International Entrepreneurship Review

2024, Vol. 10, No. 4

10.15678/IER.2024.1004.06

The impact of economic openness on the economic growth of Central and Eastern European countries after the systemic transformation

Jakub Garncarz

ABSTRACT

Objective: The objective of the article is to examine the impact of foreign trade on economic growth in countries opening up their economies as a result of their separation from the blocs of socialist countries.

Research Design & Methods: The study is quantitative. Pearson's linear correlation method and a simple linear regression model were used. The study used macroeconomic data for 1995-2022 for eight countries in Central and Eastern Europe (CEE).

Findings: In most of the studied countries, a strong positive relationship was observed between the volume of foreign trade and the rate of economic growth.

Implications & Recommendations: Restructuring the economy and opening up to international trade were important factors in the dynamic economic growth of the CEE countries studied. The observed strong positive relationship between the volume of foreign trade and the economic growth of the countries studied suggests that to stimulate a country's economic growth, policymakers should pursue policies that support international trade. The findings may also be useful for economic theory, as it has been empirically verified that opening a country to the free flow of goods and services is correlated with its faster economic growth.

Contribution & Value Added: The novelty of the article stems from the fact that it has not yet been examined whether the exit of the Central and Eastern European countries from the bloc of socialist states, which involved the liberalization of trade regulations and opening to international trade, followed by their joining the European Union on May 1, 2004, and becoming part of the single market, significantly affected the economic growth of these countries.

Article type: research article

Keywords: foreign trade; economic openness; economic growth; Central Europe; European Union

JEL codes: F14, E23

Received: 21 December 2023 Revised: 10 September 2024 Accepted: 25 September 2024

Suggested citation:

Garncarz, J. (2024). The impact of economic openness on the economic growth of Central and Eastern European countries after the systemic transformation. *International Entrepreneurship Review,* 10(4), 93-102. https://doi.org/10.15678/IER.2024.1004.06

INTRODUCTION

In economic theory, the importance of foreign trade for economic growth has undergone numerous investigations. Classical theory pointed to the important role of foreign trade in generating economic growth. In contrast, in neoclassical theory, the role of foreign trade ceased to be important in the context of GDP formation. It was only as a result of the development of endogenous growth models that international trade again became an important factor affecting economic growth (Afonso, 2001). In the academic literature, many works examine foreign trade's impact on economic growth. In his interesting review, Singh (2010) notes that various authors, especially those who based on macroeconomic variables, indicated a significant positive impact of foreign trade on economic growth in the

various analysed countries. At the same time, Singh pointed out that the empirical evidence of a positive relationship between economic growth and foreign trade in some works tends to be inconclusive.

However, there is a shortage of studies in the literature examining the impact of foreign trade on economic growth in European countries that separated from the blocs of socialist states in the late 1980s and early 1990s while simultaneously opening up and liberalizing their economies. Seven of the Central and Eastern European countries analyzed (Poland, the Czech Republic, Slovakia, Hungary, Lithuania, Latvia and Estonia) experienced systemic transformation after the collapse of the Soviet Union. Lithuania, Latvia and Estonia left the USSR, while Poland, the Czech Republic, Slovakia and Hungary were previously socialist countries that gained full independence. On the other hand, Slovenia declared independence on October 7, 1991, leaving the Socialist Federal Republic of Yugoslavia. All eight countries analysed have one thing in common: on May 1, 2004, they joined the European Union, which further opened these countries to the European Union's single market, in which the principles of free movement of people, capital, goods and services prevail.

The article aims to examine the impact of foreign trade on economic growth in countries opening up their economies as a result of their separation from the blocs of socialist countries. The article is divided into three parts. The first section will present a literature review related to the opening of countries to foreign trade. The second section will present the research methodology. The last section will present the results and a discussion based on the impact that opening to foreign trade of CEE countries has had on their economic growth.

