FOREIGN TRADE AS A DETERMINANT OF ECONOMIC GROWTH OF THE REPUBLIC OF SRPSKA: AN EMPIRICAL ANALYSIS

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ABSTRACT

Most studies that investigate the relationship between foreign trade and economic growth analyze it through the interpretation of various indicators. This paper seeks to investigate the relationship between coverage of imports by exports and the openness to foreign trade on one hand and the gross domestic product of the Republic of Srpska on other hand. The research relates to the period from 2001 to 2020. By applying the ARDL model we confirmed the initial hypothesis that an increase in the coverage of imports by exports increases the domestic product. The paper confirms the long-term relationship between independent and dependent variables, expressed through the existence of the cointegration equation. Results based on the applied ARDL method show negative, but insignificant relationship between openness and gross domestic product in the Republic of Srpska in long run, and statistically significant positive relationship between coverage of imports by exports and gross domestic product in long run. Value of coefficient shows that 1% increase in coverage of imports by exports increases gross domestic product by 0.80% in long run.

1. INTRODUCTION

The relationship between foreign trade openness and economic growth is a particularly interesting topic for researches in the 21st century. There are a large number of empirical studies from the 90s of the last century that considered the impact of foreign exchange on economic growth, and the effects of international

exchange on the economies of countries. The reason for the increased interest of economists and researchers in the advantages, disadvantages and effects of international exchange is the growth, i.e. the significant growth of the world trade from the 80s of the last century until today. During this period, the international trade grew faster than production (Krugman & Obstfeld, 2009). The accelerated process of globalization and integration of the world economy undoubtedly contributed to this. With the creation of the global market firms are in position to compete with other competitors around the world, and to place their products and services without legitime borders. The ongoing process of globalization has greatly contributed to the growing importance of international trade for economic growth. Because of that the attention of researchers is largely turned to examining the impact that international trade has on economic growth. Among numerous studies and researches, we can find different attitudes towards the direction of the influence of international trade on economic growth. However, the prevailing attitudes say that international trade positively determines growth. According to some of the most important studies in this field, trade has proven to affect the economic growth of a country and the growth of an economy that adopts liberalized trade regimes more than in closed economies (Grossman & Helpman, 1991; Edwards, 1993; Frankel & Romer, 1999; van den Berg & Schmidt, 1994; Chang, Kaltani & Loayza, 2009).

The theoretical development of the direction of free international exchange was preceded by a period that advocated the protection of domestic production. This theoretical direction is a continuation of the Hamilton and List's thinking. This theoretical direction is also known under the term of import substitution, where the assertion that the domestic production of an imported product leads to the employment of domestic resources and the creation of a larger domestic output is taken as a basic postulate. The failure in the development of countries that applied such postulates in conducting economic policy, as well as the evidence of the East Asian countries that based the economic development on the international exchange, led the economists to think that economic growth can be achieved without relying only on the domestic market. Based on the East Asian experience, many countries, guided by that example, began to adopt policies of opening their national economies to the world market. All this is done in order to use the resources provided by globalization and the movement towards the creation of a unified world market.

The experiences of the East Asian countries undoubtedly highlight that industrialization can be achieved without relying on the domestic market (Krueger, 1997). This contributed to the popularization of the direction known as export orientation. This direction also has its theoretical support in reference

works (Balassa, 1978; Krueger, 1978; Bhagwati, 1978). External orientation and good export performances can significantly contribute to economic growth (Ram, 1987). The more open the economy is, the lower the importance of the domestic market as a factor in economic growth is (Alesina & Spolaore, 2003).

Following the example of the East Asian countries, but also policies aimed at liberalizing economies and opening to the world, many former socialist countries have accepted inclusion in free international trade. In this way, the former socialist countries aimed at increasing the welfare of society and production. In the process of transition and adaptation to the capitalist mode of economy with openness to the world, some countries have successfully used these processes and raised the level of their development to a large extent compared to the previous state. Looking at European countries, we can refer to the examples of Poland, the Czech Republic, Slovakia, and even Hungary and Belarus, which have largely experienced the flourishing of their national economies in the last 30 years. On other hand, there are countries that are still struggling to find the right policies and practices in order to participate equally in the world trade, and derive benefits that would ultimately be reflected in the increase in the welfare of the population, significantly higher GDP, and its better structure. Countries like Bosnia and Herzegovina, Albania, Serbia, and even Croatia and Bulgaria, which are members of the European Union, are far below the European average in terms of their level of development.

The aim of this paper is to investigate the impact of the openness of the Republic of Srpska economy towards foreign exchange on economic growth. The research was conducted on the available time series on foreign exchange and GDP of the Republic of Srpska from the database of the Republic of Srpska Institute of Statistics for the period from 2001 to 2020. Therefore, the basic hypothesis in this research is as follows: Increase in the coverage of imports by exports increases the gross domestic product of the Republic of Srpska in the long term. The paper applies the ARDL methodology to obtain results that confirm the initial hypothesis.

