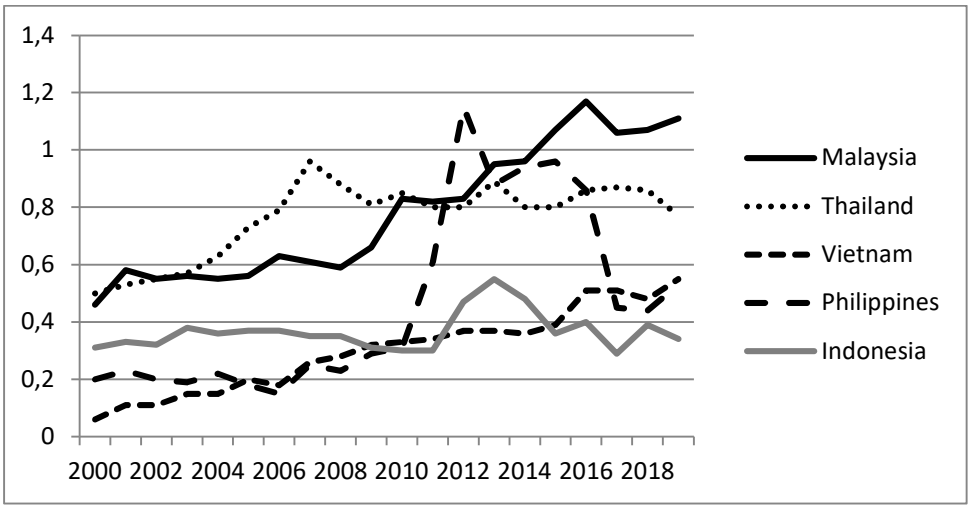
Box 1: Definition of comparative advantage in environmental goods

It is a measure of the relative advantage or disadvantage a particular country has in environmental goods, and can be used to evaluate export potential in that class of goods. Environmental goods include both goods connected to environmental protection (such as goods related to pollution management and resource management), and adapted goods (which are goods that have been specifically modified to be more "environmentally friendly" or "cleaner"). A value greater than one indicates a relative advantage in environmental goods, while a value of less than one indicates a relative disadvantage.

Source: World Bank Group (2024).

Thailand was the second after Malaysia, but with values under 1 and losing ground. The Philippines recorded a value greater than 1 only in 2012 and values close to 1 until 2015, with a decreasing trend until 2018 and an upward trend in 2019. Indonesia also had a peak in 2013. Vietnam, even if it still has a relative disadvantage, it closes the gap with the others (Chart 1).

Chart 1: The index of comparative advantage in environmental goods for AT-5, 2000-2019



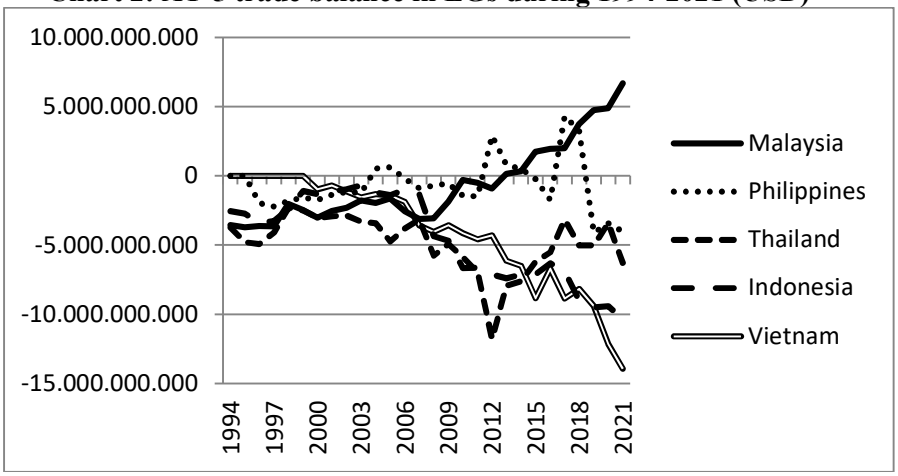
Note: Data for 2019 is the latest available.
Source: Chart elaborated by the author, based on World Bank Group (2024).

The Malaysian Ministry of Investment, Trade and Industry (MITI) launched in October 2024 the MITI *Sustainability Report 2023*, aiming to develop a trade and industry sector that incorporates sustainable practices. This follows the launch of MITI's National ESG (environmental, social and governance) Framework in 2023. The industrial policy implementation includes the National Automotive Policy 2020, the National Semiconductor Strategy (NSS), and the New Industrial Master Plan 2030 (NIMP 2030). Such initiatives reflect a people-centric concept, focusing on five core elements: investment, international trade, industrial development, job opportunities and community engagement (Business Times, 2024). Such initiatives underscore that trade and industry are interlinked.

George et al. (2024) emphasize that at the level of ASEAN, Singapore together with Malaysia are the main net exporters of environmental goods, but with opposite trends: Malaysia's net exports grew rapidly, while Singapore's have been decreasing. Among net importers, the Philippines is the only one with significant shifts between the positions of net exporter and importer. Vietnam recorded an increase of imports, and these are larger than Indonesia's, while Thailand's imports diminished between 2012 and 2017, with fluctuations at a lower level afterwards.

Chart 2 reflects the trade balances for AT-5, Malaysia being the only net exporter of EGs in 2019-2021. Malaysia has also the largest share of EGs in total exports (6%), as compared to 2% in Indonesia, 3% in the Philippines and Vietnam and 4% in Thailand (the world median is 2%) (World Bank Group, 2024). By contrast, Malaysia and the Philippines have the lowest shares of EGs in total imports (4%), while the shares of Indonesia and Vietnam are 6% and that of Thailand is 7% (world median is 4%) (World Bank Group, 2024).

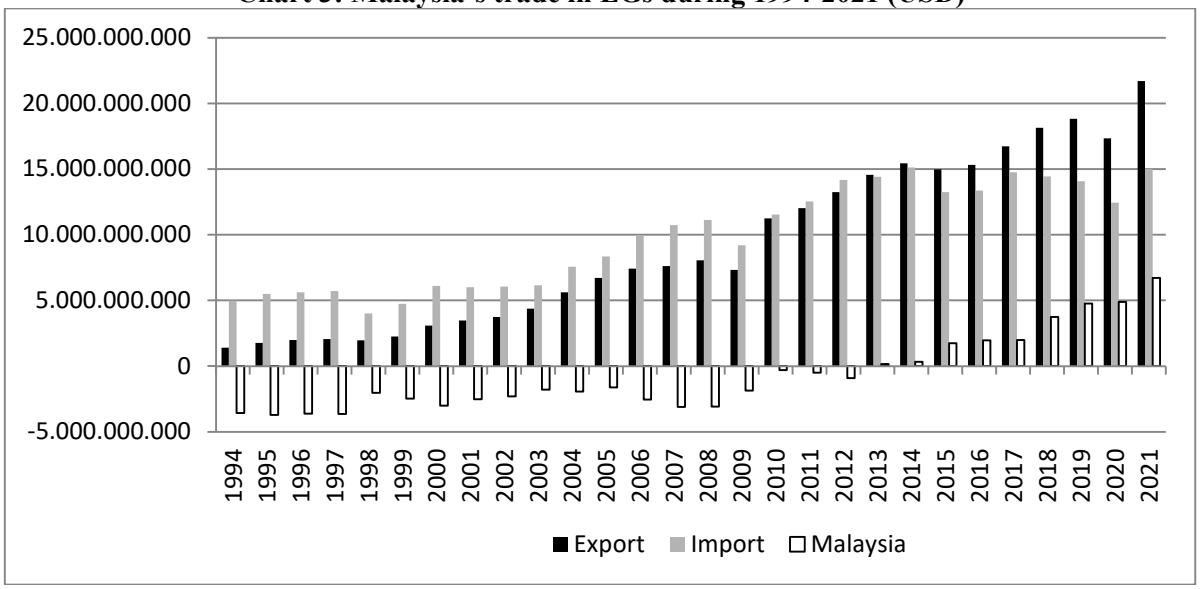
Chart 2: AT-5 trade balance in EGs during 1994-2021 (USD)



Notes: For the Philippines, data starts in 1996 and for Vietnam in 2000.
Data for 2021 is the latest available.
Source: Chart elaborated by the author, based on IMF (2024a).

Chart 3 reveals Malaysia's trade in EGs, with exports larger than imports since 2013, with an increasing trend. The surplus surpassed the value of USD 6 billion in 2021.

Chart 3: Malaysia's trade in EGs during 1994-2021 (USD)



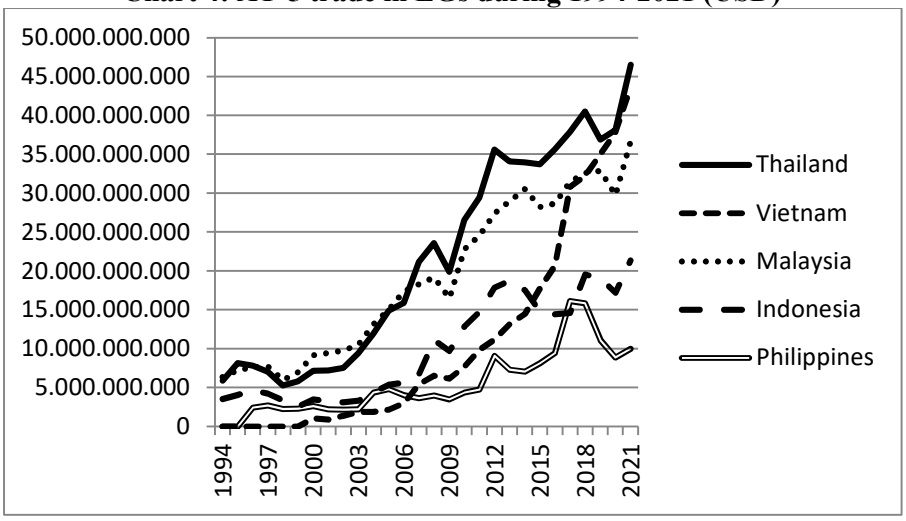
Note: Data for 2021 is the latest available.
Source: Chart elaborated by the author, based on IMF (2024a).

5. Policies related to EGs in Thailand, Vietnam, Indonesia and the Philippines

Thailand has set the goal of achieving carbon neutrality by 2050 and net-zero emissions by 2065 (Sutabutr, 2024). The new National Energy Plan (NEP), to be implemented from 2024 to 2037, comprises a power development plan, an oil plan, a gas plan, an alternative energy plan and an energy efficiency plan. Under the power development plan, the share of coal and gas is set to decrease to 48% of total fuel use by 2037, down from nearly 80% early this year, while renewable energy should comprise 51%, up from 20% at the end of 2023 (Bangkok Post, 2024).

Among the AT-5, Thailand is the first in terms of total trade in EGs, and it is followed by Vietnam, Malaysia, Indonesia and the Philippines (Chart 4).

Chart 4: AT-5 trade in EGs during 1994-2021 (USD)



Notes: For the Philippines, data starts in 1996 and for Vietnam in 2000.
Data for 2021 is the latest available.
Source: Chart elaborated by the author, based on IMF (2024a).

Vietnam announced the target to achieve net-zero emissions by 2050. Vietnam and Indonesia have signed the Just Energy Transition Partnership (JETP) with an international coalition of donors (Climate Action Tracker, 2024). According to the Ministry of Industry and Trade (MoIT), Vietnam is facing greater pressure in greening its exports as consumers and trade partners are paying more and more attention to sustainable development and environmentally friendly products, while advantages from free trade agreements are not complete. Standards and regulations on supply chains, materials, labour, and the environment to imported products are stricter, especially in developed countries. Competition is more intense, as "many nations have also been diversifying their supplies outside China, with a focus placed on a number of partners similar to Vietnam such as Turkey, Mexico, India, Indonesia, and Bangladesh" (Vietnam Investment Review, 2024).

Environmental protection is one of the priorities of the Government of *Indonesia*. In September 2022, the government updated its 2015 Nationally Determined Contribution to the Paris Agreement, and made the commitment to reduce the greenhouse gas (GHG) emissions by 32 percent by 2030 and to reach net-zero emissions by 2060 or sooner (International Trade Administration, 2024).

In August 2023, Indonesia's capital was ranked as the most polluted city in the world, the major contributors to air pollution being the transportation sector (44%) and industry (31%) (International Trade Administration, 2024). Indonesia's new capital city, Nusantara, is planned to achieve carbon neutrality by 2045, with the focus on: reversing deforestation to reforestation, no fossil fuel for energy, electricity, and transportation, green building design and material, a circular economy approach through a Reduce, Reuse and Recycle system and a climate-friendly agriculture (ADB, 2023).

Indonesia has both strengths and weaknesses in the field of EGs, as underscored by Montfaucon et al. (2024):

- Indonesia's green competitiveness has declined in recent years. In spite of that, the fourth most populous country in the world has untapped potential in exports of EGs and plastic substitutes. The private sector, especially firms involved in global value chains, will be essential to realizing Indonesia's potential in green trade.
- Even if Indonesia is committed to reducing tariffs on some EGs and it took concrete steps to ensure more environmentally sustainable palm oil and timber exports, it does not participate in most multilateral initiatives and environmental provisions in trade agreements are weakly enforceable in most cases.
- Local content requirements (LCR) aimed at creating local manufacturing capacity could also be a deterrent to growth.

According to PAGE (2021), in the field of greening exports, the product needing the most attention is palm oil, with the greatest export potential. However, the environmental impact of new oil palm plantations is extensive, through deforestation, degradation of soil quality, increased GHG emissions, and low productivity. The yield per hectare of oil palm plantations is much lower than in Malaysia. In addition, greening the supply chain is essential to ensure processing efficiency of raw material and use the residual biomass for energy generation.

The Philippines is the only AT-5 which does not have a net-zero target. It is committed to a projected GHG emissions reduction and avoidance of 75% for the period 2020 to 2030 for the sectors of agriculture, wastes, industry, transport, and energy (UNDP, 2023). The Philippines was the first country in the Southeast Asian region to set a moratorium on new coal, and is implementing some measures to support renewables. However, according to the current policies, coal will remain the dominant source of electricity generation for 2030. Therefore, the government needs to focus on accelerating the renewable energy adoption and implementing a coal and fossil gas phase out plan (Climate Action Tracker, 2024).

6. Case study of electric vehicles in Thailand, Indonesia, Vietnam and Malaysia

Most of the Asian Tigers have the potential to become regional centers for the electric vehicle (EV) industry, with a well-developed electronics industry providing a solid foundation for participation in global supply chains (Thorbecke, 2023). The Asian Tigers refuse to be only sales markets for EVs, but have the goal of producing EVs or at least being integrated into global supply chains. Between the strategies to achieve this objective, there are similarities, but also substantial differences (Guild, 2024).

Thailand and Indonesia are offering tax incentives, lower import duties and value-added tax rebates to attract EV manufacturers. Indonesia aims to produce 600,000 electric vehicles by 2030, tapping its nickel reserves (The Economic Times of India, 2024; Raharyo et al., 2022). However, it is not the leader among the AT-5.

Terasawa and Tiberghien (2024) emphasize that in Southeast Asia, Thailand leads. EVs had a share of 10% of all Thai automobile sales in 2023. As of 2024, Thailand has an estimated production capacity of 350,000 vehicles per year, entirely supported by seven Chinese automakers. One can notice a surge in Chinese EVs in Thailand and the partial displacement of dominant Japanese car makers. Toyota, Honda and even Tesla are now reacting and planning future capacity in Thailand. The EV surge has been strongly influenced by the public commitment and fiscal policies, such as: an eight-year corporate tax holiday for EV projects, 40% reduction on import duties, an excise tax cut from 8% to 2% and subsidies for eligible EVs.

Indonesia intends to become a hub for EVs and battery production in Southeast Asia (The Investor, 2024). The three investors among automotive manufacturers are: China's BYD (investment in value of USD 1.3 billion, foreseen to become operational in January 2026, with an estimated production capacity of 150,000 units yearly); South Korea's Hyundai (capacity of 250,000 units per year, but that level has not been reached yet) and China's Wuling (capacity of 120,000 units per year, investment of USD 0.7 billion) (TechInAsia, 2024; Indonesia Business Post, 2024; China Daily, 2022; Hyundai, 2022).

With the largest nickel reserves globally, along with iron, copper, and bauxite – essential components for battery production – Indonesia inaugurated in July 2024 "the region's first EV battery manufacturing plant, a joint venture between Hyundai Motor and LG Energy Solution from South Korea, with a total investment of USD 1.1 billion located in West Java" (The Investor, 2024). Domestic EV sales still have a low market share (1.7% in 2023). Sales have been constrained by EV prices and limited charging stations, therefore Indonesia has introduced further tax incentives for imports of completely built-up EVs (Terasawa and Tiberghien, 2024).

In its turn, Vietnam has a production capacity of 350,000 EVs: 250,000 at Vietnam-based Vinfast and 100,000 in a Hyundai factory. Vietnam aims to develop its market and production through policies including a reduction in excise duties on battery EVs and a US$1000 incentive for EV purchases (Terasawa and Tiberghien, 2024).

Investments in Malaysia's EV industry from 2018 to March 2023 totaled 26.2 billion ringgit ($5.4 billion), with the number of EVs increasing from 3,400 units in 2022 to more than 7,500 units in September 2023. In the budget for 2024 considerable tax incentives are provided for investments in strategic sectors, including the EV industry. The road tax for EVs is much lower compared to other vehicles and the legislative provisions on EV filling stations have been relaxed. The Malaysian government facilitated the takeover of UMW Holdings by Sime Darby, the new conglomerate having the ability to compete with large multinational companies in the EV field (Nikkei Asia, 2023). A national network of charging stations is forecast to be able to power 10,000 units in 2025, compared to only 1,000 in 2023 (Goh, 2023). Tesla launched its first showroom in Malaysia in July 2023, competing with the EV industry in Thailand and Indonesia.

7. Conclusions

The main finding of this investigation shows that, even if there is no specific trade policy focused on EGs, each of the AT-5 have plans, strategies and goals related to environmental protection and, indirectly, to EGs. All the AT-5 occupy close positions in the Hinrich-IMD Sustainable Trade Index (STI): Thailand 12, Philippines 13, Vietnam 14, Malaysia 15, and Indonesia 18. This index measures 30 global economies' "capacity to participate in the international trading system in a manner that supports the long-term goals of economic growth, environmental protection, and societal development" (Hinrich Foundation-IMD, 2024).

With the exception of the Philippines, the other four Asian Tigers of second-generation have ambitious net-zero emissions. EGs industry and trade are indirectly stimulated by green policies. Malaysia seems better prepared than the others. Among the AT-5, it has the second lowest average MFN tariff per economy, according to the APEC List of Environmental Goods: 0.8%, as compared to 0.4% in Vietnam, 1.3% in Philippines, 1.9% in Thailand, and 5.2% in Indonesia. It is also the only one among the five countries to record a relative advantage in environmental goods between 2015 and 2019. At the same time, it was the only net exporter of EGs in the timeframe 2019-2021.

In the field of EV production, Thailand is the leader in Southeast Asia, followed by Indonesia. Chinese automakers, followed by South Korean automotive manufacturers are the key investors. Indonesia intends to

also become a hub for EV battery production in Southeast Asia, due to its nickel, iron, copper, and bauxite reserves.

The second finding indicates that, with a blend of foreign capital, domestic resources, human capital, and ambitious policies, the AT-5 countries have the potential to green their economies and trade, serving as models for others. Although they have not yet attained the status of the first-generation Asian Tigers (Singapore, South Korea, Taiwan-China, and Hong Kong-China), four of the AT-5 - Malaysia, Indonesia, Thailand, and Vietnam - have made significant progress in trade in EGs. Lower trade barriers, stricter standards and regulations, intense competition and ambitious policies will further stimulate greening their international trade.

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FINANCING THE CIRCULAR ECONOMY THROUGH STATE AID: A CROSS COUNTRIES ANALYSIS

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Abstract: The circular economy is a key development goal for the European Union (EU), in line with its broader objective of achieving climate neutrality by 2050. The circular economy is built on the 3Rs: recycle, reuse, and repair, which aim to reduce waste, promote sustainable development, enhance renewable energy, and protect the environment. While several EU initiatives support financing for the circular economy, our research focuses on how State Aid can be used to foster objectives such as renewable energy and environmental protection. The primary goal is to analyse the progress made by EU Member States during and after the COVID-19 pandemic in financing the circular economy through State Aid, highlighting key challenges and opportunities. We employ a quantitative analysis based on the latest State Aid Scoreboard, primarily using data from 2019-2022, the most recent available. The analysis includes a case study of Romania, examining its performance in granting State Aid for energy and environmental protection. Our main finding is that while State Aid related to the pandemic decreased in 2022, many Member States continue to address post-pandemic economic imbalances. There remains significant potential for boosting State Aid to support the circular economy, particularly in the areas of energy and environmental protection.

Key-Words: circular economy, sustainable development, State aid, EU, Romania
JEL Classification: *H23, O38, Q57*

1. Introduction

The circular economy incorporates the principles of sustainable development, as highlighted by several recent studies (Berndtsson, 2015; Suárez-Eiroa et al., 2019; Rodriguez-Anton et al., 2019), which emphasize the importance of environmental protection and social equity. In the vision of European authorities, the circular economy involves decoupling economic growth from resource consumption and transitioning to circular systems in production and consumption (European Council, 2024).

Achieving stronger environmental protection and expanding the use of renewable energy are key pillars of the circular economy. Both foster the sustainable use of resources while reducing the pollution typically associated with industrial processes. However, enhancing circularity in these processes often faces market failures, as investments in green technology and clean energy are costly and require innovation. Given the reluctance of the business sector to invest in green technologies, State Aid can provide a crucial incentive to stimulate this circular approach to economic development (Ahmadov, Gerstlberger & Prause, 2022). According to the EU's legal framework, State Aid must be limited in scope, have clear objectives, and avoid distorting competition by granting unfair advantages to beneficiaries (Piechucka, Saurí-Romero & Smulders, 2023). Nevertheless, aids aimed at renewable energy and environmental protection are encouraged at the EU level, as they serve horizontal objectives (Elkerbout et al., 2020).

During the COVID-19 pandemic, a Temporary Framework for State Aid was introduced (European Commission, 2020), allowing Member States to make exceptional interventions to support their economies. Following the outbreak of the Russia-Ukraine war, another derogation framework was adopted to further assist sectors affected by the conflict (European Commission, 2022). While many Member States fully utilized these special derogations, horizontal objectives — such as aid for environmental protection and renewable energy — were applied to a lesser extent compared to crisis-related aid.

Against this backdrop, our research aims to assess which Member States have been most effective in supporting the circular economy through State Aid schemes, the instruments they favored, and where Romania stands within the European hierarchy.

2 Literature review

The EU's State Aid policy has not traditionally been analyzed through the lens of circularity, as much of the existing literature tends to focus on how this policy has supported industrial development (Aiginger & Rodrik, 2020; Wallace et al. 2020) and why strict regulations are needed to prevent distortion of competition in the EU's internal market (Duso et al., 2024; Werner & Caramazza, 2019).

For instance, Aiginger & Rodrik (2020) are showing that "unsatisfactory rates of productive transformation and shortfalls in generating quality jobs in manufacturing or modern services" have led to a need "for proactive government policies" (including State Aids) "to diversify and upgrade economies beyond simply freeing up markets". Werner & Caramazza (2019) reveals the delicate balance existing between the "wide interpretation of the concept of State Aid resources encompassing public funds and the Commission's burden of imputing money to the state". Majone (2019) examines the paradoxical focus on regulation amidst the international discourse on privatization and deregulation, emphasizing how European policymakers are increasingly viewing regulation as a distinct form of state intervention.

While these aspects are crucial, the relevance of State Aid for the circular economy is increasingly gaining attention, particularly as the European Union strives to meet the ambitious targets set by the European Green Deal. Verschuur & Sbrolli (2020) are showing that the Guidelines for State Aid for Environmental Protection and Energy are an important tool that can be used to achieve Green Deal targets across EU, enabling the Member States to subsidise these domains.

Transitioning to a circular economy is not only about the environmental intent, but it entails a systemic transformation and thus demands massive investments in green technologies, renewable energy sources as well as sustainable practices. This transition may be supported economically by the State Aid, especially since in many sectors the green investments are characterized by various market failures (Kaur, 2009). While businesses are presumably reluctant to bear the high costs of innovation alone, this raises the question of how State Aid may be effectively applied to support the development of the circular economy in the Member States. Kaur (2009) states that more specific State Aid rules are also increasingly important to reduce greenhouse gas emissions and tackle the resource intensive measures of climate change. Lilja Jensen (2021) also highlights that State aid may further support the goals set out under the flagship initiative of the European Green Deal while pursuing the sustainable investment across EU. The author emphasize that this principle is typically implemented either by increasing the cost to use high-polluting technologies and processes or by providing a price advantage for cleaner alternatives. In an age where industry is facing the challenges of high globalization, distinction between new technologies or cleaner production process incentives have unintended consequences in keeping Europe competitive (where if the intent was to avoid carbon leakage). When State Aid is confined and focuses on the gradual eradication of subsidies once negative externalities are internalised, distortion in competition would be limited and market failures corrected.

A cross-country analysis that follows both the pandemic and post-pandemic trends is crucial in this context. The COVID-19 pandemic led to unprecedented levels of State Aid being granted under emergency frameworks, which were designed to stabilize national economies (Kubera, 2021). Kubera (2021) reveals that while State aid is typically incompatible with the EU internal market, only allowed under specific conditions set by EU law, the unprecedented challenges of the COVID-19 pandemic required equally unprecedented measures. To introduce greater flexibility and expedite state aid decisions, the European Commission issued a Temporary Framework for state aid, which has already been revised multiple times. Moreover, the scale of aid granted during this period was immense, and most Member States quickly seized the opportunity to benefit (Honoré, 2020).
As the EU emerges from this crisis, understanding how State Aid policies are being recalibrated to support longer-term goals, such as the circular economy, is essential. Such an analysis would shed light on whether Member States are prioritizing sustainable development in their recovery plans or if crisis-related aid is overshadowing these objectives. Moreover, the pandemic exposed structural weaknesses in various sectors, like construction (Kassem et al., 2023) or agriculture (McIntyre & Roy, 2023) many of which are now more focused on resilience and sustainability, making it all the more important to investigate how State Aid is being leveraged to strengthen circular economy initiatives in the post-pandemic landscape.

In the aftermath of the COVID-19 pandemic, state aid focused on enhancing sustainability and resilience is more crucial than ever. Cavallo & Powell (2021) underline that as economies move forward, governments must prioritize capital spending that increases productivity and drives growth, all while strengthening resilience.

Additionally, in this study is shown that the many small and medium-sized enterprises that went into hibernation during the pandemic require continued support to participate in the recovery and contribute to long-term, sustainable growth.

The implications of the war in Ukraine further complicate this picture. The war has disrupted energy supplies, triggered inflation, and reshaped economic priorities across the EU, prompting the adoption of another derogatory framework for State Aid (Mukarzel, 2023). In the post-2022 economic outlook the Member States need to mitigate the economic impact of the war, particularly in sectors most affected by the energy crisis. Moreover, Ateed (2024) shows "the importance of proactive measures to address vulnerabilities, enhance energy security, and foster international cooperation for a more resilient and sustainable future". Analyzing how these recent developments influence State Aid allocations, particularly in the context of renewable energy and environmental protection, is critical. Given the pressure on Member States to secure alternative energy sources and accelerate the green transition, State Aid could be a key instrument in reducing reliance on fossil fuels and bolstering energy resilience, which directly supports circular economy goals (Antimiani et al., 2023). As shows by Nguyen et al. (2024) in the aftermath of the Russian – Ukrainian war "renewable energy companies experienced a greater rise in returns than non-renewable counterparts, indicating a potential shift towards renewables during times of geopolitical tension". A comparative analysis across countries can reveal how different states are navigating these multiple crises and whether they are maintaining focus on long-term sustainability or being sidetracked by short-term crisis responses.

In this context, Romania's situation provides valuable insights. As a Central and Eastern European (CEE) country, Romania faces unique challenges in its transition to a circular economy (Mocanu et al., 2024), including lower levels of industrial innovation and financial constraints compared to some Western European states (Hajdukiewicz & Pera, 2023). Romania's response to both the pandemic and the war in Ukraine, particularly in terms of its State Aid allocations for green and circular economy objectives, offers a case study of how CEE countries are managing these overlapping crises. By examining Romania's approach, we can better understand the specific barriers faced by less developed EU Member States and explore whether targeted State Aid policies can help bridge the gap between EU-wide ambitions and local realities. Furthermore, there is a noticeable gap in the literature when it comes to analyzing Romania's performance in this area. Our research fills this gap, offering a fresh perspective on the role of State Aid in promoting the circular economy, with particular attention to the post-pandemic and geopolitical context.

3. Methodology

Our research employs a comparative analysis of EU Member States performances in granting State Aids for circular economy using a quantitative assessment based on data from the European Commission's State Aid Scoreboard for the period 2019-2022. The methodology is designed to evaluate the effectiveness of State Aid in supporting the circular economy, with a specific focus on renewable energy and environmental protection, in both the COVID-19 and post-pandemic periods.

The quantitative analysis relies on publicly available data from the State Aid Scoreboard, which provides detailed information on the financial allocations made by EU Member States. This dataset is filtered to isolate aids specifically directed towards horizontal objectives, namely environmental protection and energy sustainability.

We begin by aggregating the relevant data across Member States, focusing on two key variables: (1) the total value of State Aid directed towards circular economy objectives, and (2) the proportion of these aids compared to overall State Aid allocations. This allows us to rank Member States based on their commitment to promoting the circular economy through State Aid.

A comparative approach is used to analyze how different Member States have responded to the dual challenges of the pandemic and the green transition. This involves assessing variations in aid allocation strategies and the types of instruments employed (e.g., grants, tax exemptions, subsidies). By examining differences between countries, we aim to identify best practices and the structural factors that influence the effectiveness of State Aid in fostering circular economy goals.

A case study of Romania is incorporated to provide a more detailed understanding of how a specific Member State has utilized State Aid in this context. Romania's performance is compared against the EU average and leading Member States to highlight its strengths and areas for improvement in supporting environmental protection and energy sustainability through State Aid.

Through this comparative and quantitative framework, our study aims to provide a comprehensive overview of the role of State Aid in advancing the EU's circular economy objectives.

4. The State aids granted in EU for boosting the circular economy

In discussing how the State Aid have been employed by the Member States for environmental protection and renewable energy during and after the COVID-10 pandemic, one must consider that the new adopted Temporary Framework has not changed the essential regulations in this field. Such State Aids aiming to boost the green transition are continuing to be regulated by the Guidelines on State aid for environmental protection and energy 2014-2020 (European Commission, 2014).

The guidelines are setting some general compatibility provisions regarding the State Aid granted for various types of aids serving the goals of the circular economy. Such allowed State Aids are as follows:

i) Aid to energy from renewable sources
ii) Aid to energy efficiency measures, including cogeneration and district heating and cooling
iii) Aid for waste management
iv) Aid to Carbon Capture and Storage (CCS)
v) Aid in the form of reduction in or exemptions from environmental taxes
vi) Aid to energy infrastructure.

The article 107 TFUE prohibits State aid that distorts competition by giving advantages to certain companies or industries within the EU internal market, but allows such aids if some specific conditions are fulfilled. In some cases, State aid can be approved to counter serious economic disturbances, such was the case during the COVID-19 pandemic. It is important to mention that each type of State Aid granted for boosting circular economy (as displayed in Box 1) must typically be notified to and approved by the European Commission unless it falls under specific exemptions. These conditions refers to the fact that the aid must address objectives of common interest (such as promoting economic development in disadvantaged regions, supporting research and innovation, or advancing environmental protection). The State Aid must be necessary and proportionate, meaning that the aid should be the least disruptive measure to achieve its purpose. Also, the State Aid should not overly distort competition or affect trade between Member States.

Box 1: State Aid for Boosting the Circular Economy in the EU – An Overview of the Regulatory Framework

TYPE OF STATE AID	GRANTING CONDITIONS	GOAL
Aid to energy from renewable sources[1]	✓ **Market Instruments**: Competitive bidding for renewable energy should minimize and eventually eliminate subsidies. ✓ **Technology-Specific Tenders**: Member States can conduct tenders for innovative technologies based on potential and grid needs. ✓ **Exceptions for Installations**: Small or demonstration-phase installations may be exempt from bidding processes. ✓ **Investment Aid for Biofuels**: Investment aid for food-based biofuels is generally not justified, but conversion to advanced biofuels is allowed.	**To enable cross-border support and to minimize costs** for Member States[2].
Aid to energy efficiency measures	✓ **Compatibility:** if granted for investments in high-efficiency technologies. ✓ **Demonstrating Environmental Benefits**: Member States must use quantifiable	**To compensate** for net extra production costs resulting from the

[1] According to these guidelines such State Aid schemes are authorised for a maximum period of 10 years. If maintained, such measure should be re-notified after such period.

[2] It is important to note that such State aid schemes should generally be open to other European Economic Area (EEA) countries, hence cooperation mechanisms may be needed to ensure foreign production counts toward national targets.

TYPE OF STATE AID	GRANTING CONDITIONS	GOAL
	indicators, such as energy savings and efficiency gains, to demonstrate the aid's contribution to environmental protection. ✓ **The form of Aid:** State aid can finance energy-efficiency measures, regardless of its form. ✓ **Repayable Advances**: A repayable advance is an appropriate state aid instrument for energy efficiency measures, especially when revenue is uncertain. ✓ **Limiting Aid to Extra Costs**: The aid should only compensate for net extra production costs arising from the investment, considering benefits from energy savings. ✓ **Duration of Operating Aid**: Operating aid for district heating and cooling is limited to five years.	investment, taking account of benefits resulting from energy saving
Aid for waste management	✓ **Waste Reduction Focus**: The investment targets waste from other undertakings, not the beneficiary's own waste. ✓ **No Relief for Polluters**: The aid should not relieve polluters from legal burdens considered normal business costs. ✓ **Beyond Current Standards**: The investment must exceed the state of the art in prevention, reuse, recycling, or innovative use of conventional technologies. ✓ **Material Disposal Alternatives**: The materials treated would otherwise be disposed of or managed less environmentally friendly. ✓ **Increasing Collection**: The investment should enhance material collection for recycling, not just boost demand for recycled materials.	**To make a positive contribution to environmental protection**, but not allowing to the undertakings generating waste to be relieved of the costs of its treatment.
Aid to Carbon Capture and Storage (CCS)	✓ **Eligible Projects**: Aid may support fossil fuel and biomass power plants with CO2 capture, transport, and storage facilities. ✓ **Cost Limitations**: Aid is restricted to additional costs for CO2 capture, transport, and storage. ✓ **Funding Gap Definition**: The funding gap is defined as the difference between the project costs and a scenario where CCS is not implemented, as it involves unnecessary infrastructure.	To ensure that the support to individual elements of the CCS chain has **a positive impact on other fossil fuel installations owned by the beneficiary.**
Aid in the form of reduction in or exemptions from environmental taxes	✓ **Objective Criteria for Beneficiaries**: Beneficiaries are selected based on transparent criteria, and aid is granted equally to competitors in similar situations. ✓ **Cost Absorption by Beneficiaries**: Beneficiaries cannot pass the increased costs onto customers without substantial sales reductions. ✓ **Minimum Tax Payment**: Aid beneficiaries must pay at least 20% of the national	To prevent that some undertakings be placed at such a competitive disadvantage that it would not be feasible to introduce the environmental tax in the first place.

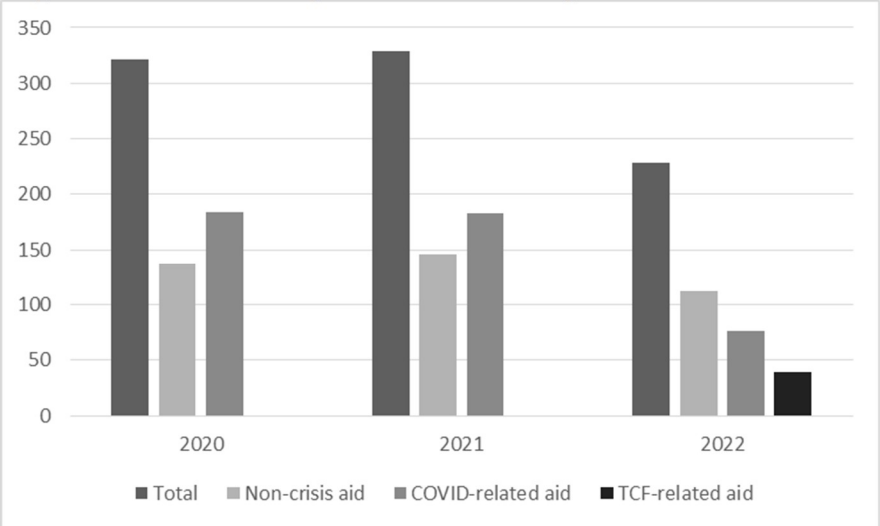
TYPE OF STATE AID	GRANTING CONDITIONS	GOAL
	environmental tax or applying the Union minimum tax level.	
Aid for energy infrastructure	✓ **Aid Limitation**: The aid amount must be limited to what is necessary to achieve the infrastructure objectives. ✓ **Counterfactual Scenario**: For infrastructure aid, the counterfactual scenario assumes the project will not occur, making the funding gap the eligible cost. ✓ **Aid Intensity Limit**: Aid measures for infrastructure should not exceed 100% of eligible costs.	**To overcome the market failure** other than by means of compulsory user tariffs.