This article makes a novel contribution to the existing literature by offering a fresh perspective on the long-term effects of foreign trade on economic growth in Central and Eastern European countries. This region has experienced significant transformation since the 1990s. Unlike prior studies, which often concentrate on shorter timeframes or individual countries, this research provides a comprehensive, cross-country analysis spanning three decades, revealing new insights into the role of economic openness in shaping growth dynamics within transitioning economies.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In the past few years, the impact of countries' openness on foreign trade has been studied in China (Kong *et al.,* 2021), where a stable cointegrating relationship was observed between the openness of the Chinese economy and the country's economic growth dynamics, as well as regional heterogeneity in the impact of trade openness on economic growth. A similar study conducted in India (Reshi & Sudha, 2023) found a strong link between the country's rapid economic growth and the increasing value of the economic openness index. Hobbs *et al.* (2021), while studying the economy of Albania, demonstrated a phenomenon in which the country's economic growth unilaterally drives growth in foreign trade volume. Studies examining the relationship between economic growth and foreign trade have also been conducted on the example of Poland (Machowska-Okrój, 2017), indicating that in the period after Poland acceded to the European Union, a 10% increase in the rate of openness of the economy leads to an increase in GDP per capita of almost 140 monetary units expressed as current international dollars, greater than in the comparable period before accession. This represents a clear benefit to the Polish economy from membership and the consequences of Poland's accession to the EU (Michalak, 2001; Balcerowicz, 2007). Karasiewicz and Nowak (2010) conducted an important study on structural and behavioural changes in Polish retailing since 1989. They analysed the sector's trans in three phases: privatisation and decentralisation, intensive internationalisation and retail concentration and consolidation, with the identification of a fourth phase – innovation and modernisation. Similar conclusions were observed for Slovakia (Križan *et al.,* 2016). Pilinkiene (2016) highlighted that Central and Eastern European countries have experienced varying economic outcomes despite their shared high levels of trade openness. The empirical research demonstrates that economic growth drives improvements in trade openness, while competitiveness in these economies enhances growth, suggesting a mutually reinforcing dynamic. Further supporting this, Rapacki and Prochniak (2019) also investigated the impact of European Union membership on the economic growth of 11 CEE countries, emphasizing the role of EU integration in accelerating growth and convergence with Western Europe.

Their findings show that key drivers, such as increased economic freedom, improved governance, market reforms, and the influx of EU funds, significantly contributed to the GDP growth of CEEs between 1995 and 2015. These factors, coupled with rising foreign direct investment and international trade, underline the positive effects of trade openness within the framework of the EU's economic policies. Moreover, Knežević *et al.* (2011) examined changes in the retail sector across the EU, focusing on how these shifts have influenced economic growth and competitiveness. Their research revealed that the growing dominance of large enterprises, especially in countries like Poland and Croatia, improved productivity and market efficiency. This process of retail consolidation has been instrumental in driving economic modernization in these nations, further demonstrating the link between openness to trade and the broader economic benefits derived from structural changes in various sectors, which is in line with the studies (Knežević & Szarucki, 2012). Kalinkova (2018) highlights that national competitiveness is closely tied to the political system within which a country evolves, making it a crucial factor in understanding economic outcomes. In the context of post-socialist countries, the results of Kalinkova's analysis reveal that despite varying initial conditions, most post-socialist countries have exhibited positive trends in competitiveness over the last decade, largely driven by improvements in institutional frameworks and market efficiency. Analysing the impact of foreign trade on economic growth in Nigeria, Adeleye *et al.* (2015) indicated that foreign exports are a positive factor for economic growth. However, the country's export structure is dominated only by oil and lacks a significant contribution of products from other sectors of the economy, such as industry or agriculture. Moreover, imports are a factor slowing the country's economic development. Lawal and Ezeuchenne (2017) add that Nigeria needs to adapt to modern economic realities, especially in terms of technological development, so that imports also lead to the country's economic growth. Similar conclusions were reached by Nguyen (2020) when analysing the Vietnamese economy, pointing out that only exports positively impact Vietnam's economic growth. Imports had a negative impact on the country's economic growth, but this impact was not statistically significant. Analysing over 20 Asian countries, Trejos and Barboza (2015) found that greater trade openness was not a key factor driving economic growth in Asian countries. At the regional level, however, in the post-financial crisis period, trade openness has shown a significant and positive impact on production growth in the short and long term. The authors also added that the study's results confirm that countries increasing their trade openness can achieve faster growth in per capita output mainly due to productivity gains resulting from capital accumulation rather than the expected technological benefits of trade. In the above-mentioned studies, the authors pointed to the significant positive impact of foreign trade on economic growth in the countries studied.

Currently, in the academic literature, scholars also discuss issues related to new-generation trade agreements (Czermińska, 2022), network relationships (Cappelli *et al.,* 2023), as well as the effects of Russia's isolation from international trade (Mardones, 2023). The impact of the COVID-19 pandemic on international trade has also been widely discussed (Ugurlu & Jindřichovská, 2022). Scholars have also investigated the determinants of export resilience under pandemic conditions (Gorynia *et al.,* 2024) and the impact of anti-crisis measures taken by export companies on their export sales during the pandemic (Daszkiewicz *et al.,* 2023).

