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ANALYZING THE RELATIONSHIP BETWEEN TRADE OPENNESS AND ECONOMIC GROWTH IN NORTH MACEDONIA: A SVAR APPROACH

АНАЛИЗА ОДНОСА ОТВОРЕНОСТИ ТРГОВИНЕ И ЕКОНОМСКОГ РАСТА У СЈЕВЕРНОЈ МАКЕДОНИЈИ: *SVAR* МЕТОДОЛОГИЈА

Summary: *The relationship between trade openness and economic growth is complex. We employ a structural vector auto-regression (SVAR) model using quarterly data for the period from 2005 to 2022 to estimate the impact of trade openness on the economic growth in North Macedonia. The study's findings indicate a negative and significant relationship between trade openness and economic development in the short and long run. The complexity of this relationship highlights an adverse impact on countries specialising in low-quality production or those with low levels of human capital accumulation, such as North Macedonia. The dynamic effects of shocks to trade openness on interest rates, consumer price index, interest rates, labour force, and exchange rate are investigated using impulse response functions. The paper suggests that North Macedonia's trade strategy requires reorientation towards trade diversification, attracting export-oriented FDIs, and fostering regional trade integration to achieve sustainable economic growth and development.*

Keywords: *Trade Openness, Economic Growth, SVAR, forecast error variance decomposition, impulse response function.*

JEL classification: *C22, C53, F41, F43*

Резиме: *Корелација између отворености трговине и економског раста је замршена. Користећи модел структурне векторске ауторегресије (СВАР) са кварталним подацима који обухватају период од 2000. до 2023. године, анализирамо утицај отворености трговине на економски раст у Северној Македонији. Наша студија открива значајну и негативну везу између отворености трговине и економског раста, како краткорочно тако и дугорочно. Ова сложеност наглашава штетан утицај на нације специјализоване за производњу ниског квалитета или које поседују ограничену акумулацију људског капитала, као што је Северна Македонија. Истражујемо динамичке последице шокова на отвореност трговине на различите економске показатеље – укључујући каматне стопе, индекс потрошачких цена, радну снагу и девизне курсеве – користећи функције импулсног одговора. Налази овог истраживања залажу се за преоријентацију трговинске стратегије Северне Македоније ка диверсификацији, привлачењу извозно оријентисаних страних директних инвестиција (СДИ) и промовисању регионалне трговинске интеграције ради подстицања одрживог економског раста и развоја.*

Кључне речи: *отвореност трговине, економски раст, SVAR, декомпозиција варијансе грешке прогнозе, функција импулсног одзива.*

ЈЕЛ класификација: *C22, C53, F41, F43*

INTRODUCTION

This paper tries to empirically examine the relationship between trade openness and economic growth in North Macedonia. Empirical evidence suggests that this relationship is ambiguous. Different studies confirm that trade openness can have either a positive, a negative, or a neutral impact on economic growth, depending on the specific country's circumstances. Furthermore, there is a divergence in the scientific techniques employed to investigate this relationship. The approaches adopted involve the development of different statistical models, such as ordinary linear regression models with panel data, vector autoregressive models and vector error correction models. To investigate the impact of trade openness on the Macedonian economy, this research employs structural

vector auto-regression (SVAR) or the co-integrated SVAR method for the period from 2005 to 2022 using quarterly data.

Since North Macedonia is a small and landlocked country, it is considered in the economic theory that trade will play a crucial role in driving economic growth and providing structural transformation. The country is integrated into regional and European value chains, mainly due to the favorable policy of attraction of foreign direct investments (FDIs) over the past two decades. Trade integration has contributed to North Macedonia's rise to the status of a middle-income country (World Bank 2023). However, there is a lack of trade diversification meaning there is a high concentration of export products and a lack of economic transformation. Also, one-fifth of the population lives in poverty (World Bank 2022).

The paper tries to test the hypothesis that suggests that economic growth in smaller economies is encouraged by trade openness due to the expansion of spillover effects and structural transformation of the country (Romer 1990; Feenstra 1996). In addition, seeks to assess the impact of openness to the Macedonian economy, on the variability of GDP, employment, inflation, interest rate and Macedonian denar exchange rate. Moreover, the paper aims to analyze the dynamic movements of interactions among endogenous variables by using an orthogonalized impulse response function.

The subsequent sections of the paper are organized as follows: Section 1 provides an overview of the specifics of the Macedonian economy. Sector 2 provides a concise review of relevant literature and discusses trade openness policies. Section 3 outlines the data and methodology employed, followed by a presentation of the empirical findings in Section 4. The final section offers conclusions drawn from the study.

1. OVERVIEW OF THE MACROECONOMIC POLICY IN NORTH MACEDONIA

North Macedonia is a small, landlocked economy that is import-dependent for many goods and services. Independence gained in 1992 was followed by external shocks such as the UN Security Council sanctions imposed against the rump Yugoslavia in 1992, the unilateral Greek trade embargo against Macedonia in 1994, the collapse of the CMEA trade area, and the loss of traditional East European markets. All these shocks created severe problems in internal trade and significantly decreased trade flows (Petkovski and Slaveski 1997). Export recovery was evident in 1995, and high imports caused a negative trend in the trade balance. Unfortunately, the country has been a net importer throughout its independence until 2022 (Figure 1).

