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## Article

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## The Relationship between Current Account Deficits and Growth in Montenegro: ARDL Bounds Testing Approach

**Abstract:** In this study, we investigate the relationship between current account deficits and growth in Montenegro by applying the bounds testing (ARDL) approach to co-integration for the period from the third quarter of 2011 to the last quarter of 2016. The bounds tests suggest that the variables of interest are bound together in the long run when growth is the dependent variable. The results also confirm a bidirectional long run and short run causal relationship between current account deficits and growth.

The short run results mostly indicate a negative relationship between changes in the current account deficit GDP ratio and the GDP growth rate. This means that any increase of the value of independent variable (current account deficit GDP ratio) will result in decrease of the rate of GDP growth and vice versa.

The long-run effect of the current account deficit to GDP ratio on GDP growth is positive. The constant ( $\beta_0$ ) is positive but also the ( $\beta_1$ ), meaning that with the increase of CAD GDP ratio of 1 measuring unit, the GDP growth rate would grow by 0,5459. This positive and tight correlation could be explained by overlapping structure of the constituents of CAD and the drivers of GDP growth (such as tourism, energy sector, agriculture etc.).

The results offer new perspectives and insights for new policy aiming for sustainable economic growth of Montenegro.

**Key words:** Current account deficit, ARDL Bounds testing, Granger Causality, Co-integration, Montenegro Economy

**Jel codes:** C22, E17, E27, F32, F41, F43, H62

## 1. Introduction

Montenegro has been facing high levels of the current account deficit for many years now. It is also one of the major concerns of economic policy because this raises the question of sustainability of the external (im)balances on one hand, while on the other it raises a concern about implications of high current account deficit on economic growth.

The analysis of this kind is very difficult when it comes to Montenegro, primarily because of the existence of short time series, as the country has been independent as of 2006. During the major part of the past several years, there have been various shocks that challenge the representativeness of the available data. For example, in the first years after gaining independence, the country experienced enormous lending activity of 125% in 2006 and 165% in 2007 (Ivanović, 2015). Additionally, in some years, there was an extremely high inflow of foreign direct investments, which led to a high level of imports (tourism, as the most attractive sector for investment usually called for extensive imports from construction materials to furniture). After the onset of the global financial crisis, Montenegro fell into a recession, which again affected the balance of payments flows. That is why the authors of this paper carried out the analysis of a relatively short time series to get more representative data. Also, both Montenegro and the region have become more vulnerable to external shocks (Asanović, 2017).

Montenegrin economy is a small, open, and unilaterally dollarized. By comparing the foreign trade exchange of Montenegro with its domestic product we get its foreign trade coefficient, which in 2013 amounted to 62.2%. This high ratio reflects the fact that foreign trade is a very important activity for the Montenegrin economy (Živković and Bjelić, 2017). Listed basic features of Montenegro's economy create a wide area for researchers to examine the dynamic relations between numerous macroeconomic indicators of the country. The importance of one of those relations lies in connecting growth to current account deficit, contributing to our understanding of whether or not there is balance of payments restriction on the growth of Montenegro. Thus, this study examines the dynamics of the correlation between growth rate and current account deficit by using ARDL bounds testing approach for the period from the third quarter of 2011 to the last quarter of 2016. The main purpose of the paper is to determine short-run and long-run interactions between the named variables. It should be noted that this is the first attempt of examining such variable correlation, on the example of Montenegro. Having all of the above in mind, the results of the paper should provide important insights for both academics and the policy makers in Montenegro.

Structurally, this paper consists of three main parts. Firstly, the introductory part provides some basic information on the traits of Montenegro's economy relevant to the study conducted in the paper. Additionally, it contains insights into the process of growth of the Montenegrin economy as well as a closer look into the structure of the current account deficit of the country and its trending over the years. The second, central part of the paper elaborates on the econometric model and relevant supporting information. Finally, conclusions and proposed measures and policies are extracted from the model, making it the third and also the last part of the paper.