These prior empirical results allowed me to assume the following research hypothesis:

H: There is a strong, positive relationship between the degree of openness of the economy and Gross Domestic Product in the Central and Eastern European countries after the systemic transformation.

RESEARCH METHODOLOGY

Sample and Data Collection

The study verifies the hypothesis for the following group of Central and Eastern European countries: Poland, The Czech Republic, Slovakia, Hungary, Lithuania, Latvia, Estonia, and Slovenia. These countries joined the European Union in 2004, becoming part of the single European market. Moreover, most analyzed countries made a political transformation in the 1990s, opening up to foreign trade. These

two important changes in the development of the countries opened them to global international trade, making them perfect countries to study the relationship between foreign trade volume and economic growth. Taking this into account, and due to data availability, the study was conducted from 1995 to 2022. The data was taken from the World Bank database.

Variables in the Analysis

Table 1. provides an overview of the key economic variables analyzed in the study, including export and import volumes as a percentage of GDP, and the Gross Domestic Product in current US dollars.

Table 1. List of variables used in the study

Variable	Explanation	Unit	Source of data
Export volume	Exports of goods and services	(% of GDP)	World Bank (NE.EXP.GNFS.ZS)
Import volume	Imports of goods and services	(% of GDP)	World Bank (NE.IMP.GNFS.ZS)
GDP	Gross Domestic Product	(current US$)	World Bank (NY.GDP.MKTP.CD)

Source: own study based on data from The World Bank.

The volume of foreign trade is often measured by the degree of openness of the economy, which is an indicator of the extent to which a country engages in international trade. We can calculate the degree of openness using the following formula (Rodriguez, 2000):

$$Degree\ of\ openness = \frac{Export\ volume + Import\ volume}{GDP} \quad (1)$$

This indicator shows the relative importance of foreign trade to the national economy by comparing the total value of exports and imports with the size of the economy, measured by Gross Domestic Product (GDP). A higher degree of openness indicates a greater integration with global trade networks.

This measure of openness is especially relevant in regions that have undergone significant economic transformations, particularly within the Single European Market, such as Central and Eastern Europe. The Single Market removes many barriers to trade, allowing for the free movement of goods, services, capital, and people between member states. As a result, intra-EU trade accounts for a significant portion of the trade volume in Central and Eastern European countries, leading to higher degrees of openness. This integration has helped these countries to accelerate their economic growth by gaining access to a much larger market and benefiting from economies of scale (Baldwin & Wyplosz, 2015).

Figure 1 shows the degree of openness of the economy of each country in 2022.

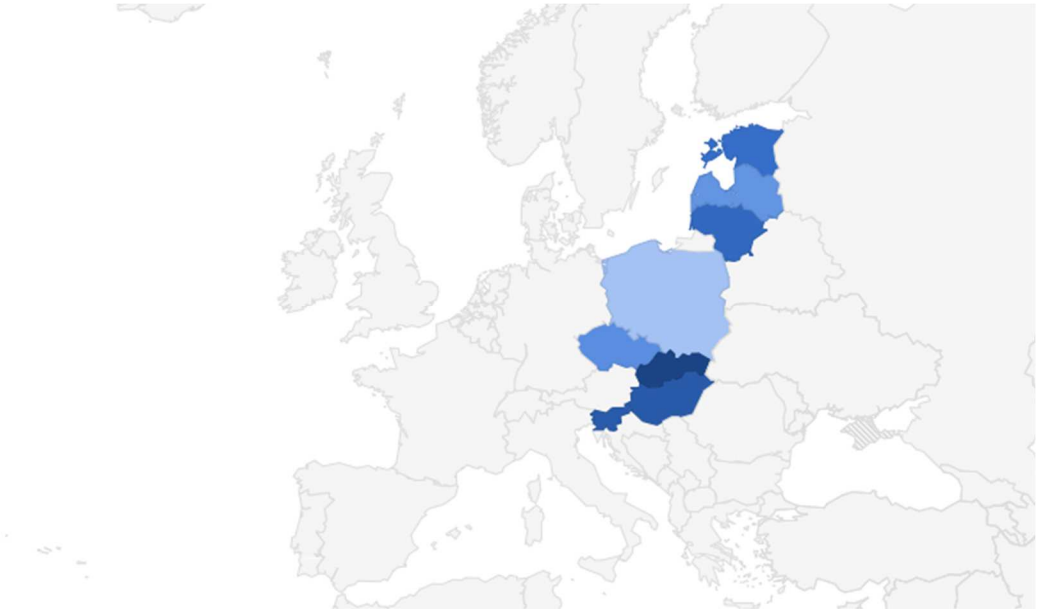

Figure 1. The degree of openness of the economy for analyzed countries in 2022

Source: own elaboration based on data from The World Bank.