Figure 1. Trade flows of goods and services, and trade balance, 1992-2022, current millions of American dollars
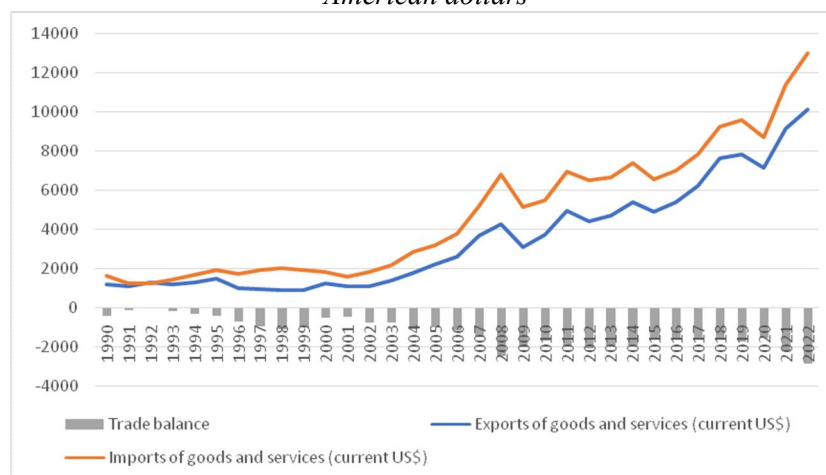

Source: World Bank Development Indicators 2023

The macroeconomic policy mix in North Macedonia has been geared towards export-led growth. The experience of the Central and Eastern European and Baltic countries group has confirmed that the best route to prosperity for small countries, especially the Western Balkans, is to integrate with the global economy by promoting trade liberalization and removing tariff and non-tariff barriers. In support of this policy, a de facto fixed exchange rate regime has existed since 1994. Economic stability

was the primary concern of the monetary and fiscal policymakers. The monetary policy was designed to sustain the stability of the denar to the Deutsche mark (to the Euro after 2002), by imposing strict control of the money supply and the fiscal authority targeted a balanced budget with tight control over the growth of wages. This macroeconomic policy provided certainty for exporters and importers and low inflation, but the economic growth and employment suffered consequently.

Trade liberalization was promoted further with the membership of Macedonia in the World Trade Organization in 2003. After signing the Stabilization and Association Agreement with the EU in 2001, Macedonian goods had free access to the EUInternal Market (asymmetrical approach). The country is participating in the free trade area CEFTA-2006 with other countries from the Western Balkans. Around 90% of Macedonian exports and about half of its imports are oriented towards EU and CEFTA markets (National Bank of Republic of North Macedonia 2023a). Trade relations with the EU also include technical help and cross-border investments, which are essential for the country's economic growth. The free trade regime of the Macedonian economy means that the country has low levels of tariff and non-tariff barriers or has none. The real obstacle in the trade is the non-trade barriers such as different administrative procedures, standards, public procurement, and others that have a structural or, in some cases, political nature.

Figure 2. Real gross domestic product, expenditure method, year, in million denars (2005 as referent year)
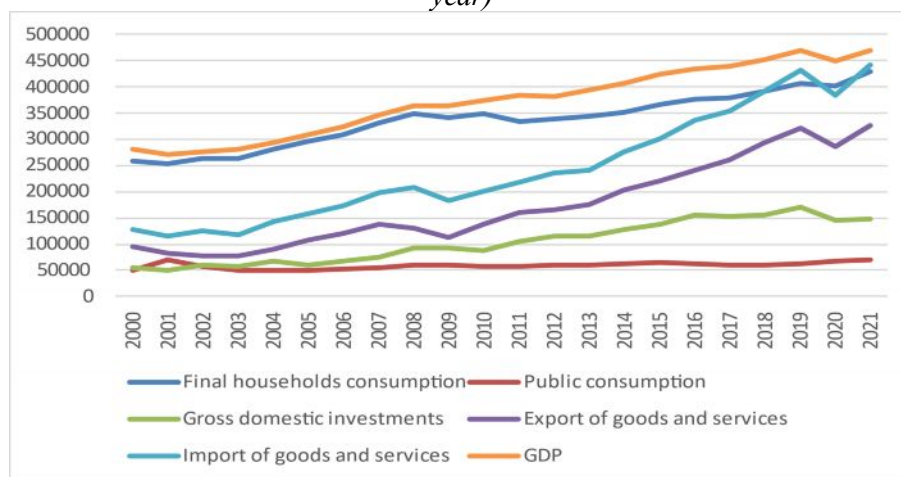

Source: State Statistical Office of the Republic of North Macedonia 2023

The data show that the trade openness of North Macedonia reached 160% of GDP in 2022 (Figure 3).[1] Figure 3 shows that the country has been continuously increasing its trade and financial openness in the past two decades, which have contributed to economic convergence from 20% to 40% of GDP (National Bank of the Republic of North Macedonia 2023b). After the signing of the Stabilization and Association Agreement with the EU, the country also started to gradually liberalise the capital account and faced significant systemic changes (Besimi 2004). In the period before the world financial crisis, from 2001 to 2008, there were large capital inflows and increased domestic spending by firms and households. This resulted in high rates of economic growth (Gligorov 2017). Evidently, in this period, economic growth was primarily driven by investments and exports (Figure 2). The spillover effects of the financial crisis resulted in a negative economic growth rate in 2009.

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[1] The degree of trade openness can be calculated as the sum of the export and import of goods and services divided by the GDP. In our calculations we use the value of nominal GDP.