Source: Author's representation based on the EU's legal framework.

As one may see, the pillars of circular economy are covered by these types of State Aids that are all permitted to the Member States with the condition to respect first the main provisions of Article 107 from the Treaty on the Functioning of the European Union (TFUE) and the additional requests specified in the Guidelines for State Aid for Environmental protection and energy (Box 1).

According to the latest data from the State Aid Scoreboard, in the first year of the COVID-19 pandemic (2020), the largest share of State Aid granted in EU were crisis-related aid, while in the following years (2021 and 2022), the share of such aids has gradually decreased (Graph 1).

Graph 1: Total State Aid granted in EU during 2020-2022 (Billion EUR)

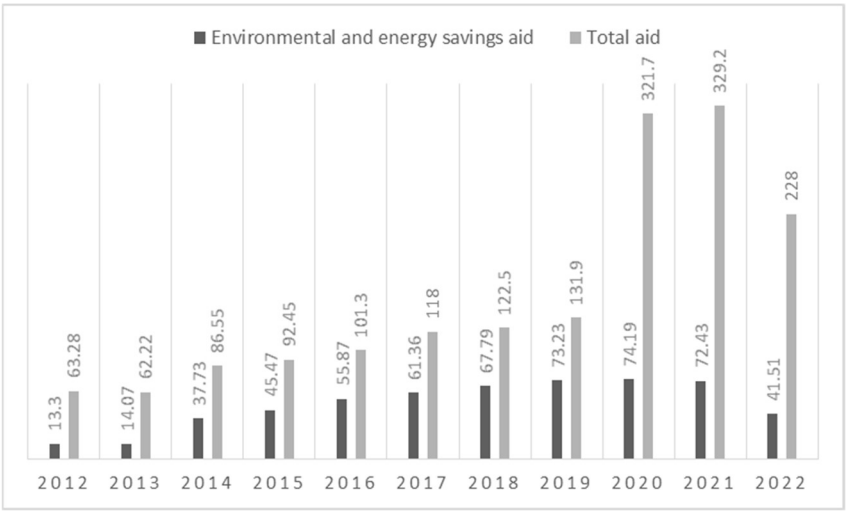


Source: Author, based on the State Aid Scoreboard (2024).

Note: The data for 2022, are the latest available. The TCF – related aid refers to measures approved under the Temporary Crisis Framework (TCF), adopted in the context of the war from Ukraine **in** March 2022 to enable Member States to support companies directly impacted by the war or the ensuing sanctions against Russian Federation.

As shown by Graph 1, while COVID-related aid significantly decreased in 2022, TCF-related aid amounted to 39.33 billion euros. At the same time, 2022 is the first year after the COVID-19 pandemic when non-crisis aid surpassed crisis-related aid, with 112 billion euros compared to 76.65 billion euros for COVID-related aid and 39.33 billion euros for TCF-related aid. The share of environmental and energy saving State Aid gradually increased across EU in the last decade (Graph 2).

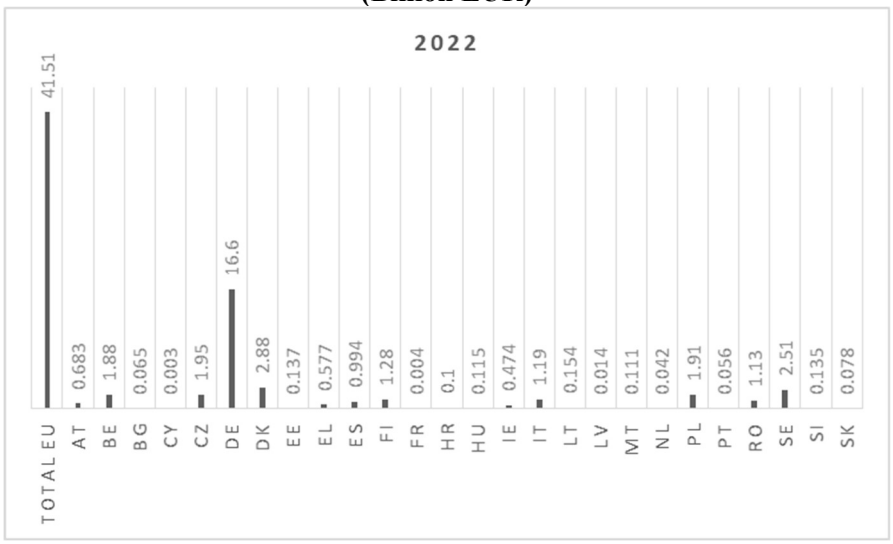
Graph 2: The evolution of State Aids for environmental protection and energy savings in EU, compared with total aid during 2012-2022 (Billion EUR)



Source: Author, based on the State Aid Scoreboard (2024).
Note: The data for 2022, are the latest available.

As highlighted by Graph 2, one may notice that, after 2019 (the year of the European Green Deal adoption), there was a strong increase in State Aid granted for environmental protection and energy savings, while in 2022, such aids registered a downfall, most likely because of the post-Ukrainian war economic imbalances that forced Member States to grant more TFC-related aids. If we look at the evolution of total State Aid granted in the EU during 2012-2022, the strongest increase can be noticed in the pandemic and post-pandemic period (a total of 228 billion euros granted in 2022, compared with the pre-pandemic level of 131.9 billion euros granted in 2019), given that the increased flexibility of the regulatory framework allowed large amounts of crisis-related aid to be granted across the EU.
So, what is the share of the environmental protection and energy saving in all the Member States? When analysing the situation in 2022, one may notice that Germany, Denmark, Slovenia and Italy are ranking high in the European hierarchy, while the lowest performances are registered by Cyprus, Latvia and France (Graph 3).

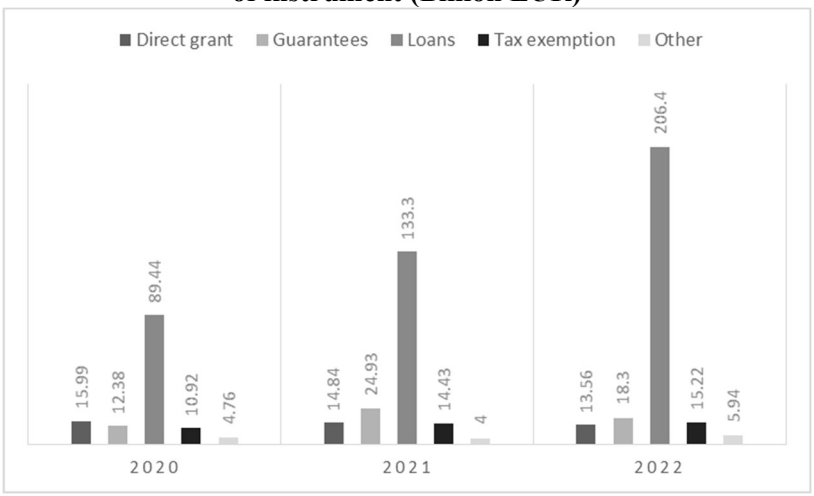
Graph 3: State Aid for environmental protection and energy savings in the EU Member states in 2022 (Billion EUR)



Source: Author, based on the State Aid Scoreboard (2024).
Note: The data for 2022, are the latest available.

Regarding the type of instrument preferred by Member States for aid related to environmental protection and energy savings, we notice that loans were most used both during and after the COVID-19 pandemic. These types of State Aid showed a clear upward trend between 2020 and 2022 (Graph 4).

Graph 4: State Aid for environmental protection and energy savings in the EU Member States, by type of instrument (Billion EUR)



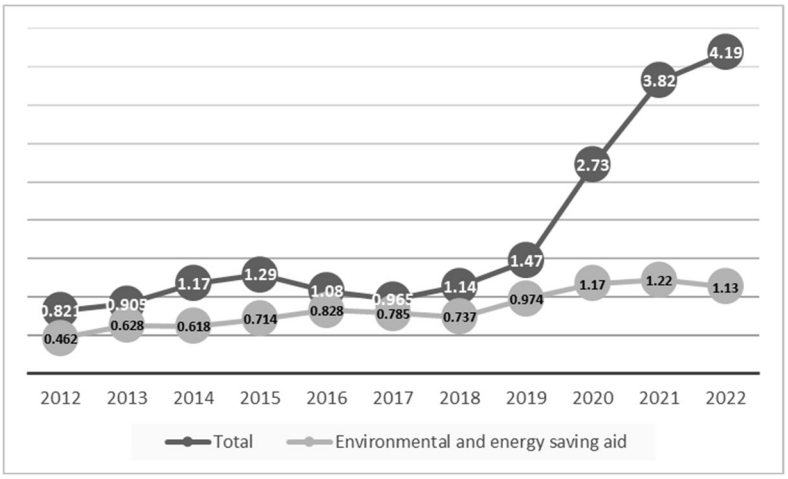
Source: Author, based on the State Aid Scoreboard (2024).
Note: The data for 2022, are the latest available.

The Member States choose loans for granting environmental and energy saving State aid for several reasons. Firstly, the loans offer more financial flexibility, providing businesses and public entities with the necessary capital without requiring immediate full funding. This type of State Aid allows to the beneficiaries to manage cash flow effectively while investing in projects that promote environmental sustainability and energy efficiency.

5. The case of Romania: State Aids for circular economy

As shown in the previous sections of our analysis, the COVID-19 pandemic and the war in Ukraine dramatically changed the focus of State Aid policy in the EU during 2020-2022. These "black swan" events required the rapid adoption of a new regulatory framework for coping with the new economic imbalances and allowed Member States to grant an unprecedented amount of crisis-related aid. In the case of Romania, the national authorities fully benefited from this flexibility, granting numerous crisis-related aids, but environmental and energy savings aid continued to register good performance during 2012-2022, with a constant increase even after the COVID-19 pandemic (Graph 5).

Graph 5: The evolution of State Aids for environmental protection and energy savings in Romania, compared with total aid during 2012-2022 (Billion EUR)



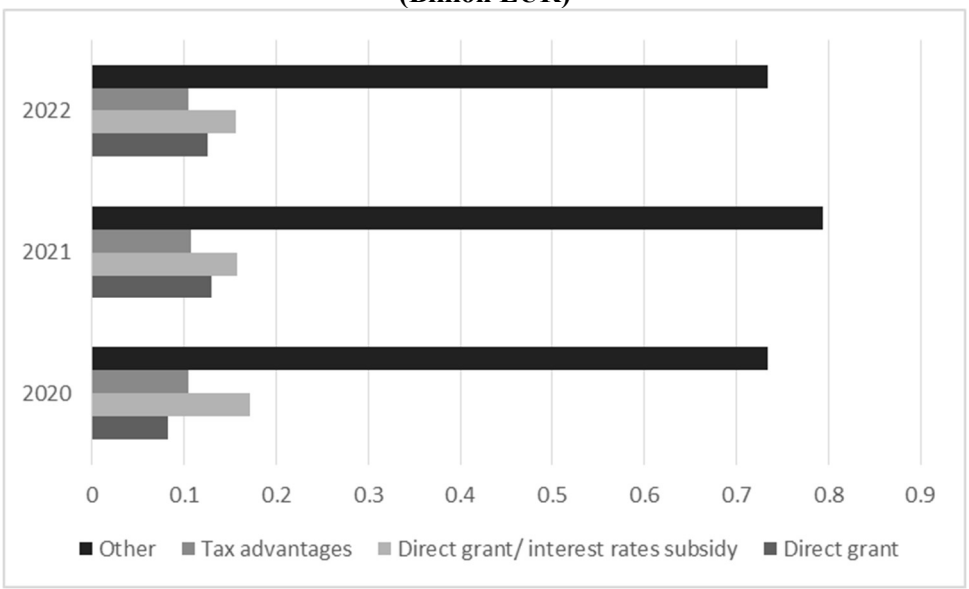
Source: Author, based on the State Aid Scoreboard (2024).
Note: The data for 2022, are the latest available.

As shown by the Graph 5, an upward trend of State aid for environmental and energy savings can be noticed in Romania after the European Green Deal adoption (in 2019), with a peak of such aids being registered in 2021 (1.22 billion euros).

The upward trend of State aid for environmental and energy savings in Romania can be attributed to several key factors. Firstly, while the European Green Deal outlines ambitious climate and environmental objectives for all the Member States, Romania aligned its national policies with these goals, leading to increased funding and support for initiatives aimed at environmental protection and energy efficiency. Secondly, while the Romanian government has recognized the importance of transitioning to renewable energy sources, the increased State aid has likely been directed toward supporting the development and integration of renewable energy projects, contributing to the overall upward trend. Moreover, in the post-pandemic era Romania saw an opportunity to rebuild its economy with a focus on sustainability, hence prioritizing increased investments in green technologies, further boosting State aid for environmental and energy savings.

In terms of preferred instrument for granting State Aid for environmental protection and energy savings, Romanian authorities did not granted loans, thus taking a different path compared with the EU's tendencies in the field (Graph 6).

Graph 6: State Aid for environmental protection and energy savings in Romania, by type of instrument (Billion EUR)



Source: Author, based on the State Aid Scoreboard (2024).
Note: The data for 2022, are the latest available.

As revealed by Graph 6, the preferred instrument for environmental and energy saving State Aid in Romania were the direct grants. This preference of the Romanian authorities was related to the fact that direct grants provide businesses and public entities with immediate financial resources without the burden of repayment. Moreover, in the post-pandemic period, many Romanian companies faced economic challenges and needed quick access to funds to implement green initiatives.

6. Conclusion

Our main finding is that although, in recent years, the State Aid policy has been reshaped by major exogenous crises, such as the COVID-19 pandemic and the war in Ukraine, it has also managed to support the green transition and circular economy initiatives. Especially after the European Green Deal adoption, a clear increase in such State Aid can be noticed at the EU level and in many Member States.

Our second finding shows that, while ranking in the middle of the European hierarchy, Romania has managed to register good performance in supporting the circular economy through State Aid. While the preferred instrument for the pandemic and post-pandemic period remained direct grants, Romanian authorities have managed to offer effective incentives for companies to adopt new environmental technologies and practices. Moreover, by reducing the upfront costs associated with green projects, such State Aid has encouraged more entities to invest in energy efficiency and sustainability.

However, despite the overall progress noted among all Member States, there is room for improvement in the field of State Aid for the circular economy, and most likely, an upward trend will be registered after the economic difficulties derived from the post-pandemic imbalances and those brought by the war in Ukraine are addressed.

In our opinion, in the short and medium term, Member States in general and Romania in particular should focus on providing State Aid for environmental and energy-saving projects, leading to increased support for boosting the circular economy across the EU. As shown by recent years' experience, many businesses, especially SMEs, may lack the financial capacity to take on loans for energy-saving investments and other circular economy goals. Given this reality, tailored State Aid schemes could eliminate this barrier, making it easier for these entities to engage in environmental initiatives while facilitating quicker and more effective investments in sustainability across all EU Member States.

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BANKS AND INTERNATIONAL TRADE FINANCE: GREEN PRACTICES IN LETTERS OF CREDIT[1]

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Abstract: The aim of this paper is to assess the role of banks in green trade finance, with a focus on the letters of credit. The research findings highlight that, among other initiatives, banks have begun to promote sustainable development through trade finance products, facilitating international trade in environmental goods and services. The multilateral development banks can also contribute to increasing international trade finance availability. In this respect, the trade finance facilitation programmes developed by the International Finance Corporation and the European Bank for Reconstruction and Development are relevant. However, green trade finance is facing a lot of challenges, including lack of international standards, but efforts are underway to address them.

Key words: green trade finance, letter of credit, banks, development banks, sustainable development, environmental goods and services
JEL codes: G21, Q50, F34.

1. Introduction

To mitigate the risks faced by importers and exporters in international trade transactions, banks offer trade finance products (Niepmann & Schmidt-Eisenlohr, 2015). Trade finance is essential for world trade, as the great part of international trade transactions depend on a guarantee of payment, an insurance or a credit (WTO, 2016). Despite its importance, the global trade finance gap increased from USD 1.7 trillion in 2020 to USD 2.5 trillion in 2022 (estimation) (Beck et al., 2023). Therefore, the contraction of trade finance can have a significant impact on the real economy (Auboin, 2009), especially on small and medium-sized enterprises (SMEs) in lower income countries (WTO, 2016).

Trade finance covers a wide range of products including letters of credit (L/Cs), standby letters of credit, guarantees, credit insurance, factoring and supply chain finance (TFG & ITFA, 2020). The trade finance facilitation programmes launched by the multilateral development banks are also vital for the supply of trade finance at international level. Their combined support reached nearly USD 50 billion in 2022 (WTO, 2023).

At the same time, to achieve the goals of the Paris Agreement, policies should be developed to direct funds towards green projects (Georgieva, 2023). To this end, instruments such as green loans and green bonds have been designed. To promote them at international level, the Green Loan Principles (GLP) (LMA et al., 2018) and the Green Bond Principles have been developed (ICMA, 2021). In line with developments in these financial segments, green trade finance solutions have also begun to emerge. To illustrate, banks can issue green guarantees for projects that contribute to the environment protection or L/Cs involving the delivery of certain goods such as solar panels **(**Botta et al., 2022).

On the other hand, sustainable development is also promoted by international trade. It contributes to mitigating the negative impact of climate change by allowing the global distribution of goods and technologies with low carbon emissions (Pangestu, 2023). Environmental goods include products such as energy-efficiency and renewable energy goods (WTO, 2022).

2. Literature review

Niepmann & Schmidt-Eisenlohr (2015) explore the use of trade finance products by US exporters, highlighting that L/Cs are preferred for riskier destinations. Crozet et al. (2022) underline the importance of L/C to mitigate risks in uncertain periods. By providing empirical evidence, the authors reveal that, during the

[1] This paper further capitalizes on the author's doctoral thesis "Banks and international banking activity".

pandemic, exports of products through L/C were more resilient. In contrast, during the global financial crisis, trade in goods supported by L/C suffered a greater decline.

A strand of literature approaches the regulatory treatment of trade finance (Auboin & Blengini, 2019; Auboin, 2010). Recently, under the impact of digitalisation, the adoption of blockchain L/C has been investigated (Chang et al., 2020; Bhat et al., 2021). Khalil et al. (2021) underline the importance of blockchain technology to increase trade finance efficiency, calling "for an urgent digital transformation".

However, green/sustainable trade finance is a relatively new concept. Establishing an appropriate definition of sustainable trade finance is not a simple task, as transactions take place internationally, covering multiple sectors, and supply chains are characterised by complexity (Chatterjee, 2021/2022). In addition, assessing whether a trade finance product is sustainable is challenging because it is sometimes difficult to know the purpose of transaction. Trade finance products where the purpose of transaction is generally known include standby letter of credits and guarantees. In contrast, trade finance products where only the good is known include L/Cs and import and export loans (ICC & BCG, 2024).

There is currently no single definition of green trade finance, but some of the main approaches are outlined below:

- The International Chamber of Commerce (ICC) has proposed an initial definition for sustainable trade finance in 2021: "Sustainable trade finance involves the financing or facilitation of sustainable trade, using recognised trade finance instruments" (ICC, 2021, p. 6).
- Societe Generale defines a green trade finance transaction "as a Trade Finance instrument, such as a guarantee or a letter of credit which secures, guarantees and/or finances an underlying project which has a clear positive contribution to the environment and which meets strict environmental guidelines" (Societe Generale, 2021).
- "Green trade finance transactions require a trade finance instrument to support an underlying green project" (Alford & Gastellu, 2021).

A common definition of sustainable trade finance is therefore a necessity (ICC & BCG, 2024). To fill this gap, the *ICC Principles for Sustainable Trade Finance* (PGTF) were recently launched in October 2024.

The International Chamber of Commerce (ICC) has proposed the following definition for green trade finance: „Green Trade Finance (GTF) refers to Trade Finance products designed exclusively to finance or mitigate financial risk from activities where the Use of Proceeds is clearly and verifiably allocated to green purposes, or, where the purpose is not known, to green goods" (ICC & BCG, 2024, p. 4).

3. Methodology

The aim of this paper is to assess the role of banks in promoting green practices through trade finance, with focus on L/Cs. Given the novelty, specificity and evolving nature of the issue, the paper is based on several research methods. First, a qualitative analysis of scientific literature has been conducted, highlighting the ongoing efforts to standardise green trade finance. Subsequently, to gain a closer insight on topic a case-study methodology has been applied. The case studies present relevant international experiences to support green trade finance of both commercial banks and multilateral development banks. They have been selected to offer a broad perspective on the use of green trade finance products and geographically coverage of banks engaged in L/C-based transactions. Data have been collected mainly by accessing information published by the discussed banks and promotors of sustainable trade finance solutions. These case studies can contribute to the emerging literature in the field by providing some examples of best practices. Investigation of the challenges faced by green trade finance concludes the research.

4. Relevant international experiences

As mentioned above, green trade finance covers several products, of which L/C is well-known for its benefits to both exporters and importers. To illustrate its adaptation to sustainability issues, several case studies have been selected. First, multilateral development banks are approached by highlighting the role of the International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD). Then, the solution offered by the Banking Environment Initiative (BEI) in the form of the BEI's Sustainable Shipment L/C is discussed. Finally, the framework of green trade finance within the Societe Generale is investigated. The case studies have been selected to provide diverse experiences in terms of international coverage, traded commodities, financial products, participants in operations - financial institutions and customers.

Case study: the IFC's Climate-Smart Trade initiative

The Global Trade Finance Program (GTFP) was established by the IFC in 2005 to increase the availability of trade finance in emerging markets (IEG, 2013). The program's success is demonstrated by both the number and value of transactions. Over time, the GTFP supported more than 68,000 trade transactions that exceeded $ 66.5 billion (as of the end of FY20) (IFC, 2024).

In order to address the climate change issues, the IFC introduced the Climate-Smart Trade initiative. This initiative is "an extension" of the GTFP, focusing on projects with climate benefits (IFC, 2022). Equipment for renewable technology, energy efficient goods and certified crops are among the eligible goods under the GTFP Climate-Smart Trade initiative (IFC, 2024).

The trade transactions include the export of a wind power turbine from Germany to Pakistan through a L/C issued by Bank Al Habib. The IFC's contribution was to provide a guarantee to Deutsche Bank in order to back this L/C. The IFC also supported the import of solar panels from Canada to Honduras (IFC, 2022).

Case study: the EBRD's Green Trade Facilitation Programme

In 1999 the EBRD launched the Trade Facilitation Programme (TFP). The aim of the TFP is to promote international trade involving the economies where the EBRD operates. Therefore, the TFP provides guarantees to international confirming banks for trade transactions undertaken by participating banks in the EBRD's regions. It is worth noting that these guarantees cover both the political and commercial payment risks of the transactions. Since its launch until December 2023, the TFP has facilitated transactions totalling over EUR 35 billion in 27 economies (EBRD, 2024a).

Subsequently, in 2016, the EBRD established the Green Trade Facilitation Programme (Green TFP) to promote sustainable trade. The Green TFP covers various trade finance instruments, such as the short-term loans to certain local banks to finance their clients involved in international commercial transactions. The sectors targeted by this programme include sustainably sourced materials and food, renewable energy and agriculture. The Green TFP has supported more than 1,750 transactions with a total value of EUR 2.6 billion (as of December 2023), resulting in energy savings of 13,504 GWh, water savings of 1.8 million m2 and emissions savings of 7,264 kilotonnes of CO_2 (EBRD, 2024b). Several banks have stood out under the programme, including Raiffeisen Bank Aval Ukraine - recognised as the issuing bank with the highest number of transactions in 2018 - and UniCredit – the most important confirming bank in the same year (Reiserer, 2019).

Notable examples include the solar modules that a company in Greece imported from Germany. In order to protect against the risk of non-payment, the German manufacturer requested some guarantees. Thus, at the request of the Greek importer, the Greek bank asked a German bank to issue a guarantee in favour of the exporter. In addition to the counter-guarantee offered by the Greek bank, the German bank requested an additional guarantee, which was provided by the EBRD within the framework of the TFP (Putz, 2020/2024).

Another transaction is related to sustainable forest management. A Romanian company imported Forest Stewardship Council certified wooden doors through deferred payment L/Cs issued by a local bank in favour of the exporter, an Italian company. The EBRD guarantees in favour to the Italian confirming bank covered the political and commercial payment risks of the transaction (EBRD, 2024b).

Case study: the BEI's Sustainable Shipment L/C

A relevant trade finance solution is the BEI's Sustainable Shipment L/C. In addition to the clauses that any L/C usually contains, this instrument has a special clause related to sustainability. More precisely, at the request of the importer, the issuing bank can require the exporter to deliver only commodities that meet certain sustainability standards recognised at international level (CPSL, 2014). If widely accepted, this financing solution can therefore significantly contribute to promoting sustainable commodity trade.

As a pilot, the BEI applied this concept to the palm oil supply chain. Initially, the BEI's Sustainable Shipment Working Group focused on the sustainability standard produced by the Roundtable on Sustainable Palm Oil (RSPO). Palm oil certified by the RSPO is referred to as Certified Sustainable Palm Oil (CSPO). In practice, once the letter of credit with the sustainability clause has been issued, the exporter delivers the goods that meet the conditions stipulated in the L/C. The seller indicates to the buyer that the shipment is CSPO certified, for example, by adding a stamp to Bill of Lading (CPSL, 2014).

Case study: Societe Generale

Societe Generale calls itself as "a pioneer in Green Trade Finance" (Societe Generale, 2021). In order to engage in this activity, the bank has followed several steps. It has developed a framework to define green trade

finance transactions (Societe Generale, 2021). According to the bank's framework, green trade finance offers solutions for green projects in five sectors - "Renewable energy / Clean transportation / Waste management / Sustainable water & wastewater management/ Hydrogen" (Societe Generale, 2022a). The bank's achievements in the field were consolidated in 2024, when a framework on sustainable global transaction banking was launched. The framework, established according to the Green and Social Loan Principles, is dedicated to large corporates and focuses, among others, on trade finance solutions (Societe Generale, 2024). These initiatives are aligned with the bank's strategy to support energy transition. Societe Generale committed to reduce its exposure to the oil and gas sector (Societe Generale, 2022b).

Trade finance products developed by Societe Generale include bank guarantees and L/Cs (Cai, 2022). The first green trade finance guarantee facility (worth EUR 230 million) was issued in 2019 for Siemens Gamesa Renewable Energy (SGRE) to support wind power projects. Subsequently, the bank enriched its portfolio of green products with, among others, guarantees issued in 2022 by Societe Generale Seoul in favour of Hyosung Heavy Industries (Cai, 2022). The green guaranties offered by the bank are linked with green projects with a positive impact on the environment, as measured by certain key performance indicators (Alford & Gastellu, 2021).

It is important to note the bank's efforts to expand its activity in the field of sustainability. Thus, in addition to green trade finance products, banks provides sustainability linked trade finance instruments (Societe Generale, 2022a). Moreover, achievements in the sustainability area are accompanied by progress in digitalization. In 2023, Societe Generale launched Easytrade, a platform for corporate clients that allows them to better manage their trade finance operations (Societe Generale, 2023).

The above experiences show that, according to international trend towards sustainability, the banking industry has begun to pay attention to green trade finance. There are many initiatives at international level, including programmes designed by multilateral development banks and trade finance products launched by commercial banks. Green guarantees and L/Cs are essential to promote trade with environmental goods and services. A relevant financing solution for sustainable commodity trade was proposed by the BEI. Development banks can play an important role in greening trade finance by providing guarantees, which are essential to cover the risk of non-payment in international trade transactions.

5. Barriers to market development

The 2023 survey on trade finance performed by the Asian Development Bank (ADB) reveals that the most part of the surveyed banks considers that demand for products related to sustainable financing will increase (Beck et al., 2023).

However several challenges are likely to limit the market expansion. One of the most important obstacles facing green trade finance is the lack of market standards (Alford & Gastellu, 2021; Beck, et al., 2023) and market definition that increase the greenwashing risk (Chatterjee, 2021/2022). It worth mentioning that efforts to combat this challenge are underway. The Principles for Sustainable Trade Finance (PSTF) recently launched by the ICC „aims to provide a consensus set of principles that define sustainable trade finance products" (ICC, 2024). Addressing this challenge is essential for green trade finance development. Therefore, before publishing the final version of these principles in late 2024, the ICC opened a consultation period with banking industry (ICC, 2024).

There is also the risk that the L/C mechanism will become even more complex as a result of the additional sustainability condition that the seller must meet (CPSL, 2014). This risk is significant as refusal of documents is a great challenge facing the beneficiaries of L/Cs. The estimates indicate that, globally, the percentage of documents that are refused on first presentation is 65 to 80% (ICC, 2022). Moreover, clients may be reluctant about banks' participation in sustainability negotiations (Chatterjee, 2021/2022).

Besides, under the impact of due diligence costs, financing cost could increase (Beck et al., 2023). CPSL (2014) stresses that banks involved in a BEI's Sustainable Shipment LC (issuing bank, confirming bank) should understand the mechanism of the operation and their role and, therefore, they should be trained. On the other hand, banks may have certain constraints regarding the funds they can allocate to sustainable products; therefore, to increase their capacity to issue new credits, banks could create sustainable trade finance assets to be sold to large investors (Botta et al., 2022).

Finally, the development of green trade finance depends on client demand for such solutions and regulatory requirements (Alford & Gastellu, 2021). Consequently, the banks' clients – importers and exporters of goods - should be incentivised to use these emerging tools. CPSL (2014) has proposed two types of incentive mechanisms for the BEI's Sustainable Shipment L/C. The first one refers to banks that intermediate commercial transactions, which, motivated by various factors, including reputational growth, could set preferential terms for

their customers promoting sustainability. The second incentive mechanism is related to implication of development banks that was illustrated with the case of the IFC. According to this mechanism, banks participating in the GTFP could enjoy some benefits for Sustainable Shipment L/Cs.

Last but not least, the spread of sustainable trade finance solutions requires raising awareness of the importance of protecting the environment among both banks and customers.

6. Conclusions

Green trade finance is an emerging field at the intersection of climate change, finance, and international trade. It promotes sustainable development by supporting international trade in environmental goods and services. Against this backdrop, banks have begun to align their offerings with the sustainability imperative, providing green trade finance products. As L/Cs are a prominent trade finance instrument, designing appropriate sustainable solutions is of paramount importance. A relevant financing initiative is the BEI's Sustainable Shipment L/C aimed to develop sustainable commodity trade. Societe Generale is one of the banks that promote green trade finance, including through L/Cs and guarantees. At the same time, multilateral development banks such as the IFC and the EBRD contribute to addressing climate change issues and increasing trade finance availability.

However, despite its achievements, green trade finance faces a number of challenges that result from the complexity of operations and their specificities. The barriers to market development are specific to both banks and their customers conducting international trade transactions. One of the most prominent obstacles is the lack of standards and a common definition of green trade finance. An important initiative to address this issue was recently launched by the ICC, which published a set of principles for green trade finance.

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THE EDUCATION AND RESEARCH SYSTEM IN ROMANIA: A COMPARATIVE ANALYSIS WITH THE EU MEMBER STATES[1]

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Abstract: The education and research system is one of the most powerful tools of a state through which long-term economic growth can be ensured, employment and income growth can be achieved, innovation stimulated, and institutions strengthened. Romania lags severely behind other European Member States regarding economic development, while the quality of education and research remains quite scarce, undermining the economic convergence process of the country. Against this background, the objective of the paper is to investigate the degree of Romanian education and research convergence with the European Union (EU). Moreover, it uncovers how the education and research system in Romania is financed and assesses its performance compared to other EU Member States.

Key-Words: education and research system, Romania, EU Member States, expenditure on education, R&D expenditure, innovation index
JEL Classification: I20, I23, H52, O57

1. Introduction

The education and research system is one of the most powerful tools of a state through which long-term economic growth, employment and income growth can be ensured, innovation stimulated, and institutions strengthened. A performing education system is one that forms human resources with cognitive skills necessary for a constantly changing economic environment, capable of using the latest technological capabilities and creating new ones. Moreover, an educated workforce facilitates the absorption of advanced technologies imported from more developed states, thus contributing to increasing the level of technological modernization of the economy. In other words, in the absence of a high-performing educational system, the sustainability and economic competitiveness of the state cannot be ensured.

2 Literature review

High-performing education system has a multitude of positive effects of on economic growth, on personal income, but also on long-term well-being. Using the results of international student assessment tests, Hanushek and Kimko (2000) revealed a significant positive effect of education quality on economic growth. Their estimates suggest that high performance on these tests would produce roughly one percentage point higher

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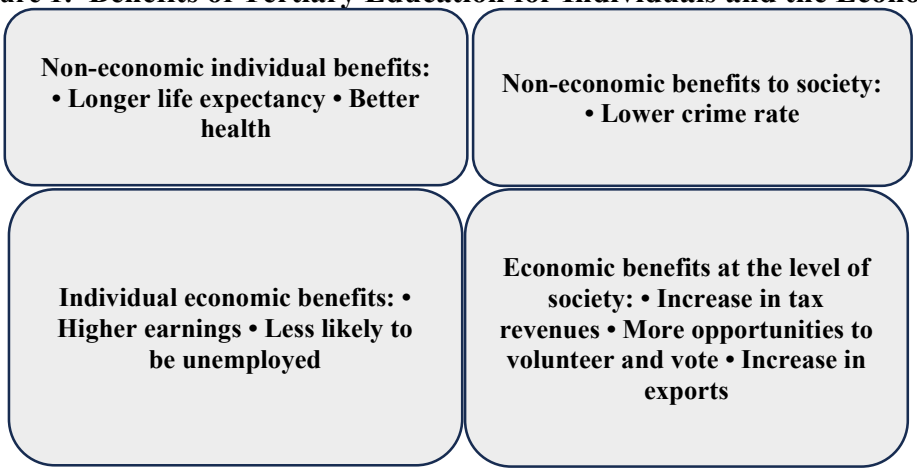
annual economic growth. Another study, conducted by Barro (2013), highlighted the major role of the quality of education and the average number of years of schooling for economic growth. Although the impact of years of schooling is positive and significant, the empirical results of the study suggest a greater positive impact of the quality of education, as measured by international assessment test scores, on economic growth.

Moreover, the major role of tertiary education for the economy is recognized in the specialized literature. It increases employment and ensures higher wage earnings, spurs productivity and innovation, provides a higher level of social stability, increases the efficiency of public administrations, the level of civic engagement and the level of health of the population (Murthi et al, 2021). The contribution of tertiary education to economic growth was also investigated by the OECD (2012), which showed that, on average, about half of the economic growth of OECD member states is related to the growth of the labour income of people with a university degree. In France, Norway, Switzerland, and Great Britain, more than 60% of GDP growth is generated by individuals with tertiary-level education. In addition, according to the results obtained by Patrinos (2016), each additional year of education produces a surge in individual income received by approximately 5-8% per year. Globally, the returns generated by tertiary education are the highest, followed by primary education and then secondary education. Given these factors, the author suggests that decision-makers must consider the further expansion of university education, increasing the access of young people to this level of studies. Another study that emphasized the benefits that higher education generates both for individuals and for society in general is that conducted by Willetts (2023). According to the author, the benefits can materialize in the form of economic gains or non-financial social gains (Figure 1).

Figure 1: Benefits of Tertiary Education for Individuals and the Economy



Source: Author representation based on Willetts (2023).

Valero and van Reenen (2019) explored the link between the increase in the number of universities and the average increase in GDP per capita and revealed the existence of a positive correlation between these two variables. Specifically, results suggest that a 10% increase in the number of universities in a region generates a higher increase in GDP per capita by about 0.4%.

The research system is another important pillar that contributes to sustainable economic growth, through the creation of knowledge, products, and new technologies, being a vital component for reducing the competitiveness gap between states (European Commission, 2021). However, the research and development (R&D) system is closely related to the performance of the education system, which is the main pillar of providing human resources capable of using the latest technological capabilities and creating new ones. In other words, without a high-performing educational system, it is impossible to ensure the creation of an effective research system, which in turn would undermine the country's economic growth and competitiveness The intensity of research and development activity is determined both by the performance of the education system, but also by the expenditures allocated by governments for R&D activity. Thus, for example, Sokolov-Mladenovic et al. (2016) investigated the influence of R&D spending on economic growth in the EU over the period 2002-2012. The results showed that a 1% increase in R&D spending as a share of GDP would increase the real GDP growth rate by 2.2%. Other studies that empirically validated the causality between R&D spending and GDP were conducted by Köhler et al. (2012), Inekwe (2015), Bilas et al. (2016) and Szarowská (2018).

In conclusion, the education and research system represent the basic pillar of economic growth and sustainable development of any state, specialized studies revealing the major role of the quality of the educational act, but also of the research activity. Romania is one of the EU Member States that lag severely behind other European states regarding the quality of education and research, which undermines the economic convergence of the country. Against this background, the objective of the paper is to investigate the degree of Romanian education and research convergence with the EU. Moreover, it uncovers how the education and research system in Romania is financed and what is the level of its performance compared to other EU Member States.