2. LITERATURE REVIEW

Vogiatzoglou & Nguyen (2016) investigated the impact of openness, viewed through three variables - foreign investment, export and import - on the economic growth of ASEAN group member countries through the period from 1998 to 2014. Research conducted for each of the five member countries shows that there is a long-term equilibrium between openness and economic growth for each country individually. Their results show that export-oriented growth is the most important growth factor in most countries.

Abendin & Duan (2021) investigated the impact of foreign trade on economic growth in African countries using panel analysis. The research was conducted on a sample of 53 countries in the period from 2000 to 2018. The research showed that trade has positive effects on economic growth only if there is an interaction with the digital economy. Therefore, the authors suggest that the development of the digital economy should be supported so that the benefits of trade are greater.

Gries & Riedlin (2012) conducted a research on a sample of 158 countries in the period from 1970 to 2009, investigating the long-term and short-term dynamics between trade and economic growth. The statistical analysis showed that the coefficients with the variables that testify to the existence of a long-term relationship between trade and growth are positive, therefore their conclusion is that the strategy of trade integration is justified when talking about the creation of economic growth.

Kong et al. (2021) investigated the impact of the international trade on the quality of economic growth in China. Their research showed that there is a stable long-term cointegration relationship between openness to trade and the quality of economic growth. Tang (2020) investigated the combined effects of export structure and economic growth in European Union member countries from Central and Eastern Europe. The research showed that the export of agricultural products does not contribute to economic growth, while transport equipment, textiles, steel and chemical products accelerate the economic growth of the observed countries. Huchet-Bourdon, Le Mouël and Vijil (2018) point out that trade can have a negative impact on economic growth if countries specialize in the production of lower quality products, while trade has a positive effect on economic growth if countries specialize in the production of high-quality products.

Trivić (2018) conducted a research on a sample of 23 small transition countries examining the relationship between openness and economic growth of these countries. The conclusion of the research is that orientation towards the outside has no alternative in the case of small transition countries, and when considering the impact of openness on economic growth, it is necessary to separate the flows of foreign trade into import and export ones.

Iyke (2017) investigated the importance of openness to foreign trade for the economic growth of Central and Eastern European (CEE) countries. Using panel data for 17 countries in the period from 1994 to 2014, he reveals in his paper that trade openness is important for growth. The paper concluded that the growth of the share of foreign trade in GDP is positively correlated with GDP per capita growth.

Bojat, Kovačević and Kurušić (2021) analyzed the interdependence of the movement of the real growth rate as a dependent variable, and the movement of the share of exports and imports in GDP as explanatory variables on the example of Serbia. The research was conducted for the period from 2000 to 2019 with the help of the VAR methodology. The results showed that economic openness, primarily through export-oriented policies, contributes to real GDP growth in the long term, while the impact of the share of imports in the domestic product is negatively correlated with GDP.

Krajišnik, Gojković, Josipović and Popović (2020) investigated the impact of export structure on the economic growth of Bosnia and Herzegovina. This research showed that there is a bad structure of foreign trade production, and that it is necessary to improve the export performances of the economy of Bosnia and Herzegovina in order to reduce the foreign trade deficit. Also, the research confirmed the importance of exports for the economic growth of Bosnia and Herzegovina.

Krajišnik and Tomaš (2014) investigated the importance of foreign trade on the economic growth of the Republic of Srpska. The research showed that foreign trade is very important for the economic growth of the Republic of Srpska, but it is necessary to work on reduction of the foreign trade deficit, primarily through increasing exports and changing the commodity structure of exports. Erić, Popović and Popović (2019) investigated the impact of trade liberalization on the economic growth of the Republic of Srpska. Applying regression analysis, it was determined that the share of foreign trade and exports in GDP has a positive impact on the economic growth of the Republic of Srpska, while the movement of the trade deficit is negatively correlated with the economic growth. Bjelić, Erić and Vujnić (2020) examined the relationship between foreign trade, economic and industrial growth of the Republic of Srpska in the period from 2001 to 2018. In this research, the absolute values of GDP were taken as indicators along with the dependent variable, while the value of total exports in absolute values was observed as the independent variable. The results showed that each change in the unit of the independent variable leads to an increase in GDP by 1.27 billion BAM.

3. THE STATE OF THE ECONOMY OF THE REPUBLIC OF SRPSKA AND THE STRUCTURE OF FOREIGN TRADE

The economy of the Republic of Srpska, as well as the whole of Bosnia and Herzegovina, structurally does not differ in many ways from the economies of other transition countries. The dependence of small economies on international

exchange is to a large extent noticeable by observing the state and structure of the economy in the Republic of Srpska. In contrast to large developed countries, for which the postulate "that they are self-sufficient" is valid, small economies of the world depend to a large extent on foreign trade. The importance of foreign trade for small economies can be seen through the participation of foreign trade in the domestic product. The large participation of foreign trade in the domestic product of small economies testifies to the dependence of these economies on foreign trade exchange.