As Figure 1 shows, in 2022, Slovakia recorded the highest degree of economic openness, with the sum of exports and imports of goods and services accounting for more than 204% of the country's GDP. In contrast, Poland recorded the lowest value of this indicator, with exports and imports of goods and services accounting for less than 124% of GDP.

Research Model and Statistical Tests

I used two statistical tools, *i.e.* Pearson's linear correlation and multiple regression modelling to verify the research hypothesis set in this study. The study used data from the World Bank's database for 1991-2022 on the volume of GDP and the volume of exports and imports of goods and services in the analysed countries. Based on the acquired data, I created an index of economic openness and developed regression models.

The first method that I used in this study was Pearson's linear correlation coefficient, which is we can measure with the following equation (Schober *et al.,* 2018):

$$r_{xy} = \frac{cov(x,y)}{\sigma_x \sigma_y} \tag{2}$$

in which:

x, y - random variables;
$cov(x,y)$ - covariance of random variables;
$\sigma_x \sigma_y$ - product of standard deviations of random variables.

I used a coefficient of determination to calculate the regression model, expressed with the following formula (Weisberg, 2005):

$$R^2 = \frac{\sum_{i=1}^{n}(\hat{y}_t - \bar{y})^2}{\sum_{i=1}^{n}(y_t - \bar{y})^2} \tag{3}$$

in which:

$\hat{y}_t$ - the predicted value of the dependent variable;
$\bar{y}$ - the average value of the actual dependent variable;
y_t - actual value of the dependent variable.

Due to the sensitivity of the R^2 coefficient to the number of variables and the sample size, I also determined the adjusted value of the above parameter (Weisberg, 2005):

$$R^2_{adj} = R^2 - \frac{k}{n-k} \cdot \varphi^2 \tag{4}$$

in which:

φ^2 - convergence factor calculated according to the formula: φ^2 = 1- R^2;
n - number of data points;
k - number of independent variables.

The study of correlations is a simple but very effective way to get an overall picture of the relationship between the variables under study. To conduct the analysis, I used two software tools, *i.e.* Python and Statistica.

RESULTS AND DISCUSSION

The study identified key relationships between the analyzed variables. Figure 2 presents the relationship between GDP and the economic openness index for 1991-2022 in the studied countries. As we can see, in most countries, a strong positive relationship exists between economic growth and increasing values of the economic openness index. Figure 3 shows the exact values of Pearson's linear correlation index.

Figure 3 shows the relationship between the index of economic openness and economic growth in the analyzed countries in 1991-2022 measured with Pearson's linear correlation coefficient. We can observe the highest positive relationship in Poland, where the value of Pearson's linear correlation coefficient was 0.96, which means a very strong relationship between the variables under study.