Figure 3. GDP growth and trade openness of Republic of North Macedonia
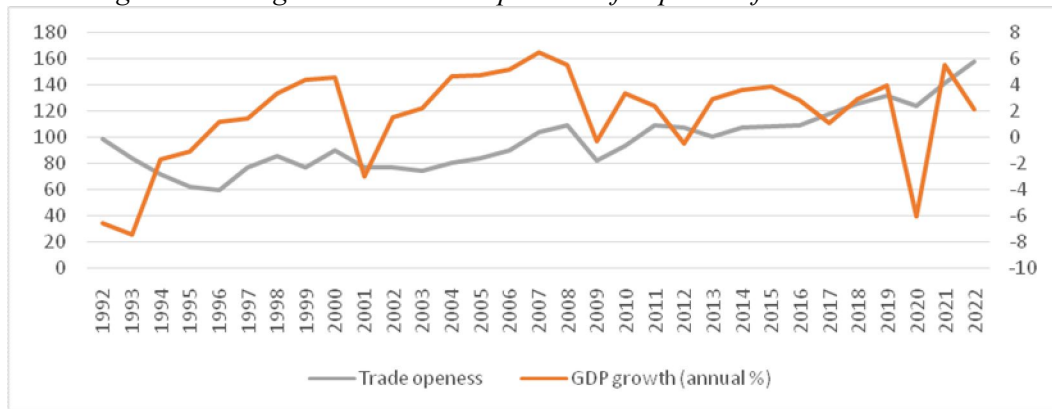
Source: Authors' calculations. Data for GDP in current US dollars and GDP annual growth rate are extracted from the World Bank Development Indicators database. Data for export and import flow are extracted from Eurostat.

In the aftermath of the crisis in 2012, it is especially evident that new companies were activated in the Technological–Industrial Development Zones (TIRZ). These zones provide tax and customs incentives to attract FDIs in tradable sectors, a significant component of the country's export strategy. The export increase as a percentage of GDP will more than double in 2021 compared to 2000. There is also evident a structural shift in Macedonian exports, with a significant increase in the share of higher-value products such as machinery and transport equipment, as well as chemical products, primarily due to companies in the automotive sector. The current share in 2022 of higher-value exports is 57.2%, compared to 10.7% in 2004, a rise of 46.5 percentage points (National Bank of Republic of North Macedonia 2023a). However, there is a lack of export diversification. The top 5 per cent of exporters (2008-2020) collectively contribute to more than 80 per cent of total exports, and this share has remained unchanged over time, creating concentration in the export sector (World Bank 2023).

In the period after the COVID-19 crisis, the economic growth in Macedonia was mainly driven by consumption, and, to a lesser extent, investment, while net exports did not contribute to the growth level of the recovery. This indicates that the current trade strategy shows signs of fatigue (The World Bank 2022). Trade openness created higher exposure to external shocks arising from the COVID pandemic, the disruption in the global value chains and the war in Ukraine. Recent intensified geopolitical tensions are imposing severe risks to the further course of global economic integration, with possible consequences in several areas, including trade, finance, global value chains, and the overall economic convergence process. In the case of fragmentation of the global economy, costs could be high, especially for small open economies in development, reflecting higher import prices, smaller and segmented markets, reduced access to technology and the workforce, and overall, reduced productivity and standard of living.

2. LITERATURE REVIEW

The link between trade openness and economic growth has been extensively researched in economics and in international trade. For example, the exogenous growth theory highlights the neutral impact of trade on economic growth in the long term (Rivera-Batiz and Romer 1991). However, the modern growth theory offers the theoretical basis for understanding the favourable link between trade openness and economic growth. Endogenous growth theory posits that trade openness facilitates technology spillovers, which leads to enhanced international competitiveness, increased productivity, and increased export revenues (Romer 1990). Lucas (1988) emphasized the importance of trade openness to enhance human capital by exposing workers and firms to new ideas and technology and thus to promote economic growth. Grossman and Helpman (1993) revealed that trade between developing and developed countries may enhance long-run economic growth in developing countries.

The impact of trade openness on economic prosperity is also examined through the lenses of the trade theories. The New Trade Theory developed by Krugman (1979; 1980) emphasizes the positive impact of trade openness on economic growth by using economics of scale and market imperfections. Participating in international trade enables firms to reduce costs through economies of

scale and enhanced efficiency. It also fosters competition and supports innovation by expanding the choice of accessible brands. Melitz (2003) extended Krugman's model by incorporating firm heterogeneity, demonstrating that trade openness leads to a reallocation of resources towards more productive firms, which boosts aggregate productivity and thus economic growth.

Conversely, some theoretical theories propose that trade openness may harm economic growth This effect can be heightened, particularly in low-income nations (Kim et al. 2012). The reverse scenario is also valid. Spilimbergo (2000) argues that trade between an advanced country and a less developed country can harm the long-term growth rates of the developed country. In addition, the relationship between openness and growth can be bidirectional. In this scenario, economic growth increases openness to trade by developing skills, enhancing efficiency and generating comparative advantages (Lancaster 1980).

The lack of theoretical consensus about the impact of trade openness on economic growth leads to varying empirical outcomes. The literature is full of mixed findings concerning the direction and strength of the relationship between openness and growth. Some of the research supports the notion that there is a direct correlation between trade openness and economic prosperity (Barro 1991; Belloumi 2014; Biwott et al. 2013; Brana 2016; Dollar 1992; Edwards 1992, 1993, 1998; Frankel and Romer, 1999; Freund and Bolaky, 2008; Manni and Afzal 2012; Mercan et al. 2013; Polat et al. 2013; Sala-I-Martin 1997). Several studies investigate the indirect impact of trade openness on economic growth. Cavallo (2009) found that trade openness stabilizes output volatility, while Iamsiraroj (2016) argued it promotes growth by increasing foreign direct investments, despite output volatility being negatively linked to economic growth.

From the long – run perspective, there are numerous country specific studies confirming the positive relationship between trade openness and economic growth (Shahbaz 2012; Khalid and Hayder 2017). Abdulkadhim (2020) found trade openness and electricity consumption as key factors in UAE economic growth. Suryandaru (2023) found trade openness contributes to long-term growth, while external debt negatively impacts growth. Rao and Rao (2009) found co-integration between trade openness and output in Fiji, suggesting a 10% increase in trade openness could increase growth by 2%.

Empirical evidence also exists on the favourable short-term effect of trade openness on economic growth. Khalid (2016) found that trade openness positively impacts economic growth in Turkey from 1960 to 2014, but its long-term impact is insignificant. Alsamara et al. (2019) confirmed these findings, finding that trade openness and financial development positively affect per capita real GDP growth, while energy imports have a negative influence.