The following table shows the trends in the GDP and foreign trade of the Republic of Srpska from 2001 to 2020:

Table 1: Gross domestic product and foreign trade in the Republic of Srpska from 2001 to 2020

Year	GDP in BAM	GDP per capita in BAM	Export in 000 BAM	Import in 000 BAM	Foreign trade in 000 BAM	Openness to foreign trade in % of GDP	The coverage of imports by exports
1	2	3	4	5	6 = 4 + 5	7 = (6/2)*100	8 = (4/5)*100
2001	3682694	3081	598829	1697455	2296284	62%	35%
2002	4226010	3539	565647	2164367	2730014	65%	26%
2003	4591976	3850	610668	2277608	2888276	63%	27%
2004	5141035	4318	842920	2702771	3545691	69%	31%
2005	5712724	4809	1130518	2953177	4083695	71%	38%
2006	6560196	5535	1540236	2760163	4300399	66%	56%
2007	7377530	6240	1671601	3347925	5019526	68%	50%
2008	8524483	7226	1921837	4146519	6068356	71%	46%
2009	8272973	7023	1672915	3567879	5240794	63%	47%
2010	8357415	7104	2177809	4053084	6230893	75%	54%
2011	8720039	7425	2560808	4577526	7138334	82%	56%
2012	8638111	7363	2374737	4487548	6862285	79%	53%
2013	8814459	7526	2604090	4557635	7161725	81%	57%
2014	8910201	7635	2692013	4946061	7638074	86%	54%
2015	9224129	7937	2613924	4369179	6983103	76%	60%
2016	9650962	8338	2869101	4426945	7296046	76%	65%
2017	10099280	8759	3476093	4899081	8375174	83%	71%
2018	10701007	9322	3741823	5222270	8964093	84%	72%
2019	11251324	9848	3610386	4782190	8392576	75%	75%
2020	11131849	9797	3393236	4472288	7865524	71%	76%

Source: Agency for Statistics of the Republic of Srpska, 2021 and author' calculations

The previous table gives an insight into the movement of GDP through the observed period when the value of domestic product and domestic product per capita tripled. In 2001, the GDP was about 3.8 billion BAM, while in 2020, the value of the GDP in the Republic of Srpska was about 11.1 billion BAM. It is similar to the movement of the value of the GDP per capita. In 2001 the GDP per capita amounted to 3 000 BAM, while the value of the GDP per capita in 2020 reached the level of 9 700 BAM. In the observed period, a significant growth in foreign trade exchange is recorded, namely the total volume of foreign trade exchange starting from 2001, when it amounted to about 2.2 billion BAM, reached the level of 8.9 billion BAM in 2018, while in the last two years of the observed series, this volume fell to the level of below 8 billion BAM.

The dependence of the economy of the Republic of Srpska on foreign trade can be seen through its participation in the domestic product. Throughout the observed period, the share of foreign trade (calculated as [export + import]/GDP) in the domestic product of the Republic of Srpska did not go below the level of 60% of the share in GDP. In 2001, the share of foreign trade in GDP was 62%, which is the minimum value through the given period. The increase in the share of trade in GDP throughout the observed period can be noticed. This growth had cyclical oscillations, but it reached the level of 86% of the share in 2014, which represents the maximum registered value. After 2014, the participation of foreign trade decreased to the level of 76% in the next two years. In 2018 and 2019, the participation reached the level of 83% and 84%, respectively. In the last two years of the observed series, the level of foreign trade decreased to the level of 75% and 71% in 2019 and in 2020, respectively. The coverage of imports by exports in 2001 was 35%, and in the following two years it continued to fall below 30%. From 2004 until the end of the observed period, the coverage increased rapidly, except for 2008, when it fell below 50%. From 2017, the coverage of imports by exports in the Republic of Srpska was measured at a level of over 70%, and the growth of this indicator increased by 2020, when it amounted to 76%.

In addition to observing the total values we indicated in the previous part of the paper, it is also important to observe the structure of foreign trade. What is common to all developing economies is the unfavorable structure of foreign trade. If we look at exports in the Republic of Srpska through the structure of exports according to the economic purpose on E - Energy, AI - Intermediate products, except energy, B - Capital products, CD - Durable products for mass consumption and CN - Non-durable products for mass consumption, we come to a more detailed insight into the very structure and "quality" of the exports in the Republic of Srpska. The following table shows the structure of the exports in the Republic of Srpska according to economic purpose:

Table 2: Structure of exports in the Republic of Srpska according to economic purpose from 2008 to 2020

Year	Energy	Intermediate products	Capital goods	Durable consumer goods	Non-durable consumer goods	Undisposed
2008	8.59%	49.79%	11.58%	4.74%	22.46%	2.82%
2009	20.25%	37.69%	9.80%	5.24%	23.22%	3.79%
2010	23.67%	41.62%	7.43%	4.77%	18.27%	4.24%
2011	23.55%	38.69%	7.08%	4.80%	17.87%	8.02%
2012	17.00%	40.73%	6.83%	6.19%	20.94%	8.31%
2013	18.38%	37.07%	7.07%	6.90%	21.74%	8.84%
2014	15.33%	38.90%	7.45%	7.12%	23.65%	7.55%
2015	8.67%	43.09%	8.46%	8.03%	24.35%	7.40%
2016	7.23%	43.60%	8.80%	8.44%	24.01%	7.92%
2017	11.50%	44.65%	8.28%	7.59%	21.51%	6.48%
2018	12.29%	44.23%	8.94%	7.43%	21.19%	5.91%
2019	8.74%	44.33%	11.10%	7.27%	23.14%	5.42%
2020	7.96%	42.50%	11.96%	8.07%	24.05%	5.45%

