THE IMPACT OF COVID-19 ON SALES OF DOMESTIC PRODUCTS - CASE OF REPUBLIC OF NORTH MACEDONIA

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Abstract

The crisis caused by Covid -19 significantly affected all spheres of society including and the economy. Measures taken by the World Health Organization to prevent the spread of the virus significantly reduced the sales of products abroad. Like all countries in the world, also and the Republic of North Macedonia was faced with the same situation. The main topic of this paper is to look at the effects of the pandemic on sales outside the Republic of Northern Macedonia. The study analyzed the four series including the gross domestic product, exports, imports and of course the Consumer Price Index. The data are quarterly covering the period from 2002 first quarter to 2020 the fourth quarter. From data processing, we came to conclusion that The impact of the Covid-19 was bigger on the second quarter of 2020. But impacts and loses form the pandemic are yet to be evaluated as the data flow in. For the future there are a lot of risks that North Macedonia has to face, since it is a country that most of its economic growth comes from growth of imports, changing of prices of production factors could lead to decrease of exports and this imposes a risk to deepening the trade balance.
Keywords: Domestic products, sales, Covid -19 pandemic, Republic of North Macedonia

INTRODUCTION

The end of 2019 and 2020 is the period when the whole world was caught by the Covid -19 virus. In addition to health, Covid -19 affected all other spheres of society. Just like developed countries also and the developing countries suddenly found themselves in a great challenge and faced with various kind of crises. Measures taken to protect the population

significantly affected the economies of countries. Developed countries have had an easier battle with this situation compared to less developed and also the developing countries such as the Republic of North Macedonia.

To see the impact of Covid-19 on the sales of domestic product outside of the Republic of North Macedonia it takes into account a longer period of time respectively is analyzed data on Gross Domestic Product (GDP), exports, imports and Consumer Price Index (CPI) starting from 2002 to the end of 2020.

LITERATURE REVIEW

Considering that statistical information is of essential importance for the economy and economic policies, as well as for the analysis of market developments, we will present some data related to the sales of products abroad by statistical entities of some countries: According to data published by the State Statistical Office,in the period January-December 2020, according to the total external trade volume, the most important trade partners of the Republic of North Macedonia were Germany, Great Britain, Serbia, China and Greece.

The total value of exported goods from the Republic of North Macedonia in the period January-December 2020 are with 10.0 % decrease compared to the same period last year according to the State Statistical Office of North Macedonia. The countries of the region are in the same situation, such as:

Albania, which during 2020 had a decline in exports of goods, decreasing by 9.0%, compared to a year ago, this is data from Institute of Statistics INSTAT Republic of Albania.

Trade in goods of Kosovo in 2020 indicates a lower trade deficit by (-9.4%), compared to 2019. Detailed data could be observed at Kosovo Agency of Statistics.

The overall value of exports in the Republic of Serbia for the period January - December 2020 amounted to EUR was with decrease of 2.8%, compared to the same period last year, the data are from Statistical Office of the Republic of Serbia. Also, for the impact of COVID-19 on the sales of domestic products there are considerable number of studies that went on and are still going on.

Virelia Sh., Wahid S. and Wahid N. (2020) conducted the impact of Covid-19 on exports and imports of Indonesia. Based on the descriptive analysis they concluded that COVID-19 did not significantly change the level of Indonesia's exports and imports for the period December 2019 - March 2020.

Another study was conducted by Wei P, et al. (2021). The study is about the influence of the COVID-19 on the imports and exports in China, Japan, and South Korea. According to them industrial structure in China, Japan, and South Korea are highly similar, but there is

heterogeneity in the impact of the epidemics on imports and exports in China, Japan, and South Korea. The epidemics stimulated the demand for medical supplies and boosted exports growth, and government intervention had a positive impact on imports and exports.

METHODOLOGY

The research is based on secondary data, through which a quantitative analysis will be performed to see the impact of Covid-19 on the sales of domestic product to the other countries.

