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The Impact of COVID-19 on International Trade of North Macedonia with its Largest Trading Partners

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Abstract: World trade during the period of the Covid-19 pandemic faced an unexpected situation that resulted in a collapse. All economic indicators took a downward turn and this situation was especially challenging for developing countries, such as North Macedonia. This paper aims to analyze the impact of Covid-19 on foreign trade in North Macedonia with its largest trading partner. The empirical analysis was conducted using the VECM and VAR models, as more suitable econometric models for analyzing the impact of Covid-19 on trade between North Macedonia and its largest trading partners, both in the short and long term. The study encompasses a 24-year time series dataset, spanning from Q1-1997 to Q4-2021, and incorporates a dummy variable representing the Covid-19 period. Based on the results, the impact of Covid-19 was evident in all trading partner countries, but it varied in strength and timing. In the long run, Covid-19 had a negative effect on trade with Belgium and Serbia. In the short term, Covid-19 affected trade with all trading partner countries that were included in the analysis, except for trade with Serbia.

Keywords: Covid-19; International trade; North Macedonia; VECM and VAR model.

1. Introduction

Our economy, like other economies worldwide, has faced major challenges in the past three years. The pandemic, followed by the energy crisis and price pressures, escalating alongside the uncertainty brought by the war in Ukraine, were the reasons why the desired economic results were not achieved. Since the beginning of the Covid-19 pandemic, the dynamics of events have become very intense, and the consequences were impossible to measure and predict, on both the national and the world economy. The world economy registered a drop in the price of oil due to the decline in global demand caused by the spread of Covid-19. North Macedonia, as a country with a small and open economy, is highly dependent on imports. The impact of Covid-19 did not spare any sector of the economy and it affected international trade significantly.

According to Economic Trading, the current account balance as a percentage of GDP provides an indication of a country's level of international competitiveness. Typically, countries with a strong current account surplus have economies heavily dependent on export revenues, with high savings rates but weak domestic demand. On the other hand, countries with a current account deficit have strong imports, low savings rates, and high personal consumption rates as a percentage of disposable incomes. Trade deficits analyzed in the years before and after Covid-19 show that the trade deficit in 2020 declined compared to the previous year (2019) and then increased again (depending on the country and sector). Additionally, the intensity and volume of the trade deficit are not the same with all trade partner countries. A deterioration in the ratio of exports to imports also results from the decrease in external demand, which significantly affects the exporting activities of the country. As a result of Covid-19 and the energy crisis, the value of the euro depreciated and immediately impacted the trade partner countries, especially those in the export trade. It's worth noting that the majority of North Macedonia's trade partner countries are from the euro area, including Germany, Belgium, Greece, Great Britain, Bulgaria, etc. Therefore, the impact of Covid-19 was evident in all trading partner countries, but not with the same strength and at the same time.

2. Literature Review

The Covid-19 pandemic, despite being a new phenomenon, has garnered significant interest among researchers from various countries, both economically developed and developing. Some authors (Dragusha and Ulqinaku, 2022; Buchel et al., 2020; Svrtinov et al., 2020; Minondo, 2020; Srbinovski et al., 2020; Gajić, 2020; Lazarević-Moravčević and Kamenković, 2020) have focused solely on a descriptive analysis of the impact of Covid-19 on international trade, while others (Lui et al., 2021; Barbero et al., 2021; Ugurlu and Jindrichovská, 2022) have conducted empirical analyses of Covid-19's impact on international trade.

Dragusha and Ulqinaku (2022) analyzed the effect of Covid-19 on the trade balance of Albania, focusing on a descriptive analysis. They concluded that Covid-19 did not impede further deficit deepening. In fact, the trade deficit improved by approximately 9% compared to the previous year.

Buchel, Legge, Pochon, and Wegmuller (2020) examined the impact of Covid-19 on international trade between January and July 2020. Their results showed that Swiss trade during that period declined by 11% compared to 2019.