Source: Agency for Statistics of the Republic of Srpska, 2021 and author' calculations

The structure of exports from the Republic of Srpska in the last 13 years shows that the largest percentage of the total exports was related to the export of intermediate products. It was around 40% of the total exports throughout the observed period. Then, in the export structure, non-durable consumer products follow, which participated in exports at the level of about 20% throughout the observed period. From 2009 to 2014, energy export participated in exports at the level of 15% to 23%, and after 2014, its participation decreased to the level of about 8%, to the same amount in 2008. Exceptions are 2017 and 2018, when the share of energy in total exports again reached double-digit values. The export of capital goods moved at the level of 7-9% throughout the observed period, with the exception of 2008, 2019 and 2020, when it amounted to over 11%. Non-durable consumer products and other products, whose share during the observed period did not exceed the level of 9%, are the ones with the smallest share in total exports.

The structure of imports in the Republic of Srpska, according to the economic purpose, deviates less than the structure of exports. The following table shows the structure of imports in the Republic of Srpska according to economic purpose for the period from 2008 to 2013.

Table 3: Structure of imports in the Republic of Srpska according to economic purpose from 2008 to 2020

Year	Energy	Intermediate products	Capital goods	Durable consumer goods	Non-durable consumer goods	Undisposed
2008	14.07%	33.90%	16.89%	6.18%	23.28%	5.69%
2009	22.24%	29.08%	15.04%	2.72%	25.78%	5.13%
2010	28.29%	29.64%	11.97%	2.51%	22.51%	5.08%
2011	31.98%	29.46%	10.88%	1.98%	20.20%	5.50%
2012	30.00%	30.22%	10.97%	1.96%	21.50%	5.36%
2013	28.93%	30.07%	12.05%	1.94%	21.65%	5.35%
2014	23.47%	31.05%	16.61%	2.02%	21.91%	4.94%
2015	17.12%	34.75%	14.49%	2.31%	25.39%	5.93%
2016	15.37%	36.51%	13.97%	2.53%	25.47%	6.15%
2017	16.32%	36.79%	15.07%	2.35%	24.03%	5.45%
2018	15.71%	37.32%	16.06%	2.35%	23.96%	4.58%
2019	7.30%	39.83%	17.30%	2.75%	28.27%	4.55%
2020	6.70%	38.64%	16.94%	2.68%	30.21%	4.83%

Source: Agency for Statistics of the Republic of Srpska, 2021 and author' calculations

If we look at the structure of imports, we can see that intermediate products participate in total imports at a level of over 30%. Also, there is a noticeable increase in the share of intermediate products in the last years towards the level of 40% of share. The share of non-durable consumer goods in total imports increased from the level of 23% in 2008 to the level of 30% in 2020, while a slightly lower percentage of non-durable products can be observed from 2010 until 2014. The share of energy in total imports showed growth from 2008 to 2013, when it stood at the level of about 30% of total imports, followed by a decline to the level of 7.3% and 6.7% in 2019 and 2020, respectively. The share of capital goods in total imports ranged from 10% to 17% throughout the observed period, while from 2010 to 2013, the share was expressed as a smaller percentage, at the level between 10 and 12%. The share of durable consumer goods was around 2.5%, while the share of other products did not exceed the level of 7% throughout the observed period.

4. MATERIALS AND METHODS

We continue to analyze the impact of foreign trade on the economic growth of the Republic of Srpska using statistical methods. The research is designed in such a way to analyze the relationship between foreign trade participation and import-export coverage as independent variables and GDP as a dependent

variable. Therefore, starting from the goal of quantifying the influence of the independent variable on the dependent variable, the basic research model in the paper can be written as:

$$GDP = f(OPEN, COV) \quad (1)$$

where *GDP* is an independent variable, that is, a logarithmically given value of GDP, *OPEN* is the share of external goods in the domestic product and *COV* is a percentage indicator of the coverage of imports by exports. The description and specification of variables in the research is given in the following table:

Table 4: Specification of research variables

Variable	Type	Label	Capital goods	Undisposed
Gross Domestic Product	Dependent	GDP	Agency for Statistics of the Republic of Srpska	The variable GDP is the GDP value given in levels in BAM
Openness to foreign trade	Independent	OPEN	Agency for Statistics of the Republic of Srpska	Openness to foreign trade is calculated as the share of total exchange in GDP
Coverage of imports by exports	Independent	COV	Agency for Statistics of the Republic of Srpska	Coverage of imports by exports is given as a percentage of the share of exports in imports