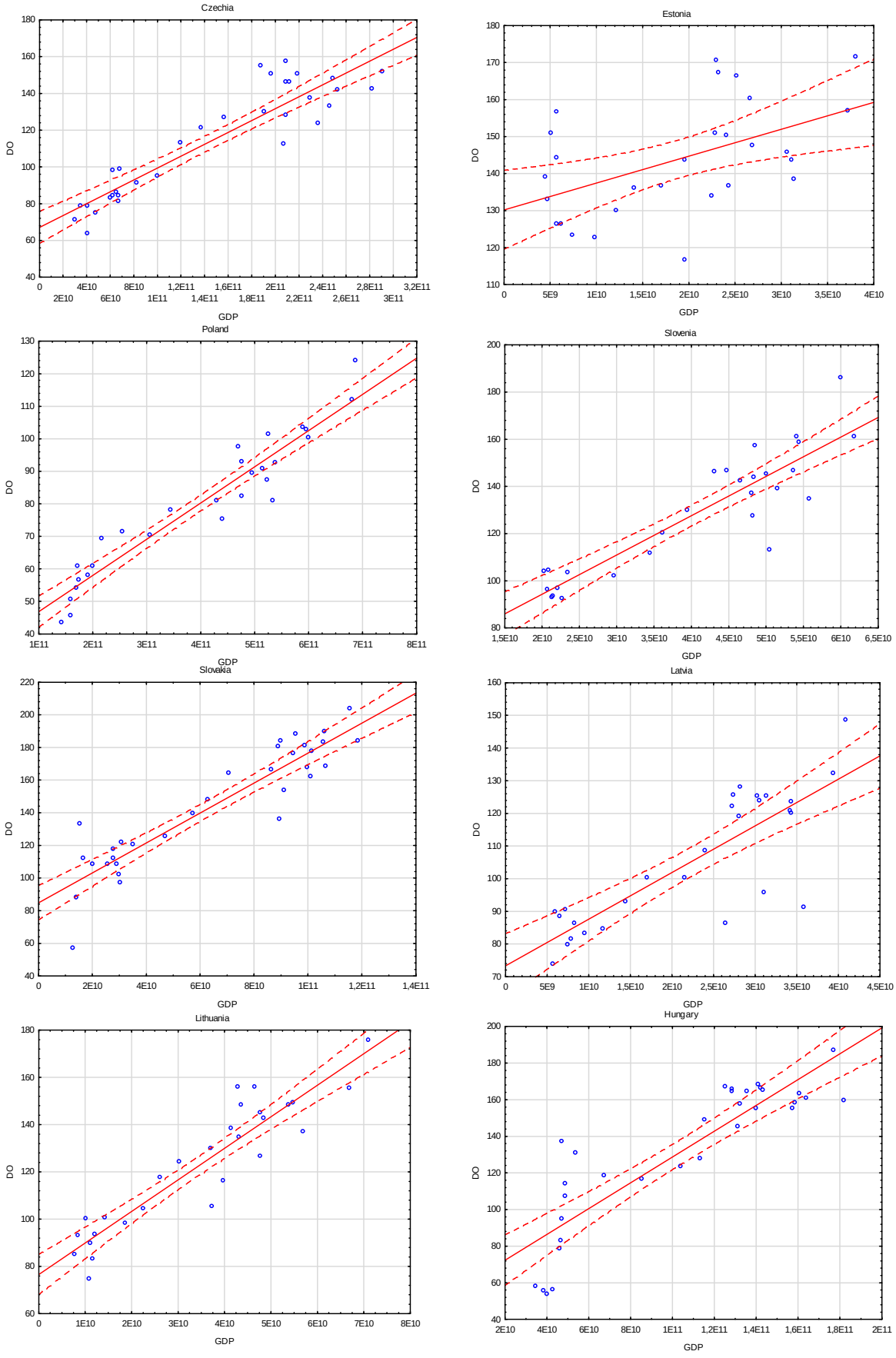

Figure 2. Correlation between GDP and the degree of openness of the economy for analyzed countries from 1991 to 2022

Source: own elaboration in Statistica.

We observed equally strong correlations in Lithuania (0.93), the Czech Republic (0.92), Slovakia (0.92), and Slovenia (0.9). In contrast, I found no relationship between the economic openness index and economic growth in Estonia, where the value of Pearson's linear correlation coefficient was only 0.51.