2. Methodology and data

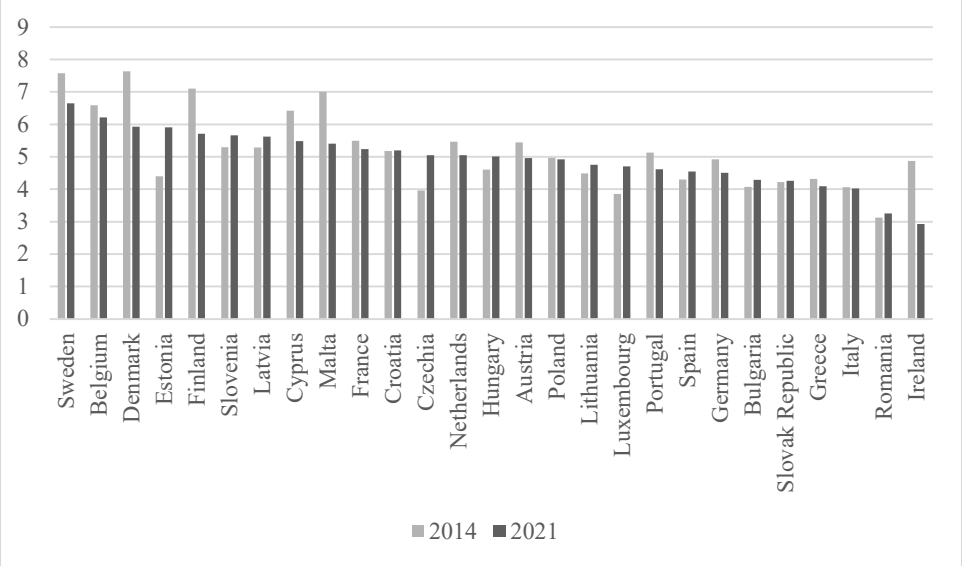
Based on qualitative and quantitative analyses, we have conducted a comparative analysis of the education and research system in the EU countries for 2014 versus 2021. In addition, we have carried out a quantitative analysis of the education and research system funding characteristics in the EU Member States. Moreover, we have used the case study of Romania to provide in-depth information about how the education and research system in Romania is financed and its performance level. The data on the education and research system funding in Romania and other EU countries were gathered from the Eurostat and World Bank database (2024), while the education and research performance level indicators were retrieved from the European Innovation Scoreboard (2024). However, this research is limited by the availability of data, with the latest figures accessible only up to 2021, while for the expenditure on tertiary education the latest figures are up to 2016.

3. The education and research system in Romania: a comparative analysis

Financial resources allocated to the education system in relation to GDP reflect the degree of importance that political decision-makers give to it. The comparative analysis of the expenditures made by the EU Member States for the education system reveals several important conclusions.

The largest financial resources were allocated to education by Sweden, Belgium, and Denmark, reaching 6.6%, 6.2% and 5.9% of GDP respectively in 2021. Despite the increase of these expenditures by Romania in the last seven years, from 3.1% in GDP in 2014 to 3.3% in GDP in 2021, their level is still extremely low, placing it in second last place in the EU (Figure 2). At the same time, we note that other states in Central and Eastern Europe have given important financial support to the education system, specifically, the Czech Republic (5.05%), Hungary (5.01%), Poland (4.92%) or Bulgaria (4.29%).

Figure 2: Government expenditure on education, in 2014 and 2021 (% of GDP)

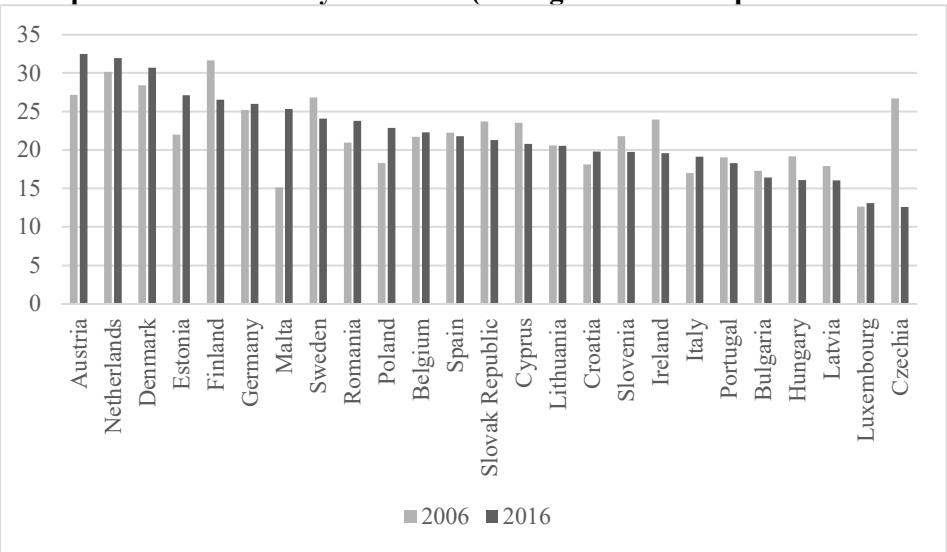


Source: Author representation based on World Bank data (2024).

Considering the significant role of tertiary education highlighted by specialized studies, the highest public expenditures in this sector were made by Austria (32.5%), the Netherlands (31.9%), and Denmark (30.6%). On a positive note, Romania has allocated to tertiary education a consistent volume of financial resources compared to the total value of public expenditure for education, ranking ninth of the 27 states and registering an

upward trend, from 20.9% in 2006 to 23.7% in 2016 (Figure 3). However, it should be noted that these data have not been updated since 2016, so the current situation could be significantly different.

Figure 3: Expenditure on tertiary education (% of government expenditure on education)

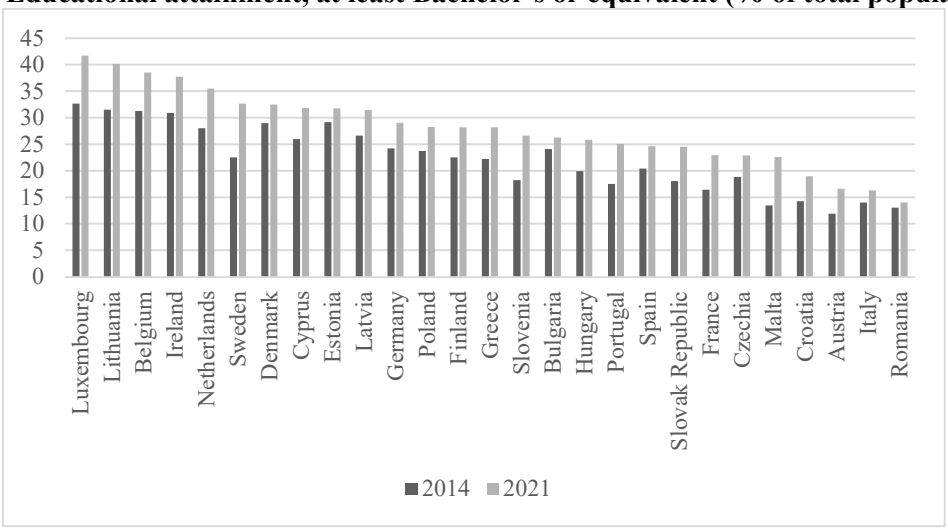


Source: Author representation based on World Bank data (2024).

The performance of an education system determines the number of graduates of bachelor's, master's, and doctorate university studies, which form human resources with cognitive skills necessary for a constantly changing economic environment, able to use the latest technological capabilities and support a high level of innovation.

From Figure 4 it can be noted that Romania has the lowest level of graduates with bachelor's degrees compared to the population over 25 years old, occupying the last place in the EU, with a level of only 13.9%. The best performing EU states according to this indicator were Luxembourg, Lithuania, and Belgium, with values of 41.7%, 40.11% and 38.5%, respectively. At the same time, we note that the states in Central and Eastern Europe managed to reach a high level for this indicator, with Poland reaching the value of 28.2%, Bulgaria, 26.2%, and Hungary, 25.8% (Figure 4).

Figure 4: Educational attainment, at least Bachelor's or equivalent (% of total population 25+)

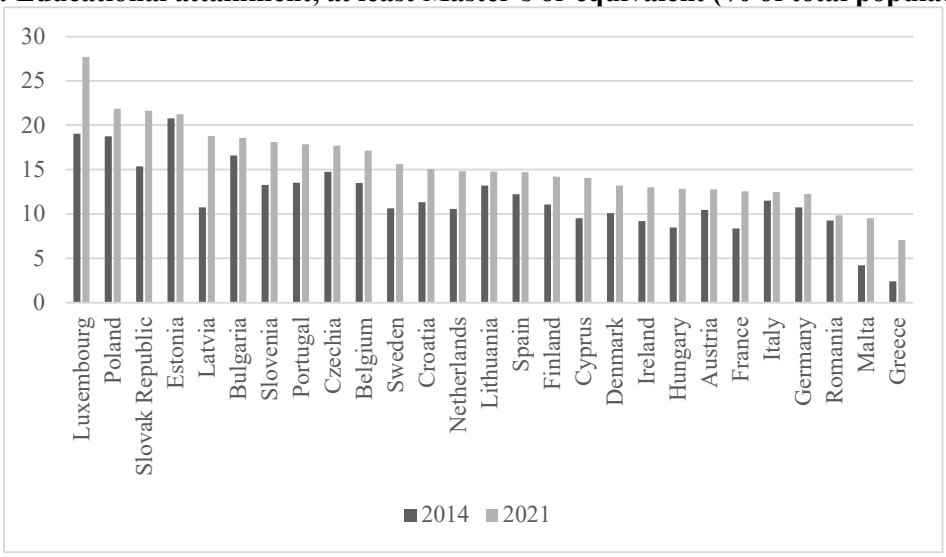


Source: Author representation based on World Bank data (2024).

At the same time, graduates of master's degree studies in Romania have experienced a growth trend in recent years, so that their share in the population over 25 years old reached the level of 9.84% in 2021 compared to 9.21% in 2014 (Figure 5). This indicator placed Romania in 25th place out of the 27 member states, while

other states in Central and Eastern Europe had significantly higher values, e.g., Poland (21.9%), Bulgaria (18.5%), Czech Republic (17.7%) or Hungary (12.3%).

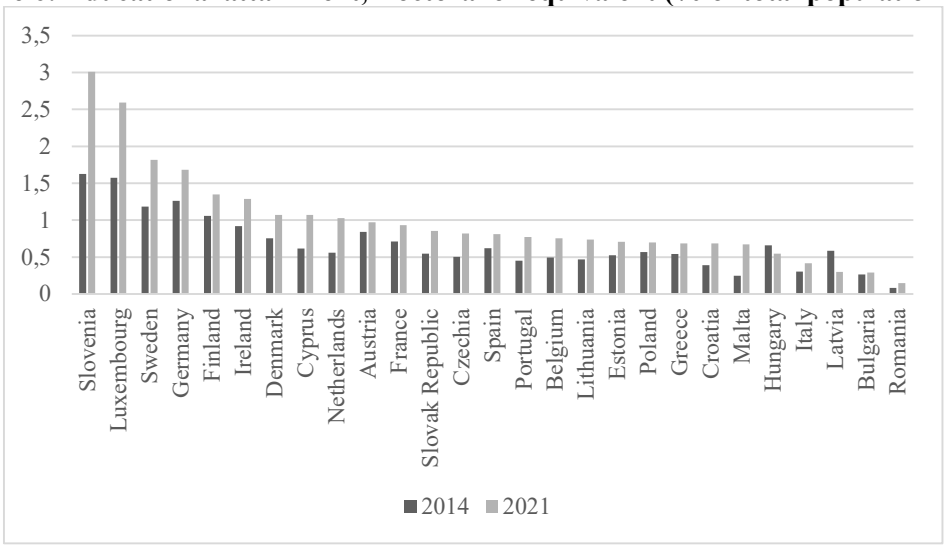
Figure 5: Educational attainment, at least Master's or equivalent (% of total population 25+)



Source: Author representation based on World Bank data (2024).

Regarding the graduates of doctoral university studies, Romania ranked last in the EU, with a share of only 0.14% in the population over 25 years old. On a positive note, a trend of their growth can be observed in the last seven years, from a value of only 0.08% in 2014. However, Romania is surpassed by all other states in Central and Eastern Europe (Figure 6).

Figure 6: Educational attainment, Doctoral or equivalent (% of total population 25+)



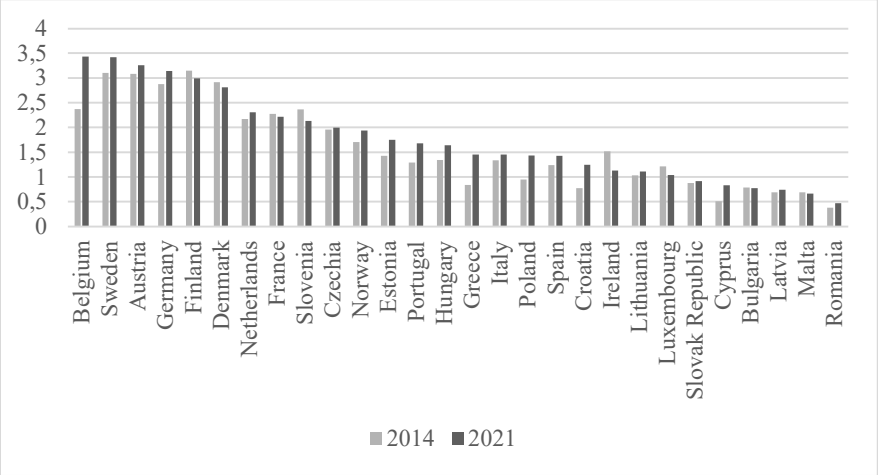
Source: Author representation based on World Bank data (2024).

The results of the education system, but also the expenses allocated by governments for R&D activity determine the degree of development of research and innovation of a state.

The data presented in Figure 7 show us to what extent R&D activity is stimulated in Romania compared to EU Member States and what is the role of R&D for the economy. Expressed by the share of total R&D expenses in GDP, the intensity of R&D activity in Romania recorded the lowest level in the EU, of only 0.47% in GDP in 2021. However, their increasing trend can be noted over the past seven years, by 0.1 percentage points. The highest shares in GDP of the financial resources allocated for R&D in the EU were registered by countries such as Belgium (3.43%), Sweden (3.41%) and Austria (3.25%), all of which are experiencing an upward trend of them compared to 2014 (Figure 7). At the same time, states from Central and Eastern Europe, such as the Czech

Republic (1.99%), Hungary (1.64%), Poland (1.43%) or Bulgaria (0.77%), significantly surpassed Romania on this indicator.

Figure 7: Gross domestic expenditure on R&D, 2012 and 2022 (% of GDP)

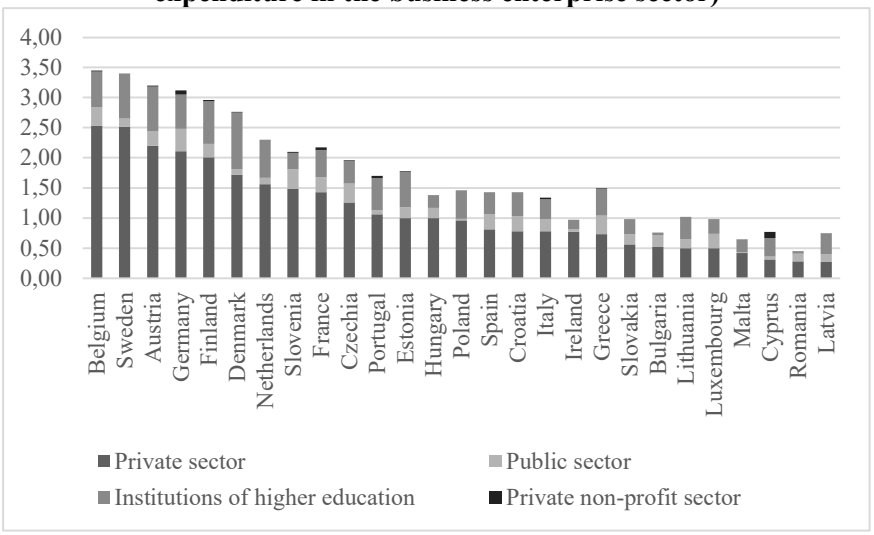


Source: Author representation based on Eurostat (2024).

The analysis of expenditures for R&D activity by sectors of the economy highlights the fact that the differences between countries in terms of the performance of the research system are often explained by the different level of involvement of the private sector of enterprises in this activity. Thus, from Figure 8 it can be noted that the private sector of enterprises is the one that makes the largest investments in R&D activity in most of the EU states, Belgium, Sweden, and Austria recording the highest values of the expenditures of the private sector of enterprises compared to GDP of 2.53%, 2.51% and 2.11% respectively in 2022.

In a negative way, we can observe that the private sector of enterprises in Romania is involved to an extremely limited extent in the R&D activity. According to the data, the expenses for the R&D activity carried out within this sector in Romania reached the level of only 0.28% of GDP in 2022, placing it in the penultimate place in the EU. At the same time, states in Central and Eastern Europe have experienced greater attention paid by the private sector of enterprises to R&D activity, such as the Czech Republic (1.26% in GDP), Hungary (1% in GDP), Poland (0, 96% in GDP) or Bulgaria (0.52% in GDP).

Figure 8: Gross domestic expenditure on R&D by sector, 2022 (%, relative to GDP, ordered by the expenditure in the business enterprise sector)



Source: Author representation based on Eurostat (2024).

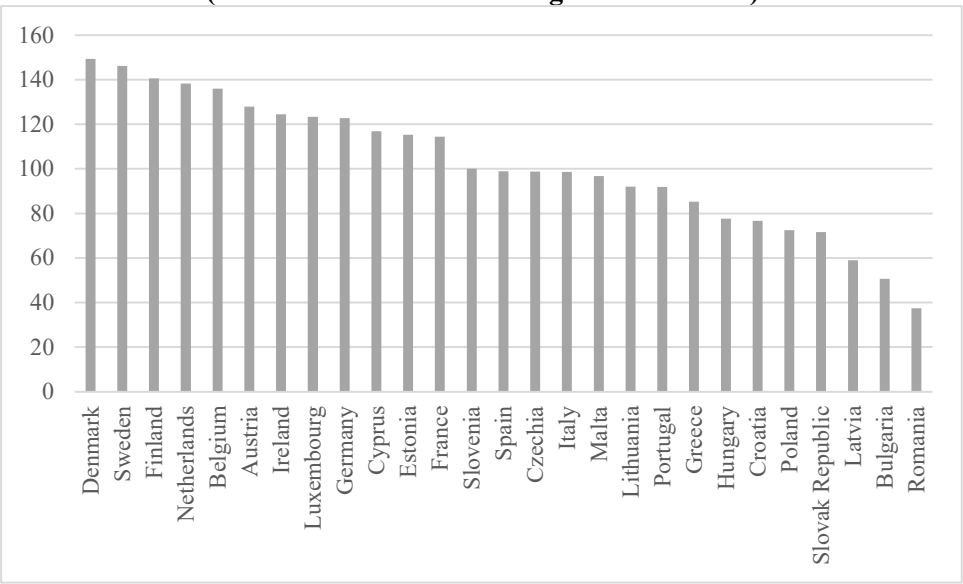
At the same time, the public sector in Romania registered a large share of expenditure for R&D activity in GDP, of 0.13% in 2022, placing Romania in 19th place out of the 27 member states. A reduced involvement in R&D is noted in the case of higher education institutions in Romania, which experienced a value of these

expenses compared to GDP of only 0.04%, the lowest value in the EU. At the same time, the non-profit private sector did not make such expenditures.

The low level of financial resources allocated to the education and research system in Romania, but also the low number of undergraduate, master's and doctorate university graduates are reflected in the extremely low level of innovation activity.

More precisely, Romania recorded the lowest score of the innovation index in 2024, of only 37.4 in relation to the EU average, being still included in the category of emerging innovative states. At the same time, it can be noted that Romania is surpassed by states from Central and Eastern Europe such as: the Czech Republic (98.7), Hungary (77.6), Poland (72.5) and Bulgaria (50.6). At the same time, the highest scores were obtained by Denmark (149.3), Sweden (146.2) and Finland (140.6) (Figure 9).

Figure 9: Index of innovation activity in EU Member States in 2024 (in relation to the EU average = 100 in 2017)



Source: Author representation based on European Innovation Scoreboard data (2024).

In conclusion, the analysis carried out in this chapter highlighted the extremely low level of funding of the Romanian education system, which represents one of the most important obstacles in achieving the real economic convergence with the EU Member States. Despite some positive trends regarding the indicators that reflect the performance of the education and research system, Romania still registers the lowest score of the EU innovation index.

4. Conclusions

The analysis of the way in which the education and research system in Romania are financed and the level of their performance revealed some conclusions. Firstly, some positive trends were noted regarding the financial resources allocated to the education and research system in Romania, more precisely, the public expenses allocated to the education system, the public expenses allocated to tertiary education, the total expenses for R&D activity increased. Also, there has been an increase in the number of bachelor's, master's, and doctorate university graduates, as well as in the number of researchers involved in R&D activity in recent years. Secondly, despite the positive evolution of the financial resources allocated to education and research in Romania, the level of performance of education and research materialized through a reduction in the innovation index registered by Romania in 2024. Romania has the lowest innovation index score in 2024 compared to the EU average, being still included in the category of emerging innovative states.

To ensure a contribution of education and research to economic growth, decision makers should pursue several objectives. First, ensure that all citizens have access to education and training, by creating youth education programs enshrined in legislation, but also by investing in lifelong learning and job creation programs to help adults to improve their lifelong skills. Second, to adjust and adapt educational programs as technologies and skill requirements change, enabling a skilled workforce to compete effectively in the global marketplace. Third, invest

in teachers and innovative teaching methods. Ensuring that education systems have enough qualified teachers is essential, but so is implementing high-quality learning practices that are responsive to change. Furthermore, to enhance the positive impact of education on the economy, it is also important that education systems react quickly in times of crisis.

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THE CONTRIBUTION OF FOREIGN DIRECT INVESTMENT TO THE DEVELOPMENT OF ROMANIA'S TRADE IN SERVICES[1]

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Abstract: During the last three decades, foreign direct investment (FDI) inflows have made an important contribution to the Romanian economic transformation. The recognition of their positive impact on the economic development has been sustained by favourable national investment policies, while the investing companies have been attracted by the Romanian market advantages. The paper highlights that the service sector in Romania experienced the most important growth, one of its determinant factors being the FDI it benefited from, so that this sector came to have a considerable support to the added value in GDP, employment and total foreign trade. The main objective of the paper is to emphasize the contribution of FDI to supporting Romania's trade in services, developed in a quantitative analysis focused on the evolution of indicators regarding FDI in services and service exports of foreign companies investing in Romania. This investigation is doubled by a qualitative search of the factors that have attracted FDI in the service industries and also the FDI effects particularly on the information and communication technology, professional, financial, telecommunications and trade services. The final remarks in the last part of this paper underline the dependence of the service sector of Romania on FDI, this relationship continuing to bring many benefits to the Romanian trade in services and thus sustaining GDP and employment and also enabling access to new technologies in services, but at the same time exposing the service sector to some potential vulnerabilities.

Key-Words: foreign direct investment, services, trade in services, Romania, economic development.
JEL Classification: E22, F23, F43, F63, L8.

1. Introduction

During the last decades, an important contribution to the economic development of many developing and emerging countries have been played by the foreign direct investment (FDI) inflows, mainly due to their role in facilitating the transfer of capital, technology, know-how, modern management processes and access to foreign markets. FDI inflows have been essential for service sector development of many countries, due to their role in providing financial support for enhancing infrastructure, technology transfer and employment opportunities. In recent decades, the service sector has seen a number of important transformations in all countries, many of which being influenced by increased FDI flows. The most relevant ones are related to the market liberalization for service businesses, as well as to the development of new technologies and their intensive use in international trading of services.

However, the effectiveness of FDI in service sector growth has been deeply related to national influencing factors, such as (i) the national policies and institutional governance, favourable to attract, maintain and multiply FDI inflows in all industries and boost long-term economic growth (Akyüz, 2017; Adelakun and Ogujiuba, 2023; Bertrand et al., 2024); (ii) the characteristics of national markets, mainly related to endowments with competitive resources, especially human capital, and the market size (Joo et al., 2022). Due to their quality in bridging the gap between domestic savings and investment needs, particularly in developing and emerging economies, FDI inflows have helped in developing the industries and infrastructure and thereby boosting overall economic growth (Alfaro and Chauvin, 2017; Adelakun and Ogujiuba, 2023).

For many years, most of the FDI has been made by multinational companies (MNC), whose global investment strategies have integrated the transfer of advanced technologies, processes and knowledge. All these

[1] This article further capitalizes on the field of the author's doctoral thesis entitled "The role of foreign investments in the economic recovery of Romania".

have helped local industries, especially in the services field, in improving their productivity and efficiency, and also in leading to innovations that stimulate their competitiveness on the global market. FDI has been widely recognized for its significant contribution to the host country employment market by creating direct jobs within foreign companies and stimulating indirect employment through the local supply chains. Moreover, FDI has often led to the establishment of new businesses and the expansion of existing ones, which create employment opportunities, the service industries being a preferred destination in this respect. It has also contributed directly to offering training programs, raising income levels and enhancing overall living standards in the host country, all these making FDI a valuable tool for service sector development (Saurav et al., 2020).

By investing in local industries, particularly in those related to service ones, FDI can enhance the host country's export capacity. The creation of export-oriented industries helps countries diversify their economies, reduce dependence on a limited category of exports, and generate foreign exchange earnings, the service sector being one of the most targeted in this regard in recent years. Overall, FDI is a key driver of economic development, particularly in developing and emerging markets. By fostering growth, creating jobs and enhancing skills and technology, FDI has the potential to significantly improve a country's economic landscape. However, for sustainable growth, countries need to ensure that FDI aligns with their broader development goals and is managed effectively.

The overall picture presented above also characterizes the Romanian economy, during the last three decades, FDI inflows playing a significant role in economic growth, technological development and integration into global markets. Among the sectors that have benefited significantly from FDI is the service sector, which is currently dominant in the Romanian economy and in its trade relations. At present, the Romanian trade in services shows an upward trend, with an important contribution in sustaining the entire economy, in accordance with its level of development and economic policies, considering its international connectivity through FDI and MNC.

2. Research methodology

This paper combines a quantitative analysis with a qualitative approach focused on the contribution of FDI inflows to the development of the service sector and trade in services of Romania, covering the last three decades. The data examined are provided by the statistical divisions of international organizations, such as the World Bank (World Bank Data), the World Trade Organization (Global Services Trade Data Hub), the European Commission (Eurostat), as well as the National Bank of Romania (Annual report on foreign direct investment in Romania).

This research is structured around the following sections: (i) the contribution of FDI in supporting the development of the service sector in Romania, emphasised by the evolution of relevant indicators, such as: the FDI inward flows and stock in Romania; the FDI net flows in the main service activities; the service development indicators of Romania (such as the percentage of services value added of GDP, the percentage of trade in services of GDP, the share of service employment of total employment, the value of total services and digitally services exports), covering the period between 1990-2023 (depending on the data availability); (ii) the role of FDI in trade in services of Romania, highlighted by the recent evolution of FDI enterprises' exports and imports of services by group of services, during 2019-2023 and the correlation between FDI inflows in services and service exports of Romania, during 2013-2023 (using the simple linear regression function); (iii) concluding remarks regarding the role of FDI in sustaining the service industries and trade in services of Romania, underlining also some potential vulnerabilities related to the dependency of service sector on FDI.

3. Literature review

During the last decades, the determinant factors and effects of FDI capital inflows were amply analysed in specialised literature and reports related to economic development. Some relevant contributions in this field are brought by Ahlquist (2006) and Ghazalian (2024), whose works are focused on the role of capital inflows in economic development of host countries, finding the positive influence of national economic policies, democratic political institutions, stability and economic growth on FDI capital inflows to developing countries. Adelakun and Ogujiuba (2023) find that FDI is viewed as a critical driver of growth in developing economies, considering the capital inflows and the knowledge transfer and productivity spillovers generated by FDI inflows.

Enhancing export capacity through FDI in different industries has been extensively studied across specialised articles and international reports. Considering that FDI plays a crucial role in bolstering the competitiveness of firms by providing access to technology, expertise and capital, for many developing and emerging countries, many studies have shown that FDI fosters the growth of export-oriented sectors, particularly

by improving firms' productivity and enabling them to compete globally (Lakshani et al., 2023; Albiman et al., 2022). FDI spillovers can increase the export potential of domestic companies by transferring knowledge and technology from foreign investors, particularly where foreign companies establish linkages with local companies (Sahoo and Dash, 2022). Moreover, the relationship between FDI and exports depends on factors such as regional policies, market conditions and the level of trade openness (Lakshani et al., 2023).

The connection between FDI and trade in services is very close, with FDI representing one of the four modes of trade in services defined by the World Trade Organization (WTO) under the General Agreement on Trade in Services (GATS) (WTO, 1995). According to Echandi & Sauvé (2020), the FDI, specifically named by GATS "commercial presence", is by far the most important mode of trading services abroad, the WTO estimating that service transactions by this mode account for over 60% of aggregate services trade.

The service sector is found to receive considerably larger amounts of FDI, Kirkegaard (2012) identifying that today the developed, emerging and many developing economies are overwhelmingly "service economies," in terms of economic output, employment, or even increasingly as regards international trade and investments. Banga (2005) explores the growing relevance of the service sector in the economy and the shifting of global FDI from manufacturing towards the service sector, emphasising the rise of its role in integrating the world economy.

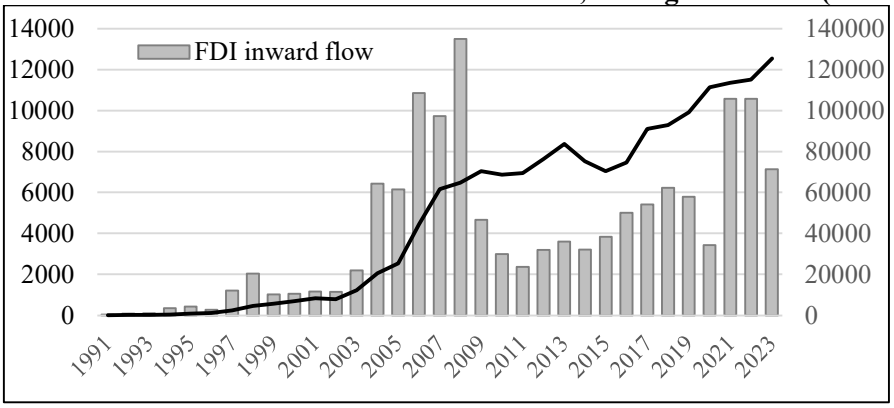
In their paper, Shah and Raza (2022) find that FDI inflows in services are a good tool to connect local service suppliers to the global value chain and boost service exports, in newly industrialised countries. Equally, Sen (2011) found the propagator role of FDI in the service sector and economic growth in a country, revealing also an important vulnerability of host countries related to the over-dependence on FDI in the service-led growth. This is the case of India, where the service sector growth is largely led by high-tech labour and outsourcing, with the main demand coming from abroad.

Central and Eastern European countries have been the subject of numerous studies analysing the role of FDI in the development of their economies. Particularly, the role of FDI in supporting the development of Romanian economy has been investigated in many studies (FIC, 2024; EY, 2024), reports (NBR, 2024) and scientific articles (Andrei, 2011; Zaman & Vasile, 2012; Russu, 2016; Danciu & Strat, 2014). This paper joins all these valuable studies by addressing the contribution of FDI in the service sector and trade in services of Romania, based on statistical data until 2023 and particular aspects of each representative service industry.

4. The contribution of FDI in supporting the development of service sector in Romania

During the last three decades, the Romanian economy has gone through major transformations generated by the adoption of free market mechanisms, the opening of its business environment to the foreign capital and its integration in the European Union (EU), all of them with positive effects on its development. FDI inflows have played a crucial role in shaping the economic landscape of Romania, contributing to its most important changes in the national development model, where services have a significant weight. As it is illustrated in Figure 1, after a modest start during the first years of transition to the market economy following the fall of the communist regime, the FDI in the Romanian economy had registered a sinuous evolution, marked by fluctuations from the maximum reached in 2008 (around USD 13.4 billion) to the minimum in 2011 (approximately USD 2.4 billion) and 2020 (USD 3.4 billion) (UNCTAD, 2024), in accordance with the various internal and external influence factors (the most significant being the global financial crisis and pandemic crisis).

Figure 1: The FDI inward flows and stock in Romania, during 1991-2023 (USD million)



Source: Author's representation based on UNCTAD (2024).

The growth of Romania's service sector through FDI has been a key component of the country's economic transformation, playing an all-important role in modernizing and expanding the service industries, particularly in areas not sufficiently represented by national companies such as telecommunications, financial services, business services and also information technology and communication (ITC) services. FDI has actioned as a catalyst for information technology (IT) growth, Romania becoming a significant player in the global ITC market, thanks largely to FDI from multinational tech companies, major corporations like Microsoft, IBM, Oracle and HP establishing here development and support centres (InvestRomania, 2023).

These investments have not only expanded the sector but have also helped to improve technical skills and drive innovation in service industries. As a consequence, Romania has become a hub for IT services and software exports, with the sector accounting for a growing share of the country's service exports (according to NBR, in 2023, the group of telecommunication, computer and information services achieved 38.3% of the service exports) (NBR, 2024). Companies established through FDI provide, among others, software solutions, cybersecurity services, and outsourcing services to global clients.

Foreign companies, particularly in the IT sector, have been increasingly attracted to Romania due to its highly specialized labour force, which is bolstered by strong university programs in science, technology, engineering and mathematics. Romania is recognized as having a robust educational system that produces a large number of skilled IT professionals, with a strong focus on computer science and engineering university programs. Many Romanian universities, such as the Politehnica University of Bucharest, the Babes-Bolyai University in Cluj-Napoca or Alexandru Ioan Cuza University in Iasi, have established strong computer science and engineering programs that provide specialized competences in software development, data science and cybersecurity. These programs create a steady pipeline of highly qualified graduates in the latest technologies and in foreign languages (essential for collaborating with global teams and partners), making Romania an attractive destination for MNC. This makes Romania an ideal location for outsourcing and nearshoring operations in Europe. Cities like Bucharest, Cluj-Napoca, Timisoara and Iasi have become key IT hubs, attracting major tech companies, including global top companies in this field. Overall, these cities provide a favourable environment for IT companies due to their growing ecosystems, strong academic presence and government support for the tech industry (InvestRomania, 2023).

Besides the high level of professional skills, labour costs in Romania remain competitive compared to other EU countries, making it a cost-effective destination for foreign investment, particularly for companies seeking to establish IT development centres (RAIFT, 2024). Moreover, Romania has also benefited from EU funding and government incentives aimed at promoting the IT sector, further making the country attractive to foreign investors. All these factors combined have helped Romania become one of the fastest-growing IT markets in Europe, with foreign companies choosing to invest heavily in IT services and development operations. First introduced in 2001 for employees with an eligible bachelor's degree working directly on software development, then expanded in 2013 to include a wider range of degrees, IT workers are exempt from income tax (the current rate is 10%) (Emerging Europe, 2023). This measure has supported FDI in IT, the foreign investors finding it as a good attracting FDI measure for high-value services in this field.

FDI has driven the growth of Romania's business process outsourcing (BPO) sector, where foreign companies subcontract non-core business functions like customer service, finance, human resources and IT support. The major cities in Romania have become BPO hubs due to their skilled workforce and competitive labour costs. Main global outsourcing companies, including Accenture, Genpact and Deloitte, have set up operations in Romania, serving both European and global markets, FDI in this sector having a contribution in job creation and the development of local expertise in service-related functions.

Similarly, FDI has supported the national telecommunications sector growth, significant FDI projects in Romania's telecom sector contributing to the fast development and expansion of its infrastructure. International telecom companies, including Vodafone, Orange and Telekom, have invested heavily in Romania, improving connectivity, increasing access to high-speed internet and providing advanced digital services. These investments have also driven the digital transformation of Romania's economy, facilitating the growth of e-commerce, digital services and other technology-based industries that rely on telecommunications infrastructure.

Another major sector is represented by financial services, FDI serving as the entry path of some representative foreign banks mainly from Europe. Romania's financial services sector has grown significantly due to FDI, with many foreign banks and financial institutions establishing a presence in the country. Banks from the Netherlands, France or Austria have expanded their operations in Romania, introducing modern financial products and technologies. FDI has led to improvements in Romania's banking infrastructure, including better

credit systems, digital banking platforms and more sophisticated risk management tools. This has enhanced the overall financial ecosystem and supported economic growth by providing better access to capital for businesses.

Due to the characteristics of the Romanian consumer market, the retail sector, and recently e-commerce, have represented an attractive destination for distribution companies, mainly from Western Europe, which have developed large-scale projects on the Romanian market. FDI has contributed to the rapid expansion of the retail sector, with international retail giants, particularly from France and Germany, investing in the Romanian market. These investments have helped modernize retail distribution channels, improve supply chain efficiency and provide consumers with a wider range of goods and services. With improved digital infrastructure, foreign investment in online retail platforms has spurred the growth of e-commerce. FDI in logistics and delivery services has further facilitated the positive evolution of online shopping in Romania, making the sector a significant contributor to the service industries.

The FDI in the tourism and hospitality sector has had an important contribution in the expansion of international hotel chains in Romania. FDI in the tourism sector has led to the establishment of well-known international hotel brands in Romania, such as Marriott, Hilton or Radisson. These investments have improved the quality of Romania's tourism infrastructure, attracting more international visitors. The influx of FDI has supported the development of Romania's tourism services, from hotel management to travel agencies, which in turn has boosted the country's tourism revenue and global reputation as a trustworthy travel destination.