Source: Authors' presentation

We evaluate the quantification of the influence of the independent variables on the dependent variable using the Autoregressive Distributed Lag (ARDL) approach. ARDL approach presented by Pesaran, Shin and Smith (2001) is best method when variables are of mixed order of integration (I(0) and I(1), and not integrated of order I(2). This method is useful when we have small sample time series for estimating long-term and short-term coefficients based on OLS method of estimation (Duasa, 2007). By applying the ARDL method we start with conducting the following model which uses logarithmic transformation of research variables:

$$\log GDP_t = \alpha_0 + \alpha_1 \log OPEN_t + \alpha_2 \log COV_t + \varepsilon_t \quad (2)$$

where α_0 is constant, α_1 and α_2 are coefficients for independent variables OPEN and COV, respectively and ε_t is error term. ARDL approach is based on lags of observed variables, so previous equation in ARDL form is given as:

$$\Delta \log GDP_t = \alpha_0 + \sum_{k=1}^{n} \Delta\alpha_1 \log GDP_{t-k} + \sum_{k=1}^{n} \Delta\alpha_2 \log OPEN_{t-k} + \sum_{k=1}^{n} \Delta\alpha_3 \log COV_{t-k} + \lambda_1 \log GDP_{t-1} + \lambda_2 \log OPEN_{t-1} + \lambda_3 \log COV_{t-1} + \varepsilon_t \quad (3)$$

Study uses the Akaike information criterion (AIC) for choosing the lag length. After finding the long-run association existing between variables, the ARDL approach uses the error correction model (ECM) to find the short-run dynamics. The ECM general form is formulated as:

$$\Delta \log GDP_t = \alpha_0 + \sum_{k=1}^{n} \Delta\alpha_1 \log GDP_{t-k} + \sum_{k=1}^{n} \Delta\alpha_2 \log OPEN_{t-k} + \sum_{k=1}^{n} \Delta\alpha_3 \log COV_{t-k} + \phi \log ECT_{t-1} + \varepsilon_t \quad (3)$$

where ϕ is parameter of speed of adjustment in the long-run equilibrium after a shock in the short run. The existence of cointegration between the observed variables is confirmed based on F-bounds with calculated F-statistics. Decision on the existence of cointegration between variables is confirmed by comparing F-statistics value to lower and bound values (Pesaran & Shin, 1999). If F-statistics value is larger than the lower and upper bound, then we can conclude that cointegration between variables exists. By confirming that the long-run associations exist between variables, the study applies the cumulative sum (CUSUM) and cumulative sum of square (CUSUMSQ) tests (Brown, Durbin and Evans, 1975). Previous studies (Pesaran & Shin, 1999; Pesaran, Shin and Smith, 2001) suggested that these tests portray the good fit of the ARDL model. These tests are used to plot the residual of ECM. If the statistics in the plot fall in critical bounds at a 5% significant value, the results suggest that the coefficients of the ARDL model are stable.

5. RESULTS AND DISCUSSIONS

The empirical study uses the time series data to explain the long-term effects of openness and coverage of import by export on gross domestic product in the Republic of Srpska. The descriptive statistics of the important variables is stated in Table 5. All variables in Table 5 are given in levels:

Table 5: Descriptive statistics

Variable	GDP	OPEN	COV
Mean	7979420	0.732257	0.524715
Median	8581297	0.730197	0.540798
Maximum	11251324	0.857228	0.758725
Minimum	3682694	0.623534	0.261345
Std. Dev.	2289048	0.075009	0.152544
Skewness	-0.466886	0.099855	-0.187242
Kurtosis	2.153015	1.782978	2.158876
Jarque-Bera	1.32443	1.267522	0.706439
Probability	0.515708	0.530592	0.702423
Sum	1.60E+08	14.64513	10.4943
Sum Sq. Dev.	9.96E+13	0.1069	0.442126
Observations	20	20	20

Source: Authors' calculations

In the paper, we first test the stationarity of the variables included in the model. Namely, as mentioned earlier, the condition for adopting the ARDL approach is that the series must be mix order of integration, I(0) and I(1). If the time series are stationary or non-stationary in levels, and stationary after the first derivative, i.e. if they are integrated of order I (1), then we can test the existence of a cointegration relationship, which can be interpreted as a long-term relationship between the observed variables, and apply the model with error correction. Therefore, the following table shows the results of the ADF test of stationarity of time series in levels and after differentiating the time series:

Table 6: Results of the ADF stationarity test

Series		Critical values of the ADF test	p-value
GDP	Levels	-4.136718	0.0053
	The first difference	-2.335948	0.1722
OPEN	Levels	-2.107396	0.2440
	The first difference	-4.947605	0.0012
COV	Levels	-0.471514	0.8768
	The first difference	-3.780477	0.0131

Source: Authors' calculations

In the ADF stationarity test, the null hypothesis assumes the existence of a unit root in the time series, which confirms that the observed series is non-stationary. Contrary to the null hypothesis, the alternative hypothesis assumes that the time series does not have a unit root, so it is stationary. If the value of the obtained test

statistic is smaller than the critical value, then we accept the alternative hypothesis of the absence of a unit root, while otherwise we discard the alternative and accept the null hypothesis. From the previous table, we can see that the GDP variable is integrated of order I (0), which means that this time series is stationary in levels, which is confirmed at the 1% significance level. Also, the results of the ADF stationarity test testify to the non-stationarity of the OPEN and COV variables when observing these series in their levels. However, after differentiating these time series, both variables become stationary. In addition to the ADF stationarity test, the PP stationarity test is also used in the paper with identical results, which are shown in the Appendix.