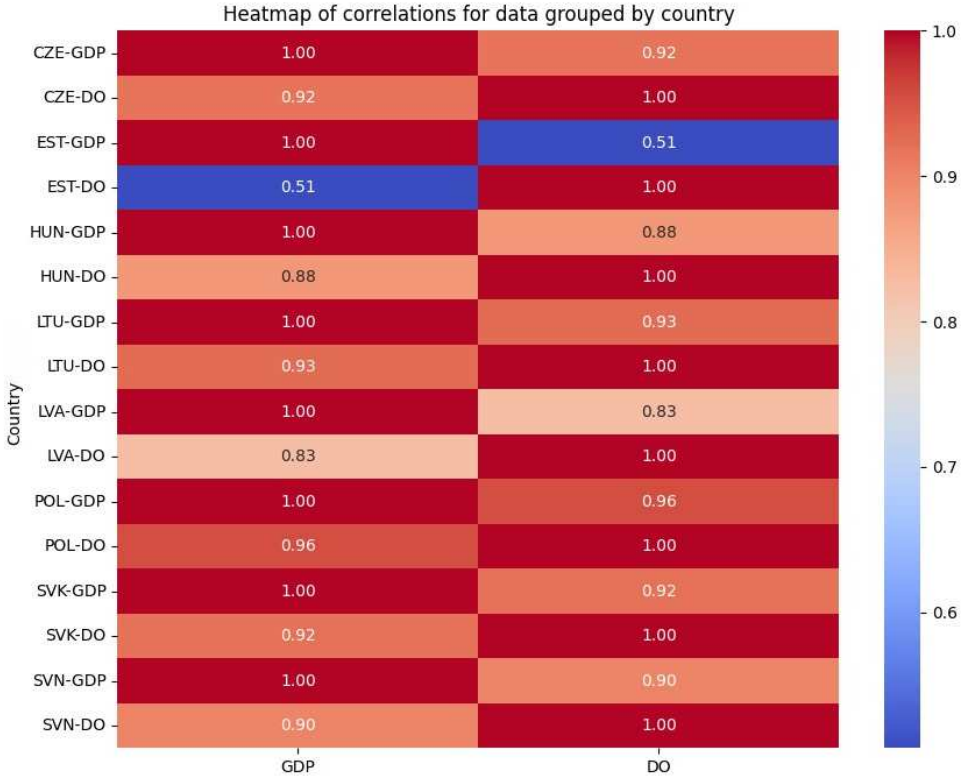

Figure 3. Correlation between GDP and the degree of openness of the economy for analyzed countries from 1991 to 2022
Source: own elaboration in Python.

Table 2 shows the results of estimating the regression model for the studied variables. It is assumed that the closer the value of the coefficient of determination is to 1, the better the model fits the data, so values above 0.75 indicate a good fit of the model to the data. I observed the highest value of the coefficient of determination in Poland, and it was 0.909, which means that the variation in GDP was 91% explained by the developed regression model. The developed regression model for Lithuania took the value of (0.853), for Slovakia (0.853), and the Czech Republic (0.836), which means that in these countries, GDP growth was about 85%, explained by the degree of openness of the economies of these countries. The regression models developed for Estonia and Latvia showed little fit, as the economic growth of these countries was explained only 22.8% for Estonia and 67% for Latvia, respectively, by the degree of openness of the economy.

I also verified the statistical significance of the developed regression models. The *p-value* (P>|t|) indicates the statistical significance of the correlation coefficient, its value should be less than the significance level, usually taken at 0.05. In the case of the regression models of the countries analysed, this indicator was 0.00, which means that there was a statistically significant relationship between the independent variable, the degree of economic openness, and the dependent variable, which in the developed model was the GDP indicator. The standard error (std. err.) measures the variability of the regression coefficients. The smallest possible value of the standard error is desirable, as it indicates the accuracy of the regression coefficient estimates. This study's standard error values were relatively low, which should be interpreted as a good fit for the regression coefficient estimates. *T-value* tells how many standard deviations the estimated regression coefficient is away from zero. In the study, most of the *t-value* values were high compared to the low standard error values, which indicates the statistical significance of the regression coefficients.

Table 2. The list of estimated regression models

Country	R^2	R^2_{adj}	coef		P>|t|	Std. err.	t-value
The Czech Republic	0.842	0.836	const	-1.513	0.000	2.41	-6.294
			DO	2.602	0.000	2.03	12.832
Estonia	0.257	0.228	const	-3.206	0.071	1.72	-1.881
			DO	3.531	0.006	1.18	2.996
Poland	0.912	0.909	const	-2.579	0.000	4.11	-6.275
			DO	8.189	0.000	4.99	16.418
Slovenia	0.812	0.805	const	-2.221	0.001	6.02	-3.689
			DO	4.879	0.000	4.60	10.611
Slovakia	0.847	0.843	const	-6.844	0.000	1.05	-6.534
			DO	9.234	0.000	7.04	13.125
Latvia	0.683	0.670	const	-2.792	0.000	6.85	-4.077
			DO	4.780	0.000	6.39	7.479
Lithuania	0.859	0.853	const	-4.439	0.000	6.42	-6.918
			DO	6.432	0.000	5.12	12.569
Hungary	0.772	0.764	const	-4.005	0.012	1.49	-2.687
			DO	1.095	0.000	1.09	10.075

Source: own study in Python.

The survey results indicate a strong positive relationship between foreign trade volume and economic growth in the five countries studied. We can explain the lack of such a correlation in the case of Estonia and Latvia by the neighbourhood of the two countries. Estonia borders only with underdeveloped Russia and Belarus, as well as Latvia, while Latvia, in addition to its neighbourhood of Russia, Belarus, and Estonia, still borders Lithuania. Countries surrounded by slower-growing economies may experience slower growth in aggregate export demand, which may impact their economic growth (Vilarrubia Tapia, 2006). However, I observed no positive relationship with economic growth for export volume alone, which was the result of studies in other countries such as Nigeria (Adeleye *et al.,* 2015), (Lawal & Ezeuchenne, 2017) and Vietnam (Nguyen, 2020). Although I did not study separately the impact of imports and exports, both variables, which are part of the economic openness index, showed a strong positive relationship with the GDP index.