Summarising, FDI has been a driving force behind the robust growth of Romania's service industries, mainly those of intensive in capital, technologies and skills, global companies entering Romania through FDI sustaining the employment, introducing modern technologies and business practices, and also fostering exports. By providing capital, technology and expertise, foreign investors have helped Romania become a competitive player in international markets, particularly in IT, BPO, telecommunications, financial services and retail. Romania has become a key player in outsourcing, with MNC setting up service centres in the major cities, benefiting from the country's skilled labour force, due to many factors, among them its high potential related to the largest university centres and also relatively low operating costs compared to Western European countries (InvestRomania, 2023). The continued flow of FDI, supported by a favourable business environment, is essential for further expanding and modernizing Romania's service sector. In order to keep its competitive position and further increase the attractiveness of FDI in the service sector, the Romanian business environment must continue the infrastructure development, investment in the workforce training and accelerated efforts for both digitalization and sustainability (EY, 2024).

All these performances described above can be confirmed in the statistical evolution of FDI in service industries. According to data published by the National Bank of Romania (NBR, 2012-2024), during the last years, service activities have been the most important destination of FDI net flows in Romania. The data presented in Table 1 reveals that in 2023, 63.7% of FDI net flows were in the service sector (EUR 4,297 million), a significant progress from 13.38% in 2011 (EUR 243 million). The recovery of economic activity, after the COVID-19 pandemic crisis, the latest devastating disrupting factor of international FDI flows, led to the resumption of the mobility of capital at the global level, this being directed primarily towards sectors with significant expansion potential, such as those of services. Therefore, after their decline in 2020, the FDI net inflows in Romania have increased, most of them being registered in the service sector (Table 1).

Table 1: FDI net flows in Romania, by main service activity, during 2011-2023 (EUR million)

Sectors	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Services, of which:	**243**	**394**	**760**	**724**	**2,625**	**1,167**	**2,103**	**2,906**	**3,601**	**2,012**	**5,601**	**4,621**	**4,297**
Trade	-29	391	70	225	1,000	609	897	1580	1,804	675	1,732	2,003	1,650
Financial intermediation and insurance	291	-295	210	22	926	800	960	896	1,102	1,454	3,065	1,613	1,740
Information and communication technology	-57	84	400	253	129	-58	-65	-20	447	-40	628	445	449
Professional, scientific, technical and administrative activities and support services	31	180	61	24	416	-158	274	379	73	-161	141	345	280
Transportation	63	65	34	92	117	65	55	37	147	115	20	110	151

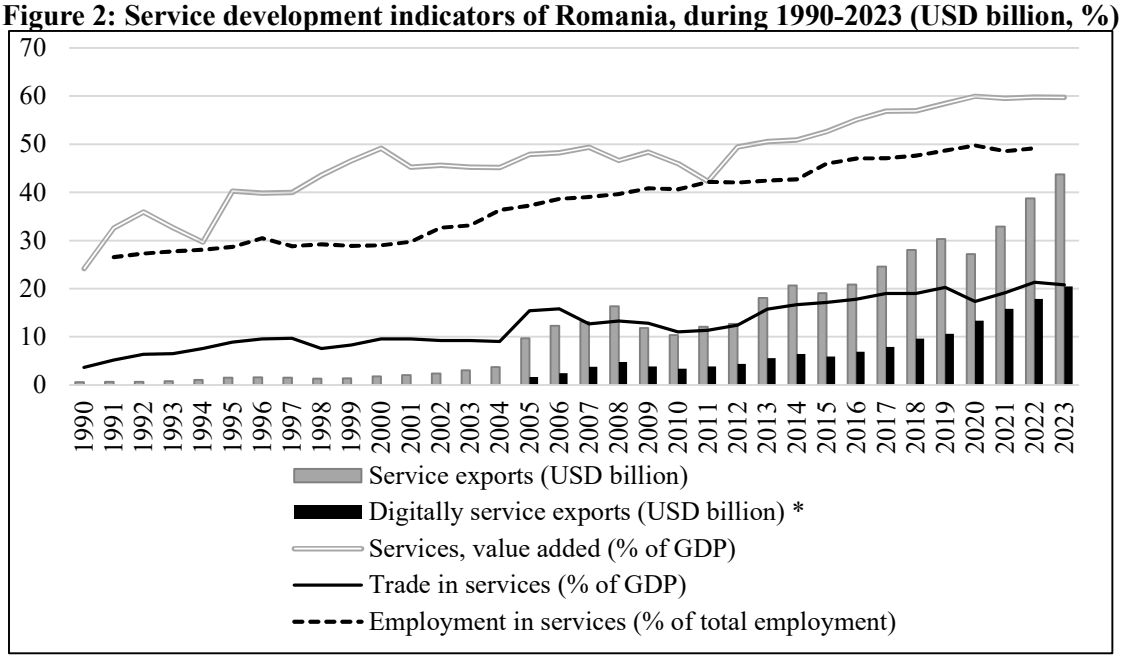
Sectors	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Accommodation and food service activities	-56	-31	-15	108	37	-91	-18	34	28	-31	15	105	27
Other sectors	1,572	1,744	1,952	1,697	836	3,350	2,694	2,360	1,573	904	3,340	5,418	2,445
Total net FDI flow	**1,815**	**2,138**	**2,712**	**2,421**	**3,461**	**4,517**	**4,797**	**5,266**	**5,174**	**2,916**	**8,941**	**10,039**	**6,742**

Source: Author based on NBR (2012-2024).

In 2023, the FDI in service industries was driven primarily by MNC focusing on areas like finance, IT and green energy. A notable contributor was the International Finance Corporation (IFC), which invested USD 546 million, among the targeted sectors being financial services, particularly green finance. The investments supported climate-smart initiatives, capital market growth and sustainability efforts. For instance, major financial institutions like Erste Bank and Raiffeisen Bank issued green and sustainability bonds with IFC's backing, funding renewable energy projects and supporting smaller enterprises. In addition to financial services, sectors like software, IT services, and telecommunications are increasingly attractive for foreign investors, contributing to Romania's digital transformation and economic competitiveness (IFC, 2023). These developments reflect how FDI is increasingly directed towards service-oriented industries, incorporating high-tech and targeting sustainable objectives.

Due to the intensive structural economic reforms and FDI in service industries presented above, the Romanian service sector has registered a remarkable growth, currently making an important contribution to the main macroeconomic indicators. The data presented in Figure 2 highlights the evolution of the service sector contribution to Romania's GDP (from 24.2% in 1990 to 59.8% in 2023), employment (from 26.6% in 1991 to 49.2% in 2022) and foreign trade (trade in services of GDP, from 3.7% in 1990 to 20.8% in 2023) (WBG, 2024; WTO, 2024a; WTO, 2024b). During this period, service exports, considerably supported by the activities of MNC developed as a result of FDI, have a spectacular evolution (from USD 61 million in 1990 to USD 43.73 billion in 2023), having an important contribution to improving the total trade balance (the surplus of the balance of services diminishing the very large deficit of the balance of goods). Similar to the service exports, the exports of digitally delivered services have seen a remarkable evolution, in 2023 hitting a new record of USD 20.44 billion, this evolution being mainly due to FDI.

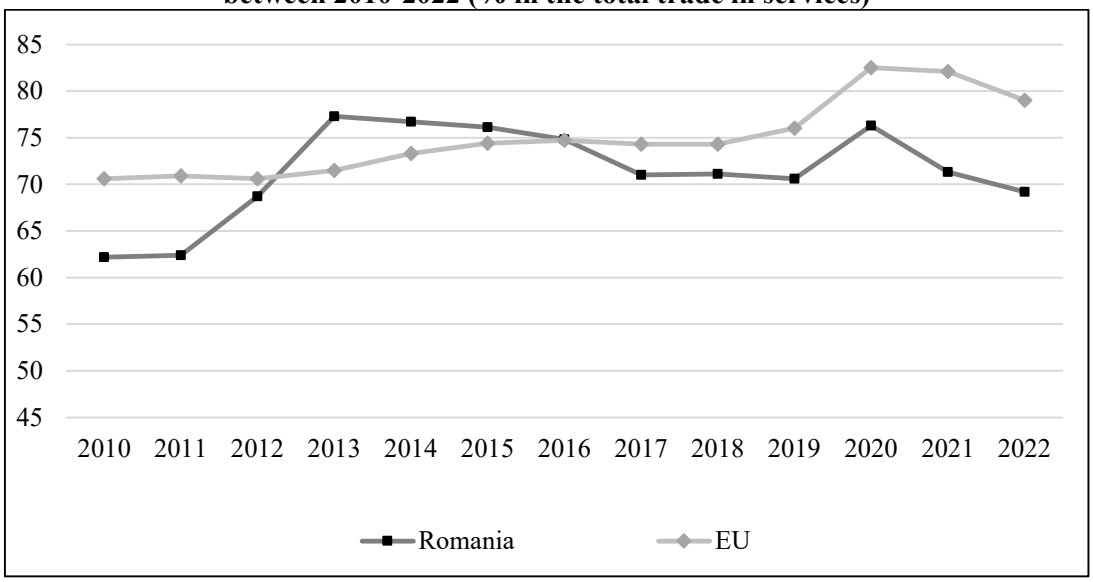
Figure 2: Service development indicators of Romania, during 1990-2023 (USD billion, %)



Note: *No data available on exports of digital services before 2005.
Source: Author's representation based on WTO (2024a, 2024b) and WBG (2024).

The role of FDI in supporting Romania's service sector is also demonstrated by its degree of integration in the global value chains of services. As revealed in Figure 3, the Romanian trade in intermediate services has recorded a good contribution to the total trade volume, compared to EU countries, with a slight fluctuation over the last years (in 2022, the percentage of the intermediate services in the total trade was 69.2%) (Eurostat, 2024).

Figure 3: The trade in intermediate services of Romania, compared to the EU, between 2010-2022 (% in the total trade in services)



Source: Author's representation based on Eurostat data (2024).

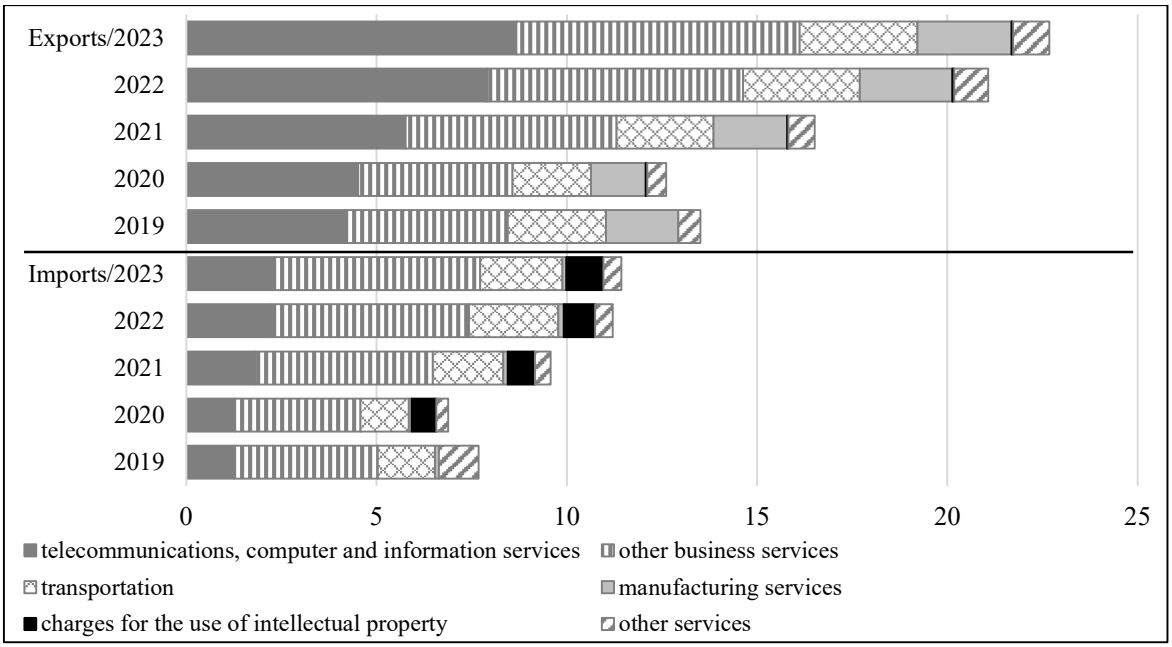
However, maintaining competitive advantages, such as skilled labour and favourable costs, will continue to be crucial in sustaining the Romanian service sector growth, especially of the IT and professional services. Their development enhanced by FDI in this field in recent years, particularly in high-skill services like IT, finance and telecommunications, has also attracted Romanian professionals to return from abroad, contributing to "brain gain" in sectors driven by FDI (Boncea, 2015). Currently, the service sector offers high-value jobs focused on digital transformation, customer experience and advanced financial services. Although Romania has made significant progress, there is still a need to improve its physical and digital infrastructure, as well as regulatory frameworks, to continue attracting FDI and sustaining growth in the service sector.

5. The role of FDI in supporting Romania's trade in services

FDI has played a decisive role in shaping Romania's export of services, particularly in high-value industries such as IT and software development, telecommunications, financial services, logistics and BPO. Major international companies have used Romania as a hub for providing services to other European countries and globally. For instance, Romania is known for its IT services exports, with companies providing software solutions, data processing and cybersecurity services to clients around the world. Similarly, outsourcing service centres established through FDI have become important sources of service exports for Romania. The inflows of FDI have led to an increased presence of MNC, technological advancements and improved competitiveness in the global market for services (InvestRomania, 2023).

During the last years, the exports and imports of services generated by the investing companies (FDI enterprises) in Romania have followed the positive trend (Figure 4), in 2023, their growths achieving new records (FDI enterprises' service exports were EUR 22.68 billion, up by 7.6% compared to previous year, and imports EUR 11.44 billion, up by 2.3% compared to previous year). Comparing the data presented in Figure 4, it can be observed the continuous surplus of foreign trade in services balance of FDI companies (in 2023, the surplus was EUR 11.24 billion, up by 13.9% compared to 2022). The analysis by the main categories of services shows that surpluses were recorded by FDI enterprises operating in almost all groups of services, except for charges for the use of intellectual property.

Figure 4: Romania - FDI enterprises' exports and imports of services, by group of services, during 2019-2023 (EUR billion)



Source: Author's representation based on NBR (2020-2024).

Analysing how FDI has impacted the export of services in Romania, we identify the following relevant aspects. First, the key sectors driving service exports are represented by: IT and software development; BPO and shared service centres; telecommunications; and financial services.

(i) Romania has emerged as a hub for IT services, with exports of this sector growing rapidly due to significant FDI. International tech companies, such as Amazon, IBM, HP, Microsoft and Oracle, have established research and development centres, outsourcing hubs and support offices in Romania (InvestRomania, 2023; Cojocaru & Moga, 2020). IT service exports include software development, data analytics, cybersecurity and other technology-based services provided to global clients. These exports have expanded due to inward FDI, which brought capital, technical expertise and access to international markets. According to NBR (2024), in 2023, the balance of computer and information services recorded a surplus of EUR 6.09 billion. The main destinations for Romania's IT service exports include the EU countries, North America and emerging markets (Figure 5).

(ii) Romania has become an attractive location for BPO activities due to its skilled labour force, favourable costs, and also strategic location within Europe. Many MNC have set up BPO and shared service centres through FDI, offering services such as customer support, finance, human resources and IT management to clients globally. The BPO sector contributes significantly to Romania's service exports, with foreign companies using Romania as a base to deliver services to clients across Europe and beyond. Factors such as multilingual capabilities, cost advantages and proximity to Western Europe make Romania an attractive location for BPO, increasing its export capacity (Conectys, 2024).

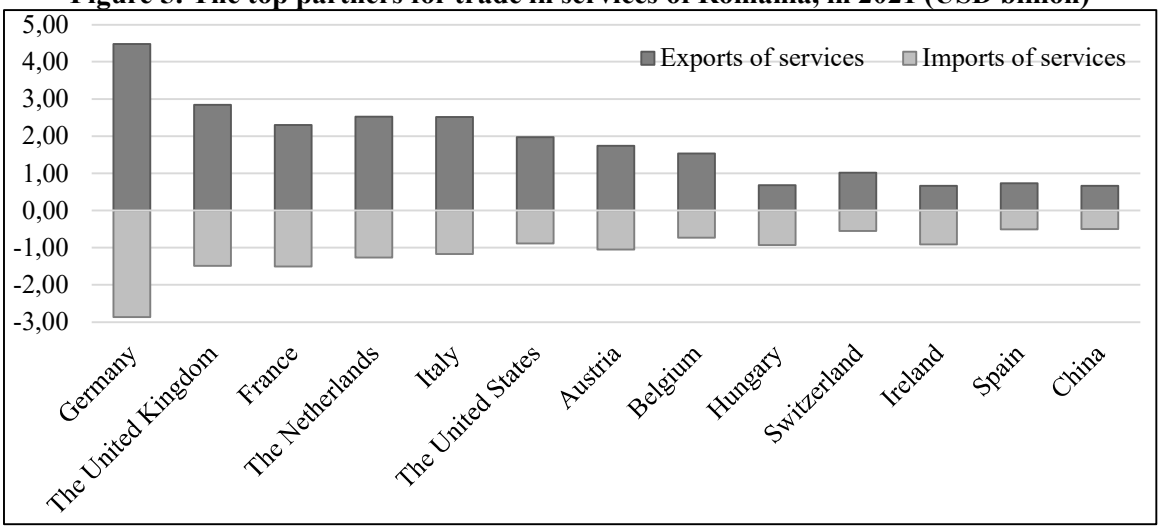
(iii) The telecommunications sector in Romania has grown rapidly due to FDI from major global telecom operators such as Orange, Vodafone and Telekom (Busu, 2023). These investments have enhanced the country's digital infrastructure, supporting the export of telecom-related services like network management, data processing and cloud services. Telecommunications services are often provided across borders, enabling businesses and consumers in other countries to benefit from Romania's digital infrastructure and technological expertise.

(iv) Foreign banks and financial institutions have expanded Romania's financial services sector, with companies mainly from Western European countries (e.g. the Netherlands, France, Austria or Italy) introducing innovative financial products and digital banking services. These services are exported to other countries, especially within the EU, as multinational banks and insurance companies serve clients across borders using Romania as an operational hub for processing financial transactions, risk management and customer service.

Second, FDI has been a driver for export competitiveness, by improving productivity and technological transfer, enabling access to international markets and receiving brand recognition and confidence. FDI has been

a tool in modernizing Romania's service industries by transferring advanced technologies, management practices and international standards. This has made Romanian service providers more competitive in the global market. For instance, the IT and software development sectors have benefited from the latest software platforms and technologies introduced by foreign investors, boosting the quality and efficiency of services offered to international clients. Through FDI, Romanian companies have gained access to the global networks and client bases of MNC. This integration has enabled them to expand their services beyond domestic borders, particularly in sectors like IT, BPO and finance. Foreign investors often facilitate global relationships, allowing Romania-based companies to serve clients in Europe, North America and other regions more effectively. The main partners of trade in services of Romania are European countries (EU, United Kingdom and Switzerland) and the United States (Figure 5). The presence of global companies in Romania has enhanced the credibility and reputation of the country's service exports. International clients are more likely to trust Romanian service providers due to their association with recognized MNC, leading to increased exports.

Figure 5: The top partners for trade in services of Romania, in 2021 (USD billion)



Source: Author's representation based on WTO data (2024c).

Third, FDI has led to the creation of numerous jobs in service sectors like IT, telecommunications and financial services, which require high levels of technical expertise. This has contributed to the development of a skilled labour force, further enhancing Romania's capacity to export knowledge-intensive services. The training programs introduced by foreign companies have improved the qualifications and competencies of local workers, making Romania a competitive exporter of skilled services. Many jobs created through FDI are directly linked to export activities. For instance, employees in IT and BPO firms primarily serve international clients, while workers in financial services and telecoms often support global operations.

Fourth, Romania's service exports have shown steady growth over the past decade, with significant contributions from sectors heavily influenced by FDI. According to NBR data, the services sector accounts for a growing share of the country's total exports (in 2023, the share of services of Romania's total exports was 31.9%), with IT and BPO leading the ranking (as presented in Figure 4). Romania's membership in the EU has facilitated greater trade in services, particularly with other EU member states. FDI from EU-based companies has supported the growth of Romania's export of services, which aligns with the single market's free movement of services, capital, and people.

The influence of FDI inflows in service industries on service exports of Romania can be also demonstrated by the correlation between two variables, where the independent variable (x_i) is FDI inflows in service industries and the dependent variable (y_i) is service exports of Romania. According to Biji et al. (2017), the correlation between the two variables (y_{x_i}) can be determined using the simple linear regression function based on the following parameters (a and b):

$$y_{x_i} = a + bx_i \quad (1)$$

$$a = \frac{(\sum y_i \times \sum x_i^2) - (\sum x_i y_i \times \sum x_i)}{n\sum x_i^2 - (\sum x_i)^2} \quad (2)$$

$$b = \frac{(n \times \sum x_i y_i) - (\sum x_i \times \sum y_i)}{(n\sum x_i^2) - (\sum x_i)^2} \quad (3)$$

where: y_{x_i} – the simple linear regression function; a – the intercept of the true regression line; b – the slope of the true regression line.

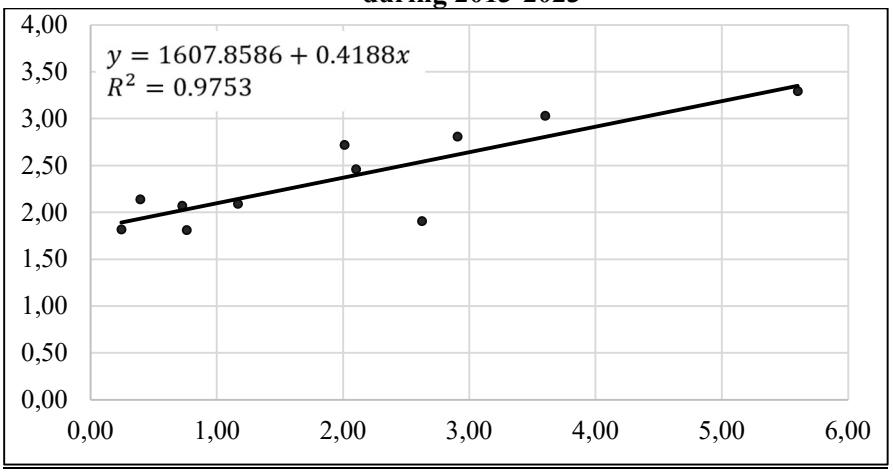
The simple linear correlation (R) between the two variables is determined using the following formula:

$$R = \sqrt{1 - \frac{\sum(y_i - y_{xi})^2}{\sum(y_i - \overline{y})^2}} \quad (4)$$

where: $\bar{y}$ – the average of the y_i.

Based on the NBR and WTO data, during 2013-2023, and the methodology developed by Biji et al. (2017), the graphical representation in Figure 6 confirms the strong direct relationship between both variables, where the influence of FDI inflows in service sector on total service exports is about 97.53%. Therefore, this method also demonstrates the hypothesis of our analysis, namely the positive impact of FDI in services on Romania's service exports.

Figure 6: The corelation between FDI inflows in services and service exports of Romania, during 2013-2023



Note: Independent variable x_i is represented by FDI inflows in Romania (in EUR billion) and dependent variable y_i is represented by service exports of Romania (in USD billion).
Source: Author calculations based on data published by NBR (2014-2024) and WTO (2024a) and on the method of determining the indicators presented in Biji et al. (2017).

Despite the service sector development helped by FDI, Romania faces several challenges in expanding its service exports. The increased competition from other Central and Eastern European countries, such as Poland or Hungary, which also attract significant FDI in services, can be a possible external risk factor. As a consequence, the continuous improvement in Romania's infrastructure, education and regulatory environment is needed in order to ensure significant FDI inflows and consequently sustained growth in service exports. Romania's relatively low labour and life costs, combined with its increasing expertise in IT and BPO remain ongoing opportunities for service industries growth (InvestRomania, 2023). The country's ability to provide high-quality services at competitive rates makes it an attractive destination for outsourcing, especially in areas like software development, fintech and customer support. Emerging areas such as artificial intelligence, cloud computing, and digital transformation offer new opportunities for service exports, particularly if Romania continues to attract FDI in innovative service sectors.

Summarising, FDI has played a pivotal role in transforming Romania into a significant exporter of services, particularly in IT, telecommunications, BPO and financial services. The influx of foreign capital has not only improved technological capabilities and workforce skills but has also given Romanian companies access to international markets and enhanced the country's global competitiveness. While challenges remain, Romania's ability to attract FDI will be key to sustaining and growing its export of services in the future.

6. Concluding remarks

Enhancing service exports through FDI can be seen as a strategy for boosting economic growth and competitiveness, foreign investments playing an important role in improving the export capacity of service industries by exploiting the favourable advantages of the Romanian economy, introducing new technologies, improving management practices and fostering external linkages. Our analysis emphasizes that FDI enables the Romanian service market to have access to cutting-edge technology and expertise, in sectors like IT or business

services, the FDI inflows leveraging service sectors to export globally and having a positive influence on local service providers to become competitive global players. By increased expertise through training and skill development programs, FDI has improved the quality of services offered, enhancing their competitiveness in international markets. Romania's financial services and software development industries are among the fields where FDI has significantly boosted skill levels and service exports. At the same time, MNC have provided local service firms access to international networks, facilitating their entry into foreign markets. Through these networks, local companies can offer services to global clients, increasing the national export potential. In Romania, FDI has helped the country's IT sector integrate into the global value chains, enabling it to export services more efficiently to international markets. FDI has led to infrastructure development in sectors like telecommunications, logistics or banking, better infrastructure and improved service standards attracting more international companies and further enhancing export growth. Romania's growing reputation as an outsourcing hub has benefited from the improved infrastructure and professional standards brought in by foreign investors. Regulatory measures adopted by the Romanian authorities have played a crucial role in facilitating FDI in the services sector by offering incentives (particularly in the IT field) and improving regulations. Supportive policies create a favourable environment for foreign investments, which can directly enhance service export capabilities.

Considering all these developments, a dependence relationship of the Romania's service industries on FDI can be observed, which in addition to the many benefits brought by FDI to trade in services and implicitly to GDP, employment and also gaining access to new technologies in services, may create some future vulnerabilities. The excessive reliance of Romanian service industries on FDI can pose potential challenges, the key exposures associated with this dependence being related to: economic volatility when global market conditions change (e.g. during periods of global financial instability, foreign investors often withdraw their investments, which can lead to capital flight, disruptions in service operations and significant job losses); profit repatriation (e.g. MNC often send a significant portion of their earnings back to their home countries, limiting the long-term benefits of FDI to the host economy); high reliance on foreign companies for job creation and especially highly specialized jobs (in case of a FDI withdrawal, many workers may face unemployment, especially if local firms services have not attained a critical mass); large dependence on foreign expertise and technology (this can hinder the positive evolution of domestic service industries and reduce the country's ability to compete in the global market without foreign inputs, influencing the trade in services).

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INTERDEPENDENCE BETWEEN POLITICAL ENVIRONMENT AND COMPETITIVENESS OF COMPANIES IN A COMPLEX BUSINESS SYSTEM [1]

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Abstract: Amidst a landscape of constant change—marked by the incredible speed of pandemics and military conflicts on one hand and the advancements of the metaverse with its artificial intelligence elements on the other—the global business environment must redefine itself at an even faster pace. Against this background, companies are continuously pressured to maintain their level of competitiveness in foreign or local markets and are directly influenced by the business environment. The interdependence between company competitiveness and the political environment is becoming increasingly powerful because a country's level of prosperity depends on its political system. In this article, the author aims to analyse how the elements of the political environment directly affect the business environment and companies' competitiveness, ultimately determining a country's level of development. The author attempts to analyse a company's level of competitiveness through the prism of the type of political system used in certain countries, such as the USA, Germany, and Venezuela.

Keywords: political environment, competitiveness, institutions, policies, companies
JEL Classification: O5, P5, K2

1. Introduction

The connection between politics and economics has existed since the beginning of time. The political environment has always been the catalyst or impediment to business development. The visible differences in per capita income between developed and less developed countries largely reflect the quality of their institutions. By reducing uncertainty, institutions are the key facilitators of cooperation, realizing the gains from trade and exchange. It is argued that there is no single institutional design strategy that can be applied to all countries (North, 2003). This is due to the diversity of political systems worldwide and the constantly changing global environment influenced by the aspirations of powerful nations. Despite facing a volatile and complex business environment, companies are fiercely competing, facing significant social, technological, military, and political pressures. They strive to remain competitive and seek ways to maximize their resources and capabilities to achieve optimal performance. Therefore, the policy environment exerts a strong impact on the companies' competitiveness, influencing both the regulatory framework and general economic conditions. This influence manifests itself through the link between the institutional and political systems. Considering that companies seek to develop on foreign markets and the institutional system is different from country to country, it is imperative to adapt to the national specificity, considering that the legislative framework, the contracting process, or the political system can be unique, thereby directly impacting the conduct of business. It is a complex process because the political system is defined as the set of institutions, political organizations, interest groups, and relations between them, which differently transpose the approach to socioeconomic problems and international affairs (Belu, 2018). Using concrete statistical data, we will show the interdependence between these factors.

2. Literature review and key concepts in defining the political environment

In our research process, it is important to define several theoretical concepts to understand the link between competitiveness and the political environment. These two notions are so intertwined that companies

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need to understand in real-time the changes taking place in the institutional environment to face the challenges imposed by one system or the other. This relationship has a direct impact on the level of development of countries. (Popa, 2018) The methodological and theoretical-scientific support of the article focuses on a set of concepts aimed at researching concepts such as political environment, competitiveness, and business environment developed by world and regionally renowned authors (M. Porter, D. North, I. Popa, M. Marinoiu, M. Ion, P. Bontempo, M. Stocker and others). It is also important to mention the author's contribution in his attempt to help identify the concrete factors of interdependence between the political environment and the companies' competitiveness in the current post-pandemic years. As mentioned above, the political body and the economy are indissolubly linked (North, 2003). The elements of the political environment have a direct influence on the business environment. (Stocker, M., & Erdélyi, Á. (2024) Starting from the idea of how the political environment is defined, we identify several key notions. The political environment is part of the external business environment in which a company operates, or in other words, part of the PESTLE (Political, Economic, Social, Technological, Legal environment), which is the environment in which a firm operates. The political environment and political dynamics affect the decisions, strategies, and results of companies in the market, as well as overall economic growth. It also influences how the government intervenes in the market, consequently enhancing competitiveness (Ion, 2015). On the other hand, the political environment is an accumulation of variables that influence business at the national, regional, and international levels. More precisely, the political environment is the political factor through which the activities and competitiveness of companies are determined. (Marinoiu, 2019) So, the relationship between institutional governance (rule of law, control of corruption, political stability, regulatory quality and government effectiveness) and the competitiveness of countries (productivity per worker) determine economic grow. (Bontempo, 2022)

In the specialized literature, the concept of competitiveness is approached through abroad prism. The competitiveness of an economy is generated by the level of performance of firms and industries in this state and competitiveness at the macro level, which refers to the outstanding results of companies operating at local and international levels. A company's competitiveness is its ability to sustainably fulfil its dual purpose of satisfying customer demand and making a profit. Achieving competitiveness requires a company to continuously adapt to changing social and economic norms. (Chikan, 2022) At the same time, the level of competitiveness is determined by the influence of factors in the political environment.

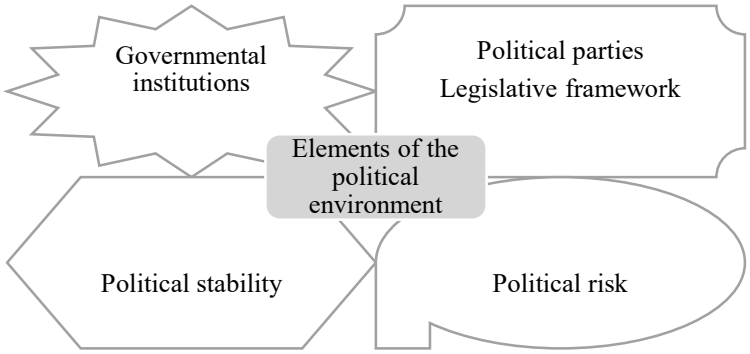
3. Methodology

To achieve the objectives proposed in the article, the author used a complex methodology by mixing several forms of research. Using the following scientific research methods, such as the abstraction method, deduction method, induction, unit method of quantitative and qualitative analysis, observation method, and comparative economic analysis method, allowed a clearer understanding of the connection between business and politics. Through concrete examples of political systems used in certain countries, we can distinguish why some countries have thriving economies with competitive companies and others do not. At the same time, the databases of the World Bank, UNCTAD, or the International Monetary Fund allow the analysis of macroeconomic indicators to demonstrate the link between these notions.

4. Exploring the conceptual field of the political environment

Political factors refer to the extent the government and political actions in a country influence the business climate. These factors include government policies, political stability, taxation, trade regulations, and international relations, observing them in figure 1.

Figure 1. Specific elements of the political environment



Source: Adapted by the author from researched literature

Understanding these elements is crucial for businesses operating in new or emerging local markets or planning to enter them. Meanwhile, political actors refer to the mechanisms, operations, and actions of governments and political institutions that affect the business environment in which companies operate. These factors are fundamental in business reshaping, influencing strategic decision-making, operational capabilities, and the overall viability of market entry or expansion strategies. A political system can either attract foreign investment by providing a steady and predictable business environment or discourage investment if perceived as volatile and unpredictable. In addition, government taxation policies can significantly affect the profitability of businesses, while trade regulations and tariffs can determine the ease or difficulty of cross-border operations. From this perspective, when a company wants to operate in a particular space to make a profit and be competitive, it is necessary to study the political environment from the standpoint of the following questions:

1. How stable is the government?
2. Which form of government: democracy or autarchy?
3. If a new political party comes to power, will it change the rules of business?
4. Is power concentrated in the hands of one or several persons?
5. Is there a well-established regulatory framework to govern businesses in a country?
6. How transparent is government decision-making?

It is important to analyse the political environment from the perspective of the questions above. Each government has its own rules, holding authority in a country as legislative bodies and administrative agencies. Government institutions create and implement laws, regulations, and policies that influence the operation of businesses. They can provide support through favourable policies or pose problems through strict regulations. If we talk about changing political parties, they represent different ideologies and interests within a nation. Changes in government due to elections can lead to changes in priorities and policies. Businesses must cope with these changes and may align themselves with certain parties or advocate for policies that suit their interests. A stable political environment also allows companies to plan and invest with confidence. However, political instability, marked by frequent changes in leadership or social turmoil, can disrupt business operations, supply chains, and consumer behaviour.

Looking at the form of government, democracy and autocracy emerge. In Table 1, we reflect how each of type deals differently with elements of the political environment, supporting or undermining the development of companies.

Table 1: Comparative analysis of forms of government

Democracy	Autocracy
Free and fair elections	Free elections either do not occur or are marred by significant irregularities and restrictions.
Govern democratically elected leaders	Democratically elected leaders do not de facto have the power to govern.
Presence of civil society organizations, NGO	Freedom of association or assembly does not exist, or civil society organizations are repressed.
Freedom of speech	Freedom of speech or media freedom is absent or severely restricted.

Separation of state powers	Constitutional oversight and control mechanisms for collaboration between the government, parliament, and judiciary do not exist or exist only on paper.
Human rights	Human rights are systematically violated.
The state is the supreme authority	Statehood is eroded (failed state): the state has no control over large parts of the country and fails to fulfil basic administrative functions.

Source: Adapted by author based on The Bertelsmann Stiftung's Transformation Index report (BTI), Available at: https://bti-project.org/en/methodology#Democracies%20and%20autocracies

Analysing these features of each form of government, we can easily identify the level of economic, social, and political development of the country, clarifying in which environment a company will operate, in a free economy or in a failed state.

5. The correlation between the political environment and its effects on the economic environment

The political environment directly impacts the country's trade policy, capital control, and competition policy, which defines the investment climate and the attraction of foreign direct investment and is explained in more detail in Table 2.

Table 2: The correlation between the political environment and its effects on the economic environment

Indicators	Type of economy	Trade policy	Investment climate	Impact on companies
Democracy	***Market economy:*** • Open economy • Profit • Economic freedom • Private ownership ***Social market economy:*** • Open economy • Social equity • Private + state ownership	***Free***: exclusion of customs duties, free trade ***Protectionist:*** The existence of customs duties to protect domestic producers	***Open*** Investment friendly	The favourable policy environment creates conditions for profit enhancement, development, and growth, promoting innovation, and generating competitive goods and services.
Results	***Companies thrive in a favourable competitive environment***	***Companies expand through internationalization***		High competitiveness of economy, companies, satisfied consumer
Autocracy	***Planned economy:*** • Closed economy • Plan • Collectivism • State ownership	***Autarchic*:** imports and exports are excluded. The state develops solely on its own resources	**Closed** Foreign direct investment is not encouraged	An autonomous or unstable political environment, corruption, and sudden changes can disrupt supply chains, investment, and consumer behaviour. In this case, companies should identify new development strategies or exit this area.
Results	***Monopoly***	**Companies operate only on the local market**		Lack of competition, frustrated consumers, lack of innovation and growth

Source: adapted by the author.

Benchmarking two systems of governance that generate different types of economies shows where companies have the potential to grow profitably and increase their competitiveness. A market economy in a democratic and free market environment allows companies to become innovative and internationalize their activities, achieving huge turnovers by creating thousands of jobs globally. This system generates the systemic virtuous cycle of economic growth (Popa, 2018). At the opposite pole are closed economic systems, which stifle business activity through a corrupt environment, lack of private ownership, and freedom of action. Table 3 shows concrete examples of the impact of politics on the economy.