Before calculating long- and short-run coefficient between the observed variables, it is important to calculate F-bounds test for confirmation of cointegration (Pesaran, Shin and Smith, 2001). The decision of existence of cointegration is made by comparing F-statistic with upper and lower bound:

Table 7: Results of cointegration in ARDL

Equation	Model	F-statistics		p-value
$GDP = f(OPEN, COV)$	$ARDL(1,3,2)$	30.883		0.000
	Significance			
Critical value	10.0%	5.0%	2.5%	1.0%
Lower bound I(0)	3.17	3.79	4.41	5.15
Upper bound I(1)	4.14	4.85	5.52	6.36

Source: Authors' calculations

Decision of existence of cointegration based on F-Bounds test follows the rule: if F-statistics value is larger than the lower and upper bound then we can conclude that cointegration between variables is confirmed. The value of F-statistics is 30.883 and by comparing with upper and lower bounds we are able to confirm cointegration between the observed variables statistically significant at 1%. The upper bound of test is 6.36 which is smaller than calculated F-statistic of 30.883.

Based on previous results we will present long- and short-run ARDL model with coefficients to determine the direction of relationship between these three variables. After verifying the existence of a long- and short-run association between variables from the ARDL bound test, the study finds the short- and long-run parameters of the variables. As we can see in Table 8 coverage of imports by exports in long rung increases GDP in the Republic of Srpska, namely 1% of rise of COV in long-term increases GDP by 0.80%. This coefficient is statistically significant at 1% level. On the other hand, calculated long-run coefficient for

variable OPEN is negative, but statistically insignificant. Table 8 presents results for long-run parameters of *ARDL (1,3,2)* calculated as:

Table 8: Long-run estimation of parameters from ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
log *OPEN*	-0.0930	0.1303	-0.7134	0.4960
log *COV*	0.8025	0.0476	16.8757	0.0000
C	12.4957	1.4837	8.4221	0.0000

Source: Authors' calculations

Short-term coefficients show that coverage of import by export has a positive effect on GDP in the first lag and negative in the second lag. Both coefficients are statistically significant at 1% level of significance. Short-term coefficients for variable OPEN have positive effects on GDP in the first and second lag, and negative in the third lag. However, these coefficients are not statistically significant. Table 10 presents short-run coefficients of ARDL model:

Table 9: Short-run estimation of parameters from ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta\log OPEN$	0.0078	0.0579	0.1345	0.8963
$\Delta\log OPEN_{t-1}$	0.0522	0.0530	0.9838	0.3540
$\Delta\log OPEN_{t-2}$	-0.0952	0.0646	-1.4732	0.1789
$\Delta\log COV$	0.2130	0.0359	5.9279	0.0004
$\Delta\log COV_{t-1}$	-0.3079	0.0563	-5.4678	0.0006
ϕ	-0.7583	0.0705	-10.7617	0.0000

Source: Authors' calculations

As we can see from the calculated parameters in short-term model coefficient ϕ or the speed of adjustment parameter is -0.7583. This means that the speed of adjustment of long-term equilibrium on short-term fluctuations is 0.76% per year.

Numerous diagnostic tests are used to find potential errors in the model. Diagnostic tests applied are R-square and Adjusted R-square tests for model fit, Durbin-Watson statistics for autocorrelation, Ramsey RESET test for stability of model, ARCH and Breusch-Pagan-Godfrey test for heteroscedasticity, Breusch-Godfrey Serial Correlation LM Test and Jarque-Bera test for normality of residuals. Table 11 presents results of these tests:

Table 10: Results of diagnostic tests

Test	Statistics	Prob.
R-square	0.943137	0.000
Adjusted R-square	0.90902	0.000
Durbin–Watson statistics	2.452189	-
Ramsey RESET	0.004181	0.9503
ARCH	0.682783	0.4225
Breusch-Pagan-Godfrey	1.236919	0.3854
Breusch-Godfrey Serial Correlation LM Test	1.542216	0.2881
Jarque–Bera	0.435824	0.8042

Source: Authors' calculations

As we can see from Table 10 R-square and Adjusted R-square are 0.9431 and 0.9090 and this implies good fit of the estimated model. Durbin-Watson statistics of autocorrelation is 2.45 which suggests that model is free from autocorrelation. Durbin-Watson statistics uses values from 0 to 4 and optimal values, which confirms there is no autocorrelation in the range from 1.50 to 2.50. Based on Ramsey RESET test we conclude that model is stable because p-value is greater than 0.05. Also, ARCH and Breusch-Pagan-Godfrey test for heteroscedasticity show that there is no heteroscedasticity in the estimated model. Based on p-value we can conclude that model is free of autocorrelation, and based on Jarque-Bera test for normality of residuals we can conclude that residuals are normally distributed.