CONCLUSIONS

The study aimed to verify the hypothesis of a strong positive relationship between the degree of openness of the economy and Gross Domestic Product (GDP) in Central and Eastern European countries. The analysis of eight economies revealed that in five of these countries, the hypothesis was confirmed, demonstrating a clear positive relationship between economic openness and GDP growth. However, the results should be interpreted with caution due to study limitations. The research did not verify the causality between economic openness and growth; therefore, we cannot definitively conclude that increasing foreign trade directly causes faster economic development. The correlation observed in this study merely highlights a relationship, but other factors could influence the outcomes, such as domestic policies or structural economic changes.

The recommendations stemming from this research emphasize the need for policies that foster international trade, especially in economies where a positive relationship between openness and growth has been established. In countries where this correlation was not confirmed, further investigation into domestic economic factors is necessary to tailor appropriate trade policies. These findings also have broader theoretical implications, reinforcing the idea that global integration can drive economic performance, though the results caution against making direct causal assumptions without further evidence.

Future research should address these limitations by exploring the causal relationship between trade volumes and economic growth rates more thoroughly, potentially using advanced econometric techniques to establish whether increased openness directly leads to faster growth. Furthermore, ex-

panding the scope of analysis to include the newest EU member states would provide a more comprehensive understanding of the relationship between trade and growth in a broader European context. Finally, further studies should examine the effects of Brexit on trade flows, especially within the Single European Market, where intra-EU trade dynamics may differ from those involving non-EU countries.

REFERENCES

Adeleye, J.O., Adeteye, O.S., & Adewuyi, M.O. (2015). Impact of international trade on economic growth in Nigeria (1988-2012). *International Journal of Financial Research*, *6*(3), 163-172. https://doi.org/10.9790/0837-2206083543

Afonso, Ó. (2001). The impact of international trade on economic growth. *Investigação–Trabalhos em Curso*, *106*, 1-33. Retrieved from https://wps.fep.up.pt/wps/wp106.pdf on April 2, 2024.

Balcerowicz, E. (2007). The Impact of Poland's EU Accession on its Economy. *Center for Social and Economic Research CASE report*, *335*, 1-31. https://doi.org/10.2139/ssrn.1015782

Baldwin, R., & Wyplosz, C. (2022). *The Economics of European Integration 7e*. McGraw Hill.

Cappelli, F., Carnazza, G., & Vellucci, P. (2023). Crude oil, international trade and political stability: Do network relations matter?. *Energy Policy*, *176*, 113479. https://doi.org/10.1016/j.enpol.2023.113479

Czermińska, M. (2022). New-generation trade agreement with Japan: Significance to EU Companies. *International Entrepreneurship Review*, *8*(4), 41-55. https://doi.org/10.15678/IER.2022.0804.03

Daszkiewicz, N., Kordalska, A., & Olczyk, M. (2023). Anti-crisis activities and export performance in the Covid-19 pandemic: The case of Polish exporters. *Entrepreneurial Business and Economics Review*, *11*, 91-108. https://doi.org/10.15678/EBER.2023.110406

Gorynia, M., Nowak, J., Trąpczyński, P., & Wolniak, R. (2024). What drives export resilience? The case of post-transition country firms in the context of the COVID-19 pandemic. *Entrepreneurial Business and Economics Review*, *12*(1), 119-133. https://doi.org/10.15678/EBER.2024.120107

Hobbs, S., Paparas, D., & AboElsoud, M. (2021). Does foreign direct investment and trade promote economic growth? Evidence from Albania. *Economies*, *9*(1), 1. https://doi.org/10.3390/economies9010001

Kalinkova, S. (2019). Measuring the competitiveness of post-socialist countries. *Економічний вісник університету*, *41*, 90-98. https://doi.org/10.31470/2306-546X-2019-41-90-98

Karasiewicz, G., & Nowak, J. (2010). Looking back at the 20 years of retailing change in Poland. *The International Review of Retail, Distribution and Consumer Research, 20*(1), 103-117. https://doi.org/10.1080/09593960903509627

Knežević, B., Renko, S., & Knego, N. (2011). Changes in Retail Industry in the EU. Business. *Management and Economics Engineering, 9*(1), 34-49. https://doi.org/10.3846/bme.2011.03

Knežević, B., & Marek, S. (2012). Retail Internationalization and Challenges-A Case of Croatia, Lithuania and Poland. In Ginevicius R., Rutkauskas A.V., & Stankeviciene J. (Eds.), *Selected Papers,* (Vol. I, pp. 392-397) VGTU Publishing House "Technika", Vilnius. https://doi.org/10.3846/bm.2012.052