The positive relationship between trade openness and growth is confirmed not only in country specific studies, but also in panel models. Gries and Redlin (2012) found a long-term positive relationship between trade openness and economic growth in 158 countries from 1970 to 2009. However, short-term adjustments may be challenging for openness. Different trade patterns in low- and high-income nations have distinct consequences on economic growth. Kim et al. (2016) found a positive long-term relationship between international trade and growth rate and growth volatility, but a negative short-term correlation. Aumal and Özyurt (2010) found that trade openness benefits states with higher per capita income, human capital, and industrialized states, leading to increased regional inequalities. Zahonogo (2017) found a non-linear link between trade openness and economic growth in sub-Saharan African countries.

Trade openness can be a significant factor in the growth of transition economies. Nannicini and Billmeier (2011) found that trade liberalization positively impacted economic growth in transition economies in the 1990s, with open economies expanding their per capita GDP by 44-100% after ten years compared to closed economies. Fetahi-Vehapi et al. (2015) examined the impact of trade openness on South Eastern European countries' economic growth from 1996 to 2012, revealing that initial income per capita and other factors influence the impact of trade openness on economic growth, but insufficient evidence exists to establish a strong relationship between these variables. Silajdzic and Mehic (2018) found that trade openness positively impacts real GDP per capita, with a 10% increase in trade share expected to increase GDP per capita growth rate by 8%.

However, recent research has demonstrated that the relationship between trade openness and economic development is not straightforward. A number of studies have verified that trade openness might possibly exert an adverse or neutral impact on economic growth (Belloumi and Alshehry 2020; Fenira 2015; Hye and Lau 2015; Rigobon and Rodrik 2005). The negative impact of trade openness on economic growth can be explained by the presence of low-quality products in trade (Hausmann et al.

2007) or the undeveloped financial institutions (Kim et al., 2011). Simorangkir (2008) found that trade openness negatively impacts Indonesia's output due to lack of preparation and lower competitiveness of Indonesian products. Financial openness makes the economy vulnerable to capital reversal. However, subsequent research (Nursini 2017) found that trade openness positively impacts economic growth and recommends policies to increase competitiveness. Trade openness has been found to have significant short-term adverse effects on economic growth and inflation in Japan and Korea, but no longer-term effects (Jin 2006). Ulasan (2008) found that trade openness variables, including current openness, real openness, and collected import duties, are not significantly related to economic growth. Vlastou (2010) found that trade openness negatively impacts economic growth, while economic growth does not impact trade openness. Sharma et al. (2018) found that foreign aid, government consumption expenditure, and foreign direct investment have a favorable long-term impact on economic growth, while exchange rate and human capital development have a negative effect.

There is insufficient of previous research examining the impact trade openness on the economic performance of the Republic of North Macedonia. Markoski (2015) found a modest association between openness and GDP growth pace from 2003 to 2013, using linear regression analysis. Mano-Bakalinov (2016) used annual data from 1993 to 2014 to evaluate trade openness's impact on economic growth. The study found that population growth and trade openness positively impacted economic growth. However, the authors have reported comparatively low value of the adjusted R^2 coefficient, suggesting a need for model improvement.

3. DATA AND MODEL

The data being used in this research is quarterly data for the period starting from 2005(Q1) until 2022 (Q4). The data is limited in its scope due to its unavailability. The variables being used include the Gross Domestic Product (GDP), the degree of trade openness (OPEN), the interest rate (IR), the consumer price index (CPI), the exchange rate of Macedonian denar to EURO (EXC), and the number of the labour force (LAB). Trade openness presents trade share calculated from total exports and imports divided by GDP. Definitions of the variables and their sources are given in Table 1. In the model, all variables are expressed in a natural logarithm.

Table 1. Definition of variables

Variables	Definition	Source
GDP	Gross Domestic Product, in current prices, in million Euros	Eurostat
EXP	Export of goods and services from North Macedonia, in million Euros	Eurostat
IMP	Import of goods and services to North Macedonia, in million Euros	Eurostat
OPEN	Trade share calculated as total trade volume (export and import) divided by GDP.	Authors' calculations.
IR	Central Bank policy rates, end of period per cent per year (Units)	Bank for International Settlements
EXC	National Currency Per US Dollar, End of Period, Rate	International Monetary Fund
LAB	Labor force, total	International Labour Organization and United Nations Population Division.
CPI	Consumer Price Index	International monetary fund

The varying empirical outcomes on the relationship between trade and economic growth can be attributed to differences in research methods and country-specific factors (Suryandaru 2023). Furthermore, certain methodological constraints exist when defining trade openness. Specifically, using the trade share, which is calculated by dividing the total value of exports and imports by the gross domestic product (GDP), as a variable for trade openness in regression models might lead to issues of endogeneity (Frankel and Romer 1999). Alternative indicators of trade openness have recently been introduced, as evidenced by the works of Frankel (2001), Sachs and Warner (1995), Squalli and Wilson (2011), and Tang (2011). However, the trade share remains the most used indicator of commercial openness (Tang 2011) and we have use it as such in our paper.

We employ the structural vector autoregression (SVAR) or the co-integrated SVAR method proposed by (Pesaran and Smith 1998) to assess the impact of openness on the Macedonian economy.

In selecting the variables and determining the order of the variables in the model, we adopted the methodology suggested by Simorangkir (2008), Shahbaz (2012) and Khalid (2016), as they address similar issues.