6. CONCLUSIONS

The export orientation of developing countries is one of the key determinants when creating the economic growth of these countries. Due to the deviation of all other theories about the protection of domestic production through protectionist policies, the forcing of an export-oriented economy through the adoption of export-oriented policy of growth and development, can be an important generator of the country's economic growth.

The main goal of this paper was to determine the relationship between foreign trade openness and coverage of imports by exports, on one hand, and nominal GDP as measure of economic growth in the Republic of Srpska on other hand. We tried to confirm the main hypothesis that an increase in the coverage of imports by exports increases the gross domestic product in the Republic of Srpska in the long term.

Descriptive statistics showed that the foreign trade in the Republic of Srpska achieved a deficit of foreign trade through the entire period from 2001 to 2020. Also, the trade openness rose through this period, from 62 % of GDP in 2001 to 84% of GDP in 2018, i.e. by 22 percentage points, but significantly decreased in last two year and ended at the level of 71% of GDP in 2021 due to COVID-19 pandemic. A positive trend in indicator coverage of imports by exports was also recorded during the observed period. It grew significantly from 35% in 2001 to 76 % in 2021, which means that foreign trade deficit was relatively smaller in 2020 compared to 2001. As the deficit of foreign trade is constantly achieved through the observed period with a negative impact on GDP according to the economic theory, coverage of imports by exports became the main variable with a positive impact on GDP.

The econometric analysis confirms the long-term relationship between the economic growth and coverage of import by export, which is reflected in the existence of one cointegration equation. Using the ARDL approach, we came to the result that the long-term increase in the coverage of imports by exports has statistically significant and positive impact on the economic growth, while the openness has is a negative but statistically insignificant impact on the economic growth.

As foreign trade of the Republic of Srpska is mainly oriented towards the trade in intermediate goods we suggest that this is the reason why foreign trade does not produce higher effects on economic growth as Huchet-Bourdon, Le Mouël and Vijil (2018) explained. Also, the results we obtained are in line with Abendin & Duan's (2021) results which imply that foreign trade is significant for economic growth only if there is interaction between foreign trade and digital economy. Trivić (2018) showed that it is important to divide the flows of foreign trade into import and export ones. And considering this statement we conclude that an increase in export and an increase in coverage of imports by exports are strongly correlated with the economic growth. This conclusion is in accordance with results of Bojat, Kovačević and Kurušić (2021) who showed that economic openness, primarily through export-oriented policies, contributes to real GDP growth in the long term, while the impact of the share of imports in the domestic product is negatively correlated with GDP. Also, our results are in line with the results showed in Krajišnik et al. (2020) who emphasized the importance of export structure for the economic growth.

The final conclusion is that the adoption of export-oriented economic policies towards higher value-added products, along with the reduction of the balance of payments deficit should be one of the goals of the policymakers in the Republic

of Srpska. Authors are aware of limitations of this research due to lack of data and short time series for reliable econometric analysis. Also, due to the specifics of BiH organization some variables were not possible to calculate at the entire level, so we included available variables for the analysis. The possible directions of further research indicate that they can be directed towards researching the relationship between the structures of foreign trade, both export and import, and the domestic product in the Republic of Srpska.

Conflict of interests

The authors declare there is no conflict of interest.

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APPENDICES

Appendix 1. Results of Philips-Peron stationarity test

Table 11: Results of the PP stationarity test

Series		Critical values of the ADF test	p-value
GDP	Levels	-4.136718	0.0053
	The first difference	-2.335948	0.1722
OPEN	Levels	-2.107396	0.2440
	The first difference	-4.947605	0.0012
COV	Levels	-0.471514	0.8768
	The first difference	-3.780477	0.0131

Source: Authors' calculations

Appendix 2. Normality of residuals

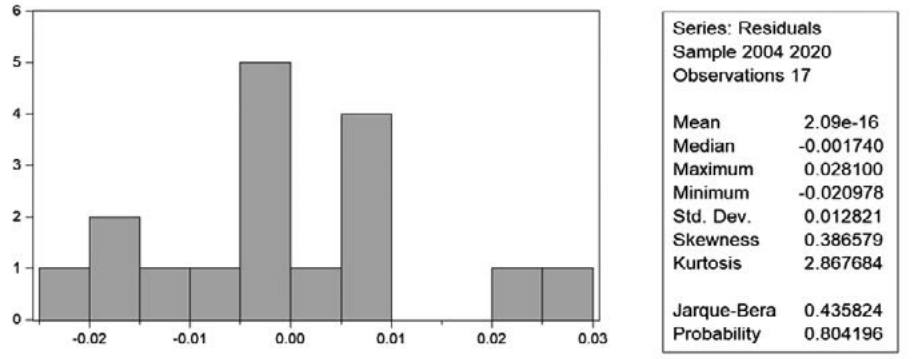
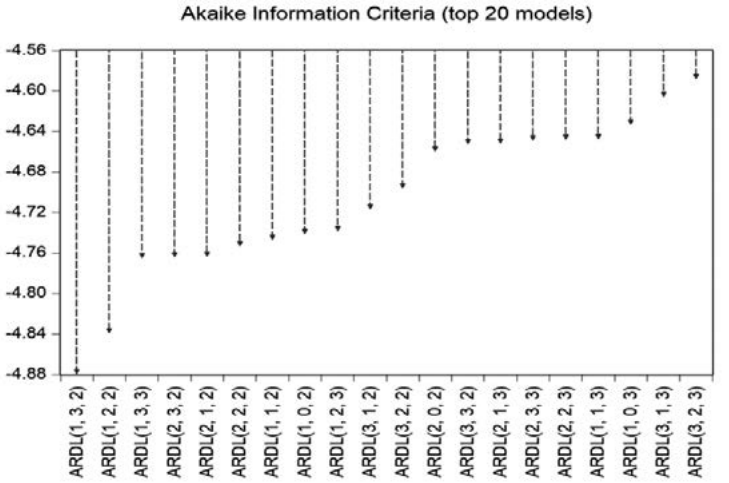