Minondo (2020) analyzed the impact of Covid-19 on the trade in goods and services of Spain. The study found that the substantial contribution of transport equipment, capital goods, outdoor goods, and tourism to Spanish exports exacerbated the Covid-19 trade crisis in Spain.

Gajić (2020) analyzed the impact of Covid-19 on the Serbian economy and concluded that the Serbian economy experienced a significant impact from the Covid-19 pandemic, albeit on a smaller scale compared to its regional counterparts. Additionally, Lazarević-Moravčević and Kamenković (2020) analyzed the consequences of the Covid-19 on the Serbian economy. They concluded that Covid-19 did not affect all economic activities and entities equally, and the state's measures were effective, yielding immediate results.

Liu, Ornelas, and Shi (2021) utilized a gravity model to study the effect of Covid-19 deaths and lockdown policies on countries that imported from China in 2020. They found that Covid-19 deaths and lockdowns significantly reduced imports from China by nearly 10%.

Ugurlu and Jindrichovská (2022) explored the impact of Covid-19 on international trade among the Visegrad Four (V4) countries. They used monthly data for the period 2010–2021 and the ARDL model

for each member country of the V4 in relation to other V4 members. Their findings revealed that the Covid-19 impact was evident in all countries.

Barbero, de Lucio, and Rodriguez-Crespo (2021) analyzed the impact of Covid-19 on bilateral trade flows using a gravity model of trade, with monthly data between January 2019 and October 2020 for 68 countries exporting to 222 destinations. They identified a negative impact of Covid-19 on bilateral trade for countries that were members of regional trade agreements before the pandemic.

Regarding our country, we have the studies of Svrtinov et al. (2020) and Srbinoski et al. (2020). Svrtinov, Trajkovska, Miteva-Kacarski, and Koleva (2020) analyzed the impact of Covid-19 on the economies of the Western Balkans (Bosnia and Herzegovina, Serbia, Kosovo, North Macedonia, Albania, and Montenegro). They concluded that the Western Balkan economies were among the regions heavily affected by the Covid-19 pandemic due to their fragile political and economic circumstances.

Srbinovski, Petreski, and Petreski (2020) analyzed the potential contribution of export- oriented companies to the post-Covid-19 economic recovery of North Macedonia. Their findings indicated that exporters experienced a slowdown in their revenue, profit, investment, capital, employment, and salary growth rates.

3. Data and Methodology

3.1. The Model

In our research, to investigate the impact of Covid-19 on international trade in North Macedonia with its largest trading partners, we have based our model on Ugurlu and Jindrichovská's (2022) approach. In their model, they treated the export and import volumes of the countries as dependent variables, with independent variables including the host country's GDP (GDPi), the partner country's GDP (GDPj), and the exchange rate (ER). However, in our model, we have chosen the trade balance with the respective partner (TB) as the dependent variable. In other words, we are examining the trade surplus or deficit in our trade with the respective trading partner.

Symbolically, our model takes the general form:

$$LnTB_t = \alpha_0 + \alpha_1 LnGDP_{i,t} + \alpha_2 LnGDP_{j,t} + \alpha_3 LnER + D + \varepsilon_t$$

So:

TB – represents the ratio of North Macedonia's imports over exports with the trading partner;

GDPi – represents the GDP of North Macedonia; GDPj – represents the GDP of the trading partner; ER – represents the exchange rate EUR/MKD.

The model also includes the variable dummy (D), which represents the presence of Covid-19. It takes the value 1 during the Covid-19 period and the value 0 for the rest of the period.

In the framework of this work, we will analyze this model individually for each partner country. Therefore, we will have individual models as follows.