ANALYSIS AND FINDINGS

To see the effects given by the pandemic we start with analysis of four series: gross domestic product, exports, imports and of course the Consumer Price Index, these series are considered most important for the study of the main topic of this paper. The data are quarterly covering the period from 2002 first quarter to 2020 the fourth quarter.
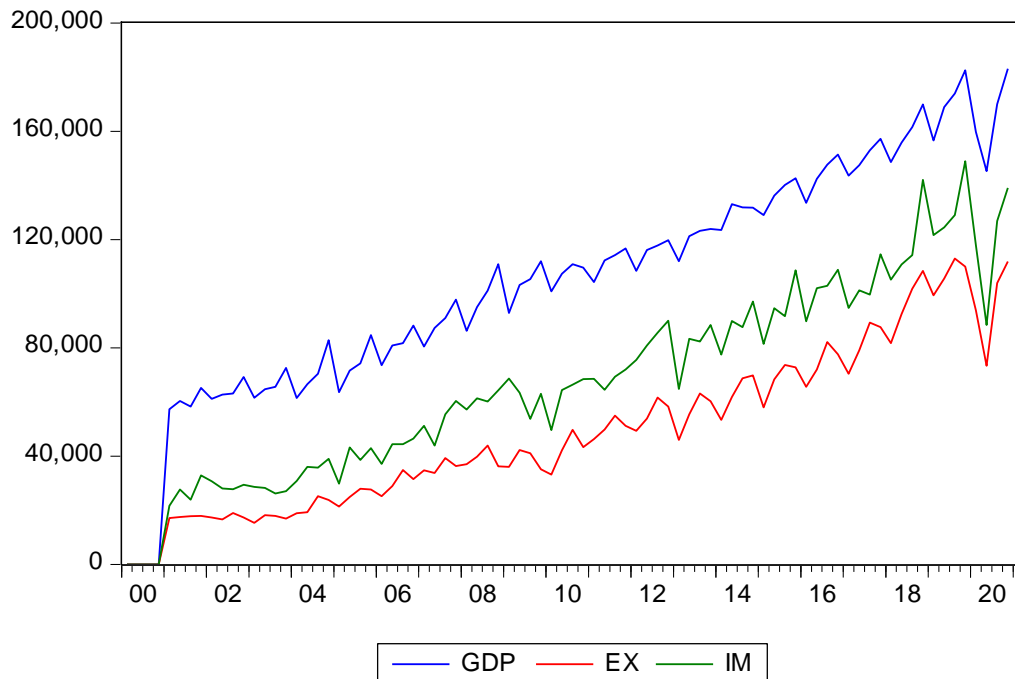

Figure 1- GDP, exports and Imports of North Macedonia, period: 2002Q1-2021Q1

Source: www.stat.gov.mk, accessed: 09.06.2021

From the Figure 1, it is quite hard to measure the impact of Covid-19 on the economy of a given country and elsewhere in the World because there are still few data to use to make promising models.

As we can see from the Figure 1 the series of GDP, exports, imports are seasonal series and unstationary since they have a trend (increasing). Variability is also visible, and this is indication to stabilize series and then to put them on a model.

GDP is showing positive trend, first quarters seasonally have lower values than other seasons; on the other hand, fourth quarters of each year are higher in values. We can note that the second quarter of 2020 shows drastic change and negative growth. The impact of the Covid-19 was bigger in this quarter, the first quarter compared to the fourth quarter had around 12% decrease and this negative growth moved to the second quarter of 2020 with around 9% decrease. This was not the case other years when the second quarter showed promising growths. The exports also have a positive trend and are seasonally "addictive".

The series were stabilized by transforming on to the growth values of the corresponding ones, this means that each of the series that do have trend and variability are transformed using the formula:

$$g = \frac{x_t - x_{t-1}}{x_{t-1}} \dots\dots\dots\dots\dots\dots\dots(1)$$

The series of CPI is without a visible trend (Figure 2), the Unit Root test will show the result, but the variability is visible and present throughout the series.
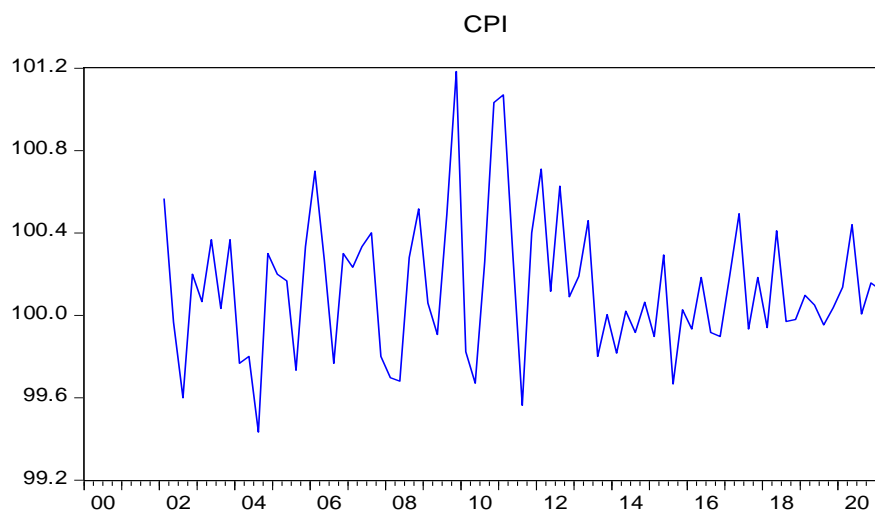

Figure 2- Consumer Price Index of North Macedonia, chained indices, quarterly data, period 2002Q1-2021Q1

Source: www.stat.gov.mk, accessed: 09.06.2021

For the realization of the statistical model, we used the Method of Least Squares which is a standard approach in regression analysis. The dependent variable are the growth of exports while the difference of CPI, economic growth and imports growth are the independent variables.