Kong, Q., Peng, D., Ni, Y., Jiang, X., & Wang, Z. (2021). Trade openness and economic growth quality of China:Empirical analysis using ARDL model. *Finance Research Letters*, *38*(1), 101488. https://doi.org/10.1016/j.frl.2020.101488

Križan, F., Bilková, K., Kita, P., & Siviček, T. (2016). Transformation of retailing in post-communist Slovakia in the context of globalization. *E & M Ekonomie A Management, 19*(1), 148-164. https://doi.org/10.15240/TUL%2F001%2F2016-1-011

Lawal, E.O., & Ezeuchenne, K. (2017). International trade and economic growth in Nigeria. *Journal of Humanities and Social Science*, *22*(6), 35-43. http://doi.org/10.9790/0837-2206083543

Machowska-Okrój, S. (2017). Empiryczna analiza zależności między otwartością gospodarki a wzrostem gospodarczym na przykładzie Polski. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, *489*, 222-230. https://doi.org/10.15611/pn.2017.489.20

Mardones, C. (2023). Economic effects of isolating Russia from international trade due to its 'special military operation' in Ukraine. *European Planning Studies*, *31*(4), 663-678. https://doi.org/10.1080/09654313.2022.2079074

Michalak, W. (2001). Retail in Poland: An assessment of changing market and foreign investment conditions. *Canadian Journal of Regional Science, 24*(3), 485-504. Retrieved from V24N3-michalak.pdf (idjs.ca) on April 2, 2024.

Nguyen, H.H. (2020). Impact of foreign direct investment and international trade on economic growth: Empirical study in Vietnam. *The Journal of Asian Finance, Economics and Business*, *7*(3), 323-331. https://doi.org/10.13106/jafeb.2020.vol7.no3.323

Pilinkiene, V. (2016). Trade openness, economic growth and competitiveness. The case of the central and eastern European countries*. Inžinerinė Ekonomika, 27*(2), 185-194. https://doi.org/10.5755/j01.ee.27.2.14013

Rapacki, R., & Prochniak, M. (2019). EU membership and economic growth: empirical evidence for the CEE countries. *The European Journal of Comparative Economics, 16*(1), 3-40. https://doi.org/10.25428/1824-2979/201901-3-40

Reshi, I.A., & Sudha, D.T. (2023). Trade and growth in india: an analysis of the relationship and its implications. *International Journal of Social Science, Educational, Economics, Agriculture Research and Technology*, *2*(4), 1331-1336. https://doi.org/ 10.54443/ijset.v2i4.149

Rodriguez, C.A. (2000). On the degree of openness of an open economy. *Universidad del CEMA*.

Schober, P., Boer, C., & Schwarte, L.A. (2018). Correlation coefficients: appropriate use and interpretation. *Anesthesia & Analgesia*, *126*(5), 1763-1768. https://doi.org/10.1213/ANE.0000000000002864

Singh, T. (2010). Does international trade cause economic growth? A survey. *The World Economy*, *33*(11), 1517-1564. https://doi.org/10.1111/j.1467-9701.2010.01243.x

Trejos, S., & Barboza, G. (2015). Dynamic estimation of the relationship between trade openness and output growth in Asia. *Journal of Asian Economics, 36*, 110-125. https://doi.org/10.1016/j.asieco.2014.10.001

Ugurlu, E., & Jindřichovská, I. (2022). Effect of COVID-19 on international trade among the Visegrad countries. *Journal of Risk and Financial Management*, *15*(2), 41. https://doi.org/10.3390/jrfm15020041

Vilarrubia Tapia, J.M. (2006). Neighborhood effects in economic growth. *Documentos de Trabajo/Banco de España, 0627*. https://doi.org/ 10.2139/ssrn.938084

Weisberg, S. (2005). *Applied linear regression* (Vol. 528). John Wiley & Sons. https://doi.org/10.1002/0471704091

Author

Jakub Garncarz

Research and teaching assistant at Krakow University of Economics, Department of International Trade at College of Economics and Finance. His research interests include international entrepreneurship and Artificial Intelligence.

Correspondence to: Mgr Jakub Garncarz, Department of International Trade, Krakow University of Economics, ul. Rakowicka 27, 31-510 Kraków, Poland, e-mail: garncarj@uek.krakow.pl

ORCID https://orcid.org/0000-0003-0166-9403

Acknowledgements and Financial Disclosure

The article presents the results of the Project no 079/EEZ/2024/POT financed from the subsidy granted to the Krakow University of Economics. The authors would like to thank the anonymous referees for their useful comments, which allowed to increase the value of this article.

Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright and License

Published by Krakow University of Economics – Krakow, Poland