## 2. Basic characteristics of Montenegro's economy

A small, open, dollarized economy is the most common combination of features used to describe the economy of Montenegro. In 2008, a couple of authors (Fabris and Kilibarda, 2008) depicted the following as some of the basic characteristics of the Montenegrin economy. Namely, their description marked it as an: open-market one, with liberalized foreign flows and fast-growing economic activity, low level of inflation rate, existing budget surplus, record level of inflows from foreign direct investments, continuous decline in unemployment rate, decrease in the level of foreign debt, high current account deficit and a strong growth of trade deficit. They took into consideration a whole set of positive movements (unemployment decrease, price stability etc.) that were contributing to the inner stability of the system whereas, on the other hand, they raised the question of the outer stability as well as of the sustainability of the current account deficit (CAD), due to the imbalance of payments. Sustainability of CAD mainly depends on the way of financing this external imbalance by capital inflow from abroad (in the form of FDI and portfolio investment), but as well as of using these flows to achieve good business environment for the growth of domestic savings and investment. However, there is an ongoing debate on the appropriate level of CAD in percentage of GDP and its sustainability and when BoP crisis occurs. According to the Regular economic report by the World Bank (2018), current account deficits widened in almost all countries in the Western Balkan despite growth in exports because in all of the countries, except in Kosovo and FYR Macedonia, imports overwhelmed exports. This is the case with Montenegro as well and the current account sustainability analysis suggests that Western Balkan countries need to reduce external deficits in the medium-term. Kovac (2004) claims that BoP sustainability can be seen as the status that can be maintained automatically without using instruments of economic policy.

Before taking a closer look at the inputs used for the econometric model created within this research and the model itself, some of the main constituents of the model (that are in the same time the main macroeconomic indicators of Montenegrin economy) will be elaborated in the further text, such as: basic principles of an open, unilaterally dollarized economy, Montenegrin current account deficit and its chronological movements, reasons for its very existence and similar and lastly the key drivers of the economic growth of Montenegro.

Montenegrin economy is a dollarized one. In order to be able to properly analyse the following findings, one should be able to understand the basic features of such economy. According to Mann: "Policy-initiated dollarization is like wiring your mouth shut to lose weight. It is effective in the short-run, but unless you undertake life-style changes (eating habits, exercise) you are not a healthier individual, just a thinner one. Moreover, once you have achieved your desired new weight, you'll want to take off the braces and eat something besides a liquid diet." (Fabris et al, 2004). Defining it in other words, it is understood, under the official term of dollarization, that the foreign currency is the only legitimate mean of payment and that there is no domestic currency. It is also possible for several foreign currencies to be used as a means of payment, even though this is a relatively rare situation. Only sixteen countries today create the group of officially dollarized countries. Montenegro is one of the officially dollarized countries, as well (Fabris et al, 2004). Fabris and Kilibarda (2008) point out that with CAD of Montenegro on that basis there is a lower risk than in the case of countries that have their own currency. However, in that way the option of using exchange rate as an instrument of economic policy to reduce CAD is eliminated. Kilibarda (2011) point out that in almost all years before the global economic crisis began FDI was the main source of financing CAD in Montenegro. He claims that CAD in the longer period, when this trend regarding FDI reversals and when the time for paying debt is come, it may reduce money supply and can have recession effect.

According to the Regular Economic Report prepared by World Bank (2018), although the external environment remained favourable, in 2017 net exports contributed less to growth, overwhelmed by higher imports for energy projects, consumption, and investment. Bold structural reforms are necessary if Montenegro is to grow sustainably over the medium term.

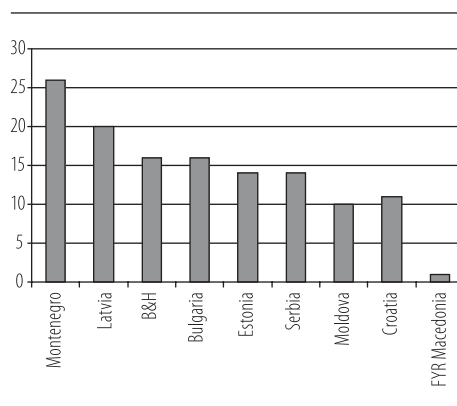
### **3. Current account deficit and growth in Montenegro**

One of the two variables examined with the model is current account deficit of Montenegro. In order to be able to properly address this topic later in the text, the

definition, structure and the yearly movement trend of this variable is presented here.