Table 1- Estimation of the regression Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: X_GROWTH				
Method: Least Squares				
Sample (adjusted): 2002Q2 2020Q4				
Included observations: 75 after adjustments				
C	0.013906	0.011730	1.185518	0.2398
D_CPI	-0.099029	0.026532	-3.732406	0.0004
GROWTH	0.319035	0.175275	1.820195	0.0729
M_GROWTH	0.420763	0.095809	4.391679	0.0000
R-squared	0.422793	Mean dependent var		0.032859
Adjusted R-squared	0.398404	S.D. dependent var		0.126844
S.E. of regression	0.098384	Akaike info criterion		-1.748023
Sum squared resid	0.687235	Schwarz criterion		-1.624423
Log likelihood	69.55085	Hannan-Quinn criter.		-1.698671
F-statistic	17.33539	Durbin-Watson stat		2.597240
Prob(F-statistic)	0.000000			

Growth of exports is positively affected by GDP growth, for every increase of 1% of economic growth, exports growth is increased by 0.319% in average, ceteris paribus. If growth of imports increases for 1% then the growth of exports, increases for 0.421% on average, ceteris paribus. If the difference between CPI of quarters rises for 1 unit, then growth of exports decreases for 0.099 unites on average, ceteris paribus.

X_growth=0.0139-0.099D_CPI+0.319growth+0.421M_growth   (Model 1)

About the coefficients we can add that, except the constant of the model, all of the other coefficients are statistically significant with p-value<0.05, except the growth coefficient which is statistically significant for α<0.1. The corresponding p-values are as follows (Table 1): D-CPI has p-value of 0.0004, GROWTH has p-value of 0.0729 and M_GROWH with a p-value 0.0000. We continue further with analysis of the Model 1 to see if there are any changes that could be taken into consideration. First thing we do is to see if there is a multicollinearity between independent variables (Table 2).

Table 2- Matrix of correlations coefficients for Model 1

	M_GROWTH	GROWTH	D_CPI
M_GROWTH	1.000000	0.552383	0.119899
GROWTH	0.552383	1.000000	0.185530
D_CPI	0.119899	0.185530	1.000000

As we can observe there is a moderate linear correlation between growth of imports and economic growth with a coefficient of correlation 0.5524. Slightly high correlation is seen between difference of CPI and economic growth with a coefficient of 0.1855. Considering the above results, we should remove from the model the variable of economic growth.

Table 3- Estimation of the Model 2

Dependent Variable: X_GROWTH				
Method: Least Squares				
Date: 08/24/21 Time: 21:14				
Sample (adjusted): 2002Q2 2020Q4				
Included observations: 75 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.016805	0.011806	1.423372	0.1589
D_CPI	-0.092067	0.026674	-3.451636	0.0009
M_GROWTH	0.515532	0.081709	6.309328	0.0000
R-squared	0.395859	Mean dependent var		0.032859
Adjusted R-squared	0.379077	S.D. dependent var		0.126844
S.E. of regression	0.099952	Akaike info criterion		-1.729082
Sum squared resid	0.719304	Schwarz criterion		-1.636382
Log likelihood	67.84057	Hannan-Quinn criter.		-1.692068
F-statistic	23.58871	Durbin-Watson stat		2.399286
Prob(F-statistic)	0.000000			

The corrected model has no multicollinearity and all of the coefficients of independent variables are statistically significant at $\alpha < 0.05$.

$X\_growth = 0.0168 - 0.092\ D\_CPI + 0.5155\ M\_GROWTH$ (Model 2)

Table 4- White's Heteroscedasticity Test parameters for Model 2

Heteroskedasticity Test: White			
F-statistic	0.280731	Prob. F (5,69)	0.9222
Obs*R-squared	1.495294	Prob. Chi-Square (5)	0.9136
Scaled explained SS	1.214579	Prob. Chi-Square (5)	0.9435

Model does not have heteroscedastic errors since the F test of the Whites test is 0.2807 with corresponding p-value 0.9222, which means that we cannot reject the null hypothesis of homoscedastic residuals.

