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THE EFFECTS OF EXPORTS ON ECONOMIC GROWTH: A COMPARATIVE ANALYSIS OF SERBIA AND NORTH MACEDONIA

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Abstract: The aim of this paper is to empirically examine the impact of exports on the economic growth of Serbia and North Macedonia. Both countries represent small, open economies of the Western Balkans that rely heavily on trade with the European Union and undergo similar transition processes, but differ, among other things, in market size, export structure, and industrial capacity. The comparative analysis provides insights into the specific challenges and potentials of both countries and may serve policymakers in the Western Balkans in shaping strategies for sustainable economic growth. The research is based on annual time series covering GDP per capita growth rate, the share of exports in GDP, the share of imports in GDP, and the share of foreign direct investment (FDI) inflows in GDP for the period 1995–2024. The analysis was conducted using the Autoregressive Distributed Lag (ARDL) model, which is particularly suitable for examining macroeconomic time series of different orders of integration. The results of the ARDL bounds test indicate the existence of cointegration among the observed variables in both countries. In the long run, exports have a positive and statistically significant effect on GDP per capita growth in Serbia and North Macedonia. However, in the short run, exports in Serbia show a lagged negative effect on economic growth, while in North Macedonia their short-run effect is not statistically significant. Imports and FDI serve as control variables in the model. In Serbia, imports stimulate growth in the short run but pose a risk of negative long-term effects, indicating dependence on the external sector and an unfavorable import structure. In North Macedonia, imports have no statistically significant effects. FDI in both countries represent a consistent and significant growth factor, as they exert both short-run and long-run positive effects on GDP per capita growth, confirming the importance of capital inflows and technology transfer for sustainable economic growth.

Keywords: *export, economic growth, ARDL, Serbia, North Macedonia.*
Field: Social sciences (economy)

1. INTRODUCTION

International trade represents one of the key drivers of economic development, with the export of goods and services playing a significant role in shaping the economic performance of countries (Chu et al., 2023). The role of exports as a catalyst for economic growth has long been one of the central topics in contemporary economic theory and policy. Within the framework of an open-economy model, exports enable countries to exploit comparative advantages, expand production, stimulate employment, and increase national income. Many developing and transition economies view exports as a crucial lever for achieving sustainable growth and integrating into global economic flows (Fraser et al., 2020; Cherif & Hasanov, 2024). In this regard, Huang et al. (2023) emphasize that countries heavily reliant on international trade have made substantial progress in accelerating economic growth over the past decades. This development approach has been particularly evident in Asia, where, since the 1960s, several economies have built their growth strategies around export-oriented activities. Thanks to such a model, countries such as Malaysia, Taiwan, South Korea, Hong Kong, and Thailand – most notably China and India – have achieved remarkable results in the process of modernization and global economic affirmation (Ego, 2024).

In the context of transition economies, such as Serbia and North Macedonia, exports can potentially contribute to economic growth through several mechanisms. First, exports provide access to wider markets, which may increase the scale of production and efficiency (Stephen & Obah Daddy, 2017). Second, exports may enhance foreign exchange reserves, thereby strengthening macroeconomic stability. Third, exports can stimulate innovation and technological progress, as competition in international markets often requires improvements in products and processes. Fourth, exports may increase employment in export-oriented sectors, thereby reducing unemployment and raising household income. Finally, exports can help reduce trade deficits, improving the balance of payments and the overall financial position of the country.

Exports undoubtedly generate numerous benefits for the economy. However, it is important to recognize that in the global context, constant changes occur that can negatively affect the volume and structure of exports, and consequently, the dynamics of economic growth. One of the recent shocks was the outbreak of the COVID-19 pandemic, which prompted governments to adopt measures such as social

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distancing and border closures. These restrictions resulted in higher unemployment, a decline in exports, and a slowdown in economic growth (Liu & Chu, 2024).

The subject of this study is the impact of exports on economic growth through a comparative analysis of Serbia and North Macedonia over the period 1995–2024. Both countries represent small, open economies of the Western Balkans, highly dependent on trade with the European Union and undergoing similar transition processes. However, they differ, among other factors, in market size, export structure, and industrial base capacity.

Given that exports represent one of the key determinants of economic growth and integration into the global economy, the aim of this paper is to empirically examine the long-run and short-run effects of exports on GDP per capita growth in Serbia and North Macedonia. The comparative analysis provides insights into the specific challenges and potentials of both countries and may serve as a useful reference for policymakers in the Western Balkans in designing strategies for sustainable economic growth.

This paper is structured into four sections. Following the introduction, Section 2 describes the data and methodological framework, while Section 3 presents and interprets the results. Finally, Section 4 outlines the key findings, policy implications, and directions for future research.