A co-integrating VAR model integrates a cointegration matrix into a VAR model, resulting in a general vector error correction model (VECM), as explained by (Pesaran & Pesaran, 1997). This VECM can be represented as follows:

$$Increment\,\Delta x_i = a_{ox} + a_{ix}t - \Pi_x\,q_{t-1} + \sum_{i=1}^{p-1}\Gamma_{ix}\Delta q_{i-1} + \Psi w_t + t_t \quad t = 1,2,\ldots n \tag{1}$$

Where $q_t = (x_t', z_t')'$, x_t is a vector of jointly determined (endogenous) I(1) variables, z_t is a vector of exogenous I(1) variables, w_t is a vector of exogenous/deterministic I(0) variables (excluding the intercepts and/or trends), u_t is a white noise vector of error terms, Γ_{ix} is a short run matrix of parameters, and Π_x is the long run multiplier matrix. The latter can be written as $\Pi_x = \alpha x \beta'$, where β contains the long-run cointegration parameters. In this paper, z_t and w_t are absent, $x_t = (GDP_t, IR_t, OPEN_t, EXC_t, CPI_t, LAB_t)$, and the parameters of concern are the cointegration matrix. With the ordering of variables in x_t as follows $GDP_t, IR_t, OPEN_t, EXC_t, CPI_t, LAB_t$, β' can be written explicitly as follows:

$$\begin{pmatrix} \beta 11 & \beta 21 & 1 & 0 & : & 0 \\ \beta 12 & 1 & 0 & 0 & : & \beta 52 \end{pmatrix} \tag{2}$$

Where the augmented elements in the fifth column correspond to the linear trend (t). This VAR system may be transformed into a "structural" VAR model (SVAR).

The co-integrating VAR and SVAR parameters are related through $A\Pi_i = -A_i$, for $i = 2,1,\ldots k$, and $A\Sigma A' = \Omega$. This leads to the establishment of the following relationship:

$$\Sigma = A^{-t} BB` A^{-t} \tag{3}$$

Applying limitations to specific components of the matrices facilitates the determination of structural shocks, known as contemporaneous restrictions. While it is feasible to introduce over-identifying restrictions, our focus in this Structural Vector Autoregression (SVAR) lies not in the elements of matrices A and B, but predominantly in the subsequent analyses of Impulse Response Functions (IRF) and Forecast Error Variance Decomposition (FEVD). Therefore, we opt to employ only identifying restrictions as outlined below for heuristic purposes.

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 & 0 \\ a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & 1 \end{bmatrix} \begin{bmatrix} e^{gdp} \\ e^{ir} \\ e^{0} \\ e^{exc} \\ e^{cpi} \\ e^{lab} \end{bmatrix} = b_{ij} \begin{bmatrix} e^{gdp} \\ e^{ir} \\ e^{0} \\ e^{exc} \\ e^{cpi} \\ e^{lab} \end{bmatrix} \tag{4}$$

Where: a_{ij} : element from A
ε : innovation (error) of variables used by j
b_{ii} : element from B (in this case i=j for i,j = 1,....,6)
e_j : structural shocks from variable j.

Examining the factors influencing openness in the Macedonian economy involves conducting both Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analyses. The research incorporates several key variables, namely GDP, degree of openness (OPEN), interest rate (IR), total labour force (LAB), consumer price index (CPI), and the exchange rate of the Macedonian denar to the Euro (EXC). Given that, in the long run, CPI and exchange rate exhibit no impact on output, the model restricts the parameters of CPI and EXC to zero.

4. RESULTS AND INTERPRETATION

4.1. The coefficients of the long-run cointegrating equation

The analysis starts with conducting stationary test to each variable by using Augmented Dickey Fuller (ADF) test. All variables used in this analysis have non-stationary tendencies and become stationary once they are first differenced I(1) (Table 2).

Table 2. Augmented Dickey-Fuller Unit Root Test

Variables	Level (P-Value)	First Difference (P-Value)
Gross Domestic Product	0.7173	0.0000
Interest Rate	0.3172	0.0000
Trade Openness	0.0031	0.0001
Exchange Rate	0.6627	0.0000
Consumer Price Index	0.0000	0.0000
Labour	0.9576	0.0001

Source: Author calculation

The next step of the empirical analysis is determining the optimal order of VAR. The results from the Akaike information criterion (AIC) point to VAR of order 2, and for that purpose, the model includes 2 lags. Furthermore, the testing for cointegration is conducted using the Johansen cointegration test. The results of cointegration are presented in Table 3. The presented results regarding the use of a cointegrating relationship point to a 5 cointegration rank. The existence of cointegration signifies the presence of five long-term economic relationships among the selected variables.

Table 3. Cointegration Test

Date: 11/03/23   Time: 15:38
Sample (adjusted): 2005Q1 2022Q4
Included observations: 72 after adjustments
Trend assumption: Linear deterministic trend
Series: D(LOG_NOMGDP_USD) D(IR) D(TRADEOP_NEW) D(FXEOP) D(CPI) D(LOG_LABOUR)
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.633561	231.0919	95.75366	0.0000
At most 1 *	0.566328	158.8094	69.81889	0.0000
At most 2 *	0.441393	98.65586	47.85613	0.0000
At most 3 *	0.396577	56.72958	29.79707	0.0000
At most 4 *	0.211883	20.35972	15.49471	0.0085
At most 5	0.043682	3.215893	3.841465	0.0729

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.633561	72.28244	40.07757	0.0000
At most 1 *	0.566328	60.15358	33.87687	0.0000
At most 2 *	0.441393	41.92627	27.58434	0.0004
At most 3 *	0.396577	36.36986	21.13162	0.0002
At most 4 *	0.211883	17.14383	14.26460	0.0171
At most 5	0.043682	3.215893	3.841465	0.0729

Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Author calculation

The empirical model further relies on performing Cholesky decomposition. The model restricted the parameters of exchange rate and CPI to be 0, since there was no real effect of these variables on the output in the long run. The parameter of the labor force is restricted to be -1, since economy accelerates, the labor force decreases in the long run. This approach is already explained by Simorangkir(2008). The restricted long-run cointegrating equation is called the trade openness equation with a p-value 0.0098 (Table 4). The long-run equation for trade openness is as follows:

$gdp = -0.32IR – 0.05TRADEOP$ (5)
(0.05)   (0.006)
the number in parenthesis is p-value for each parameter.