Table 3: Comparative analysis of economic systems as a result of the heterogeneity of the political environment

Indicators	Economic system	Country	Macroeconomic indicators (2023)	Company Market capitalization (2024)	Turnover (2024)	Number of employees (2024)
Form of governance: Democracy	Market economy	The United States of America	Total GDP – 28 trillion USD GDP per capita – 80 000 USD	1. Apple – 3.5 trillion USD	1. Apple – 385 billion USD	1. Apple – 150000
				2. Nvidia – 3.3 trillion USD	2. Nvidia – 96 billion USD	2. Nvidia – 29000
				3. Microsoft – 3.1 trillion USD	3. Microsoft – 245 billion USD	3.Microsoft – 221000
	Social market economy	Germany	Total GDP – 4.5 trillion USD GDP per capita – 52 000 USD	1. SAP – 269 billion USD	1. SAP – 35 billion USD	1. SAP – 107000
				2. Siemens – 158 billion USD	2. Siemens – 83 billion USD	2. Siemens – 320000
				3. Allianz – 129 billion USD	3. Allianz – 107 billion USD	3. Allianz – 157000
Autocracy	Closed economy/ Autarchic economy	Venezuela	Total GDP – 129 billion USD GDP per capita – 4500 USD	1. Banco nacional de crédito, c.a., banco universal – 1.48 billion USD	1.Banco nacional de crédito, c.a., banco universal – 1.2 million VES	1.Banco nacional de crédito, c.a., banco universal – 3200
				2.Banco provincial, S.A. Banco Universal - 190 million USD	2.Banco provincial, S.A. Banco Universal – 2.3 million VES	2.Banco provincial, S.A. Banco Universal – 1852
				3.Productos EFE S.A. – 174 million USD	3.Productos EFE S.A. – 1.4 billion VES	3.Productos EFE S.A. – 2300

Source: drafted by the author based on UNCTAD data, available at : https://unctadstat.unctad.org/datacentre/dataviewer/US.GDPTotal and company analysis databases, (Marketcap, 2024) available at: https://companiesmarketcap.com/all-countries/; https://stockanalysis.com/

In democratic states, the economic level is significantly higher than in autocratic states, with GDP per capita being 10 times larger in highly democratic economies (UNCTAD, 2024), and this has a strong impact on the development of companies, generating huge turnover. If in the liberal model of economic development companies, have market capitalization levels at over $3 trillion and are based on manufacturing high-value-added goods in the technology and innovation sector, then in Venezuela, which is an autarchy, with an inflation level of over 200% (2024), decreasing from 63500% (2018) according to UNCTAD(2024) data, state sector companies predominate, mainly providing banking services, which is not a favourable pool for launching prosperous free

businesses in diverse sectors. Analysing turnover and employee numbers in developed economies, we observe a very high level of labour productivity in companies, and this generates an equally high level of competitiveness.

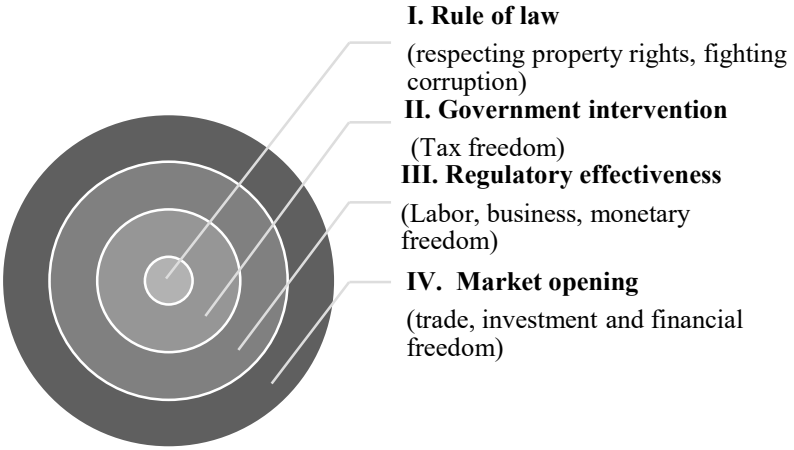
6. Assessment of the political environment through specific indicators

To analyse and identify the political and economic environment in which a company should operate, several specialized institutions produce various complex reports on which entrepreneurs can choose whether or not to operate.

Healthy democracies emphasize economic freedom. Economic Freedom is the absence of government constraints on the production, distribution, or consumption of goods and services to protect and maintain the liberty of the entrepreneur and consumer. This concept, proposed by the Heritage Foundation (2024), is measured by the ***Index of Economic Freedom***. The Index measures the impact of liberty and free markets worldwide, demonstrating the positive influence of economic freedom on business progress.

The indicators used to compile the Freedom Index are grouped into several categories, as seen in figure 2.

Figure 2. Dimension/indicators determining the economic freedom index



Source: adapted by the author based on the report *The Index of Economic Freedom,* available at: https://www.heritage.org/index/pages/about#indexMethodology

According to the above indicators and the analysis methodology, countries are ranked in the following order:

1. Free Countries – with an index between 80-100 points;
2. Preponderantly free countries – with an index 70-70.9 points;
3. Moderately free countries – index 60-60.9 points;
4. Countries Slightly Free – 50-59.9 points;
5. Repressed countries – 40-49.9 points.

In comparing countries, we can observe in table 4 a significant disparity in the level of freedom between the USA, Germany, and Venezuela. When we examine specific indicators for the year 2024, the differences are quite evident. While the US and Germany can be considered as free economies, Venezuela is obviously repressed in terms of economic freedom.

Table 4: Index of economic freedom in different countries

Indicators/country 2024	Total index and type of economy	Government integrity	Rule of law/ judicial efficiency	Tax burden
The USA	70.1 points/ 25th place out of 184, Preponderantly free economy	76.4 of 100 points	74.8 of 100 points	74.8 of 100 points

Germany	72.1 points/ 18th place out of 184, Preponderantly free economy	86.4 of 100 points	93 of 100 points	59 of 100 points
Venezuela	28.1 points/ 174th place out of 184, Repressed economy	6.4 of 100 points	3.3 of 100 points	75.9 of 100 points

Source: adapted by author from Heritage foundation, (2024). The *Index of Economic Freedom,* available at: https://www.heritage.org/index/pages/about#indexMethodology

The USA is in the category of predominantly free in 2024 because it's an election year, and the government has increased public spending, directly impacting business regulation. However, that doesn't mean it's not a free environment for companies to grow and prosper.

Germany's economy is based on decades of high competitiveness. It has an effective judicial system (93 points), which supports a strong rule of law. Government transparency is high with effective enforcement of anti-corruption measures. Open market policies enhance the benefits of Germany's involvement in global trade. The regulatory regime allows dynamic, innovative, and competitive businesses to be established and operate.

Venezuela, as a repressed economy, is not a favourable space for business development. The formal economy is stagnant due to state intervention, while informal activity is rising. Prices of nearly all goods and services are controlled, and the rule of law is weak and unequal, partly due to widespread corruption and legal framework weaknesses. Entrepreneurial activities are restricted by heavy government control and inconsistent enforcement of regulations. Decision-making transparency is low, and most contracts are awarded without competition. The labour market is also controlled by the state, and inflation is nearly 187%. (VENEZUELA, 2024)

Another important indicator that analyses how the political system and governance do or do not stimulate the business environment is the ***Bertelsmann Transformation Index***. The Bertelsmann Transformation Index (BTI, 2024) analyses and assesses countries leading social change towards democracy and market economies. It studies the transformations world countries experience in their economic evolution from underdeveloped to advanced economies. There are 17 criteria according to which 137 countries undergo an analysis. Following their study, we identify *the Status Index* and the *Governance Index*, which represent the quality of the rule of law and democracy and how they stimulate the business environment. The index ranges from 1 to 10. The more positive changes the country shows, the closer the score is to 10. The report does not include Germany and the USA because they are countries with a formed political system and governance, meaning they are mature countries with a high level of development. However, Venezuela appears with great shortcomings in this area. The Political Transformation Index is 3.08, indicating a high level of autocracy, while the Governance Index is 1.63, generating an Economic Transformation Index of only 2.39. It is hard to believe that in 2024, we will still have states with oppressive autocracy as a form of government, as in Venezuela. This is due to the lack of basic democratic principles such as separation of powers, judicial independence, and the rule of law. Under the leadership of President Nicolás Maduro, the country's GDP has fallen by more than three-quarters, resulting in the worst economic depression outside of wartime. Venezuela is still an oil state, with a staggering level of corruption, a limited number of civil servants with military training rather than job-specific skills, millions of Venezuelans out of the country, inadequate education, and 80% of the population below the poverty line. In this context, Venezuela is unfavourable for business development and does not stimulate economic growth.

Another influential indicator is the ***Democracy Index*** by the Economist Intelligence Unit. It combines information on the extent to which citizens can choose their political leaders in free and fair elections, enjoys civil liberties, prefer democracy over other political systems, participate effectively in political life, and have a functioning government working on behalf of its citizens. According to this index, companies choose whether or not to operate in a market. Democracy conditions the development of companies. It ranges from 0 to 10 (most Democratic) (EIU, 2024). Comparing this indicator, the United States of America has a democracy index of 7.8 out of 10, Germany 8.8 out of 10, and Venezuela 2.3 out of 10, the latter being a dramatic situation because instead of increasing from 2006 to the present, it has decreased from 6 to 2, once again demonstrating the lack of democracy and development.

7. Conclusions

In conclusion, one observation is that without a correct political environment based on law and democracy, we cannot speak of economic growth. There is a strong correlation between the political and economic environment, and the space in which companies operate depends on them. We have shown by concrete examples that a political environment based on democracy generates evolution, growth, innovation, prosperity, and profit for companies. While autocracy facilitates profits for a small group of corrupt and influential people, a non-existent business environment, and under such conditions, companies cannot be competitive and prosperous. It is mandatory for any company to correctly analyse the business environment where they intend to expand their activities and for national economies to constantly review their level of governance and political system in order to create an attractive investment environment to increase national compatibility by stimulating the development of local and international companies.

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SHIFTING TO E-MOBILITY: CHALLENGES AND ACCOMPLISHMENTS IN CEE AUTOMOTIVE INDUSTRY

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Abstract: The European Union (EU) is currently undergoing considerable simultaneous challenges pertaining to climate change, in the context of its commitment to achieving climate neutrality by 2050. In pursuing the decarbonisation goal that underlies the assumed energy transition, a shift from fossil-fuelled to electric vehicles (EVs) represents a crucial step. In this context, the objective of our article is to conduct a comprehensive analysis of three key areas: (a) the potential impact of road transport electrification on the automotive industry in Central and Eastern European (CEE) countries and Romania; (b) the current state of development of battery cell production for EVs in each of these states; and (c) the prospects for implementing the transition to e-mobility in the region.

Keywords: Central and Eastern European countries, CEE, Romania, transport electrification, automotive industry transition, electric vehicles (EVs), Li-ion battery.
JEL Classification: L62, L98, O13, O25

1. Introduction

Western Europe invented the car approximately two hundred years ago and has practically always been a force in the manufacturing of conventional cars equipped with internal combustion engines. Even nowadays, the large German, French, Italian, Spanish or Northern European manufacturers, along with their plethora of sub-suppliers are generating the second largest sectoral contribution to the EU trade surplus: +EUR 96 billion in 2022 (+EUR 112.2 billion, in 2021), with only the chemical industry (+EUR 198 billion, in 2022) surpassing the automotive industry in this respect.

Central and Eastern Europe has become a strong hub of the European automotive industry, particularly in the recent decades. After 1989, the year that marked the fall of Communism, the comparative advantages of these countries – the highly skilled, professional, and cheap workforce, the proximity to and, later on, membership of the EU, with all the advantages of the single market – as well as the national programmes that these countries implemented to encourage foreign investment, allowed CEE countries to attract an increasing number of large automotive manufacturers. The majority of these were Western European companies (Renault and PSA in Romania, Volkswagen in the Czech Republic, Fiat in Poland and Serbia, and, a little later on, many others from the luxury segment, particularly in Slovakia and Hungary – BMW, Mercedes-Benz Group, Audi, Volvo Cars, Jaguar, Porsche), but there were also companies from Asia (Daewoo in Romania, Suzuki in Hungary, Toyota in Poland, Kia in Slovakia, Hyundai in the Czech Republic and, more recently, even Chinese companies: Great Wall in Bulgaria – unsuccessfully, BYD in Hungary), as well as U.S. companies (Opel and Ford in Romania).
These companies either took over locally well-known manufacturers (such as Dacia or Skoda, for example) in the context of the local privatisation programmes that these countries had underway, built new facilities at grassroots level (for example, those in Hungary, where there was no automotive industry prior to 1989), or relocated to the CEE a part of their business already operating in other areas, triggering similar moves from their sub-suppliers. As a result, the CEE area came to be included in the European and global automotive and component manufacturing networks and in the regional and global supply chains, they received inflows of capital, technological and organisational know-how and good practices, while the local industries were able to modernise and to significantly improve their productivity and competitiveness, created jobs and became the source of decent salaries for their employees, of an improved standard of living in the CEE and of economic growth in these countries.

2. Brief literature review

Given the unprecedented transformations currently underway in the European and global automotive industry aimed at achieving climate neutrality by 2050, the issues related to the challenges of electrifying transport have been extensively analysed and well documented in the international economic literature of recent years. A review of the specific literature reveals a multitude of scientific papers that examine the implications of transitioning to electric vehicles, several of them focussing on Central and Eastern Europe and Romania, an approach particularly relevant considering that a significant proportion of the cars produced in Europe are manufactured in this region (e.g. Kozinski, 2023; Hilllebrand, 2023). Consequently, a number of studies have explored the challenges of this transition for the CEE automotive industry, in the light of their position as an "assembly hub" for Western car companies. From this perspective, the potential impact on regional employment – which is double than the European average – has been considered, especially in the context of less labour-intensive EV production. (e.g. Szabó, 2023; Hruby, 2024). Furthermore, a substantial volume of scholarly research has assessed the capacity of CEE to meet the evolving demands of the automotive industry, in which the production of batteries represents a pivotal sector. Among these studies, Szilagy (2022) and Ioniță (2023) examined the role and position of CEE countries in the manufacture of cells for electric batteries, a crucial driver of the transition to e-mobility. They also emphasised the significance of attracting foreign investment to this end.

3. A concise description of the methodology employed

In order to provide the most accurate representation possible of the impact that the electrification of transport will have on the automotive industry in Central and Eastern Europe, and in this respect, in each of the countries that comprise the region, a set of research tools was employed throughout the research.
A quantitative analysis was thus conducted with the objective of synthesising the conclusions of the most relevant regional studies. The objective of this analysis was to identify the challenges that the manufacturing of electric vehicles poses for automotive industries in the countries under examination, for the value chains involved in EV manufacturing, and for employment. Subsequently, a quantitative analysis was employed to assess the current status of Li-ion battery production in each of the CEE countries and in Romania, given the pivotal role this factor plays in the transition to e-mobility. Additionally, a series of relevant case studies were presented, which enabled an accurate assessment of the current electric battery production capacity in each of the CEE countries. This assessment allowed for the establishment of their position in the regional and global hierarchy, as well as the identification of their capacity to attract foreign investment and of the main investing companies.

4. In a nutshell: CEE automotive industry in European and global context

Today, the automotive industry in the CEE countries accounts for 25% of the 194 automotive plants in Europe, while four of the most important countries in automotive manufacturing in the Central and Eastern Europe – the Czech Republic, Slovakia, Romania and Hungary – together account for one third of the car manufacturing output in Europe as a whole (Kozinski, 2023; Hilllebrand, 2023). Of particular note is the fact that no other country in the world manufactures more cars per thousand inhabitants as Slovakia (raking 1st worldwide with 180 units/1,000 inhabitants/year), followed by the Czech Republic (ranking 2nd) and Slovakia (3rd) [Table 1].

Table 1: Total car manufacturing output of CEE countries in 2022* (thousands of units)

	Czech Republic	Slovakia	Romania	Hungary	Poland	Slovenia
Number of cars	1221.3	970.3	509.5	453.4	451.1	67.9

Note: * Total conventional and electric cars.
Source: Authors' compilations based on data published by Statista (2024).

The only one of these countries that did not experience a decline in production in 2021 under the impact of the COVID-19 pandemic was Slovakia, and the only CEE country that did not exceed in 2022 the production level of 2020 was Slovenia. Car manufacturing continued to decline in Slovenia, reaching half its 2020 level in 2022. Romania on the other hand had a record output in 2022, with over half a million cars, for the first time in history.

During the last few decades, in many of the CEE countries the automotive industry became an essential pillar of the economy, a sector that ensures jobs for hundreds of thousands of citizens (around 800 thousand direct employees in the automotive industry in the Visegrad countries plus Romania), a business area that has become the driving force behind numerous other industries at horizontal level, contributing with considerable amounts to national exports (10%-15%) and holding a significant share of the gross domestic product (GDP), such as, for example: 13% of the GDP in Romania (2023); 13% in Slovakia (2022); 9% in Poland and the Czech Republic; 5% in Hungary, etc. (Hillebrand, 2023; Dumitrescu, 2023; Prandin et al., 2023; Poland Alternative Fuels Association [PSPA] 2022; Liss, 2023).

While, on average, people working directly in the automotive industry only represent 8.5% of the total number of employees in the European industry as a whole, in the CEE countries the situation is very much different, with the percentage of those directly involved in automotive manufacturing of the total industry workers being as much as twice higher than the European average, in some countries: in Slovakia, for example, it stands at 16%, in Romania at 15%, in the Czech Republic at 13.8%, and in Hungary at 13.1%. This indicator is below the European average only in Poland, at 7.7% (Hillebrand, 2023).

This indicates a high degree of dependency on the wellbeing of this industry and of the related international market which, in a certain context, could become a significant vulnerability for the countries concerned, in particular if we take into account the fact the most of the automotive companies are foreign companies which, at turning points, decide the fate of their production facilities and, implicitly, of their employees in various countries. According to Hillebrand (2023), over 90% of the automotive manufacturing output in CEE countries (EU Member States) is controlled by foreign companies, therefore the decisions regarding the automotive industries of CEE countries are made outside this region. This reality is all the more important to consider as the automotive industry has entered the amplest and most profound stage of its transformation, the development of electromobility[1] by transitioning from the internal combustion engine using fossil fuels, to electric engine propulsion.

The Romanian automotive industry had a total turnover of EUR 3 billion in 2022, accounting for 12% of the GDP. This includes the achievements of the over 230,000 employees working in two large automotive companies, Dacia Renault (5% of the GDP) in Mioveni and Ford-Otosan in Craiova, but also of the employees of the over 500 companies that supply components, parts and technologies, which are covering around 60% of the local automotive industry and are also major exporters (Cornea, 2022; Alecu et al., 2023).

The automotive industry is Romania's main exporter, accounting for approximately 14.2% of the country's total exports (EUR 92 billion[2] in 2022) (Alecu et al., 2023; Romanian National Institute of Statistics [INS], 2024). It is worth noting that Romania's car manufacturing output grew practically around 100 times since 2000, after the existing facilities – *Dacia* and *Automobile Craiova* – were taken over by the large automotive manufacturers *Renault* and *Ford*, respectively. Romania's automotive production is overwhelmingly exported to other European countries, with the three largest exporters from Romania in 2022 being, in descending order: (1) *Dacia*, (2) *Ford*, and (3) *Star Assembly*, part of the *Mercedes-Benz* giant, which manufactures gearboxes, drive lines and components in Alba County (Cornea, 2022).

It is worth highlighting that in the entire Central and Eastern European area, *Daci*a and *Skoda* are the only two companies that preserved their original local brand names, surviving the difficult market economy transition faced by the countries of the former Communist Bloc with the contribution of the two large Western companies that took them over, developed and promoted them, Renault and Ford.

5. Road transport electrification's impact on CEE automotive industry

The transition towards fully electric transport entails a fundamental technological change, reflected in a completely different logic of car manufacturing. While many of the components of the conventional car are kept, the main conceptual change consists of the EV powertrain, in terms not only of the energy used, but also in terms of how this energy is stored and distributed: EV construction no longer includes an internal combustion engine and, as such, entire conventional automotive manufacturing systems are eliminated – the fuel tank with its entire fuelling system (fuel pump, pipes, filters, etc.), the internal combustion system (piston, spark plugs, etc.), alternator, the complex multiple-gear transmission system, the exhaust gas evacuation system. All these are replaced by an electric engine, a rechargeable battery, cables for electricity transmission and a simple gearbox.

[1] Electromobility/e-mobility is the mobility provided by electrically powered vehicles.

[2] According to the National Institute for Statistics (INS), the total value of Romania's exports in 1991 equalled the equivalent of EUR 3.5 billion. Over the course of 30 years, it grew 26 times (Romanian National Institute of Statistics [INS], 2024).

A BEV[3] car is at the same time simpler, easier to assembly and significantly more expensive than a conventional one. Its powertrain comprises only a few hundred components, around 400, compared to the at least 1,000 components of the conventional vehicle, but it is a lot costlier due to the high price, diversity and much higher quantity of minerals used in the construction of the battery and of the engine, most of these being critical mineral resources. According to calculations made by the Price Waterhouse Cooper consultant (PWC, 2020), the cost of manufacturing one electric powertrain stood at around EUR 9,500, while the cost for the manufacture of a conventional powertrain amounted to only EUR 5,000.

Another important change brought about by the radical shift in technology, from conventional vehicles to EVs, consists of the fact that electronics and software became a lot more important in the functioning of the EV, and their share in the total manufacturing cost of a car tends to increase substantially, accounting for as much as up to 10% din of the total manufacturing costs. According to Hillebrand (2023), these cost structure changes determine the transfer of the main link where the most added value is created in the case of the electric vehicle manufacturing chain, from the companies that manufacture/assemble the final product, as it was the case for conventional automotive manufacturing, to the companies that manufacture the main component, the battery, plus those that produce the electronics and software which equip the electric vehicle and which its proper functioning depends on.

As far as the automotive manufacturer is concerned, the shift towards BEVs does change the type of activities, but, according to more recent research, it will not have as great an impact on the required workload as had previously been thought. The German Fraunhofen Instutute calculated for Volkswagen that the workload required to manufacture an electric powertrain, including the battery, is 41% lower than that required to manufacture a conventional powertrain but, nevertheless, this decrease in necessary labour is compensated by increases at other stages of the assembly process (such as, for example, the installation of the wiring or the recharging of batteries). Overall, the required workforce is not significantly lower in BEV manufacturing, but only 3-4% lower following the transition to e-mobility, only that the workforce input is of a different type and necessary at other manufacturing stages. In other words, a company shifting towards BEV assembly does not require staff cuts, but rather employee reskilling.

As such, the EV manufacturing value chain is no less workforce-intensive than that of conventional manufacturing and, as a result, the effects in terms of the workforce engaged in the European automotive sector will not be as dramatic as initially thought. The change will be in terms of the type of activities necessary and of the qualifications and skills required to perform them.

The constructive novelties of the electric car and its manufacturing technology entail the radical transformation of the entire manufacturing process, the provision of new workforce qualifications and skills, the provision of with new equipment and, in particular, the changing of a significant part of the supplier chains. Practically, component suppliers that ensured the supply of parts and systems that are eliminated from the construction of the new type of car, briefly listed above, become useless and are bound to go bankrupt unless they promptly shift towards different activities that are needed on a fully changed automotive market or on other markets.

This is the major risk faced by entire clusters of CEE component manufactures that supply not only the national conventional car industries, but that are also important exporters to other countries with strong automotive industries. Poland, for example, is among the top ten countries globally in this respect, with annual exports of automotive components amounting to more than USD 12.3 billion. In Romania as well, the manufacturing and export of components are very important: 7 of the country's 10 most exported products are related to the automotive industry. In 2021, around EUR 6 billion worth of automotive components, EUR 3.5 million worth of wiring, plus dashboards, consoles and tires were exported from Romania.

CEE-wide, 80% of the jobs in the automotive industry are in facilities that manufacture components and parts, a large number of the employees working in those very facilities that will be most affected by the EV transition: the manufacturing of internal combustion engines and transmission systems. According to calculations made by PWC for the European Association of Automotive Suppliers (CLEPA), it is expected that by 2040, 43% of the jobs estimated to be lost in the manufacturing of conventional powertrains, including internal combustion engines, will not be compensated by the new jobs created in the manufacturing of electric powertrains. Several studies suggest however that the transition towards electromobility will be considerably slower in the CEE area than in Western Europe and, as a result, for an additional considerable length of time, the European ICE industry will remain concentrated and active in the CEE countries (Hillebrand, 2023), especially since the electromobility

[3] Battery Electric Vehicle [A/N];

issue seems to have been resolved only as far as passenger cars and urban public transportation are concerned, but viable solutions are yet to be provided for long-haul freight trucking. At the same time, in many developing countries the transition towards e-mobility will very likely be even slower than in the CEE, and therefore they will remain viable markets for European ICE manufacturers. As a result, these manufacturers will no longer face an immediate shock, but instead will have the necessary respite to adapt and reorient themselves according to the circumstances.

According to PWC, the number of employees involved in the European manufacturing of components for conventional powertrains will reach its peak in 2030, after which it will decline, and this will also happen in the CEE countries. According to this forecast, the strongest impact on the employed staff will be felt in Romania, where 48% of the jobs in the field may (gradually) disappear if no new jobs are created as soon as possible in the manufacturing of EV components, to absorb the staff laid off from the conventional manufacturing area. In Poland, the estimated impact is substantially lower, at 20%, and for the Czech Republic PWC expects the conventional powertrain system manufacturing sector to remain stable.

6. Li-ion battery manufacturing in the CEE

The impact of the transition to e-mobility, the extent and ways in which this process will affect the automotive industry in the CEE countries and their economy largely depend on how well these countries will manage to attract strong investors to develop their manufacturing of rechargeable EV batteries. For countries that have already had notable successes in this area, as is the case of Hungary or Poland, the impact will depend on the extent to which they will be capable of maintaining the very good positions they hold at present.

The global demand for EV Li-ion batteries increases rapidly and will reach 9,300 GWh in 2030, an increase of 1,600% compared to its level in 2020 (Buthada, 2022). With this dynamic, demand constitutes one of the major factors driving the accelerated increase in EV battery manufacturing capacities, along with the effort to decarbonise economies and stop global warming, and the strategic objective of the EU and other developed economies to reduce dependency on China and Asia. Against this background, the development of ever more comprehensive regional (and even internal, in large economies) supply chains becomes increasingly important for countries with a significant automotive industry, in the effort to ensure the transition from conventional technologies developed around the internal combustion engine to the fully electric drive.

The production of electric battery cells is very capital-and energy-intensive, but not workforce-intensive, because manufacturing is largely automated. Therefore, such an investment has a very limited positive effect on the volume of hires, but it is essential for the transition of the local automotive industry towards electromobility and, in the end, not only for the survival of an industry that is extremely important for the economies in question, but also for a very promising future of this industry in the long run, with an increased positive impact on national economies.

The criteria investors look for when choosing the overseas location for a new EV battery manufacturing facility are related to the proximity of the downhill user industry facilities, the availability of high-skilled labour and of sufficient energy resources and, of course, the cost of these inputs. These are objective economic criteria, which are well met by the CEE countries. At the same time, an important factor in the decision to invest in CEE countries is the intention of foreign companies – such as those in Asia, in particular China, the world leader in the production of batteries for electric vehicles – to enter the European single market not only as exporters (which could be or become problematic), but also as local manufacturers.

As far as China is concerned, a very important factor when choosing the location of any external investment, and even more so in the case of an investment of very high value such as the construction of Li-ion battery factories is, the intensity of China's political relation with the beneficiary country, the level of their mutual support and trust, as well as the level of influence obtained by China in that country are more important than the economic and commercial criteria. Because it must be remembered that Chinese companies, though they may be private ones, always follow the foreign policy of the Chinese state and only make decisions that are approved or even indicated by the Communist Party, through its leaders who hold the highest positions in the state's administration. It is not rarely that a decision of this kind made by China also seeks to have a demonstrative effect for other potential partners and takes the appearance of a reward for the country that responded to its political expectations, as part of a "carrots and sticks" external strategy, such as the one China employs towards CEE countries, in the 16+1 format.

Regarding the evaluation of CEE countries in terms of their attractiveness for investments in EV battery manufacturing, a European Trade Union Institute (ETUI) report considers the local labour and energy costs as

essential for the decision of foreign companies to invest, these alone accounting for 50% of the score required for a positive assessment. Based on a localisation matrix designed by the authors, the report concludes that while Hungary and the Czech Republic have very good scores, already confirmed by the number and volume of related investments attracted (which is correct in the case of Hungary, but not in the case of the Czech Republic), other CEE countries such as Poland and Slovakia would receive a sensibly inferior score (Schade, Haug, & Berthold, 2022). Hillebrand (2023) cites the ETUI Report in its own analyses, including Romania along with Poland and Slovakia in the category of countries with lower scores, which would not be attractive for investments in the production of Li-ion electric batteries, while Romania was completely absent from the original ETUI Report analysis. However, the inconsistencies between the theoretical model based on the localisation matrix and reality raise serious doubts as to the thoroughness of the assessments that use this system (for example, Italy has a very weak score and Poland a weak score, but both have investments in the battery industry, while Norway has the best score but has not attracted any investment in this industry).

In 2022, according to the same report, there were 25 electric battery cell factories in Europe, plus another 6 about to be announced. In 2023, the production capacity announced should have reached a total of 157 GWh and then reach 900 GWh in 2030 (in almost all cases the production started with smaller outputs and grew gradually, as the market evolved, until reaching maximum production capacity). According to the calculations in this report, around 50% of the production capacity in 2030 would be held cumulatively by European investing companies, while the remaining foreign companies, both Asian, and American would strive to adjudicate more consistent and firmer positions on the European market which promises to become an extremely competitive one as a result. Europe's problem at this moment is related to the fact that while foreign Asian companies, in particular CATL (China) and American ones represented by Tesla are one step ahead, being already established on the market and operational, while European companies are barely now entering the Li-ion battery market and starting to operate, with significantly less experience than, for example, their Chinese competitors.

6.1. Central and Eastern Europe

CEE is well positioned to meet the increased demand for EV batteries, increasingly outlining its future as a centre for the manufacture of batteries and other EV components, as well as for the assembly of electric vehicles. In the recent years, many European investors and from outside Europe implemented and/or announced new investments in the manufacture of Li-ion batteries in the CEE area.

In an industry such as that of EV batteries, characterized by an entirely different dynamic in the last decade that is forecasted to remain the same in the future, statistical data regarding cumulated production capacities located in different countries may vary a lot, depending on the source of the data, the time when they were collected and the stages those investments are at, and can also present a certain volatility because there is a considerable possibility that potential investments may not always turn into real investments. As a consequence, these data are often ephemeral and can easily become contradictory when statistics from different sources are compared. Keeping these observations in mind, these were the statistical data in February 2021 regarding battery production capacities (Table 2) cumulated by countries based on the announcements made by companies and provided by S&P Global Marketing Intelligence, for the period 2018-2025 (Yu & Sumangil, 2021). Although at present the figures in Table 2 are very likely obsolete, given the extraordinary dynamics of the sector, they still reveal some important aspects, including with regard to the situation of the CEE countries, which we are looking at in this section in particular:

i. in 2018, China (ranking 1st worldwide at present) already had a significant advance compared to all the other countries, which it permanently increased over the years, while much more developed economies in Asia barely made timid steps in this industry, and while others from Europe were either at the beginning (UK) or did not have such initiatives before 2021 (Germany);

ii. in the CEE countries of the Visegrad group (V4), foreign investments in EV battery factories had a more rapid start, ahead of both other CEE countries and even of large automotive manufacturing countries in Western Europe;

iii. Hungary and Poland gained early recognition as locations of choice for investors in the battery industry and the countries' continued efforts to attract such investors bore fruit, as they took and kept top positions both in the CEE and the EU rankings, and in the global hierarchy (Table 3).

Table 2: EV Li-ion battery production capacities 2018-2025, by countries and large regions (GWh)

	Country	2018	2019	2020	2021	2022	2023	2024	2025
	Australia	0	0	0	1	1	1	4	7
Asia	China	260	268	350	558	718	884	944	944

	Country	2018	2019	2020	2021	2022	2023	2024	2025
	Japan	17	17	17	17	17	17	17	17
	South Korea	11	18	18	18	18	18	18	18
	Thailand	0	0	0	1	1	1	2	2
Europe	**Czech Republic**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**
	France	0	0	0	0	0	20	32	32
	Germany	0	0	0	11	52	93	128	164
	Hungary	**3**	**14**	**20**	**28**	**37**	**47**	**47**	**47**
	Poland	**6**	**6**	**6**	**22**	**54**	**70**	**70**	**70**
	Slovakia	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**10**
	Sweden	0	0	0	4	14	23	32	32
	UK	2	2	2	2	2	5	12	12
North America	US	27	37	42	44	51	76	91	91
TOTAL		325	362	455	706	966	1,246	1,403	1,447

Source: Authors' compilations based on data published by S&P Global Marketing Intelligence (company disclosures; data as at 1 February 2021).

Table 3: Hierarchy of EV Li-ion battery manufacturing countries in 2021 and 2025 (GWh)

	2021				2025 P		
1.	China	558	79,0%	1.	China	944	65,2%
2.	USA	44	6,2%	2.	Germany	164	11,3%
3.	**Hungary**	**28**	**4,0%**	3.	USA	91	6,3
4.	**Poland**	**22**	**3,1%**	**4.**	**Poland**	**70**	**4,8%**
5.	South Korea	18	2,5%	**5.**	**Hungary**	**47**	**3,2%**
6.	Japan	17	2,4%	6.	Sweden	32	2,2%
7.	Germany	11	1,6%	7.	France	32	2,2%
8.	Sweden	4	0,6%	8.	South Korea	18	1,2%
9.	UK	2	0,3%	9.	Japan	17	1,2%
10.	Australia	1	0,1%	10.	UK	12	0,8%
	Other	1	0,1%		Other	20	1,4%
TOTAL WORLDWIDE		706	100.0%	TOTAL WORLDWIDE		1,447	100.0%

Source: Authors' compilations based on data published by S&P Global Marketing Intelligence (company disclosures; data as at 1 February 2021).

Hungary and Poland are among the top five countries worldwide in the production of EV batteries, ranking the 3rd and 4th, respectively, in 2021. According to S&P forecasts, Poland was expected to preserve its 4th position in 2025, while Hungary was going to fall to 5th place. However, regardless of the positions they will hold in the hierarchy, what is remarkable is that the two CEE countries are in the foreground of the automotive industry electrification trend, on top positions, and cumulatively hold significant shares of the global production of EV batteries – 7.1% in 2021 and, potentially 8.0% in 2025. Beyond their competitive advantages, which other countries in the region also have (lower production costs, qualified staff, high-performing technological universities, proximity of the downstream industries, access to the single market, to financing, etc.), these two states used more coherent and more active policies to encourage investors and concerned themselves earlier and more insistently with the creation of a friendly business environment, with the development of the necessary transport infrastructures, with granting state aids and other incentives for investors.

6.2. Poland

Today, Poland is not only one of the large producers of Li-ion electric batteries, with a production capacity of 72 GWh in 2022, but also the largest exporter of these batteries in Europe and the 5th exporter worldwide. 90% of its export of batteries is represented by the Li-ion batteries, which are already accounting for 2% of the Polish annual export revenues (Kozinski, 2023). This country also supplies batteries internally, for the factories held on its territory by the companies Volkswagen, Fiat, Toyota, Opel and soon Mercedes-Benz, which currently runs an investment of EUR 1.3 billion in a facility that will produce minibuses. The electric battery industry also supplies

various local manufacturers, such as, for example, producers of electric buses, a field in which this country performs very well, Poland currently being the largest exporter of electric buses in Europe (Kosc, 2021).
Poland's foreign investors in the production of Li-ion batteries are numerous and important. Thus:

⇒ Kobyerzice is the location of an investment of the company *LG Chem* (South Korea) which, with an annual output capacity of 20 GWh, is currently the largest Li-ion battery production facility in Europe. It has 50 manufacturing lines for both battery cells, and complete cell packs. It is designed to be able to reach an annual capacity of 65 GWh, but the Polish government announced in 2021 that it will grant the company an aid of EUR 300 million to be able to extend the output capacity of this facility to 100 GWh annually, the equivalent of 60% of the European needs per year.

⇒ The companies *Umicore, Foosung and Enchem* from Belgium have four factories in Poland manufacturing components for Li-ion batteries: *Umicore* has 2 factories, and the other companies have one each;

⇒ *SK Nexis*, from South Korea, is building a battery copper foil factory in Stalowa Wola due to start operating mid-2024.

⇒ The company *Northvolt* from Sweden has already built a very large factory in Gdansk for stationary energy storage equipment (Kosc, 2021; Kozinski, 2023; Ioniță, 2023).