2. DATA AND METHODS

The empirical analysis in this paper is based on a set of macroeconomic variables selected in line with the relevant literature on the relationship between exports and economic growth. The dependent variable is the annual GDP per capita growth rate, as it is most commonly used as the primary indicator of overall economic performance and growth dynamics. Exports, measured as a percentage of GDP, represent the independent variable. This variable captures the net contribution of exports to overall economic activity and reflects their structural importance, namely the extent to which exports are integrated into economic growth and the degree to which the national economy depends on foreign trade (Balassa, 1978; Feder, 1983).

Imports, expressed as a percentage of GDP, are included in the analysis as a control variable. Since higher levels of exports are often accompanied by higher levels of imports, particularly in countries that import intermediate goods, technology, or capital goods for export-oriented production (Ali, 2024; Awokuse, 2008), controlling for the effect of imports allows for a more accurate isolation of the true contribution of exports to economic growth. Foreign direct investment (FDI), also measured as a percentage of GDP, is likewise employed as a control variable. Given that FDI may generate multiple effects on the economy, such as technology transfer, productivity growth, and access to new markets, its inclusion in the model enables consideration of this additional dimension of influence on GDP (Ali, 2024; Borensztein et al., 1998). At the same time, FDI often affects exports, as foreign companies may use the domestic economy as a base for accessing international markets..

This study employs annual time series data for the period 1995–2024 for all relevant variables. To ensure comparability, data were obtained from the World Bank's World Development Indicators (WDI) database. The analysis was conducted using the econometric software EViews, version 10. For clarity, Table 1 provides abbreviations and a brief description of the observed variables.

Table 1 Summary of Variables Included in the Analysis

Abbreviation	Explanation
Y	GDP per capita growth (annual %)
EXP	Exports of goods and services (% of GDP)
IMP	Imports of goods and services (% of GDP)
FDI	Foreign direct investment, net inflows (% of GDP)

Source: Calculations by the author, 2025

In the analysis of the impact of exports on economic growth, the ARDL model is employed (Pesaran & Shin, 1998; Pesaran et al., 2001). The first step in the analysis is to examine the stationarity of the time series. The ARDL model allows the time series to be of different orders of integration, provided that none is integrated of order two (I(2)). After that, the ARDL model is specified in order to test for cointegration among the observed variables. Accordingly, to conduct the bounds test, i.e., to examine cointegration among the variables, the following equation is applied:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{q_1} \beta_1 \Delta Y_{t-i} + \sum_{i=0}^{q_2} \beta_2 \Delta EXP_{t-i} + \sum_{i=0}^{q_3} \beta_3 \Delta IMP_{t-i} + \sum_{i=0}^{q_4} \beta_4 \Delta FDI_{t-i} + \gamma_1 Y_{t-1} + \gamma_2 EXP_{t-1} + \gamma_3 IMP_{t-1} + \gamma_4 FDI_{t-1} + \varepsilon_t \quad (1)$$

where α0 and εt are the intercept and random error terms, respectively, while Δ is the first difference operator. Short-term relationships are measured by the parameters β1, β2, β3 and β4, while long-term relationships are represented by the parameters γ1, γ2, γ3 and γ4. The parameters q1, q2, q3, and q4 indicate the optimal lag length for the corresponding variables in the model.

Based on equation (1), the existence of cointegration among the variables is tested using the F-test. The test is based on the null hypothesis H0: γ1 = γ2 = γ3 = γ4 = 0, which implies that there is no cointegrating relationship among the variables. In contrast, the alternative hypothesis H1: γ1 ≠ γ2 ≠ γ3 ≠ γ4 ≠ 0 indicates the existence of cointegration. The obtained F-statistic is compared with the critical values established by Pesaran et al. (2001).

If a cointegrating relationship exists in the model, the next step is the estimation of the long-run coefficients. Given the previously defined ARDL model, the long-run coefficients can be estimated using the following equation:

$$Y_t = \alpha_0 + \gamma_1 Y_{t-1} + \gamma_2 EXP_{t-1} + \gamma_3 IMP_{t-1} + \gamma_4 FDI_{t-1} + \varepsilon_t \quad (2)$$

Then, in order to identify the short-run relationships between the variables, an error correction model (ECM) based on the ARDL model is constructed. In accordance with the ARDL model defined in equation (1), the ECM can be expressed as follows:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{q_1} \beta_1 \Delta Y_{t-i} + \sum_{i=0}^{q_2} \beta_2 \Delta EXP_{t-i} + \sum_{i=0}^{q_3} \beta_3 \Delta IMP_{t-i} + \sum_{i=0}^{q_4} \beta_4 \Delta FDI_{t-i} + \theta ECM_{t-1} + \varepsilon_t \quad (3)$$

where ECMt-1 error correction term, is the error correction term, i.e., the component of the model that captures the short-run dynamics of the system and determines the speed of adjustment toward equilibrium.