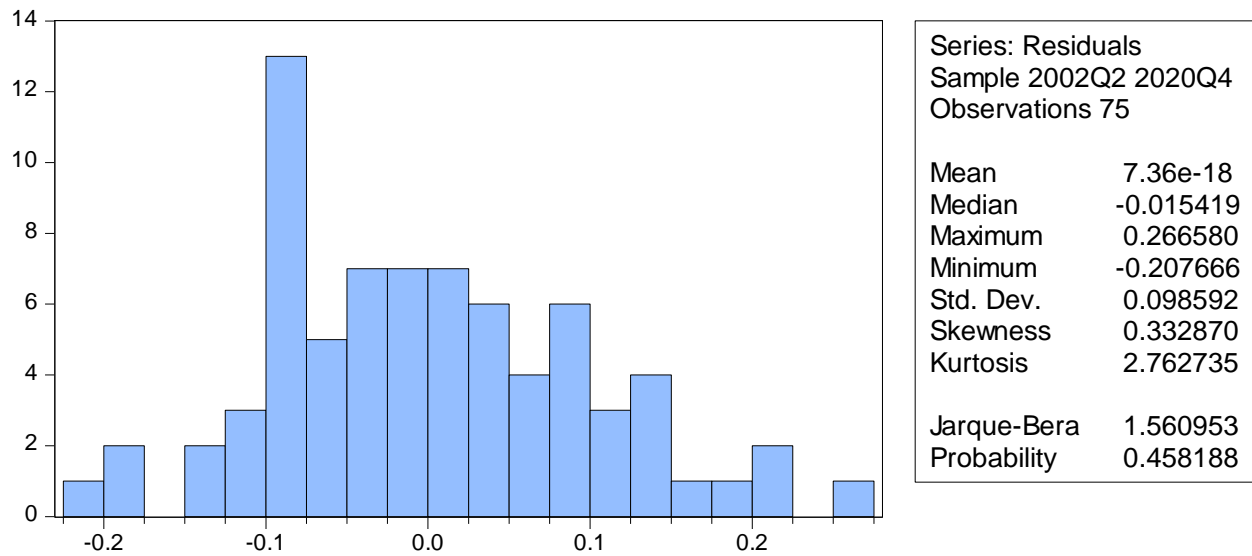| Series: Residuals	
Sample 2002Q2 2020Q4	
Observations 75	
Mean	7.36e-18
Median	-0.015419
Maximum	0.266580
Minimum	-0.207666
Std. Dev.	0.098592
Skewness	0.332870
Kurtosis	2.762735
Jarque-Bera	1.560953
Probability	0.458188

Figure 3- Descriptive statistics of residuals of the Model 2

The residuals of the model (Figure 3) show that the model has normally distributed errors (residuals). With Jarque- Berra statistics 1.561 and corresponding p-value 0.4582 we cannot reject the null hypothesis of normally distributed errors.

Table 5- Chow Breakpoint test, point of break is year 2020 Q1

Chow Breakpoint Test: 2020Q1			
Null Hypothesis: No breaks at specified breakpoints			
Varying regressors: All equation variables			
Equation Sample: 2002Q2 2020Q4			
F-statistic	1.197130	Prob. F (3,69)	0.3174
Log likelihood ratio	3.805487	Prob. Chi-Square (3)	0.2832
Wald Statistic	3.591391	Prob. Chi-Square (3)	0.3091

There are some ways to analyze, if Covid-19 has had a big of an impact on sales here in North Macedonia but, there are needed further data. As is shown in the Figure 1 it is visible that the pandemic had impact on exports of North Macedonia, and according to the values, in comparison to the other two series (GDP and Imports) exports had bigger decrease in level, thus in growth too.

We have tried to make a Break Chow analysis of the Model 2 to see if the coefficients of the model before the start of the crisis differ from those of the regression after start of the pandemics. With F-statistics 1.1971 and corresponding probability of 0.3174 we cannot reject the null hypothesis that the coefficients do not differ. The breakpoint is taken at the start of the year 2020, which means we have divided the sample in two models and the second model has

only 6 observations. The recommendation is the model to be reevaluated after there is going to be enough data to see if the pandemics had really impact on the exports.

CONCLUSION

Impacts and loses form the pandemic are yet to be evaluated as the data flow in. We can mention indicators that shall be considered in the future one should do analysis on sales as exports. Changing situations with waves of the pandemics are showing that there are a number of obstacles and uncertainties the entire world faces. Further analysis also could be done using primary data to see how the microeconomic aspect of sales has changed by analyzing the demand and supply of certain markets.

The result of the model estimated in this paper is showing that there are major impacts on exports during pandemics but that impact seems to be statistically insignificant. Economic growth is a very important macroeconomic indicator and as we saw, it has a positive impact on growth of exports in North Macedonia. Growth of imports is also a very important matter since they have a positive impact, this means that growth of imports causes growth of exports and that is due to the fact that for most of the products that North Macedonia exports are needed inputs that it imports. The rise of CPI means higher prices and with higher prices products become less competitive and this is the reason why this indicator has a negative sign in the model estimated.

There are a lot of risks that North Macedonia has to face, since it is a country that most of its economic growth comes from growth of imports, changing of prices of production factors could lead to decrease of exports and this imposes a risk to deepening the trade balance.

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