Table 4. Vector Error Correction Estimate

Vector Error Correction Estimates
Date: 11/03/23   Time: 15:52
Sample (adjusted): 2005Q1 2022Q4
Included observations: 72 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:
   B(1,1)=1, B(1,4)=0, B(1,5)=0, B(1,6)=-1
Convergence achieved after 419 iterations.
Restrictions identify all co-integrating vectors
LR test for binding restrictions (rank = 1):

Chi-square(3)	11.3946
Probability	0.009773

Co-integrating Eq:	CointEq1
LGDP	1
IR	-0.31822
	-0.05324
	[-5.97702]
TRADEOP	-0.050444
	-0.00619
	[-8.14938]
EXCHR	0
CPI	0
LLABOUR	-1
C	0.027972

Source: Author calculation

The results show that interest rate elasticity is negative and significant, -0.32. The negative coefficient means that in the long run as the interest rate increases, the economic growth decelerates; therefore, the sign of parameter is in the expected direction, and it is in line with the theory.

The sign of the coefficient of trade openness is negative and significant, namely -0.05. Other things remain constant a one percent increase in trade openness is associated with a decrease in economic growth by 0.05 percent, pointing to an inverse relationship between the trade openness and the economic growth. This finding aligns with prior research conducted by Kim (2011), who observed that increased trade openness negatively impacts both economic growth and real income in less developed countries. Likewise, Hye (2012) documented that a rise in the trade openness index detrimentally affects economic growth in Pakistan.

Careful consideration of causation, possible explanations, and the broader economic context is crucial for a more nuanced interpretation. The negative coefficient might suggest that other factors associated with increased trade openness (such as competition, import exposure, or economic restructuring) could be influencing economic growth. Moreover, the influence of factors like unequal distribution of gains from trade, trade imbalances, or the impact of global economic conditions should

be explored. The complex nature of the relationship between trade openness and economic growth is explained by other authors, as well. Similar views are shared in the empirical study by Huchet-Bourdon et al. (2018), that points to a non-linear relationship between these two macroeconomic variables, emphasizing that trade openness may impact growth adversely for countries specializing in low quality production. Non-linearity is also discussed by Fatima et al. (2020), showing that trade may have a negative impact on GDP growth when countries exhibit a low level of human capital accumulation. A study focusing on South East European Countries by Fetahi-Vetapi et al. (2015) points to a lack of conclusive evidence on the relationship between trade and economic growth, with empirical results that indicate a positive effects of trade openness on economic growth, but conditionally on the initial income per capita and other explanatory variables.

4.2. Forecast error variance decomposition analysis

This paper has expanded the examination of the interrelations among the variables beyond the sampled timeframe through the application of variance decomposition analysis. Employing this method facilitates the assessment of the degree of fluctuation in the dependent variable lagged by its own variance. Moreover, it determines the extent to which independent variables explain the variability observed in the dependent variable.

Since the purpose of the paper is to analyze the impact of openness to Macedonian economy, the main analysis of this paper will just focus on the analysis of shocks to trade openness on the variability of GDP, employment, inflation, and Macedonian denar exchange rate. According to the orthogonalised FEVD results as shown in Table 5, shocks to trade openness are important in explaining fluctuations in GDP, employment, inflation, and exchange rate.

Table 5. Variance Decomposition

Variance Decomposition of LGDP:

Period	S.E.	LGDP	IR	TRADEOP	EXCHR	CPI	LLABOUR
1	0.057543	100	0	0	0	0	0
2	0.064991	86.15812	6.026104	0.031527	7.712482	0.054822	0.016945
3	0.077112	79.24753	4.61209	7.917854	5.543056	2.618536	0.060935
4	0.084696	78.35073	4.527847	7.747567	7.020786	2.299052	0.054017
5	0.092984	79.4387	3.782164	7.948061	6.8064	1.929349	0.095327
10	0.119	82.20135	2.597758	7.251946	6.074682	1.595893	0.278373

Variance Decomposition of D(IR):

Period	S.E.	LGDP	IR	TRADEOP	EXCHR	CPI	LLABOUR
1	0.575002	0.146337	99.85366	0	0	0	0
2	0.787725	1.915363	96.87561	0.001554	0.721304	0.485811	0.000358
3	0.950417	2.560963	92.10365	1.877024	0.536347	2.599472	0.322539
4	1.031257	2.213047	90.42714	4.273585	0.462625	2.271891	0.351714
5	1.104652	2.195822	89.0778	5.859441	0.415083	2.130598	0.321252
10	1.472867	1.92426	89.93196	5.883068	0.341306	1.681312	0.238096

Variance Decomposition of TRADEOP:

Period	S.E.	LGDP	IR	TRADEOP	EXCHR	CPI	LLABOUR
1	7.959537	3.139306	4.156311	92.70438	0	0	0
2	8.331905	3.608994	4.099115	85.49496	0.620557	2.481625	3.694747
3	8.854528	6.929651	10.75194	75.75868	1.083351	2.198418	3.27796
4	10.04237	5.855454	25.76042	60.03097	1.265683	4.421417	2.666056
5	10.56305	7.097573	30.63423	54.36356	1.168133	4.114713	2.621789
10	12.36562	8.183459	43.43049	41.91681	1.080061	3.199596	2.189591

Variance Decomposition of EXCHR:

Period	S.E.	LGDP	IR	TRADEOP	EXCHR	CPI	LLABOUR
1	2.534043	27.90372	2.683689	5.578003	63.83458	0	0
2	2.816965	27.10304	8.951839	8.422405	55.17096	0.015911	0.335848
3	3.34782	20.10115	6.458279	21.29001	50.88893	0.014141	1.247487
4	3.741785	25.53597	5.214659	18.2387	49.90082	0.021596	1.088255
5	4.022939	24.10294	4.574492	18.77735	50.00567	0.276914	2.262627
10	5.148487	24.17702	3.992033	18.95153	50.75825	0.278589	1.842588

Variance Decomposition of CPI:

Period	S.E.	LGDP	IR	TRADEOP	EXCHR	CPI	LLABOUR
1	1.256472	1.145739	11.62955	2.968585	0.237784	84.01835	0
2	1.646905	0.958012	10.89801	0.701542	77.82914	2.574532	
3	1.761555	1.266561	6.248449	12.66389	1.503202	75.59727	2.720621
4	1.910904	1.269149	7.649017	13.77033	1.278791	73.71467	2.31804
5	2.13953	1.027344	7.872605	14.00715	1.114104	73.65023	2.328572
10	2.821203	1.055301	6.99728	15.1228	1.152264	73.36572	2.30663

Variance Decomposition of LLABOUR:

Period	S.E.	LGDP	IR	TRADEOP	EXCHR	CPI	LLABOUR
1	0.043767	0.171826	0.580756	4.437045	0.149376	0.741944	93.91905
2	0.045762	0.559889	2.44493	4.460454	2.755993	2.920742	86.85799
3	0.055099	0.445031	1.997755	3.090877	2.914919	6.257587	85.29383
4	0.055859	0.634803	2.025892	3.322417	3.221978	6.335844	84.45907
5	0.060342	0.544226	1.942924	3.190038	2.778876	5.81409	85.72985
10	0.07065	0.532371	2.508252	2.639894	2.102735	5.892154	86.32459

Cholesky Ordering: LGDP IR TRADEO EXCHR CPI LLABOUR

Source: Author calculation

Short- and medium-term fluctuations in GDP are mainly self-explanatory, with these inherent variations accounting for up to 82 percent in the medium term. Additionally, trade openness shocks and exchange rate fluctuations each contribute to approximately 7 percent and 6 percent, respectively, of the medium-term variability in GDP. Shocks to interest rate, inflation and labor force have trivial effects on the variability of the GDP, which could stem from different sources: implementation of effective monetary policy responses that can help mitigate the impact of shocks and contribute to a more stable GDP, existence of flexible labor markets that can limit the impact of labor force shocks on overall economic activity, establishment of well-anchored inflation expectations which might enable firms and households to adjust more smoothly to changes in inflation without significant disruptions to economic output, structural factors that contribute to a more resilient and stable economy, etc.

Fluctuations in interest rates are largely influenced by their own past values, whereas the economic variables such as GDP, trade openness, exchange rates, consumer prices, and labor market conditions have only minor influence on interest rate changes. These insights are relevant for policymakers since the dominance of the autoregressive component underscores the importance of considering past interest rate movements in forecasting and policy decisions. The limited impact of external economic factors on interest rate changes suggests a degree of independence or inertia in the interest rate-setting process.

The variability of exchange rate in the short-term and medium term is primarily explained by more than 50 percent due to its own past values, indicating a strong autoregressive component. In the subsequent periods, the influence of GDP, interest rate, trade openness, and other factors on exchange rate variability is presented. Notably, trade openness consistently contributes around 18-22 percent to the variability in the exchange rate, suggesting a relatively stable impact of trade openness on the exchange rate over time.

The largest contributor to CPI variability is its own past values, suggesting a strong autoregressive component. The interest rate contributes positively to CPI variability, indicating that changes in interest rates have an impact on inflation. In the short term, the influence of interest rates on CPI is relatively low, but it becomes more pronounced over time. The impact of trade openness on CPI is noticeable but relatively modest, reaching up to 15.1 percent. This suggests that changes in trade openness have a limited direct effect on consumer prices. Other factors, such as GDP, exchange rate and labor force also contribute to CPI variability, but their influence is relatively smaller.

The variability of labor force in the short-term and medium term are associated mainly with its own self, namely 86 percent in the medium term. The shocks to CPI, trade openness, interest rate and inflation have very small to cause fluctuations in the labor force.

## 4.3. Impulse Response Function Analysis

The impulse response functions are used to analyze the dynamic interactions among endogenous variables. In vector error correction models, the impulse response functions are expressed through a vector autoregressive model where variables are expressed in their original values. In this example, orthogonal impulse response functions will be considered, where the innovation or shock amounts to one standard deviation in the transformed model. The functions are depicted for a time period of 12 quarters, or three years, to better assess the effect of shocks to Macedonian trade openness.

Dynamic movements of each variable in response to a one standard error shock in trade openness are analyzed using orthogonalized IRFs presented in Graph 4. The results suggest that shocks to trade openness lead to reduced economic growth, with a short-term output decline of 0.02 percent and a consistent long-term decrease of 0.01 percent. These results might suggest that increased trade openness initially leads to more imports than exports, negatively impacting the GDP.

Furthermore, shocks to trade openness will lead to an decrease in interest rate, that ranges between 0.12-0.16 percent. This could imply that increased trade openness is associated with increased capital inflows, which could lead to lower interest rates.

Shock to trade openness will lead to increase the inflation, initially by 0.5 percent and by 0.3 percent in the long term. A positive shock in trade openness might lead to inflationary pressures over time, which could reflect changes in import prices or the competitiveness. A one standard error shock to trade openness has a modest negative effect to labor force, suggesting that increased trade openness could initially lead to lower labor market performance. This could be due to factors like labor market adjustments to new trade conditions or increased competition from abroad.