The model for trade with Germany:

$$LnTB\_GR_t = \alpha_0 + \alpha_1 LnGDP_{NM,t} + \alpha_2 LnGDP_{GR,t} + \alpha_3 LnER + D + \varepsilon_t$$

The model for trade with Belgium

$$LnTB\_BEL_t = \alpha_0 + \alpha_1 LnGDP_{NM,t} + \alpha_2 LnGDP_{BEL,t} + \alpha_3 LnER + D + \varepsilon_t$$

The model for trade with Bulgaria

$$LnTB\_BL_t = \alpha_0 + \alpha_1 LnGDP_{NM,t} + \alpha_2 LnGDP_{BL,t} + \alpha_3 LnER + D + \varepsilon_t$$

The model for trade with Serbia

$$LnTB\_SR_t = \alpha_0 + \alpha_1 LnGDP_{NM,t} + \alpha_2 LnGDP_{SR,t} + \alpha_3 LnER + D + \varepsilon_t$$

The model for trade with Great Britain

$$LnTB\_GB_t = \alpha_0 + \alpha_1 LnGDP_{NM,t} + \alpha_2 LnGDP_{GB,t} + \alpha_3 LnER + D + \varepsilon_t$$

The model for trade with Greece

$$LnTB\_GE_t = \alpha_0 + \alpha_1 LnGDP_{NM,t} + \alpha_2 LnGDP_{GE,t} + \alpha_3 LnER + D + \varepsilon_t$$

3.2. Data

The data used in the empirical analysis consists of quarterly data for the period from the first quarter of 1997 to the fourth quarter of 2021. The data for the GDP of North Macedonia, the exchange rate (MKD), and the trade balance between North Macedonia and its trading partners are collected from The National Bank of The Republic of North Macedonia (NBRN M), while the data for the GDPs of the trading partners are collected from the Federal Reserve Bank of St. Louis (FRED).

4. Empirical results

The analysis begins by examining the stationarity of the time series data using the Augmented Dickey-Fuller test. According to the results of the Augmented Dickey-Fuller test presented in Table 1, all the variables are stationary at the first difference.

Table 1. Augment Dickey-Fuller Unit Root Test Results

Variables	At Level		At First Difference		Conclusion Order of integration
	t-statistic	t-statistic at 5%	t-statistic	t-statistic at 5%	
LnTB_GR	-0.266	-2.895	-4.921	-2.895	I(1)
LnTB_GRE	-1.085	-2.894	-4.528	-2.895	I(1)
LnTB_SR	-1.022	-2.894	-4.439	-2.895	I(1)
LnTB_BL	-1.186	-2.893	-5.344	-2.894	I(1)
LnTB_BE	-2.554	-2.893	-5.320	-2.894	I(1)
LnTB_GB	-0.884	-2.894	-4.539	-2.895	I(1)
LnGDPNM	-1.163	-2.897	-5.221	-2.898	I(1)
LnGDPGR	-1.417	-2.892	-7.596	-2.893	I(1)
LnGDPGRE	-1.177	-2.893	-4.391	-2.894	I(1)
LnGDPSR	-0.847	-2.892	-8.121	-2.893	I(1)
LnGDPBLL	-0.898	-2.893	-6.788	-2.894	I(1)
LnGDPBEL	-1.805	-2.892	-8.354	-2.893	I(1)
LnGDPGB	-2.249	-2.896	-4.710	-2.897	I(1)
LnER	-1.321	-2.892	-9.142	-2.893	I(1)

Source: Authors calculation

After ensuring that all the variables are stationary in the first difference (I(1)), we conducted a lag order selection process. The lag length of the model was determined using Akaike's Information Criterion (AIC). The results of the Akaike Information Criterion, as presented in Table 2, recommend setting the lag length at 4 for each country's model. Therefore, we have chosen a lag length of 4 for our models.

Table 2. Akaike Information Criteria Results for Lag Order Selection

Lag	Germany	Belgium	Bulgaria	Serbia	Great Britain	Greece
0	-16.4923	-14.7314	-14.5733	-12.5957	-12.4907	-13.5871
1	-23.8936	-21.5458	-22.8839	-20.5085	-20.4506	-22.7554
2	-25.2031	-23.1942	-23.3766	-20.8365	-21.1552	-23.6115
3	-25.4712	-24.1154	-23.3577	-20.7567	-21.2143	-23.6465
4	-26.2085*	-25.174*	-24.0211*	-21.2525*	-22.0745*	-24.5698*

*Note: * indicates the optimal lag*

Source: Authors calculation

After selecting the lag length for the models, the next step is to test the existence of cointegration among the variables for each model with every partner country. Based on the results presented in the following Tables 3 and 4, it is evident that three out of the six countries included in the analysis exhibit one cointegration equation (vector) among the variables at the 5% significance level (Table 4).