After estimating the coefficients in the aforementioned equations, diagnostic tests are conducted to identify potential issues, such as serial correlation, heteroskedasticity, model specification error, deviations of the residuals from normality, and instability of the model parameters.

3. RESULTS AND DISCUSSIONS

The stationarity analysis of the time series revealed that the observed series have a mixed order of integration. The results of the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979) are presented in Table 2. For Serbia, the series EXP, IMP, and FDI are stationary at level (I(0)), while the series Y becomes stationary only after first differencing (I(1)). Similarly, for North Macedonia, the series EXP, IMP, and FDI are stationary at level (I(0)), whereas Y is stationary at first difference (I(1)). None of the series are integrated of order two (I(2)). Based on these results, the application of the ARDL model is justified, as it allows for the analysis of time series with a mixed order of integration.

Table 2 Results of ADF unit root test

Level form				
Series	Y	EXP	IMP	FDI
Serbia	-2.664417	-4.783513*	-4.543241*	-5.117034*
North Macedonia	-2.246892	-6.788676*	-3.359167***	-3.700281**
First-differenced form				
Series	ΔY	ΔEXP	ΔIMP	ΔFDI
Serbia	-6.597922*	-	-	-
North Macedonia	-4.973407*	-	-	-

Source: Calculations by the author, 2025

Note: * , ** , and *** denote significance levels of 1%, 5%, and 10%, respectively. The symbol "–" indicates that the test was not performed because the series is stationary in level.

After specifying the ARDL model, the F-test was applied to equation (1) in order to determine whether cointegration exists among the observed variables. The results of the ARDL Bounds test, presented in Table 3, indicate the existence of a long-run relationship between the observed variables in both countries. For Serbia, the ARDL model (2,2,2,1) yields an F-statistic of 8.9800, which exceeds the upper critical bounds (I(1) bound) at all significance levels (10%, 5%, and 1%), thereby confirming the presence of cointegration. Similarly, for North Macedonia, the ARDL model (1,2,0,0) produces an F-statistic of 8.8383, which also surpasses the corresponding upper critical bounds, thus confirming the existence of a stable long-run relationship between the variables in this case as well.

Table 3 ARDL Bounds Test Results

Country	ARDL model (optimal lag)	F-Statistic	Critical Value Bounds						Cointegration
			I(0) Bound			I(1) Bound			
			10%	5%	1%	10%	5%	1%	
Serbia	(2,2,2,1)	8.9800	2.72	3.23	4.29	3.77	4.35	5.61	Yes
North Macedonia	(1,2,0,0)	8.8383	2.72	3.23	4.29	3.77	4.35	5.61	Yes

Source: Calculations by the author, 2025

Note: The optimal lag structure of the ARDL model was selected based on the Akaike Information Criterion (AIC).

Given that a cointegrating relationship exists between the variables in the model, the next step involves estimating the long-run coefficients using equation (2). The results of the long-run coefficient estimates from the ARDL model are presented in Table 4. In the case of Serbia, exports have a positive and statistically significant effect on economic growth, while imports exert a negative effect, significant at the 10% level, implying that a higher level of imports may slow down economic performance. Foreign direct investment shows a positive and highly significant effect, confirming its important role in long-run growth. For North Macedonia, exports also have a positive and significant impact, while imports are not statistically significant. Foreign direct investment exhibits a strong positive and highly significant effect, highlighting its crucial role in ensuring sustainable growth. These findings suggest that exports and FDI are key drivers of long-run economic growth in both countries, while the effect of imports is heterogeneous and less stable across the observed economies.

Table 4 Estimated Long-run Coefficients in ARDL Model (Dependent variable: Y)

Country	Regressor	Coefficient	Probability
Serbia	EXP	0.4408	0.0188**
	IMP	-0.8762	0.0923***
	FDI	0.0380	0.0041*
North Macedonia	EXP	0.6860	0.0156**
	IMP	0.2477	0.8843
	FDI	0.2020	0.0000*

Source: Calculations by the author, 2025

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

The results presented in Table 5 represent the coefficient estimates from the ECM model given in equation (3). In the short run, exports in Serbia exhibit a lagged negative effect on economic growth, while in North Macedonia their impact is not statistically significant. Regarding the other variables, imports and foreign direct investment have a positive and statistically significant effect on economic growth in Serbia, whereas in the case of North Macedonia only foreign direct investment shows a strong and highly significant positive effect. The ECM(-1) variable in both models has the expected negative sign and high statistical significance, confirming the existence of a stable adjustment mechanism. In Serbia, about 36% of deviations from the long-run equilibrium are corrected within one year, while in North Macedonia the adjustment dynamics are faster, amounting to approximately 47% per year.