Figure 4. Impulse Response Function of Trade Openness
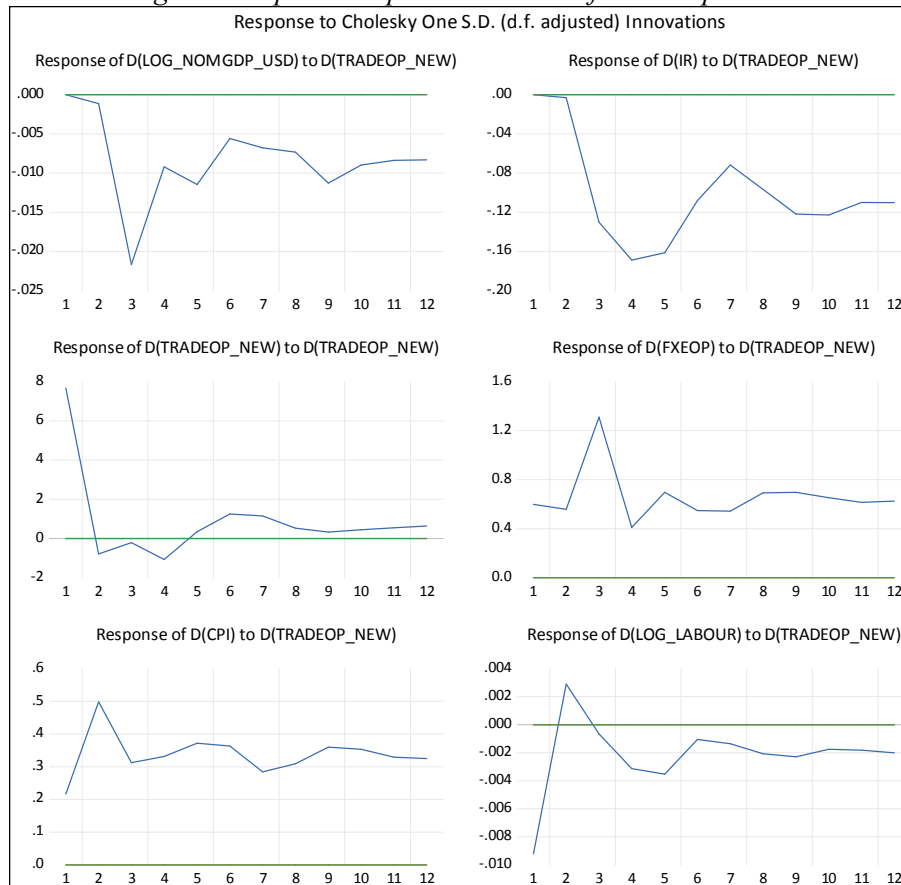
Source: Author calculation

In summary, the analysis reveals that shocks to trade openness induce short-term declines in economic growth, a reduction in interest rates, an increase in inflation, and modest negative effects on the labor force, potentially attributed to factors such as adjustments in labor markets and heightened competition from foreign markets.

CONCLUSIONS

The relationship between trade openness and economic growth is complex, and the outcomes may vary based on various factors, including the country's institutional framework, policies, and the global economic environment. Besides international trade being a driving force in the world, it is also one of the primary mechanisms for spreading the negative implications, especially during crises. Different theoretical frameworks offer conflicting conclusions about the importance, direction, and strength of the relationship between trade openness and economic prosperity.

There are not many papers that explore the link between trade openness and economic growth in the Republic of North Macedonia and this paper fills the gap in the present literature by providing insights into the trade – growth nexus in the country.

The study's findings indicate a negative and significant relationship between trade openness and economic growth in North Macedonia. The findings suggest that shocks to trade openness result in decreased economic growth, with a short-term output decline of 0.02 per cent and a consistent long-term decrease of 0.01 per cent. The findings are in line with previous research on the adverse relationship between trade openness and economic growth (Belloumi and Alshehry 2020; Fenira 2015; Hye and Lau 2015; Rigobon and Rodrik 2005; Simorangkir 2008). The complexity of this relationship highlights an adverse impact on countries specializing in low-quality production or those with low levels of human capital accumulation, such as North Macedonia. Furthermore, the dynamic effects of shocks to trade openness on interest rates, consumer price index, interest rates, labour force, and exchange rate are investigated using impulse response functions.

The paper suggests that North Macedonia's trade strategy requires reorientation towards trade diversification, especially on services. The country's trade openness in services lags compared to the trade openness in merchandise trade. This reveals untapped potential in the services sector, especially in the digital trade era.

The tradable sector remains small for the size of the economy, not sufficiently diversified and internationalized, with a dominance of larger firms, and not appropriately innovative (Gligorov 2017). Therefore, the policies for attracting FDIs should continue to attract FDIs with an export-oriented focus that will lead to increased job creation, business sustainability, and a more diversified economy overall. The recent crisis stressed the need for greater dependence on renewable energy and further investment in this sector. Better-targeted public investment can also be part of the fiscal policy reforms. The reforms should predominantly focus on increasing productivity, achieving further production and export diversification, on higher value-added products, and a greater focus on the service sector and its export potential.

Also, the potential for intensified trade can be seen in the regional market of other Western Balkan countries (WB6). For that purpose, countries must eliminate non-tariff barriers to trade (NBTs): the differences in technical regulations, licenses and certificates, and other product compliances that increase costs and distort trade. Trade integration in the region can improve the living standards of the countries. This idea is envisaged in the action plan for regional initiatives such as creating a Common Regional Market (CRM) in trade investment, digital, and industrial and innovation areas. A country's ability to achieve greater trade diversification will depend on several factors, including competitiveness, investment, innovation, and education policies. Economic diversification is needed through a complex set of policy actions and strong high-level political support.

Further research can take into consideration the export quality and export variety as key dimensions of countries` integration in world trade, as well as alternative measures for measuring trade openness.

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