Table 3. Johansen Cointegration Test Results (countries without a cointegration among variables)

Maximum Rank	Germany		Bulgaria		Great Britain	
	Trace statistic	**0.05 Critical Value**	**Trace statistic**	**0.05 Critical Value**	**Trace statistic**	**0.05 Critical Value**
None	57.1991*	68.52	58.0141*	68.52	64.8097*	68.52
At most 1	30.5324	47.21	26.4392	47.21	30.0530	47.21
At most 2	16.4328	29.68	13.4815	13.4815	13.9646	29.68
At most 3	6.5073	15.41	3.8599	3.8599	3.6149	15.41
At most 4	0.3163	3.76	0.5353	0.5353	1.6533	3.76

*Note: * indicates the rejection of the null hypothesis at 5% level.*

Source: Authors calculation

While the other three countries do not have cointegration equations (vectors) among the variables at the 5% level of significance (see Table 3).

Table 4. Johansen Cointegration Test Results (countries with a cointegration among variables)

Maximum Rank	Belgium		Serbia		Greece	
	Trace statistic	**0.05 Critical Value**	**Trace statistic**	**0.05 Critical Value**	**Trace statistic**	**0.05 Critical Value**
None	73.7079	68.52	69.3593	68.52	70.3362	68.52
At most 1	39.9751*	47.21	27.5328*	47.21	35.2170*	47.21
At most 2	20.6602	29.68	14.6519	29.68	11.8072	29.68
At most 3	5.5021	15.41	4.6799	15.41	3.2965	15.41
At most 4	2.6010	3.76	1.1338	3.76	0.0057	3.76

*Note: * indicates the rejection of the null hypothesis at 5% level.*

Source: Authors calculation

For the countries that had one cointegration equation (vector) among the variables, we used the VECM model for further analysis. For the other countries that didn't have a cointegration equation (vector)

among the variables, we employed the VAR model for further analysis. In the case of countries such as Germany, Bulgaria, and Great Britain, where the VAR model was used, we solely obtained the short-term coefficients of the dummy variable. However, for countries in which the VECM model was used, we not only acquired the short-term coefficients of the dummy variable but also obtained the long-term coefficients.

The short-term coefficients of the dummy variable are presented in Table 5, while the long-term coefficients are displayed in Table 6.

Table 5. Short- run estimations based on the VAR and VECM model

	Germany	Bulgaria	Great Britain	Belgium	Serbia	Greece
D (-1)	0.0495 (0.85)	-0.0234 (-0.26)	-0.2117 (-1.71)*	-0.6522 (-2.00)**	-0.1102 (-0.50)	-0.2080 (-2.15)**
D(-2)	-0.1706 (-1.72)*	-0.0009 (-0.01)	0.1058 (0.53)	-0.9762 (-1.35)	0.3076 (1.27)	-0.1167 (-0.85)
D(-3)	-0.0887 (-0.53)	-0.1087 (-0.76)	0.7394 (2.62)***	0.7622 (0.77)	-0.1565 (-0.64)	-0.2174 (-1.46)
D(-4)	0.2567 (2.20)**	0.1986 (1.73)*	-0.6991 (-3.40)***			

*Note: t-statistics are in ().*indicates statistical significances at 10 %, ** indicates statistical significances at 5 %, *** indicates statistical significances at 1%.*

Source: Authors calculation

Based on the results presented in Table 5, we observe that in the short run, Covid-19 had an impact on trade with all trading partner countries take into analysis, except for trade with Serbia. Covid-19 had a negative impact on trade with Belgium and Greece with a one-period lag, while it had a positive impact on trade with Bulgaria with a four-period lag. This occurred because during the Covid-19 period, both exports and imports with Bulgaria increased compared to the pre-pandemic period.