6.3. Hungary

Hungary attracted important car manufacturers – *BMW, Audi, Daimler-Benz, Suzuki, Stellantis* – who are or will soon be producing in their Hungarian facilities the hybrid or BEV versions of the vehicles in their ranges. The same goes for *Suzuki* (Japan), the first automotive company that arrived in Hungary, currently manufacturing hybrid models for the Hungarian market and for the EU. In a somewhat visionary take, the Hungarian government supports the development of autonomous cars and, to this end, it financed the construction of a special track to test them, as well as the construction of a company dealing exclusively with the development of artificial intelligence technologies and of the film cameras required for this new type of transport.
To further develop the Li-ion electric battery industry, Hungary attracted many investors in the field, in particular from Asia. As such (Szilagy, 2022; Ioniță, 2023):

⇒ The Japanese company *GS Yuasa*, the second largest in the world, built a battery factory in Miskolc in 2019, which is operational at present;

⇒ The South Korean company *SK* already has two factories - one operational, of 7.5 GWh in Komarom, and a second one, of 30 GWh, currently being constructed in Ivancsa -, and is planning to build a third facility at a site adequate to service Daimler and Audi plants in Hungary;

⇒ The South Korean company *Samsung* transformed a TV factory it had in Gor into a battery factory with a capacity of 3GWh, and is envisaging extending it to 15 GWh; and

⇒ Most recently, the Chinese company *CATL*[4], the largest in the world in the manufacturing of Li-ion batteries, has commissioned the building of a USD 7.5 billion and 100 GWh factory in Debrecen, which will increase the total Hungarian output capacity to 152 GWh annually, that will bring the country to the second place in Europe, after Germany. It was reported that the plant will hire 9,000 workers and will drive the continued development of electric and hybrid vehicle in Hungary. Economist Tamas Matura warned however of the obstacles that this grandiose project, which would double or even triple the volume of Chinese investments in Hungary will have to overcome: (i) the huge consumption of energy required for the operation of such a factory: "*We will need a new 1 GW nuclear plant! So where is the electricity going to come from?"* – he wondered; (ii) the absence of workforce, both in numbers, and in terms of skills and specific qualifications; (iii) the impact on the environment. At the same time, Matura pointed out the creation of an excessive dependence on the automotive industry, in particular when its future "*...is increasingly about electronics and software, not about hardware"* (Hompot apud Matura, 2023; Szilagyi, 2022).

6.4. Slovakia

Slovakia is attempting to develop the EV and the EV battery industries in parallel. Already the Swedish company *Volvo* is making a large investment in a facility that will manufacture 250,000 EVs annually and has started talks regarding a parcel of land in the vicinity, to be able to build a Li-ion battery factory in the future. The Bratislava government encouraged this investor by covering a fifth of the investment. Slovakia is a European leader in terms of the number of EV models it currently assembles (9), which is likely to also attract investors in the EV battery industry:

[4] CATL = Contemporary Amperex Technology Co. Ltd [A/N].

⇒ The Slovakian start-up *Inobat Auto* is building a Li-ion battery factory in Bratislava with a capacity of 10 GWh annually, which will be able to ensure the provision of batteries for 240,000 EVs annually for the local facilities of *Volkswagen, PSA and Kia*, from the beginning of 2024 (Ioniță, 2023; Szilagy, 2022). In September 2023, the Chinese company *Gotion High Technology* bought a 25% stake in the Slovakian company and, two weeks later, the two announced that, beginning in 2024, they will build together a Li-ion battery factory in Europe with a capacity of 20 GWh. The location is yet to be decided, and several European countries are considered for this purpose. The factory is set to start operating in 2026. It is worth noting that the majority shareholder of the Chinese company is Volkswagen, which signed an exclusive agreement with it to enable it to provide batteries outside China. On the other hand, we note that *Inobat Auto* had already signed memoranda (MOUs[5]) with Spain and Serbia, regarding the construction of factories for EV batteries in these countries (Carey, 2023).

6.5. The Czech Republic

To the dissatisfaction of automotive manufacturers, the Czech Republic was late in adopting policies to incentivise the EV and EV battery industries, because of the government officials' reluctance with regard to this true breakthrough in the field. *Volkswagen*, which years ago took over the local company Skoda, has however a mega-project involving the construction of a battery factory near Pilsen which would create 4,000 jobs, but for a long time was unable to decide on the country where to locate it, while waiting for a government decision on state aid. Once the government agreed to provide a consistent subsidy for this investment, *Volkswagen* began its project to make *Skoda* one of the largest EV manufacturers in Europe, with the first major step being a EUR 4.4 billion investment in the Li-ion battery plant.

In the meantime, the *Skoda* plants began producing their own EV battery systems in the Northern region of the country, in Mlada Boleslaw. *Skoda* is already producing hybrid models but has much higher ambitions.

An important comparative advantage for the Czech Republic is represented by its resources of lithium, a mineral that is not very present in Europe, but which is vital for the EV electric battery industry, which has become its main consumer industry. The government has yet to decide whether to approve the mining of lithium, which is extremely pollutant and could be rejected by the population[6]. Other arguments in favour of the production of Li-ion batteries are the fact that the Czech Republic hosts investments from important EV and EV component manufacturers, as well as 49 local start-ups active in the field of electric car manufacturing (Kozinski, 2023; Szilagy, 2022).

6.6. Bulgaria

Bulgaria has also been approaching, more recently, the development of a new local electric EV batteries industry, although it is not an automotive manufacturer. There are organisations such as *Automotive Cluster Bulgaria* which are willing to support investors wishing to establish themselves in this country with services such as finding the right plot of land, the local partners or the staff to hire. Following these endeavours, a battery manufacturing company in South Africa, Solar MD, has recently opened in Ruse a manufacturing facility for $LiFePO_4$ batteries, initially aiming for an annual output of 60MWh for clients in Bulgaria, Romania, Turkey and the Middle East. The most important components will be produced in China, while the rest will engage local producers, with the Ruse factory to only deal with the assembly. The electric battery cells will be produced by CATL (Ioniță, 2023; Todorović, 2023a)

On the other hand, the Bulgarian Ministry of Energy and the EBRD have signed two agreements based on which the EBRD will analyse the existing energy storage technology and recommend those most adequate for Bulgaria, and then deal with the organisation of calls for tenders for the turn-key delivery of two such systems to this country (Ioniță, 2023).

A daring endeavour started in 2017 by the Bulgarian group *Monbat,* a manufacturer of conventional (acid) batteries, to expand towards the production of Li-ion batteries by taking over two German companies (*GAIA Akkumulatorenwerke GmbH* and *EAS Germany GmbH*[7]) failed in 2022, when the two companies,

[5] MOU = Memorandum of Understanding [A/N].

[6] At present, Europe has only one active lithium mine, in Portugal, but the EV industry needs more such exploitations on our continent, in the countries that have such reserves: Portugal, Spain, Germany, the Czech Republic, Finland, and Austria. The governments concerned have the same problem: the pollution entailed by lithium extraction and the risk of encountering a firm resistance from the communities in the areas in question.

[7] *GAIA Akkumulatorenwerke GmbH,* now at the forefront of the field in Germany, is a high-tech company specialising the production of large-format cells and Li-ion batteries, for trucks, buses and maritime activities, and *EAS Germany GmbH* manufactures Li-ion batteries for hybrid heavy transports and military use.

consolidated into one (*Monbat Holding GmbH*), were taken over by *Britishvolt* for EUR 36 million and a number of shares, with the Bulgarian company becoming a minority partner in the British company (Kokalova-Gray, 2022).

6.7. Romania

Romania is in its turn concerned with becoming part of in the production networks and supply chains in the EV battery industry, a field which is now growing at an extremely rapid pace in the EU area, in the effort to implement the EU strategies for stopping global warming, developing the green economy and reducing trade dependency on China. The EU incentive and financing programmes that come to support the business environments and the stakeholders of road transportation electrification, as well as the development of production activities surrounding this process have obviously provided a significant momentum for investments in the constructions of Li-ion battery factories in Europe, including in the CEE countries.

Romania – which is also an important car manufacturer – must align with this trend. Although later than other companies on the continent, from the CEE and from around the world, the two large manufacturers in our country, Dacia-Renault and Ford-Otosan, will also manufacture their own light hybrid and BEV models in Romania.

Dacia manufactured its first electric car, the *Spring* model, in China, at the Renault-Donfeng plant in Shiyan, Hubei Province. It was imported and sold successfully in Romania and in the rest of Europe and at present it accounts for 12% of total sales. However, in 2023, Dacia began in Mioveni the production of its first hybrid model, *Jogger Hybrid 140*, with an autonomy of over 900 km. The first step towards Dacia BEV variants produced in Europe will be made with the *Sandero* model, but in Morocco, beginning in 2028, and then there will be a fourth generation of the *Duster* model, full electric, the first BEV manufactured in Mioveni starting only in 2033. Starting 2035, according to Denis Le Vot (CEO of the Dacia brand within the Renault Group), all Dacia models will be electric: "*We are now producing lower cars in Morocco and higher ones such as SUVs and crossovers – Duster, Jogger and Sandero Stepway in Mioveni. The next Duster will be an internal combustion engine one* (in 2025, author's note) *and the generation to follow, most probably in 2033, will be electric,"* Le Vot explained (Meșter, 2020; Alecu, 2022).

*Ford-Otosan***,** a joint venture of the U.S. company Ford with a Turkish partner[8], took over the Craiova plants in 2022 (motor vehicles and engines) from Ford, which had bought them in 2007 from the Romanian state. Ford-Otosan announced it was going to invest EUR 490 million in Craiova during the first three years, to launch a new generation of the Courier model in 2023, both in its *Transit* variant (for freight transportation), and in the *Tourneo* variant (for passenger transport), followed by their full-electric versions (BEV) beginning in 2024. At the same time, *Ford Puma,* the best sold Ford model in Europe, will also be manufactured in a BEV version, also in Craiova and also starting in 2024 (Chirileasa, 2022). In May 2023, Ford-Otosan announced a hiring campaign for 1,300 new jobs required to support an increase in annual production from 250,000 to 272,000 *Transit Courier* and *Tourneo Courier* units*,* each in both drive variants, ICE and electric. As such, the entire staff in Craiova will reach 6500 employees working three shifts.

In this effervescent national and European context, the need to build more plants manufacturing Li-ion batteries is understood by everyone and the and new projects emerge almost daily throughout Europe. Without having been at the forefront of the phenomenon, Romania is working towards building such production facilities for itself. As such:

⇒ Although it is not a large-scale project yet, it is absolutely remarkable the initiative of two Romanian entrepreneurs to establish, in 2016, a Romanian start-up called *Prime Batteries Technology* (PBT) which produces Li-ion batteries in Cernica, near Bucharest. PBT is a high-tech company focusing on Li-ion battery packs and electric powertrain systems for EVs, individualised according to customer requests.

⇒ In 2017, the South-African company *Metair* purchased a 35% stake in the PBT capital through its fully-owned subsidiary called *Rombat* (a Romanian manufacturer of conventional acid batteries), with the two companies aiming to develop Li-ion electric batteries together, and in December 2019 *Metair* announced that *PBT* and *Rombat* completed the installation of a Li-ion battery production capacity of 600 thousand to 1 million cells per year, following a greenfield investment of EUR 13.6 million by *Metair.* The production was due to start mid-2020 (Venter, 2018). Since 2022, the *Metair* shareholders decided to withdraw from the manufacturing of

[8] Ford Otosan is a joint venture created with the participation of Ford (41% of the capital) and of the Turkish holding company Koc Holding (41%), the difference of 18% of the share capital being listed at the Istanbul Stock Exchange (Chirileasa, 2022).

both electric and lead-based batteries, and to sell the facilities in Romania, Turkey and South Africa, with the company announcing its departure from Romania in 2023.

In November 2022, *PBT* signed an investment agreement with *EIT InnoEnergy*[9] aiming to increase its production capacity up to 8 GWh. By this agreement, *EIT InnoEnergy* became a shareholder of PBT, and was due to invest EUR 1.0 billion in the extension of its production capacity to 8 GWh annually (Ernst, 2022). This small factory is the first in Romania and in the entire Southern and Eastern Europe that manufactures Li-ion batteries targeting both the automotive industry, and other industrial users, solar parks, wind farms, the national energy system, but also users who are electricity producers, by also offering stationary energy storage equipment.

⇒ However, the largest Greenfield investment in Romania in the field of Li-ion batteries is that of EUR 1.4 billion by the Belgian group *Avesta Battery & Energy Engineering (ABEE),* announced in the summer of 2023. The new plant with a capacity of 22 GWh annually will be built in Galați, in the free port, on an area of 60 hectares, already taken under a lease by ABEE, and will produce batteries solely for the automotive industry. According to the project, a battery recycling factory will also be built there, with a capacity of 50,000 tons/year, following an additional investment of EUR 200 million. ABEE investments will eventually generate 8,000 new jobs. The project is currently in the process of obtaining all the permits, which should be completed by mid-2024, followed by the construction of the building and the purchase and installation of the production lines between 2024 and 2025, followed by the start-up of the new producer, called Romvolt, in 2026 (Energy Industry Review, 2023; Roberts, 2023).

⇒ There is also an announcement by the German company *Draxlmaier,* which operates in the automotive component industry regarding its intention to invest in an electric battery factory in Timișoara, and information from the Ministry of European Funds in relation to the discussion held with the German company *Varta* which is considering Romania as well in its decision regarding the location of a battery factory worth EUR 1 billion, partly financed from European funds (Neagu, 2022).

⇒ As far as the sub-suppliers of the Li-ion battery industry are concerned, we can also point out to a memorandum signed by the Canadian company *RockTech Lithium* with the Romanian officials (Prime Minister Nicolae Ciucă), regarding an investment of EUR 400 million in Romania, in a factory producing materials for Li-ion battery materials. This company currently produces lithium hydroxide, and will have two facilities in Europe, in Germany and in Romania, which will produce Lithium powder. The Romanian factory will create 700 jobs and will meet the demand for 500,000 EVs/year (Neagu, 2022).

⇒ In the same context, it is worth reminding that the Romanian company *Salrom* will produce (in addition to salt) *graphite,* one of the critical minerals that are essential for the EV electric battery industry, representing the anode in the Li-ion electric battery cells. *Salrom* and, possibly other companies that may engage in the extraction of natural graphite must be supported in getting involved in this activity and make it part of the European graphite and even cathode supply chains.

⇒ Also of great importance is the decision of the German company *Mercedes-Benz A.G*., to manufacture in its local divisions, *Star Assembly* and *Star Transmissions,* electric engines for its EV lines equipped with EV batteries. Production will start in 2024, in the facilities in Sebeș and Cugir. Of the total EUR 40 billion allocated by *Mercedes-Benz* to the transition to electric drive, part will go to these two factories in Romania which are currently manufacturing gearboxes and other components for petrol and diesel oil engines (Dumitrescu, 2022).

⇒ Finally, although not strictly related to the automotive sector, we have to point out here an Austrian investment into a stationary electricity storage facility: *Megalodon Storage* – a Romanian company controlled by Austrian investors[10]. The facility has a maximum capacity of 7 MW and is located near Bucharest, in Căciulești Village, Moara Vlăsiei Commune, having the purpose of balancing the energy system. It has already been commissioned in June 2023, with an increase of its storage capacity to 14 MW to follow in a second stage of the project.

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[9] *EIT InnoEnergy* is considered the most active local investor in sustainable energy, it is the driving force behind the *European Battery Alliance* (EBA), and receives technological innovation support from the *European Institute of Innovation and Technology* (EIT). *EIT InnoEnergy* is recognised as a major investor in budding initiatives, with notable successes in the development of operations of giga-factories that are now famous, from *Northvolt* (Sweden), to *Verkor* (France) (Ernst, 2022).

[10] The shareholders of *Megalodon Storage* are: Austrian investment fund *Core Value Capital* (33,33), *Gerdan Real Estate*, controlled by the executive management of *LSG Group* (33.34%) and an Austrian manufacturer and operator of solar parks, *Green Source* (Todorovic, 2022).

The system has a NMC Li-ion battery produced in Romania by *Prime Batteries Technologies*. So far, this is the first largest such equipment in Romania, with only another one, EDPR's 2 MW facility, being operational in Dobrogea, in the proximity of the wind farms (Todorovic, 2022).
Stationary energy storage systems will develop at an accelerated pace in the coming years, driven by the increasingly large-scale use of renewable solar and wind energy which, due to their fluctuating nature, require interventions to balance the national energy system, which would be impossible in the absence of electricity storage capacities.

⇒ Other investments similar to the Austrian one are going to follow in Romania. The Romanian company *Electricom,* an electricity producer and provider, is already considering a 10 MW project to be installed in the proximity of the Tulcea wind farms, through an EUR 5 million investment for the financing of which the company intends to rely on EU funds (Todorovic, 2022).
The Romanian government will authorise the Ministry of the Economy, which has responsibilities in the field of industrial policies, to identify financing opportunities through a state aid scheme for the manufacturing of EV batteries.

7. Looking into the future

Focussing on the European automotive industry, an analysis of the consulting company Buck Consultants International (BCI, 2023) estimates that in the next 10 years, another 250 electric battery factories will be built on our continent. Of this entire fulminant, 800% increase of the global EV electric battery market during the next 5 years, the largest part will be in Europe. Most of the new facilities opened here will produce Li-ion batteries for the European electric vehicle manufacturers, with the EU strategy stimulating the development of local battery supply chains fit to satisfy the rapidly increasing demand of the European EV industry internally, in order to thus reduce Europe's excessive dependency on China and Asia in this respect.

Another forecast, presented by *Benchmark Mineral Intelligence*, is more toned down. It claims that 200 new mega-factories for EV batteries will be built around the world by 2030, most of them in China (148 plants, around 80% of the total), followed by Europe with only 21 plants, then by the US (11 plants) and other economies (20 plants) (Buthada, 2022).

Not only well-established manufacturers in the field, mainly from Asia – CATL, BYD, LG, Panasonic – will be investing in the European Li-ion battery market, but also the sub-suppliers of their components (anodes, cathodes, separators, electrolytes, battery management systems), as well as the automotive manufacturers themselves. As such, for example, *Tesla* is considering a second European mega-factory in the field, and *Volkswagen* intends to build 9 electric battery factories in Europe by 2030, with a cumulated capacity of 240 GWh. Some of the investments of the German company will probably target CEE countries as well, more likely the Czech Republic and/or Slovakia, but Romania is not excluded either, as we have seen.

In the CEE countries, a recent forecast by *Erste Group* considers that the more important annual outputs in 2023 will be in: 1. Hungary – with electric batteries totalling 250 GWh; 2. Poland – 150 GWh; 3. The Czech Republic – 25 GWh; 4. Romania – 22 GWh and 4. Slovakia – 10 GWh (Erste Group, 2023).

On the other hand, according to a forecast of the U.S. consulting company *McKinsey & Company,* in 2040 the increase of European electric vehicle manufacture will have triggered a substantial increase in the manufacturing of electric batteries in Europe, already bringing an additional annual capacity between 0.7-1.5 TWh, the equivalent of another 45-95 new very large plants. At an annual demand of 1200 GWh in 2040, only the value of the battery cell market would amount in Europe to around EUR 90 billion[11] per year, with the potential to generate approximately one quarter million new jobs in the manufacturing of battery cells and in the related R&D&I field[12].

Battery manufacturers will have a large spectrum of possibilities to choose from for the location of their investments in Europe, therefore it is important for the countries that could be the potential beneficiaries of these investments to understand that meeting the needs of investors is an attitude that is beneficial for the country itself, if attracting this industry to the national economy becomes a priority. Battery manufacturers will typically look for locations that provide them with the best business outlook at the lowest level of risk, in a political environment that supports investors, enables the provision of financial incentives to companies and provides them with a supple approval granting system (Eddy, Pfeiffer & Van der Staaij, 2019).

[11] Taking into account an average price of USD 76/battery in 2040.
[12] Taking into account the same requirement in terms of jobs for an annual GWh capacity applied by the giant factory owned by Tesla in Europe to a capacity of around 1200 GWH/year in 2040.

According to the McKinsey study, large plants, of over 8 GWh annually, proved to be twice more productive per invested euro than battery factories with lower capacities. Recent projects above 8 GWh/year have engaged investments of around USD 120 million/1 GWh on average, which, extrapolating, could lead to a total investment volume of approximately USD 150 billion in Europe, to cover an additional capacity requirement of 1200 GWh/year by 2040.

Such projects support the development of local upstream industries, but also FDI in upstream and downstream activities, generating more jobs, cost efficiencies along the supply and production chains and additional merchandise availability for export, creating a beneficial internal competition but also opportunities for cooperation between manufacturers, and between them and the academia or various local service providers. For countries that have their own automotive industry, investments in the electric battery industry help stabilize it, preventing a possible relocation of manufacturers to countries with more favourable business environments and costs, or may even protect them from bankruptcy through the support provided for a smoother transition towards EV manufacturing. For the automotive industry in the beneficiary country these investments open the road towards a successful future, all the more so when market opportunities witnessing an exponential growth are tapped into earlier. At the same time, countries with natural resources useful for these industries, which are also willing to develop the processing thereof for the battery and EV industry have, on the on the one hand, an additional advantages in the competition to attract foreign investors and, on the other hand, additional chances of becoming part of the European supply chains and production networks in the field of electric vehicle manufacturing.

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THE IMPACT OF TAX INCENTIVES ON THE PERFORMANCE OF THE CONSTRUCTION SECTOR IN THE CONTEXT OF THE COVID-19 PANDEMIC

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Abstract: The construction sector plays a key role in economic development of a country, providing not only essential infrastructure, but also many jobs. In this context, the Romanian government has implemented in 2019 a series of fiscal measures aimed at stimulating growth and ensuring the financial sustainability of this crucial segment. The objective of this paper is to establish whether wage tax reductions for construction employees have contributed to economic growth, whether these tax incentives have provided the necessary support for the pursuit of the construction sector business during the Covid-19 pandemic and to what extent the managers of companies in this sector have been able to protect and even develop their business under these conditions. Macroeconomic analysis of the construction sector in Romania based on data provided by the National Institute of Statistics shows that these tax incentives have had a positive impact on the activity of construction companies. Annual increases in turnover, average number of employees and number of companies in the construction sector have occurred in each year of application of the tax facilities, although the COVID-19 pandemic slowed down the pace of growth in 2020 and 2021. Even though many firms closed down or became insolvent due to the pandemic in 2020 and 2021, the construction sector in Romania generated the highest share of Gross Value Added (GVA) compared to the rest of the European Union in 2022. The analysis carried out in the second part of this paper focused on the financial performance of five companies in the specialised construction sector (NACE code 4399) and showed significant increases in profitability and labour productivity in the period 2019-2022. The managers of these companies took full advantage of the tax facilities and managed to develop their business during this period, securing a stable position in the Romanian construction market.

Keywords: tax incentives, Covid-19 pandemic, profitability, rates of return, labour productivity

1. Introduction

In 2018, the construction sector in Romania was adrift, with contractors in the sector facing a lack of manpower and financial liquidity and implicitly, a reduced capacity to undertake works and thus contribute to public and private investments. In this economic context and considering the revolt of the Construction Employers, the Government Emergency Ordinance no. 114 was adopted at the end of 2018, through which the Government adopted tax measures aimed at recovering this branch of the economy. Although the construction sector was declared a priority for a 10-year period and the facilities provided in the form of salary tax reductions for construction employees were promised until 2028, some of these were eliminated as from 2023.

The objective of this paper is to underline the role the tax incentives played during the period of their application, whether they provided the necessary support for the pursuit of the construction sector business during the Covid-19 pandemic and to what extent the managers of the companies managed to protect and even develop their business under these conditions.

The impact of tax incentives on the financial performance of the Romanian construction sector during the timeframe 2019-2022, marked by the Covid-19 pandemic, is analysed from two perspectives: macroeconomic and microeconomic. The macroeconomic analysis of the activity in the construction sector in Romania under the impact of the tax incentives implemented since 1 January 2019 is based on data provided by the National Institute of Statistics. The study carried out in 2019 outlines that these incentives had a positive impact on the activity of construction companies: total turnover increased by 27.4% related to 2018, the average number of employees increased in one year by 37,843 and the number of companies in the construction sector increased by 7.37%, all these contributing to an increase in the share of this sector in Romania's Gross Value Added from 6.6% in 2018 to 7% in 2019. Annual increases in these indicators also occurred during the following period, although the COVID-19 pandemic slowed the pace of growth in 2020 and 2021.

The microeconomic analysis carried out in the second part of the paper focused on the financial performance of five companies chosen from Top Business Romania 2023 and Top Business Bucharest 2023 in the construction sector - NACE code 4399, considering that large companies have a high potential for carrying out public investment projects, thus contributing more to the development of the national economy. Based on the financial information of these companies, taken from www.risco.ro, we calculated and analysed the evolution of economic, financial and commercial rates of return and labour productivity during the timeframe 2018-2022, using the comparison method. It points out a significant increase in rates of return in 2019 compared to 2018, a downward trend in 2020 and 2021, both due to the challenges brought by the pandemic and the increase in construction material and fuel prices, followed by a further increase in financial performance in 2022. It results from this analysis that payroll tax relief has been instrumental in increasing the profitability of construction companies during the timeframe 2019-2022.

2. Tax incentives granted in the construction sector, from GEO no. 114/2018 to Act no. 296/2023

At the end of 2018, the construction sector became a priority for the government programme, as in recent years the sector has been facing difficulties in providing skilled labour and unfair competition. This led to a decrease in the average number of employees during the timeframe 2016-2018 by 2%, i.e. around 8,000 people[1]. At the same time, turnover in the construction sector was declining and more and more companies went out of business.

Under these circumstances, the Romanian Government gave in to pressure from the employers of construction companies and on 29 November an agreement was signed for the adoption of sustainable growth measures based on investment over a 10-year period, declaring the construction sector to be a "priority of national importance for the Romanian economy"[2].

Thus, on 28 December 2018, GEO no. 114 was adopted, which established for employees in the construction sector the increase of the minimum wage and certain tax incentives, valid as from 1 January 2019. These incentives are granted only for salaries obtained from employers with a turnover obtained from the construction sector representing at least 80% of the total turnover. Given that the minimum gross basic salary in 2019 was RON 2,080, GEO no. 114/2018 established a minimum gross wage for the construction sector, not including bonuses and other allowances, of RON 3,000 per month, for normal working hours on average 167.333 hours per month, representing RON 17.928/hour[3]. At the same time, for gross salary income and similar income between RON 3,000 and RON 30,000, employees benefited from an exemption from paying 10% tax on salaries and 10% health insurance contribution (CASS), as well as a reduction in the public insurance contribution (CAS) rate by 3.75 p.p., from 25% to 21.25%[4].

At the end of 2022, by GEO no. 168 of 8 December 2022, the minimum gross basic salary for the construction sector was increased to RON 4,000 per month, for normal working hours comprising on average 165.333 hours per month, for the timeframe 1 January 2023-31 December 2028[5]. At the same time, the maximum salary limit for which facilities are granted was lowered from RON 30,000 to RON 10,000. This change has caused dissatisfaction among employers in the construction sector, as the taxation of salaries above RON 10,000 has been implemented during a period of time when construction materials were on the rise and during the winter period when work in this sector was fewer and harder to carry out due to bad weather.

[1] https://federatiaconstructorilor.ro/files/docs/AcordConstructiiFPSC-GuvernulRomaniei.pdf.
[2] https://static.anaf.ro/static/10/Anaf/legislatie/OUG_114_2018.pdf.
[3] GEO no. 114/2018.
[4] Maria Grigore, Viorica Ștefan-Duicu, Fiscalitate, Nicolae Titulescu University Publishing House, Bucharest, 2023.
[5] https://legislatie.just.ro/Public/DetaliiDocumentAfis/262353.

At the end of October 2023, Act no. 296/2023 is published in the Official Gazette, which provides that as of 1 January 2024, employees in the construction sector "benefit from the reduction of the public insurance contributions (CAS) by the percentage points corresponding to the contribution rate to the privately administered pension fund provided in Act no. 411/2004 - 4.75."[6] Thus, the CAS rate withheld from salary income changes from 21.25% to 20.25% as of January 2024. Although the construction sector was declared a priority sector for a 10-year period and the facilities granted by Ordinance 114/2018 were promised until 2028, at the end of October 2023, Act no. 296/2023 repealed Article 154(1) letter (r), i.e. beginning with November 2023 income, employees in the construction sector no longer benefited from the 10% CASS exemption. Act no. 296/2023 also provides that the wages tax exemption and the reduction of the CAS rate will apply only to the place where the employees' basic function is located.

By GEO no. 93/31 October 2023, the Government increased again the minimum salary for the construction sector from RON 4,000 to RON 4,582 per month for normal working hours averaging 165.333 hours per month, representing on average RON 27.714/hour.

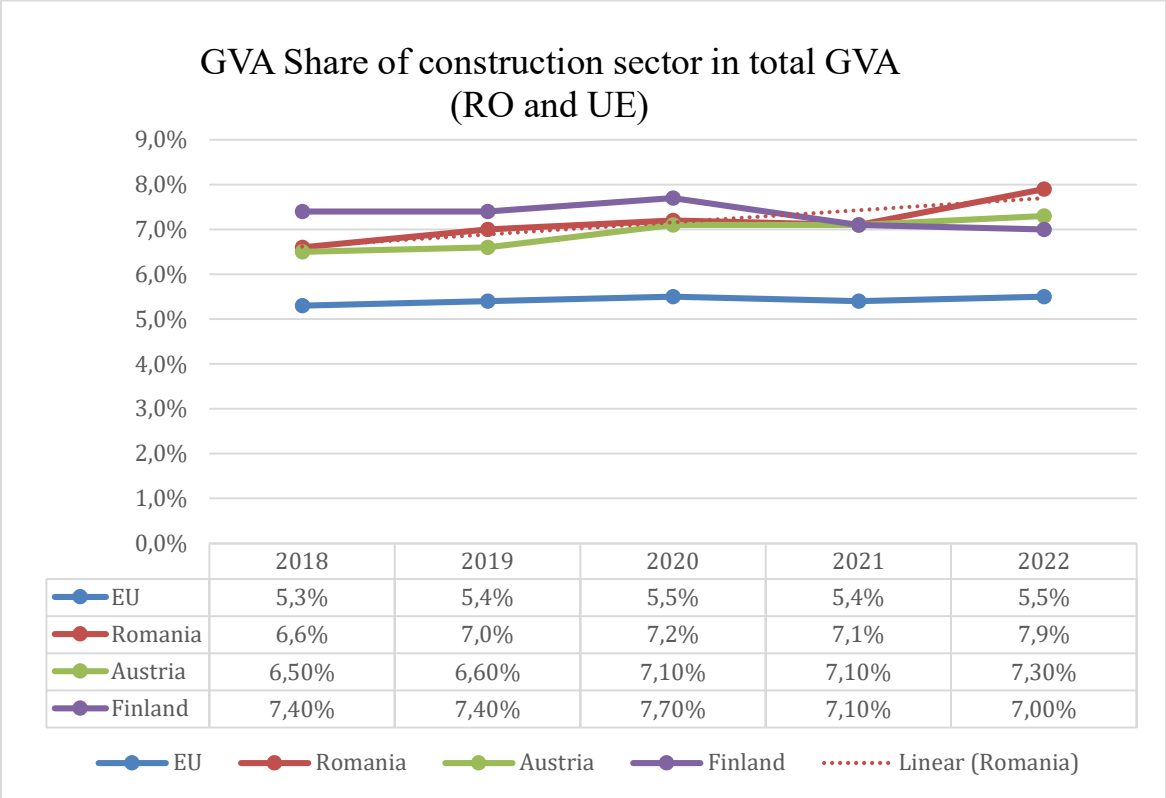
This progressive phasing out of facilities granted to employees in the construction sector come in an unstable political climate, with rising prices for fuel and the main materials used in this sector, due to the war in Ukraine, which was one of the main suppliers of iron to our country.

3. Impact of tax incentives on construction activities in Romania

A way to measure the growth of the construction sector as an impact of the facilities applied during the timeframe 2019-2022 is through the gross value added (GVA) generated by this economic activity as a share of total GVA.

In 2018, the share of this sector in total GVA was 6.6% in Romania, while the EU average was 5.3%. In Romania, the value of this branch of the economy has increased every year, reaching in 2022, pursuant to data provided by Eurostat (chart 1), the highest share in GVA in comparison with the rest of the European Union, namely 7.9%, followed in second place by Austria with a share of 7.3% and in third place by Finland with 7.0%, while the EU average is 5,5%.

Chart 1



	2018	2019	2020	2021	2022
EU	5,3%	5,4%	5,5%	5,4%	5,5%
Romania	6,6%	7,0%	7,2%	7,1%	7,9%
Austria	6,50%	6,60%	7,10%	7,10%	7,30%
Finland	7,40%	7,40%	7,70%	7,10%	7,00%

Source: Eurostat Housing in Europe – 2023 interactive edition - Eurostat (europa.eu)

[6] https://static.anaf.ro/static/10/Brasov/Brasov/contributii_296_nou.pdf.

In order to analyse the impact of the tax incentives applicable from 2019 on the construction sector, we will analyse the evolution of the turnover, the number of employees and the number of companies in this sector as from 2018 (when no tax relief was applied) to 2022. The period analysed covers three distinct stages of the Covid-19 pandemic: pre-pandemic, pandemic and post-pandemic.

3.1. The impact of tax incentives on sales in the construction sector in Romania

According to the NIS, in 2019, the first year when tax incentives in construction sector were granted, turnover increased by 27.4% compared to 2018 (table no. 1).

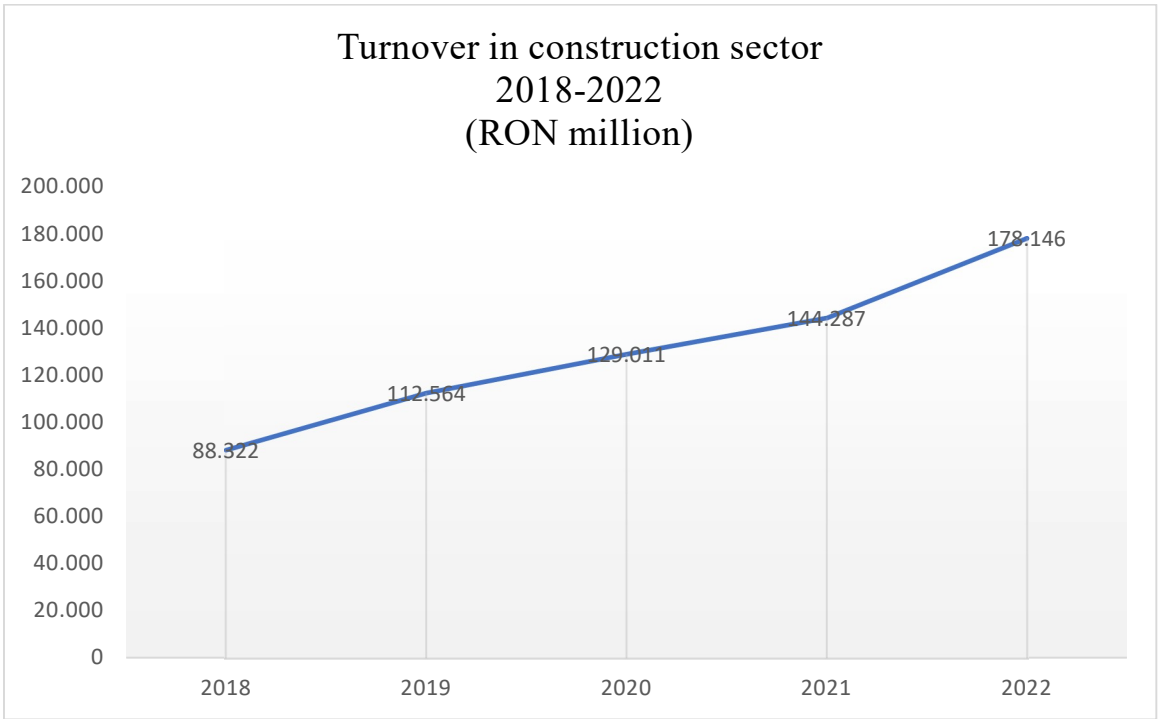
Table 1. Total turnover in construction sector in Romania

Year	Turnover in construction (RON million)	Relative change N/(N-1)
2018	88,322	-
2019	112,564	27.4%
2020	129,011	14.6%
2021	144,287	11.8%
2022	178,146	23.5%

Source: National Institute of Statistics Press release template (insse.ro)

Throughout the period of tax relief, turnover increased year-over-year, even though the growth rate during the timespan 2020-2022 was slower than in the first year with tax relief (chart 2).

Chart 2



Source: National Institute of Statistics Press release template (insse.ro)

3.2. Impact of tax incentives on the number of employees in the construction sector in Romania

In compliance with the data provided by the National Institute of Statistics, in 2019 the average number of employees increased by 39,921 compared to 2018 (Table 2).