Figure 1: Results of the normality tests

Source: Authors' calculation

Appendix 3. Akaike Information Criterion selection of the model

For determining optimal number of lags, we used Akaike information criterion (AIC). As AIC shows optimal ARDL model is given by ARDL (1,3,2). This result suggests that optimal number of lags for variable GDP is one, for variable OPEN is three, and for variable COV is two. In the next figure we can see results of this selection process:

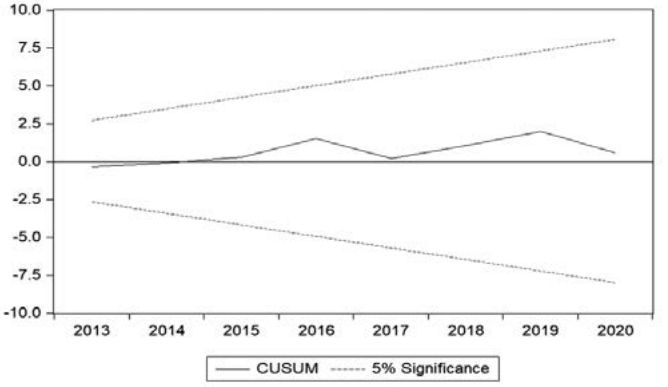


Graph 1: AIC selection process

Source: Authors' calculations

Appendix 4. CUSUM test for stability

The study uses cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for checking stability in the short-run and long-run coefficients proposed by Brown, Durbin and Evans (1975). The CUSUM and CUSUMSQ are at the 5% significance level over time, confirming the stability and good fit of the ARDL model. CUSUM test for stability of coefficients of model shows that cumulative sum of GDP lies within 5% significance boundaries. Next figure presents the results of CUSUM test of stability:

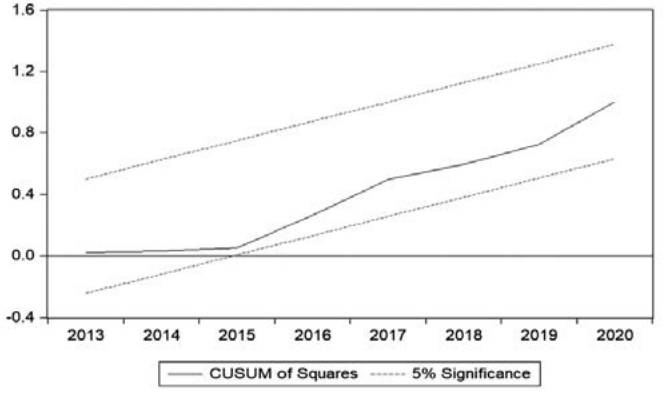


Graph 2: CUSUM stability test results

Source: Authors' calculations

Appendix 5. CUSUMQ test for stability

Based on CUSUMQ test as we can see from next figure, we conclude that our model is stable. Next figure presents the results of CUSUMQ test of stability:



Graph 3: CUSUMQ stability test results

Source: Authors' calculations

СПОЉНА ТРГОВИНА КАО ДЕТЕРМИНАНТА ЕКОНОМСКОГ РАСТА РЕПУБЛИКЕ СРПСКЕ: ЕМПИРИЈСКА АНАЛИЗА

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САЖЕТАК

Већина студија које истражују везу између спољне трговине и економског раста анализирају везу кроз интерпретирање различитих индикатора. Овај рад настоји истражити везу између покривености увоза извозом и отворености према спољној трговини, с једне стране, и бруто домаћег производа Републике Српске, с друге стране. Истраживање се односи на период од 2001. до 2020. године. Примјеном ARDL модела потврдили смо почетну хипотезу да повећање покривености увоза извозом повећава домаћи производ. Рад је потврдио дугорочну везу између независних и зависне варијабле, што је изражено кроз постојање коинтеграционе једначине. Резултати базирани на примијењеном ARDL методу показују негативну, занемариву везу између отворености и бруто домаћег производа у Републици Српској у дугом року, као и позитивну статистички значајну везу између покривености увоза извозом и бруто домаћег производа у дугом року. Вриједност коефицијента каже да 1% повећања покривености увоза извозом повећава бруто домаћи производ за 0,80% у дугом року.

Кључне ријечи: *спољна трговина, економски раст, трговинска отвореност, бруто домаћи производ*.