Covid-19 had a negative impact with a two-period lag, followed by a positive impact with a four-period lag on trade with Germany in the short run. This pattern can be attributed to the initial decrease in the value of exports at the onset of Covid-19, followed by an increase.

Regarding trade with Great Britain, Covid-19 initially had a negative impact with a one-period lag, then a positive impact with a three-period lag, and ultimately, a negative impact with a four-period lag. This trend is due to the fact that, before and at the start of Covid-19, the value of imports was lower, followed by an increase, and subsequently, a decrease.

Table 6. Long- run estimations based on the VECM model

	Belgium	Serbia	Greece
$LnGDP_i$	-1.2783 (-1.03)	-6.5130 (-9.07)***	0.0845 (10.47)***
$LnGDP_j$	18.3772 (3.25)***	15.9532 (8.69)***	3.1532 (0.52)
LnER	-103.6129 (-5.18)***	-141.3003 (-7.65)***	-15.8884 (-2.42)**
D	-0.8103 (-2.54)**	-0.6425 (-3.17)***	-0.0194 (-0.21)

*Note: t-statistics are in ().*indicates statistical significances at 10 %, ** indicates statistical significances at 5 %, *** indicates statistical significances at 1%.*

Source: Authors calculation

Based on the results of the VECM model presented in Table 6, Covid-19 had a negative impact on trade with Belgium and trade with Serbia in the long run, while there was no impact of Covid-19 on trade with other partner countries taken into analysis in the long run.

5. Conclusion

During the Covid-19 pandemic, global trade faced a volatile situation that led to a collapse. All economic indicators declined, this situation was particularly severe for developing countries like North Macedonia. Based on the empirical analysis we conducted separately models for each trading partner and we conclude that Covid-19 had a negative impact only on trade with Belgium and Serbia in the long run, out of the six partner countries we analyzed. In the short run, Covid-19 affected trade with all trading partner countries we examined, except for trade with

Serbia. Specifically, Covid-19 had a negative impact on trade with Belgium and Greece with a one-period lag, while it had a positive impact on trade with Bulgaria with a four-period lag. In the short run, Covid-19 initially had a negative impact with a two-period lag, followed by a positive impact with a four-period lag on trade with Germany. In the case of trade with Great Britain, Covid-19 initially had a negative impact with a one-period lag, then a positive impact with a three- period lag and ultimately a negative impact with a four-period lag.

The Covid-19 pandemic has profoundly impacted the global trade dynamics, with both long-term and short-term consequences in the interactions with our trading partners. While Belgium and Serbia bore the brunt of long-term trade disruptions, the short-term scenario witnessed fluctuations in trade dynamics across all partner countries, underscoring the complexity and volatility of the pandemic's effects.

These findings hold several implications for policymakers and stakeholders in the realm of international trade. Firstly, it is imperative for countries to bolster their resilience to unforeseen disruptions, such as pandemics, by diversifying their trading partner portfolio and supply chains.

Moreover, proactive and adaptable policy responses are crucial for mitigating the negative impacts of crises like Covid-19. Governments and trade organizations should consider implementing measures that can facilitate trade continuity during crises, such as the adoption of digital platforms for trade documentation and negotiations.

Additionally, the findings underscore the need for robust forecasting and risk assessment mechanisms, allowing countries to anticipate potential trade disruptions and tailor their strategies accordingly. Continuous monitoring of trade trends, as demonstrated in this analysis, can aid in timely decision-making.

In conclusion, while the Covid-19 pandemic posed substantial challenges to global trade, it also offers valuable lessons for enhancing trade resilience and adaptability in an increasingly interconnected world. Policymakers should heed these insights to navigate the uncertainties of future global crises effectively and ensure the stability and growth of international trade.

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