Table 2. Annual increase in the average number of employees

Year	Employees in construction		Total number of employees in the economy	
	Average no.	Absolute change N/(N-1)	Average no.	Absolute change N/(N-1)

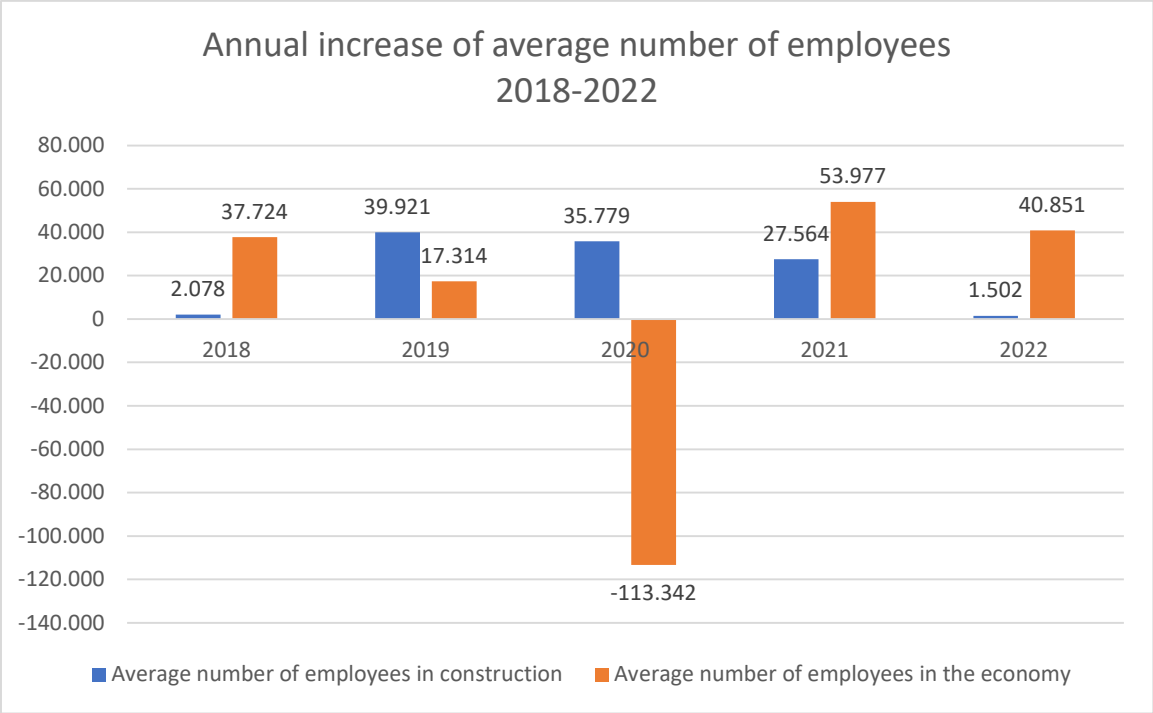
2017	354,191	-	4,082.296	-
2018	356,269	2,078	4,120.020	37,724
2019	396,190	39,921	4,137.334	17,314
2020	431,969	35,779	4,023.992	-113,342
2021	459,533	27,564	4,077.969	53,977
2022	461,035	1,502	4,118.820	40,851

Source: National Institute of Statistics Press release template (insse.ro)

The increase in the minimum wage and tax relief have improved competitiveness among construction companies, which have increased their activity, leading to an increase in the contribution of this sector to the total economy in a troubled and particularly difficult period. The construction sector, together with the IT sector, became the engine of the Romanian economy during the pandemic.

Following the implementation of facilities pursuant to Ordinance no. 114/2018, construction is one of the few sectors of the economy where the average number of employees has increased year over year after 2019, even during the pandemic period. The tax incentives provided have made the development dynamics of this sector in 2020 to be contrary to that of the economy, as can be seen in chart 3.

Chart 3



Source: National Institute of Statistics Press release template (insse.ro)

The reduction in taxation of salary income has also brought a change in the way of thinking of workers in this industry, who have begun to look for Romanian companies instead of those from the European Union. Thus, one of the effects of the tax incentives has been to stabilise the existing labour force, decrease the number of workers going abroad and even the return to Romania of those in this sector.

In early March 2020, when the COVID-19 pandemic locked people in their dwellings and limited travel, many Romanians working abroad decided to return home, scared of the unknown. Some of them looked for jobs with Romanian construction companies, attracted by the increased salary income resulting from tax cuts.

During the pandemic period, when the hotel and catering sector was collapsing and many of the service companies on the market went out of business, both skilled and unskilled labour force was needed in construction. While the slogan "stay at home if you care" was on everyone's lips and being widely used in the media as a form of protection against the COVID-19 virus, construction company owners were looking for ways to complete contracts they had started and needed people to work on the sites.

The state of emergency in the pandemic brought new challenges and construction companies had to adapt to the new rules that were changing from week to week, forcing the sector to face a new deadlock. As regards the employees working on construction sites across the country, companies had to look for new ways to protect and incentivise them to stay active but healthy. Most companies chose to stay in business, with managers taking responsibility to their workers and to the authorities.

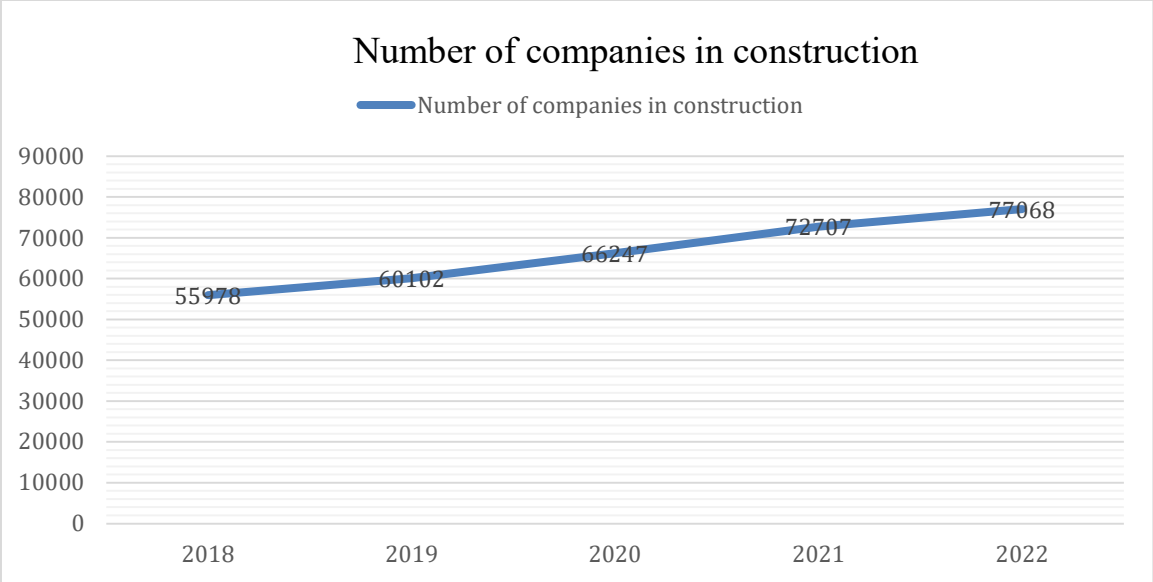
The impact of the COVID-19 pandemic on the construction sector can be seen in the uncertainty of business development, but tax incentives, digitisation programmes implemented by the authorities and private investment contributed to the economic recovery of this sector in Romania.

3.3. Impact of tax incentives on the number of companies in the construction sector in Romania

Pursuant to the National Institute of Statistics, the number of companies in the construction sector increased from 55,978 in 2018 to 77,068 in 2022 as indicated in Chart 4.

The tax incentives provided by GEO no. 114/2018 kept this branch in continuous activity even during the pandemic period, when other companies went out of business. A necessary measure for the pursuit of the business was to adapt the way of working on construction sites to the new rules of protection and social distancing. Companies had to invest money in efficient equipment and sanitary protective materials, disinfectants and change the organisation of work on the site, respecting social distancing and not allowing people to swap between sites. With all these measures, many construction companies suffered financial losses, being unable to meet deadlines, lost contracts due to a lack of employees who were either ill or quarantined and unable to attend sites.

Chart 4



Source: https://insse.ro/cms/sites/default/files/com_presa/com_pdf/actv_intrep_2022r.pdf

In addition to staffing problems, companies were also faced during the pandemic with problems in delivering the materials imported and subsequently, with their prices rising at an alarming rate. Rising prices for building materials and fuel contributed to a fall in profits for the companies in this sector. Ensuring financial liquidity was another real issue during this time span, leading to major delays and even suspension of activity.

The evolution of the construction sector over the timespan 2018-2022 is summarised in the table 3.

Table 2. Evolution of construction sector during timeframe 2018-2022

	Indicators	Unit of measurement	2018	2022	Absolute change (2022/2018)	Relative change (2022/2018)
1.	Number of enterprises	number	55,978	77,068	21,090	37.68%
2.	Average number of employees	persons	356,269	461,035	104,766	29.41%
3.	Turnover	RON million	88,322	178,146	89,824	101.70%
4.	Gross result for the year	RON million	9,755	22,068	12,313	126.22%

5.	Gross investments	RON million	18,873	41,047	22,174	117.49%
6.	Gross value added	RON million	26,139	55,857	29,718	113.69%

Source: National Institute of Statistics

Between 2018 and 2022, the number of businesses in the construction sector increased by 37.68%, leading to an increase in the average number of employees in this sector by 29.41%. We may definitely state that the tax incentives granted have reduced undeclared work and thus in 2022 the average number of employees reached 461,035 people.

Turnover in the construction sector has increased pursuant to data posted on the website of the National Institute of Statistics by more than 100% during the last 5 years.

The 117.49% increase in gross investment in this sector is reflected in a gross result for the financial year 2022 that is RON 12,313 million higher than in 2018.

4. Evolution of the financial performance of companies in the specialised construction sector (NACE code 4399) during the timespan 2018-2022

The NACE code 4399-Other specialised construction activities class represents about 0.15% of the total number of economic agents in Romania[7]. This class includes specialised construction activities comprising: geotechnical and hydrogeological studies and surveys; construction of foundations; construction of piles, micro-piles, braces and injections for land reinforcement and improvement; design and performance of underground water supply; insulation works; rental of cranes and construction equipment for general use with operators; construction of uncovered swimming pools, etc.

The turnover, net profit and number of employees for the 10 largest Romanian companies in this sector in 2022 are listed in table 4, in descending order by turnover.

Table 4. Main competitors in the specialised construction sector in Romania

	Company	Turnover (RON)	Net profit (RON)	No. of employees
1	Activ Group Management SRL	245,598,906	85,387,412	485
2	Maristar SRL	196,853,373	37,580,270	195
3	Electro Vest SRL	147,779,136	7,263,698	159
4	Deme Macarale SRL	85,620,328	10,513,439	177
5	Presto Steel Construction SRL	82,248,369	1,391,868	34
6	77 Insat Ve Taahhut SA Istanbul Suc Constanta	76,068,000	9,899,034	31
7	Mega Edil SRL	75,589,827	12,451,634	90
8	S.U.C.P.I SA	67,707,127	3,471,863	203
9	Kronstarr BAU Company SRL	67,082,015	3,317,124	41
10	Freyrom SA	62,396,842	8,240,188	64

Source: www.risco.ro

At national level, Activ Group Management is the leading company with a 41% increase in turnover in 2022 compared to 2021 and a net profit of RON 85,387,412, with 485 employees.

As it may be seen in Table 5, at the level of the Municipality of Bucharest, Union General Construct is in first place, with a net profit of 26,842,497 RON in 2022, with only 14 employees. According to data published by risco.ro, this company achieved an increase in turnover in 2022 of 5165% compared to the year 2021.

Table 5. Main competitors in the specialised construction sector in Bucharest

	Company	Turnover (RON)	Net profit (RON)	No. of employees
1	Union General Construct S.A	30,686,051	26,841,497	14
2	Recon si Doje SRL	29,653,789	3,492,461	135

[7] https://www.topfirme.com/caen/4399.

3	Trustul pt servicii cu utilaje diverse SRL	27,761,328	1,797,630	174
4	Allspace Interiors SRL	18,246,033	4,345,677	23
5	Geosond SA	18,164,150	3,424,901	51
6	Calitek Group SRL	17,298,869	552,416	36
7	Grit Constructii Lucrari Speciale SRL	16,873,242	828,519	13
8	Trylon TSF SRL	15,627,334	2,384,256	96
9	WTM Group Montaj SRL	18,831,038	2,531,047	61
10	Dewatering& Silent Piling SRL	14,327,343	2,069,894	17

Source: www.risco.ro

In order to study the profitability of companies in this construction sector and its evolution during the period 2018-2022, we have chosen a sample of 5 companies from Tables 4 and 5, direct competitors in the country and in Bucharest, in compliance with the following criteria:

- Based on the specifics of the activity, pursuant to the main works carried out, in order to cover the whole range of activities specific to NACE code 4399
- Participation in tenders for the implementation of investment projects financed by the Romania's National Recovery and Resilience Plan or the European multiannual budget
- At least 10 years' experience on the Romanian market

The 5 companies we will analyse in terms of turnover, net profit or loss and return rates are:

a) ACTIV GROUP MANAGEMENT SRL, the main competitor in the whole country on NACE 4399 class - main activity rental of equipment and machinery for construction works, with operators (1st place in Top Business Romania 2023 and 1st place in Top Profit Romania 2023, NACE code 4399).

b) GEOSOND SA - design and performance of geotechnical works applied to construction, geological-technical research, exploration and use of underground mineral resources (1st place in Top Business Romania 2023, sector 6 Bucharest, NACE code 4399)

c) MEGA EDIL SRL - water supply works, sewerage, water treatment and purification plants, road rehabilitation and asphalting works, land improvement works (1st place in Top Business Romania 2023, for Buzău county, NACE code 4399)

d) FREYROM SA - construction of bridges and passages, renovation and consolidation of works of art (1st place in Top Business Romania 2023, sector 3, Bucharest, NACE code 4399)

e) CALITEK GROUP SRL - commercial, industrial, medical, office and high-profile residential projects, mechanical, electrical and sanitary construction services - MEP Engineering (2nd place in Top Business Romania 2023, for Small Enterprises, sector 2, Bucharest, NACE code 4399)

In order to measure the economic-financial performance of these companies, we will calculate the following ratios and indicators that allow a systematic analysis of the management at a given time, but also in its evolution over a period of several successive years, providing appropriate information on the causes and effects of changes[8]:

Return on Assets Ratio: $ROA = \frac{\text{Net Income}}{\text{Average Total Assets}} \text{ x } 100$

Return on Equity Ratio: $ROE = \frac{\text{Net Income}}{\text{Average Shareholder s Equity}} \text{ x } 100$

Return on sales: $ROS = \frac{\text{Net Income}}{\text{Turnover}} \text{ x } 100$

Labour productivity: $WP = \frac{\text{Turnover}}{\text{Number of employeess}} \text{ x } 100$

[8] Maria Grigore, Viorica Ștefan-Duicu *Managementul financiar al firmei*, Nicolae Titulescu University Publishing House, Bucharest, 2024.

a) Analysis of the financial performance of ACTIV GROUP MANAGEMENT SRL

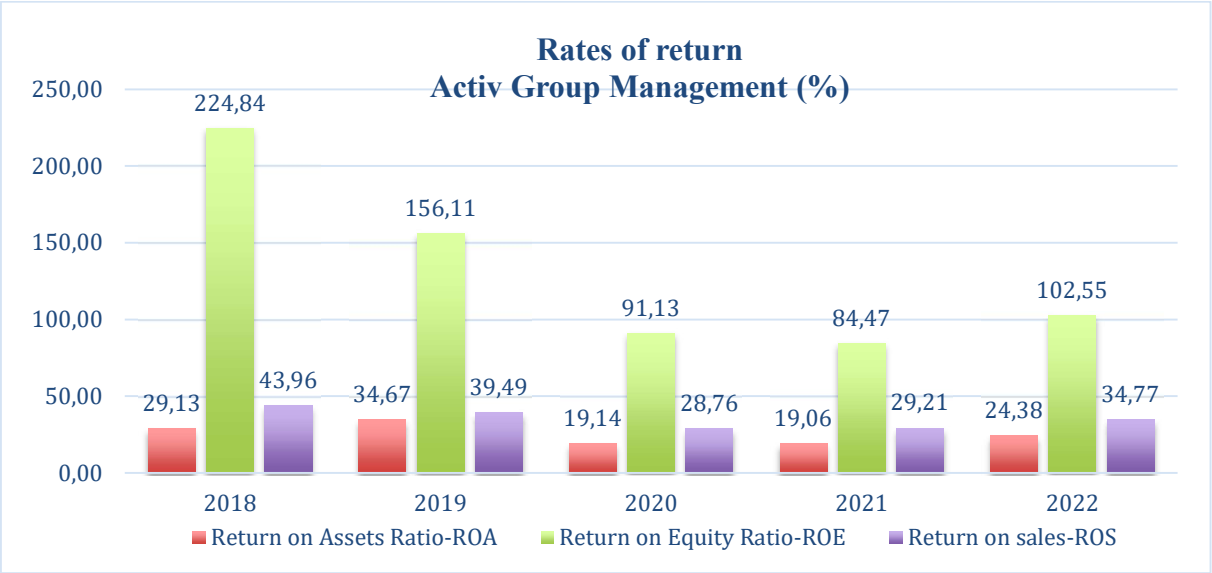
The company Activ Group Management SRL, which ranks first at national level among the companies with NACE code 4399, has recorded an increase in turnover of RON 214,225,811 during the timespan 2018-2022 and an increase in the number of employees from 45 people in 2018 to 485 people in 2022. The company went from a micro-entity to a large company with more than 400 employees in 5 years.

Although the net result has increased every year, the rates of return have decreased due to investments made by the company management in machinery. Equity increased from RON 741,419 in 2018 to RON 86,587,772 in 2022, a very large increase for this period with pandemics and political instability (chart 5).

2021 was the hardest year for Activ Group Management, the return on assets ratio was 19.06%, the lowest level during the whole period under analysis. The return on equity ratio also decreased in 2021 by 6.66 p.p. compared to 2020, reaching to 84.47%, the lowest level during the whole period 2018-2022.

Even if the trend is downward, we still note high levels of the rates of return throughout the period analysed, especially in the case of the return on equity ratio which varies between 84.47% (in 2021) and 224.84% (in 2018).

Chart 5



Source: own processing based on financial data posted on www.risco.ro

In terms of labour productivity (Table 6) we notice a downward trend in the first 3 years of the tax relief implementation, which was due to a higher rate of growth in the number of net employees than in turnover. For instance, in 2019 the number of employees increased by 4.3 times and turnover by 3.6 times. However, we notice an increase in labour productivity in 2022 compared to 2020 and 2021.

Table 6. Labour productivity of Activ Group Management SRL

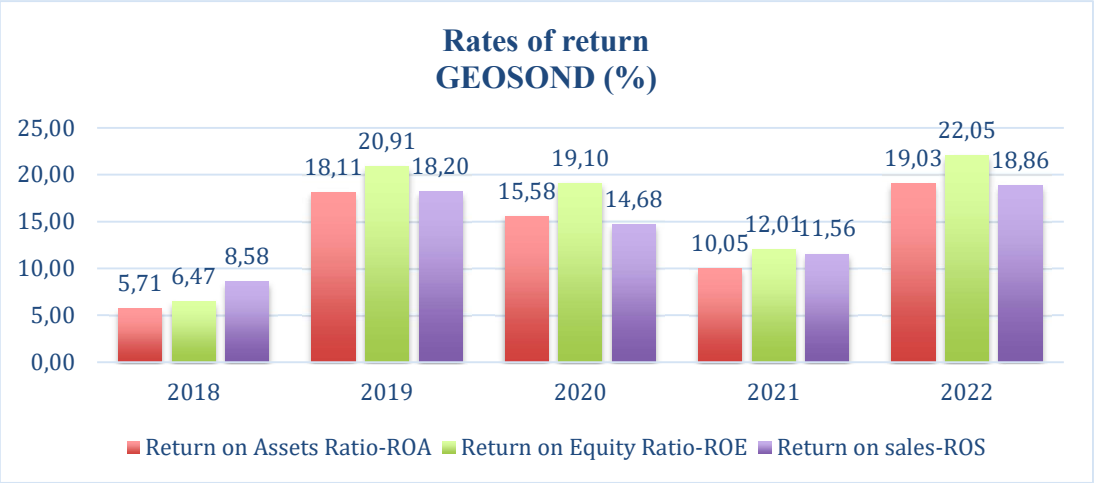
Year	2018	2019	2020	2021	2022
Labour productivity (RON/employee)	697,180	584,693	489,564	440,213	506,389

Source: own processing based on financial data posted on www.risco.ro

b) Analysis of the financial performance of GEOSOND SA

GEOSOND SA, 1st place in Top Business Romania 2023, sector 6 Bucharest, NACE code 4399, has taken full advantage of the tax facilities that came into force on 1 January 2019 and this can be seen in the financial results obtained in the first year of their implementation.

Chart 6



Source: own processing based on financial data posted on www.risco.ro

Turnover increased by RON 5,633,973 in 2019 and net result by RON 1,798,252 compared to 2018. These increases led to a doubling of the return on sales and a tripling of ROA and ROE in 2019 compared to 2018, as shown in Chart 6.

The effects of the pandemic are reflected in lower rates of return in 2020 and especially in 2021, when turnover and net profit fall significantly, as equity and total assets increase. Although ROA, ROE and ROS remain above 2018 levels in 2021, they fall to almost half of what they were in 2019.

In 2022, the level of turnover increases by RON 3,130,977 compared to 2021 and by RON 4,501,702 compared to 2019. This leads to high values of all rates of return, the highest in the period under analysis.

Labour productivity follows the trend of turnover (Table 7) increasing in each year, except in 2021 when the decrease in turnover by RON 2,730,636 leads to a decrease in labour productivity by RON 61,864/employee.

Table 7. Labour productivity of GEOSOND SA

Year	2018	2019	2020	2021	2022
Labour productivity (RON/employee)	182,465	284,634	362,527	300,663	356,160

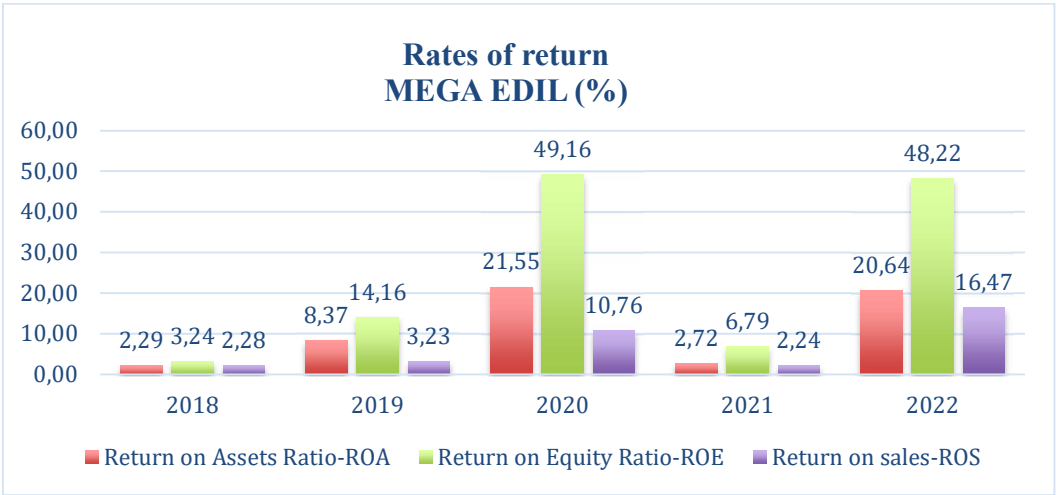
Source: own processing based on financial data posted on www.risco.ro

c) Analysis of the financial performance of MEGA EDIL SRL

MEGA EDIL SRL ranks 7th in the country ranking and 1st in Buzău County Top Business, according to NACE code 4399, with a turnover of RON 75,589,827 in 2022 and 90 employees.

In 2019, the company had an increase of RON 1,554,4911 in its net result and the turnover increased 3.22 times compared to the previous year, reaching the amount of RON 61,619,299, which resulted in an increase in all rates of return in the first year of tax incentives implementation.

Chart 7



Source: own processing based on financial data posted on www.risco.ro

In compliance with Chart 7, the highest values of the rates of return are recorded in 2020: the return on equity ratio is 49.16% (compared to 3.24% in 2018 and 14.16% in 2019), the return on assets ratio is 21.55%, 19.26 p.p. higher than in 2018, while the return on sales is 10.76%, 4.7 times higher than in 2018.

The challenges posed by the COVID-19 pandemic are reflected in the financial results of 2021, when due to rising material prices and fuel price increases, the company is forced to reduce the number of employees from 119 to 105. The net result decreases by RON 7,557,001 compared to 2020, the rates of return also decreasing, approaching the level of 2018.

In 2022, the company management succeeds in reducing the value of debts, increases the equity by RON 6,532,229 and the net result reaches the highest value in the whole period under analysis, namely RON 12,451,634. This leads to a spectacular increase in all rates of return. While ROA and ROE are about 1 p.p. lower than in 2020, the return on sales reaches the maximum of the period, 16.47%, 5.71 p.p. more than in the previous year 2020.

Labour productivity follows the trend in turnover and rates of return. It increases dramatically in 2019 and moderately in 2020, declines in 2021 and peaks in 2022 (table 8).

Table 8. Labour productivity of MEGA EDIL SRL

Year	2018	2019	2020	2021	2022
Labour productivity (RON/employee)	225,196	604,111	709,338	649,376	839,887

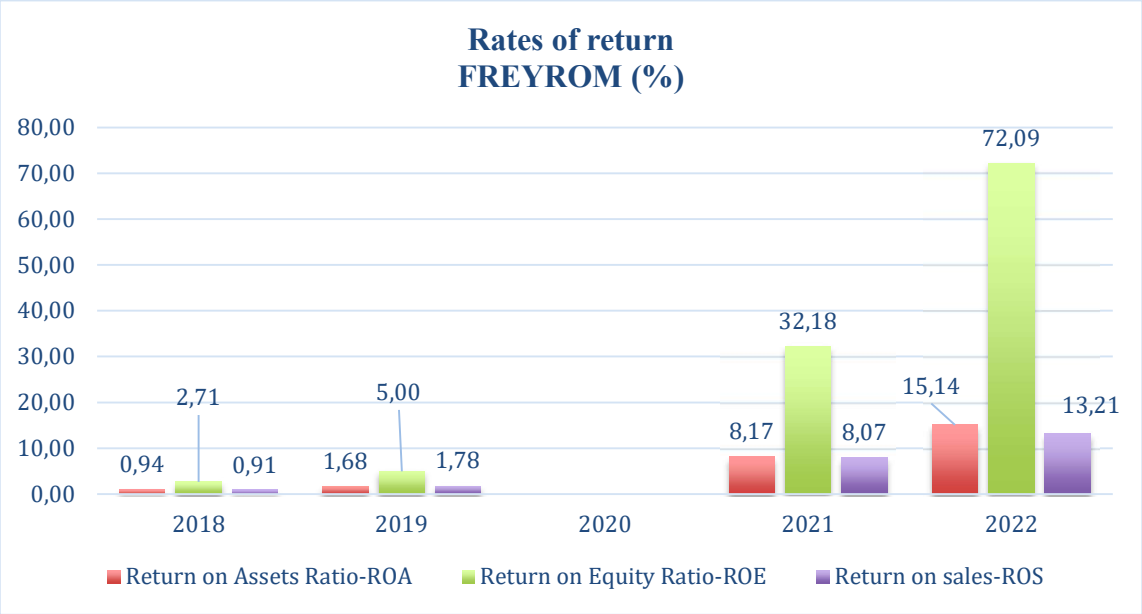
Source: own processing based on financial data posted on www.risco.ro

d) Analysis of FREYROM's financial performance

FREYROM SRL ranks 10th in the national ranking and 1st in Top Business Romania 2023, sector 3, Bucharest, for NACE code 4399, with a turnover of RON 62,396,842 in 2022.

In 2019, the company almost doubles its profit, although the turnover decreases by about RON 500,000. Even if the rates of return double compared to the previous year, they are very low (5% ROE and less than 2% ROA and ROS). In 2020 the pandemic brings big challenges and although the turnover increases by RON 8,098,147 compared to the previous year, the company makes a loss of RON -1,997,386. For this year, it is not possible to calculate rates of return.

Chart 8



Source: own processing based on financial data posted on www.risco.ro

In 2021, the company obtains a net profit of RON 2,026,581 and the rates of return are 8.17% ROA, 32.18% ROE and 8.07% ROS, these values being several times higher than in 2018 and 2019.

As in the case of the other companies analysed, the year 2022 brings spectacular increases in net profit, which increases by RON 6,213,607 and in the rates of return, which double compared to the year 2021.

Labour productivity of FREYROM SRL oscillates around RON 450-500 thousand/employee during the timespan 2018-2021, doubling its value in 2022, as it can be observed in table 9.

Table 9. Labour productivity of FREYROM SRL

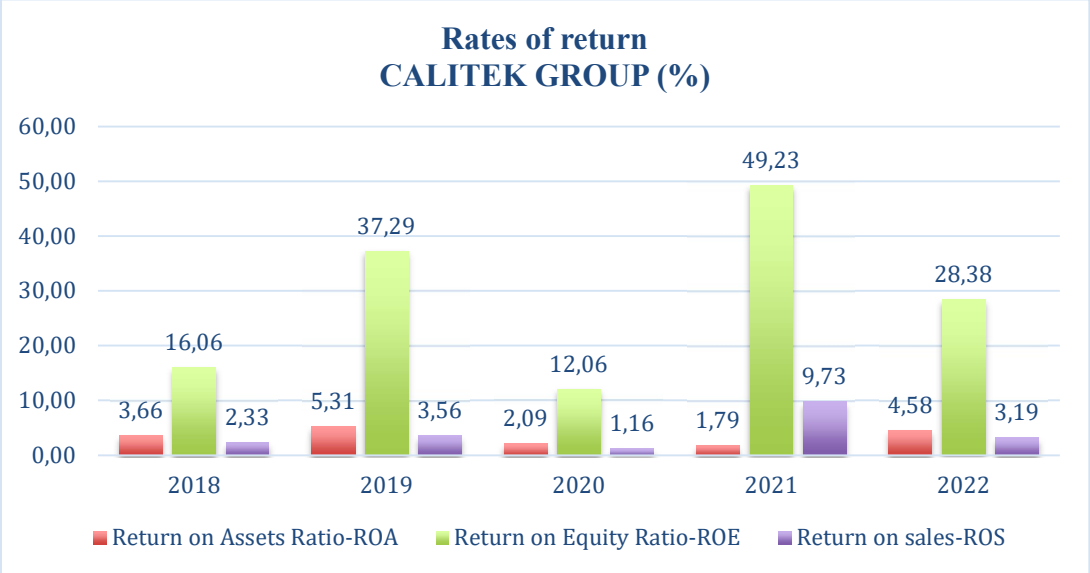
Year	2018	2019	2020	2021	2022
Labour productivity (RON/employee)	500,200	433,451	509,362	448,557	974,951

Source: own processing based on financial data posted on www.risco.ro

e) Analysis of the financial performance of CALITEK GROUP

For the company CALITEK GROUP SRL - 2nd place in Top Business Romania 2023, for Small Enterprises, sector 2, Bucharest, NACE code 4399, the same growth trend can be noticed in 2019, as for the entire construction sector. The implementation of the facilities led to an increase in turnover by RON 832,747 and in net result by RON 145,525 compared to the previous year. As a result, the return on sales increases from 2.33% to 3.56% and the return on assets ratio from 3.66% to 5.31%. As equity decreased in 2019 and profit increased, the return on equity ratio increased from 16.06% to 37.29%.

Chart 9



Source: own processing based on financial data posted on www.risco.ro

The year 2020, when the pandemic also started in our country, was difficult for Calitek. Although turnover increased by more than RON 5,300,000, the net result halved. This fact in conjunction with an increase in equity of around RON 1,300,000 resulted in ROA, ROE and ROS falling below 2018 values.

The net result in 2021 recorded the maximum value of the period under analysis (RON 1,351,789), which led to the highest level of the return on equity ratio (49.23%) and the return on sales (9.73%). In 2022 the net result falls to more than half of the previous year and this leads to a decrease in all rates of return.

In terms of labour productivity (Table 10), we observe an upward trend in the first 2 years of the tax relief, which was due to the increase in turnover. In 2021, sales decrease compared to the previous year and the average number of employees increases, which leads to a reduction in labour productivity. The company recovers in 2022, when labour productivity is at its highest level of the period analysed, due to the fact that turnover increases while the number of employees remains unchanged from the previous year.

Table 10. Labour productivity of CALITEK GROUP SRL

Year	2018	2019	2020	2021	2022
Labour productivity (RON/employee)	285,753	366,521	473,673	386,102	480,524

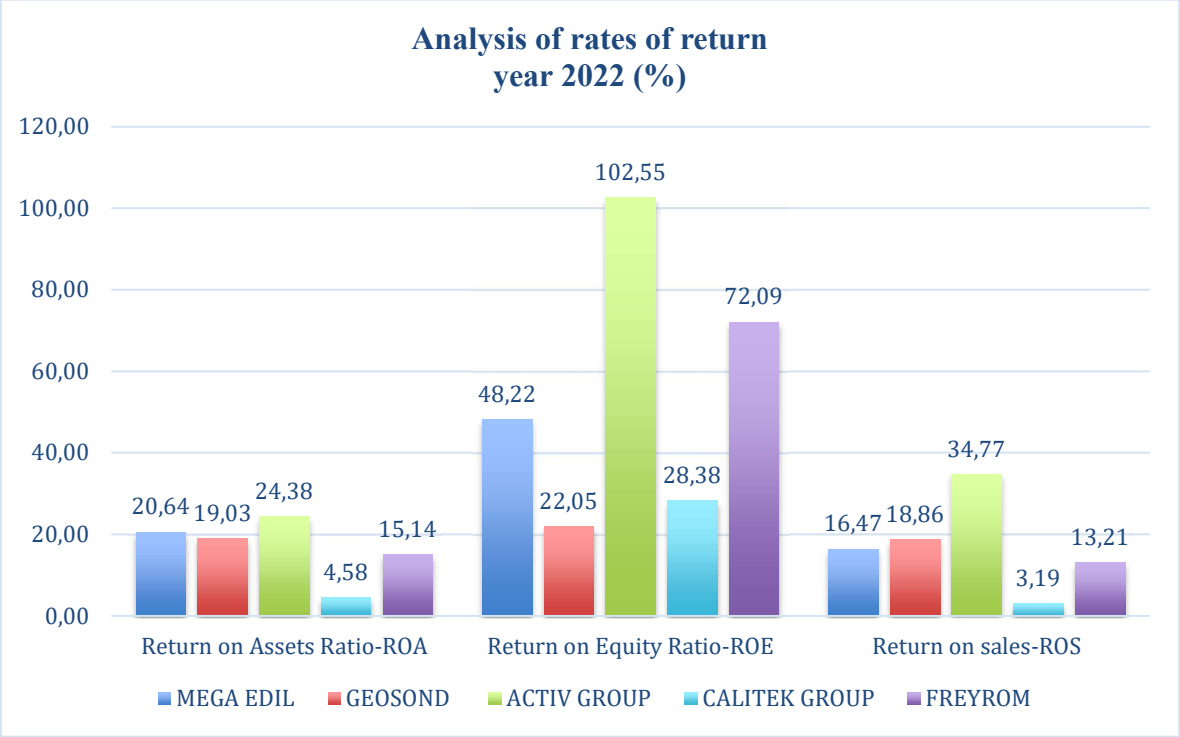
Source: own processing based on financial data posted on www.risco.ro

A comparative analysis of the labour productivity of the 5 companies indicates a very high increase in 2022 compared to 2018 for 4 of them. The only exception is the company Active Group Management, which records a 27% decrease in labour productivity during this time span, explained by the fact that the number of employees increased by about 11 times during the timeframe 2018-2022, while the turnover only by about 8 times.

From the point of view of net result, the companies under analysis had an increase in each year due to tax incentives, with two exceptions: in 2020, during the pandemic period, Calitek had a profit below the one achieved in 2018, while Freyrom had a loss (RON - 1,997,386).

Comparing the financial performance of the five companies in the field of specialised construction in 2022, we see that the first place with the highest rates of return is the company Activ Group (Chart 10). It stands out with a return on equity ratio of more than one hundred percentage (102.55%). Freyrom holds the second place, with a ROE of 72.09%, followed by Mega Edil with 48.22% and Calitek Group with 28.38%. Geosond has the lowest return on equity ratio – 22.05%.

Chart 10



Source: own processing based on financial data posted on www.risco.ro

From the point of view of economic returns, the 5 companies are at small differences, the first place is held by Activ Group with a return on assets ratio of 24.38%. Mega Edil is on the second place with a difference of only 3.74 p.p. from Activ Group, while the lowest rate of 4.58% pertains to the company Calitek Group.

In terms of commercial profitability, Activ Group is also on the first place with a return on sales of 34.77%, followed by Geosond with 18.86%, almost half of the first place. The last ranked is Calitek Group with a ROS of 3.19%. These low rates of return are due to the decrease in financial performance, which is also reflected in the net result, which is RON 799,373 lower than last year 2021.

5. Conclusions

The incentives on construction workers' salaries, introduced by Government Emergency Ordinance no. 114/2018 from 2019, consisted of a 23.75% decrease in payroll taxes (of which: 10% payroll tax, 10% CASS and 3.75% CAS) and the establishment of a minimum salary well above the level of the economy. A first effect has been the reduction of undeclared work and the stabilisation of the labour force in this sector, with the average number of employees in the construction sector increasing by 37,843 after only one year of the facilities granted. Secondly, it can be seen that turnover in the construction sector increased by 27.4% in 2019 compared to 2018. The granting of the facilities also led to an increase in the number of firms in this sector, by 4,132 more within one year and by 21,090 by the end of 2022.

This growth in construction sector activity has been an important source of additional budget revenue collection, which has fully compensated for the losses resulting from wage tax cuts. For instance, the increase in turnover has meant an increase in VAT collected and higher corporate taxes or taxes on microenterprise income (especially considering the high number of newly established companies).