Table 5 ARDL Short-run Results with Error Correction Model (Dependent variable: ΔY)

Country	Regressor	Coefficient	Probability
Serbia	ΔY(-1)	0.0095	0.9604
	ΔEXP	0.1309	0.7618
	ΔEXP(-1)	-0.0438	0.0612***
	ΔIMP	0.3120	0.0436**
	ΔIMP(-1)	1.1731	0.0902***
	ΔFDI	0.1264	0.0380**
	ECM(-1)	-0.3651	0.0000*
North Macedonia	ΔEXP	0.5320	0.3888
	ΔEXP(-1)	0.7665	0.1947
	ΔIMP	0.7108	0.2471
	ΔFDI	0.1950	0.0000*
	ECM(-1)	-0.4715	0.0000*

Source: Calculations by the author, 2025

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

As the final step in the analysis, diagnostic tests were conducted to verify the model assumptions, and the results are presented in Table 6. The diagnostic tests indicate that the estimated ARDL models for both Serbia and North Macedonia satisfy key assumptions. The Breusch-Godfrey LM test shows no evidence of serial correlation ($p > 0.05$), while the Jarque-Bera test confirms that residuals are normally distributed ($p > 0.05$). The Breusch-Pagan-Godfrey test does not reveal significant heteroskedasticity ($p > 0.05$) in Serbia, and although the p-value is lower for North Macedonia, it remains above conventional significance levels. The Ramsey RESET test suggests that the functional form of the models is correctly specified ($p > 0.05$). Finally, both CUSUM and CUSUM of Squares tests indicate that the models are stable over time.

Table 6 Diagnostic Tests Results

Test	Serbia		North Macedonia	
Breusch-Godfrey LM Test (Serial correlation)	0.425	(0.6611)	1.496	(0.2479)
Jarque-Bera (Normality)	2.029	(0.3624)	0.860	(0.6503)
Breusch-Pagan-Godfrey (Heteroscedasticity)	0.560	(0.8235)	2.806	(0.1350)
Ramsey RESET Test (Functional form)	1.541	(0.2322)	0.065	(0.8002)
CUSUM Test	Stable		Stable	
CUSUM of Squares Test	Stable		Stable	

Source: Calculations by the author, 2025

Notes: Values in parentheses are p-values. CUSUM and CUSUM of Squares tests indicate model stability.

4. CONCLUSIONS

This study aimed to examine the long-run and short-run effects of exports on economic growth in Serbia and North Macedonia. The model includes the annual per capita GDP growth rate as the dependent variable. Exports, expressed as a percentage of GDP, serve as the independent variable, while imports, also as a percentage of GDP, and foreign direct investment (FDI) as a percentage of GDP are included as control variables. The analysis of annual time series was conducted for the period 1995–2024 using the ARDL model.

The results of the ARDL bounds test confirmed the existence of cointegration among the observed variables in both Serbia and North Macedonia. In the long run, exports have a positive and statistically significant effect on per capita GDP growth in both countries. However, in the short run, exports in Serbia exhibit a lagged negative effect on economic growth, whereas their short-term impact in North Macedonia is not statistically significant. The long-run effect of imports on economic growth is negative in Serbia, while it is not statistically significant in North Macedonia. In contrast, imports have a positive short-run effect on economic growth in Serbia, whereas in North Macedonia this effect is not statistically significant. Foreign direct investment shows a strong and consistently positive impact on economic growth in both the long and short run, confirming its key role in the development of both economies. The results also indicate the existence of a stable adjustment mechanism toward long-run equilibrium, with deviations being corrected more slowly in Serbia than in North Macedonia.

The findings highlight the importance of export-oriented policies and attracting foreign direct investment as key factors for promoting economic growth. Policymakers should develop measures that facilitate access to international markets, enhance the competitiveness of domestic products, and attract investments that contribute to technological advancement and employment.

Although the results provide valuable insights into the role of exports and foreign direct investment in the economic growth of Serbia and North Macedonia, the study has certain limitations, such as its focus on aggregate-level data and the omission of sectoral differences within exports. These limitations can serve as a basis for future research. In this context, it would be useful to examine the impact of the sectoral composition of exports on economic growth, the interaction between foreign direct investment and innovation, as well as the assessment of the effects of global shocks, such as geopolitical conflicts, on the sustainability of economic growth in transition economies.

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