The emergence of the COVID-19 pandemic in early 2020 has caught this industry in full swing, with economic growth in 2019 helping firms to ease the burden of the SARS-CoV-2 virus. At the same time, the fact that the vast majority of construction sites were outdoors made it easier for people to work with a lower risk of illness. All companies were affected by the pandemic, but depending on the strategy and solutions implemented by management, some partially went out of their business in 2020 and had poorer results, others felt the effects of the pandemic only in 2021, when rising material prices led to more modest financial results.

The study conducted at the macroeconomic level, as well as at the level of the top five companies in the specialised construction sector, points out that despite the negative effects of the pandemic felt in 2020-2021, the stimulation of construction workers by offering high net salaries allowed the stabilisation of skilled staff and specialists, which led to an increase in profitability and labour productivity.

In conclusion, the facilities granted to the construction sector have played a determining role not only in the development of the companies in this sector, but also of the entire national economy, contributing to an increase in the share of this sector in Romania's Gross Value Added from 6.6% in 2018 to 7.9% in 2022, the highest value among EU Member States.

Keeping the tax incentives for 10 years, until 31 December 2028, as originally foreseen in GEO no. 114/2018, would have been a real benefit leading to the growth of this sector. The changes made at the end of 2023 by GEO no. 93/31 October 2023 have created controversy in the business community. The majority of economists believe that all tax incentives should be removed, while entrepreneurs in the sector argue that giving up the promised facilities will lead this branch of activity into a new economic impasse.

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STUDY ON THE IMPACT OF CREDIT RISK ON THE QUALITY OF THE LOAN PORTFOLIO IN THE ROMANIAN BANKING SECTOR

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Abstract: This study aims to explore and evaluate the composition and performance of the loan portfolio of commercial banks in Romania, identifying the main risk factors and development trends. Starting from a historical analysis and reaching the assessment of the impact of some macroeconomic and regulatory factors, the study aims to provide a comprehensive picture of the state of lending in the Romanian context. In this analysis, we will adopt a multidisciplinary methodology, combining statistical analysis, evaluation based on econometric models and qualitative data interpretation, with the aim of providing a comprehensive and detailed perspective. The work will also try to shed light on how lending policies and banking sector regulations have evolved over time and how they influence financial performance and credit risk.

Keywords: credit risk, banking system, the interest rate, *loan, efficiency, macroeconomic determinants*
JEL Classification: E51; E52; E60; G21; G32.

1. Introduction

In the financial sector, risk is an essential component of banking activity, and the way it is managed has a significant impact on the quality of loans granted. In a globalized economy and a constantly changing financial world, banking institutions face various challenges and risks that can affect their stability and sustainability.

According to specialized studies, banks represent the pillars of financing the national economy, channelling savings to productive investments and thus contributing to economic growth and social development. In this context, the banks' loan portfolio becomes a key indicator, reflecting not only the financial health of the banking sector, but also general economic trends. Recent financial crises have demonstrated the vulnerability of banking systems to external shocks and economic fluctuations, emphasizing the importance of rigorous analysis of loan portfolios. Thus, understanding the dynamics and structure of these portfolios, as well as identifying associated risk factors, become essential for anticipating potential problems and implementing effective risk mitigation strategies.

Banking regulations, at national and European level, are in a continuous evolution, with the main purpose of protecting deposits, ensuring financial stability and promoting responsible lending practices. Analysing the

loan portfolio in light of these regulations provides valuable insight into the degree of compliance of banks and the impact of these regulations on lending behaviour.

2. Bank management approach to risk management

Risk is a phenomenon that appears throughout the course of the bank's operations and activities and that can cause negative effects that affect the entire activity, by deteriorating the quality of business, decreasing profit or even recording losses and affecting the bank's functionality and image.

The regulatory authorities requires banks to hold adequate capital for the many and various risks that arise in their activity: liquidity risk, interest rate risk, market risk, credit risk, off-balance sheet risk, technological and operational risk, currency risk, country or sovereign risk, insolvency risk, etc. Effective management of these risks is critical to banks' performance. The most important risk that banks are exposed to is credit risk, which involves loans that are not returned and comes from the lack of performance of a borrower, and its management has a major influence on the bank's performance. [16, 4]

The credit risk management process is a complex one and begins with the identification of existing and potential risks, inherent in the lending activity, the analysis and assessment of risks, their monitoring and control in order to maintain them within the accepted limits. [7, 1]

Despite its complexity, effective management of credit risk is a prerequisite for the success of a bank and the banking system in general.

The main objective of the credit risk quantification analysis is to know the evolution of the client from the past periods and to forecast his future performances, in order to forecast his viability. [13]. This risk increases as the size of the loan increases. Its restriction leads to a decrease in the cases of insolvency of the bank's debtors, because the increase in their obligations increases, as a rule, the obligations of the beneficiaries of loans, and the customers who are assessed as risky will have a lending regime with higher interest rates. Thus, an increased risk of insolvency determines a lower credit offer.

By manifesting the credit risk, the lending bank records a loss of income from the loan granted, and therefore a decrease in its profit, and the loan granted turns into a non-performing loan [16, 7, 5, 10]. Increasing bad loans in a bank can lead to bankruptcy and a loss of efficiency in the banking sector. It is also one of the symptoms of a banking crisis.

The management of bad loans is a problem of the banking sector, and managing these loans in a less than adequate manner is dangerous to the survival of banks and threatens to endanger the overall stability of a financial system.

In general, research conducted in the field of credit quality analysis has shown that non-performing loans can hinder economic growth and reduce economic efficiency.

Shocks to the financial system can arise from bank-specific factors or macroeconomic conditions. In general, research from developed economies has confirmed that macroeconomic conditions affect credit risk. [18,3,6,11,15]

Macroeconomic variables such as GDP growth rates, inflation rate, unemployment rate, exchange rate of exchange rates, public and private spending rates, and savings and money sizes are the major factors that could explain systematic credit risk. On the external level, the risk is generated by currency volatility, while on the internal level, competition or political-economic instability are causes of its appearance. Credit risks can be generated by individual economic phenomena or by a certain economic situation. [10, 9]

In the conditions of the permanent manifestation of the risk, under the influence of the determining factors, both at the financial, monetary, and banking level, its management is vital. In this way, the unwanted effects can be removed, and the presence of risk can become a prosperous business opportunity. An effective management of banking risks will also leave its mark on the public image of the bank.[5]

2.1. Fundamental principles in credit risk management

Risk management includes the identification, evaluation, measurement, monitoring and control of all risks inherent in banking activity.

Credit institutions should have a mechanism to identify stress situations early and plan to deal with such unusual situations in a timely and effective manner. Contingency planning activities include disaster recovery planning, public relations damage control, litigation strategy, response to regulatory criticism, etc. Contingency plans should be reviewed periodically to ensure that they cover reasonably likely events that could impact the bank.

Banks do not have a separate risk management department. The main responsibility for risk management rests with the credit administration department, which takes into account credit risk in particular. In credit risk management the main focus is the management of non-payment by the customer, the credit process having as its common objective the prevention, identification and resolution of potential customer problems. To minimize the negative impact of major borrower problems, it is essential to maintain a balance between risk and effective credit recovery.

If a bank's lending rules are excessively rigid, this can limit the number of loans it makes, thereby reducing its customer base, service opportunities, and interest and fee income. On the other hand, if the standards are too permissive, the increase in the volume of loans and the expansion of the customer base may be counterbalanced by the increase in bad loan losses.

Failure to meet contractual obligations by customers can lead to various risks for the bank, including credit risk, borrower insolvency and deterioration in the quality of bank assets. This risk increases with the growth of the loan portfolio. By limiting this risk, the cases of debtor insolvencies can be reduced, as the increase in customer obligations is balanced by the increase in financing costs, which leads to a reduction in the supply of credit due to the increased risk of insolvency.

At the macroeconomic level, to prevent and mitigate insolvency, various banking regulations and methodological standards are implemented, which protect depositors - the banks' main sources of funding. These standards are intended to balance customer relationships, minimizing the impact of insolvency. [16,17,18]

Specific regulations include:

• Minimum bank capital requirement, regulation that ensures banks hold an adequate level of capital to absorb potential losses.

• Risk coverage ratio, this standard, also known as Norma Cooke, establishes that banks must have a capital of at least 8% of total risk-weighted assets.

• Risk concentration limit, this rule limits the maximum amount a bank can lend to a single borrower, relative to the bank's equity, to prevent the bankruptcy of a large borrower from destabilizing the bank's financial situation.

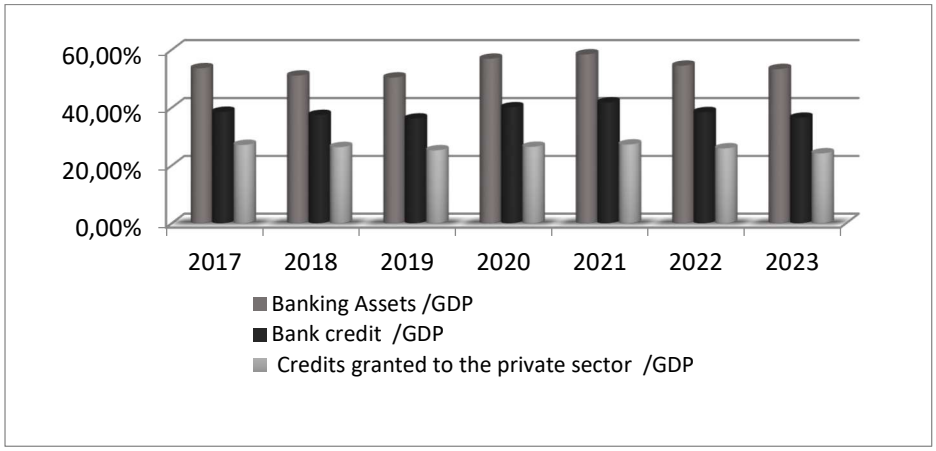
The division of risks and their limitation are fundamental principles in credit risk management. The problems associated with the concentration of the loan portfolio, where the bank's assets are disproportionately oriented towards a group of borrowers' resources, are mitigated by the diversification of loans, which include different geographic criteria, maturities, forms of ownership of borrowers and sectors of activity. This diversification is crucial to minimizing risk exposure and ensuring adequate profitability, and is an essential part of any bank's lending strategy.

2.2. Analysis of the credit portfolio of the banking sector in Romania

The Romanian banking system has a key role for the optimal functioning of economic and financial mechanisms. Also, the Romanian banking industry has an impact on the macroeconomic developments of the dynamics of the business environment and for improving the degree of Romanian economic prosperity.

The banking system in Romania, during the pandemic, recorded a downward evolution in terms of financial intermediation, the ratio of non-governmental credit to GDP, reaching below 25% at the end of 2023 (graph 1).

Graph 1: Indicators of Financial Intermediation



Source: NBR's anual report *[19, 20,21]*

The share of bank assets in GDP, the ratio of bank credit to GDP and that of non-governmental credit to GDP are decreasing compared to the values recorded in previous years, for all these indicators Romania is below the EU average, but also below the countries with emerging economies.

The evolution of these indicators shows that the indebtedness of the real sector continued to advance at a rate lower than economic growth, the dynamics of the demand for bank loans being more pronounced in the case of the population sector compared to that of non-financial companies, due to the increase in demand for mortgage and consumer loans. [16,] (RSF, 2023, page 28.)

The decrease in financial intermediation calculated as the ratio between private sector credit and GDP was generated by a number of factors, the most important being the volatility of the legislative framework and the precarious economic situation of SMEs (negative capital, declining profitability and liquidations). The process of cleaning up the balance sheets of non-performing loans started by banking institutions in the period immediately following the financial crisis of 2008 also contributed to the decrease of financial intermediation.

Currently, 32 banks operate within the Banking System in Romania, of which 8 are branches of foreign banks, 2 banks with majority state capital, 22 banks with majority private capital, 2 banks with full or majority state capital and 18 banks with majority foreign capital (table 1).

Table 1: Structural indicators of the banking system in Romania

Indicators	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Financial institutions	40	36	37	35	34	34	34	34	32	32
Financial institutions with majority privat capital	29	27	27	26	25	25	23	23	22	-
Financial institutions with majority foreign capital	25	23	24	22	21	21	20	19	18	-
- branches of foreign banks	9	7	8	7	7	7	8	8	8	8

Source: NBR's anual report *[21]*

As regards the assets held by foreign-owned banks, including branches belonging to foreign credit institutions, it can be argued that there is a slight decrease attributed to changes in the shareholding structure (table 2).

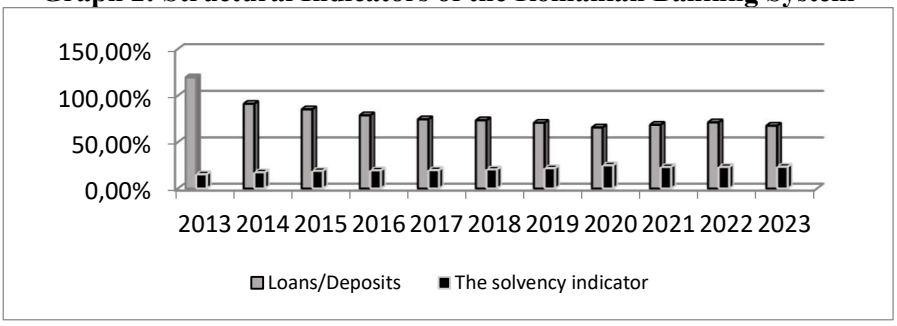
Table 2: Proportion of assets in the Romanian banking system

Indicators	2014	2015	2016	2017	2018	2019	2020	2021	2022
Share in total assets of banks with majority private capital (%)	91,3	91,7	91,8	91,3	91,9	91,8	89,4	88,6	87,9
Share in total assets of banks with foreign capital (%)	89,9	90,4	91,3	77	75	73,7	70,5	68,2	68,1

Source: NBR's anual report *[21]*

From 2019, the share of credit institutions with majority private and foreign capital in the total assets of banks has decreased, the territorial network of credit institutions following the same downward trend, on account of the adverse influences exercised in the economic activity by the Covid 19 pandemic. The progress of the Romanian banking sector, despite the health crisis, was worth noting, in the last period, through the structural indicators of the banking system regarding liquidity and solvency. Romanian banks have the necessary resources for lending, the loans/deposits indicator being placed at 67.82% at the end of December 2023, while the solvency indicator is almost three times above the minimum allowed [18,19].

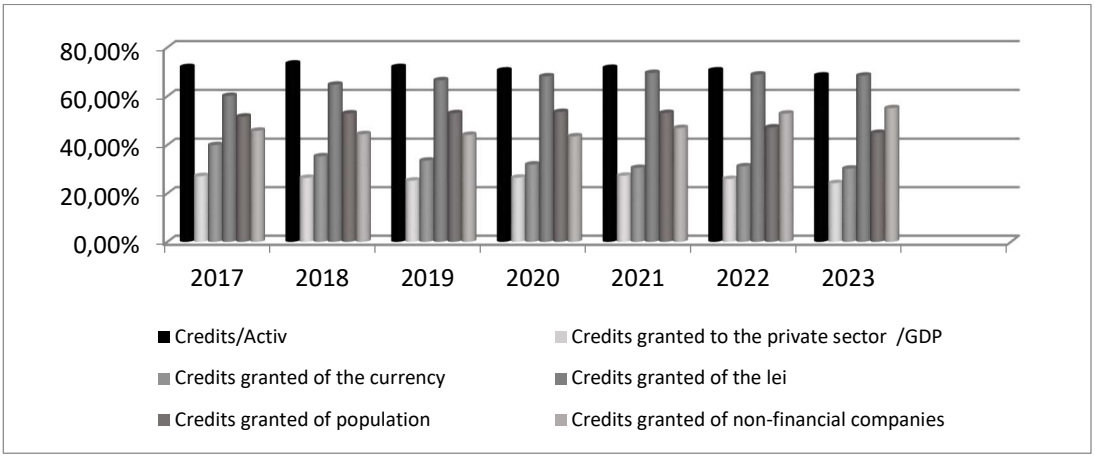
Graph 2: Structural Indicators of the Romanian Banking System



Sursa:BNR*[19, 20,21]*

According to the data from the aggregate monetary balance of credit institutions, the year 2023 was characterized by the upward attenuation of the rate of growth of non-governmental credit compared to the previous year, a rapid growth of non-financial companies higher than the rate of population growth, as well as by further modification of the lei/currency structure in favor of the lei component, (its share in the total volume of non-governmental credit increased to 68,41% in 2023).

Graph 3:.Evolution of the Indicators that Characterize the Lending Activity in Romania



Source: NBR*[19, 20,21]*

The indicator regarding loans granted to customers in total assets was on a downward trend from 73.35 % în 2017, compared to 68.46% at the end of 2023. According to the data from the aggregate monetary balance of credit institutions, the year 2023 was characterized by the drastic reduction in the growth rate of non-governmental credit compared to the previous year (+6.4% in nominal terms and -0.2% in real terms in 2023), as well as by the further modification of the lei/currency structure in favour of the lei component (its share in the total volume of non-governmental credit increased to 68.41% in 2023).

The average growth rate of loans granted to the private sector increased to 6.4 percent in 2023 (compared to 12.1 percent in 2022), the acceleration of the rate being determined by the substantial increase in lending activity in lei (-0.8 percent in real terms) and by 7.9 percent of the foreign currency component expressed in lei (7.3 percent in the case of expressing the indicator in euros), both on the population segment and on that of non-financial companies, in the context of tempering the pace of credit outsourcing operations carried out by credit institutions.

For 2023, lending data showed non-government credit growing by 5.5% to €58 billion. Thus, in 2021, paradoxically, we witnessed an increase in financial intermediation to 26.8% - from 25.3% in 2019. The new credit granted to corporations and the population was 84 billion lei in 2021 and had a weight of almost one third of the balance of non-governmental loans.

The structural analysis of loans granted by credit institutions provides an important perspective on how they direct their lending activity to various segments of the economy, as well as depending on the currency in which these loans are granted.

In 2021, consumer loans denominated in lei represented 8.8% of the total, while loans denominated in euros and other currencies registered significant decreases (-14.1% and -16.7%) - table 3.

Table 3: Credits granted to population by destination and currency

Period	Consumer loans (%)			Home loans (%)			Loans for other purposes (%)		
	Lei	Euro	Other currencies	Lei	Euro	Other currencies	Lei	Euro	Other currencies
2021	8,8	-14,1	-16,6	20,4	-10,9	-10,1	3,4	-2,1	-
2022	4,1	-15,1	-13,8	8,9	-9,2	-10,3	32,9	40,1	-
2023	6,7	-15,9	-10,3	2,0	-12,9	-7,4	7,5	-10,9	-
2024 T1	10,6	-16,7	-14,1	3,5	-15,2	-11,8	7,9	-13,6	-

Sursa: https://www.bnr.ro/Credite-acordate-gospodariilor-populatiei-5771.aspx#peloc

Home loans denominated in lei represented 20.4% of the total, while those denominated in euros and other currencies registered moderate decreases (-10.9% and -10.1%). Loans for other purposes were predominantly expressed in euros and other currencies, representing 3.4% of the total for lei and -2.1% for euros. In 2022, we observe a reduction in the percentage of consumer loans denominated in all currencies, but a significant increase in the percentage of home loans denominated in lei (8.9%). Loans for other purposes expressed in euros registered a significant increase, representing 40.1% of the total. In 2023, the percentage of consumer loans expressed in lei increased to 6.7%, while those expressed in euros and other currencies continued to decrease. Home loans denominated in lei decreased to 2.0%, while those denominated in other currencies registered a significant decrease (-12.9%). The percentage of loans for other purposes fell in all currencies.

The percentage of home loans denominated in all currencies fell significantly. In conclusion, the analysis of loans granted to the population shows that, in general, credit institutions have adapted their lending policy according to market requirements and economic and financial evolution. They concentrated their lending more in lei and decreased the granting of loans denominated in other currencies. We are also seeing significant changes in the structure of loans for various purposes, such as an increase in loans for housing and a decrease in loans for other purposes, especially those denominated in other currencies.

The analysis of loans granted to non-financial institutions, public administration and non-residents shows that credit institutions adjusted their lending policy according to the needs and requirements of the market in each analysed period (table 4).

In 2021, the percentage of loans granted to non-monetary financial institutions was 33.2%, while those granted to public administration were extremely high, representing 116.0% of the total.

Table 4: Credits granted to the public administration, non-financial companies and non-residents

Perioada	Loans granted to non-financial companies (%)	Loans granted to the public administration (%)	Loans granted to non-residents(%)
2021	33,2	116,0	19,4
2022	38,0	27,8	-5,9
2023	17,8	21,4	27,8
2024 T1	15,4	65,4	33,5

Sursa: https://www.bnr.ro/Credite-acordate-institutiilor-financiare-nemonetare,-administratiei-publice-si-nerezidentilor-5793.aspx#peloc

The percentage of loans granted to non-residents was 19.4%. In 2022, we see a significant increase in the percentage of loans granted to non-monetary financial institutions (38.0%), while the percentage of loans granted to the public administration decreased to 27.8%. The percentage of loans granted to non-residents was negative, indicating a possible reduction in lending to this segment. In 2023, the percentage of loans granted to non-monetary financial institutions decreased to 17.8%, and the percentage of loans granted to public administration increased slightly to 21.4%. The percentage of loans granted to non-residents increased significantly, reaching 27.8%. The percentage of credits granted to the public administration increased significantly, reaching 65.4%. The percentage of loans granted to non-residents continued to increase, reaching 33.5%.

The total of loans granted to non-financial companies registered a significant increase during the analysed period, from 148,528.1 million lei in 2021 to 191,170.6 million lei in February 2024. This increase indicates an increase in lending activity in the corporate sector.

Overall, the analysis of loans to non-financial corporations indicates an increase in lending activity in the corporate sector, which may be a sign of economic growth or increased interest in investment and corporate expansion. This can be influenced by various factors such as general economic conditions, the level of interest rates and the level of confidence of the corporate sector in the economy.

Loans in lei dominate the total of loans, but there is also a significant proportion of loans in euros and other currencies (table 5).

The fluctuations of loans granted to non-financial companies in the analysed period reflect changes in credit demand, economic conditions and other factors.

Table 5: Loans granted to non-financial companies

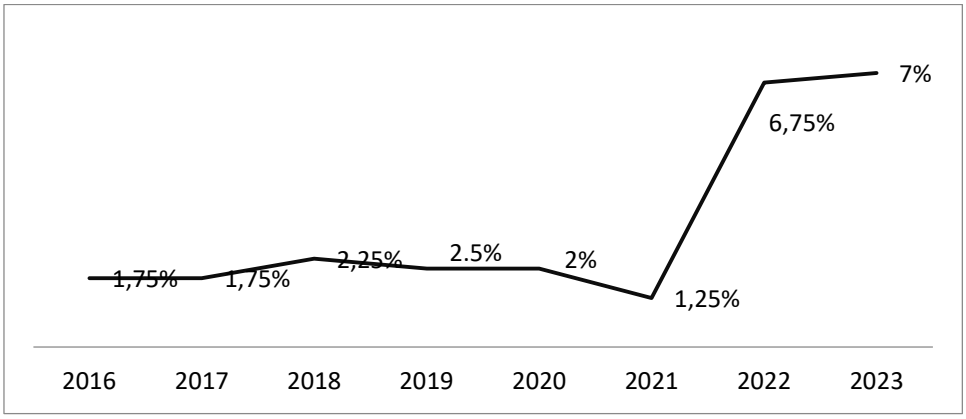
Period	Loans in lei (%)	Loans in euro (%)	Loans in other currencies (%)
2021	26,0	10,4	13,8
2022	4,3	46,4	-12,5
2023	8,8	11,8	25,7
2024 T1	6,9	3,8	-14,1

Sursa: https://www.bnr.ro/Credite-acordate-societatilor-nefinanciare-5792.aspx#peloc

In conclusion, the analysis of loans granted to non-financial institutions, public administration and non-residents shows that credit institutions have adjusted their lending policy according to the needs and requirements of the market in each analysed period. Although the percentage of loans granted to non-monetary financial institutions generally decreased, the percentage of loans granted to public administration and non-residents experienced significant fluctuations during this period. These adjustments were influenced by economic factors, regulations and market demands, as well as the strategy of each lending institution. The interest rate on loans is influenced both by endogenous factors (the cost of financing, the cost of credit risk related to the loans granted and operational costs), and by exogenous factors, such as fiscal instability and the higher volatility of the economic cycle.

The monetary policy acted consistently in the sense of mitigating the amplitude of the economic cycle. From the previous table it can be seen that the reference interest rate fluctuates from year to year. Thus, from 2015 to 2017 it decreased from 2% to 1.75%, and then reached 2.25% in 2018 (Graph 4). This increase implies an encouragement of saving, being influenced by all users who have loans with variable interest (increase in loan rates in lei).

Graph 4: The monetary policy interest rate



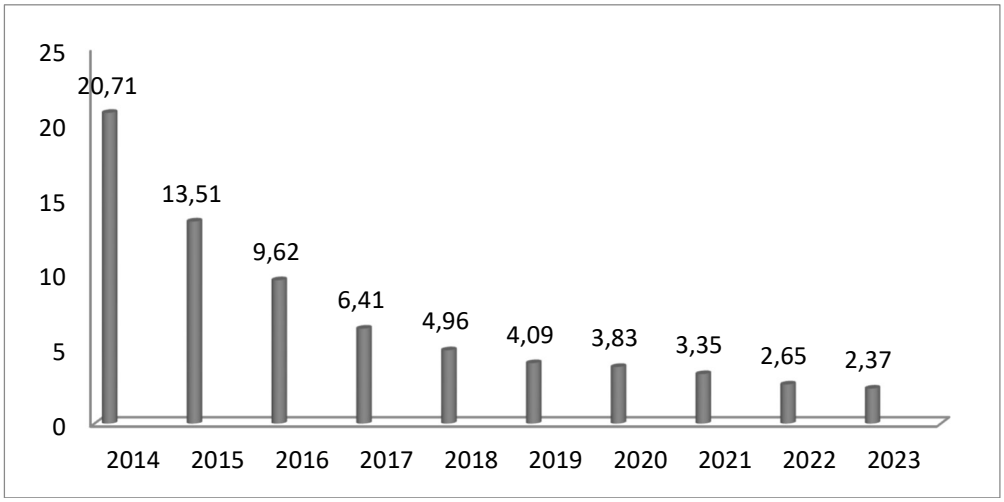
Source: www.NBR.ro - Statistics

Subsequently, a decrease of one percentage point is visible from February 2018 to October 2021, thus encouraging consumption and investment. Inflation is also accentuated, and emphasis is placed on facilitating access to credits.

Since 2022, the monetary policy interest rate has been rising as a result of persistent inflation,

Regard of assets quality non-performing loans rate (according to EBA classification) improved at 3.3% in March 2022, compared to 3.83% at the end of 2020, but remains in the medium risk zone, with an EU average of 2% (Graph 5).

Graph 5: The Rate of Non-Performing Loans in Romania

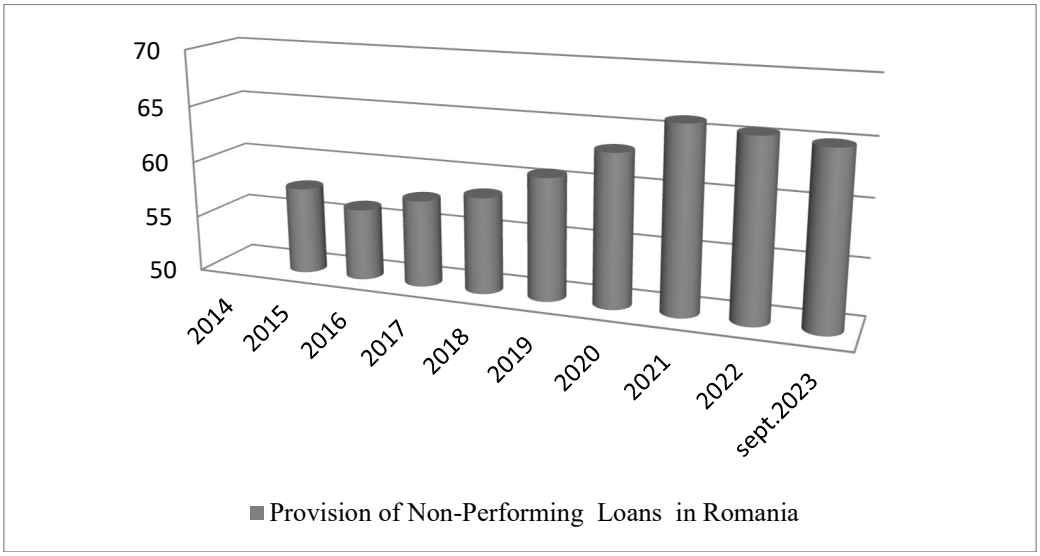


Source: NBR*[19, 20,21]*

The dynamics of the rate of non-performing loans show an improvement in the quality of the portfolio of loans granted both to the population and to corporations, but the credit risk remains important for the Romanian banking sector, at the high level of uncertainty that characterizes current economic developments and the increase in interest rates.

The degree of provision coverage of non-performing loans continued to increase, evolving up to 65.08% in september 2022, its dynamics placing Romania at the top of the European ranking (Graph 6).

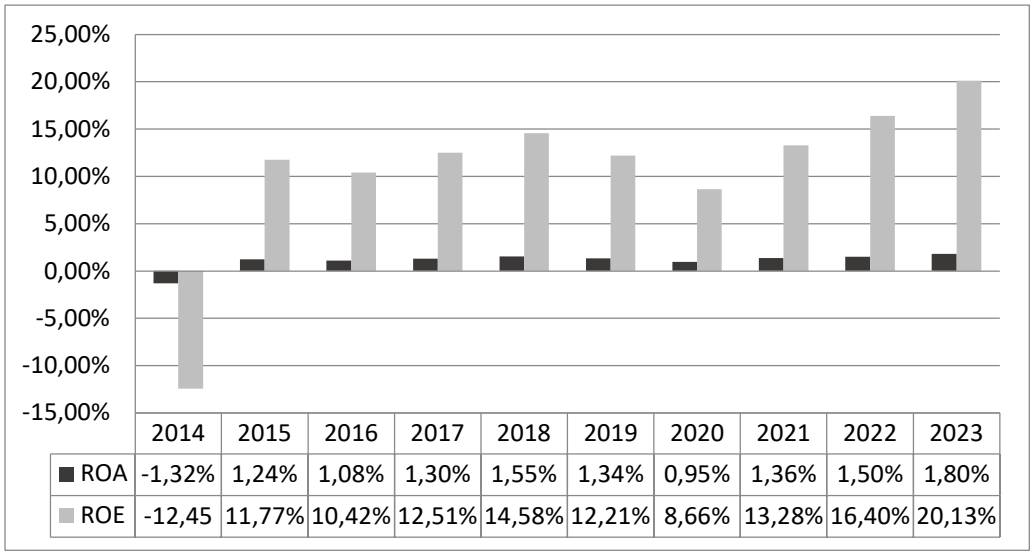
Graph 6: The Degree of Cooperation with the Provision of Non-Performing Loans in Romania



Source: NBR*[19, 20,21]*

Regarding the performances recorded by the Romanian banking system, starting from 2018, the ROA and ROE indicators began to decline, which stood at 1.55% and 14.58%, respectively, until 2020, decreasing by 0.6 p.p. and respectively by 5.92 p.p. compared to 2018. From 2021, the positive trend resumes in the level of ROA and ROE indicators that had positive values higher than 2020 from 0.95% to 1.36% and respectively 8.66% to 13.28% (Graph 7).

Graph 7: The Evolution of Performance Indicators in Romania



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ROA	-1,32%	1,24%	1,08%	1,30%	1,55%	1,34%	0,95%	1,36%	1,50%	1,80%
ROE	-12,45	11,77%	10,42%	12,51%	14,58%	12,21%	8,66%	13,28%	16,40%	20,13%

Source: NBR*[19, 20,21]*

The profitability of the banking sector continued to increase due to the increase in net interest income through the increase in interest rates and the efficiency of operational expenses (including through digitalization).

2. Estimating the development of the rate on non-performing loans with the help of an economic model

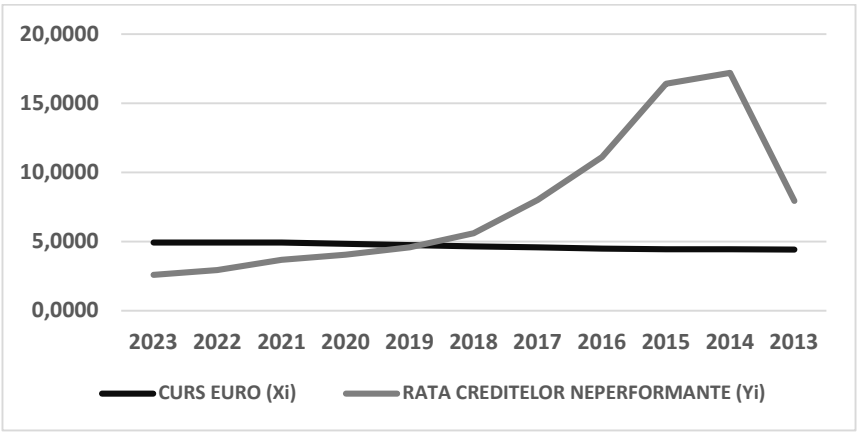
Through the following econometric study, we aim to determine the extent to which the rate of non-performing loans is influenced by the evolution of the Euro/leu exchange rate. For this purpose, we used the data provided by the BNR on the level of the exchange rate and the rate of non-performing loans, between september 2013 and september 2024, and we built a unifactorial econometric model of the form: y= ax+b+u

Where: u represents the residual variable and ax + b represents the first-degree function associated with the unifactorial model.

Therefore, y represents the real values of the dependent variable (the rate of non-performing loans) x represents the real values of the independent variable (the Leu/Euro exchange rate) u is the residual variable, with insignificant influences on the y variable.

In the case of a unifactorial model, the most frequently used procedure is the use of the "Method of the smallest squares". To apply this method, the data set is represented graphically, and the representation of these values must indicate an ascending line.

Graph 8: Development of the rate on non-performing loans



Source: www.NBR.ro – Statistics

From the graph it can be seen that the distribution of empirical points (Y) can be approximated by a straight line.

As such, the econometric model that describes the link between the two variables is transformed into a unifactorial linear model Y=a+bx+u, a and b representing the parameters of the model.

Application of M.C.M.P to estimate parameters a and b.

$$\sum [y_i - (a + bx)]^2 = \min$$

From this condition, differentiating with respect to a and b, the following system of equations results:

$$\begin{cases} na + b\sum x_i == \sum y_i \\ a\sum x_i + b\sum x_i{}^2 = \sum x_i y_i \end{cases}$$

$$a = \frac{\begin{vmatrix} \sum y_i & \sum x_i \\ \sum x_i y_i & \sum x_i^2 \end{vmatrix}}{\begin{vmatrix} \text{n} & \sum x_i \\ \sum x_i & \sum x^2{}_i \end{vmatrix}} = \frac{\sum y_i \sum x_i^2 - \sum x_i \sum x_i y_i}{n\sum x_i^2 - (\sum x_i)^2} =$$

$$= \frac{84.09 * 240.64 - 51.4017 * 383.666}{11 * 240.6423 - (51.4017)^2} = 104.215$$

$$b = \frac{\begin{vmatrix} \text{n} & \sum y_i \\ \sum x_i & \sum x_i y_i \end{vmatrix}}{\begin{vmatrix} \text{n} & \sum x_i \\ \sum x_i & \sum x_i^2 \end{vmatrix}} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{n\sum x_i^2 - \sum x_i \sum x_i} =$$

$$\frac{11 * 383.666 - 51.4017 * 84{,}09}{11 * 240.6423 - 51.4017 * 51.4017} = \text{-}20.87$$

The econometric model is:

$$y(x_i) = 104.215 - 20.876x_i$$

The two parameters of the function are interpreted as follows:

a = 104,215 represents the rate of non-performing loans when the exchange rate is zero (theoretical case)

b =-20.876 represents the slope of the right and indicates that, when the exchange rate increases by one unit, the rate of non-performing loans decreases by 20 units.

In order to establish the proportion in which the amount of non-performing loans is determined by the value of the euro/leu exchange rate, the correlation coefficient and the correlation ratio must be calculated:

The linear correlation coefficient

$$r_{y/x} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{(n\sum x_i^2 - (\sum x_i)^2}\sqrt{(n\sum y_i^2 - (\sum y_i)^2}} =$$

$$\frac{11 * 383.666\text{-}51.4017*84.09}{\sqrt{(11*240.6423\text{-}51.4017\ \ ^2) * \sqrt{(11 * 913.3789 - 84.04\ \ ^2}}} = \text{-}0.8301$$

Conclusion: the correlation is strongly negative between variables r = -0.8301

The econometric model suggests that exchange rate variation has a negative impact on non-performing loans.

3. Conclusions

During 2023, the banking sector continued to perform adequately from a financial and macroprudential perspective, despite the challenges associated with the health crisis and the geopolitical situation in the region.

The ratio of bad loans and the ratio of restructured loans show that the banking sector in Romania is in the low risk category, while the adequate amount of non-performing loans covered by provisions had a counterbalancing influence.

The results of the study reveal that the level of non-performing loans consistently causes a lower profitability of the banking sector, as the spread of banks shrinks due to lower loan recovery and low loan yield.

Adequate credit risk management and the application of appropriate credit standards are essential to reduce the risk of non-performing loans and to ensure that banks" profitability is not affected.

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