Current account balance, according to the experts from the field (Fabris and Kilibarda, 2008), gives information on country's inflows and outflows derived from the goods and services trade, income and current transfers among residents and non-residents, or, in other words, on foreign liabilities or assets generated based on the previously listed transactions. Current account deficit, according to the same source, does not represent an economic policy variable, such as for example the amount of cash in circulation, but rather an aim of the economic policy, such as the inflation rate or the level of GDP. Current account movements portray an important source of information to the economic policy creators and are reflecting the results of those policies. During the pre-crisis period (2005-2007), the current account deficit of Montenegro was higher than one of any other European, neighbouring country (Figure 1).

**Figure1: Current account deficit of the payment balance, expressed in % of GDP (period 2005-2007)**



Source: Transition report 2007

In 2007 (EBRD, 2007 Country assessment: Montenegro), the general viewpoint of the IMF regarding the question of the high rate of CAD was that the balanced system represented the response to the high level of foreign direct capital inflows as well as to the swift growth of loans.

Standard components of balance of payments are two main accounts:

- Current account and
- Capital and financial account.

All transactions (Fabris and Kilibarda, 2008) (except the ones within financial points of the accounts) relating to the economic values and that are happening among residents and non-residents are taken into calculation with the current account. These transactions of legal entities are generating an added value and are therefore included in the computation of GDP. On the other hand, transactions noted in the capital-financial account represent the transition of the main

part of the generated income in the shape of savings from one country to another. Current transactions enlarge the volume of the national income, whereas capital-financial transactions simply record its allocation. All goods or services transactions, factor income, as well as one-sided transfers are noted within the balance of payments.

Another position of the balance of payments that should be brought to the attention, especially in the case of Montenegro, is the so-called “net errors and omissions”. To be more precise, net errors and omissions account for the transactions that have either not entered the calculation (due to various reasons) or have been improperly valued. In the case of Montenegro, this position in the balance of payments makes up for a quite high number of transactions and, therefore, has alarmingly large value. Part of the explanation behind this phenomenon is:

- a. The country (having in mind that the Central Bank of Montenegro does not have the issuing function and that the country does not have its own currency but is dollarized and uses euros printed within the European Union) does not have the exact information on the quantity of cash in circulation ( $M0$ ). The last available related information dates back to the beginning of the century when the currency used at the time (Dinar) was converted to the new one (Deutsche Mark). Since then, the level of  $M0$  was an open question that will have a mere approximation as an answer in the near future. Until there is an approximation of the level of  $M0$ , the Central Bank of Montenegro uses its own estimation, making the position “net errors and omissions” questionable;
- b. Substantial amount of the transactions that are entering the calculation of the balance of payments are the ones related to *tourism* (according to the EBRD as well as the relevant Montenegrin authorities, tourism is one of the leading sectors contributing to the country’s growth). However, the country is facing difficulties in measuring the income generated through tourism.<sup>1</sup> As a result, this can have an important impact on the level of net errors and omissions and, ultimately, on the balance of payments itself.
- c. It is suspected that a part of transactions that are basically foreign direct investments in goods is statistically recorded as imports.
- d. Other miscellaneous reasons for outdated or missing data.

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<sup>1</sup> Mainly due to the incomplete or outdated information as well as due to the informal economy and tax avoidance appetite of the parties involved in the process. The figures based on which the information are computed are estimations and therefore can be further analyzed and/or amended.

Such a high level of net errors and omissions indicates that the current account deficit is probably not that high as statistically recorded. However, the 2017 revision of the balance of payments statistics has brought about a significant decline in the amount of net errors and omissions.

Having in mind that the double-entry accounting method is used for computation, the balance of payments of Montenegro is, accordingly, balanced at all times. One cannot talk about surplus or deficit of the balance of payments itself but rather only about surplus or deficit of its subaccounts, such as the current account.

After introducing the basic principles of the balance of payments and its subaccounts, the following information will put a focus on the causes of the current account deficit of Montenegro and analyse its sustainability as well as the means of its financing.

Developing countries usually finance their growth and developments precisely this way. According to Fabris and Kilibarda (2008) “high level of current account deficit and high level of foreign direct investment inflow are main characteristic of almost all countries of Central and Eastern Europe”. This is, therefore, one of the main reasonings behind the current account deficit in Montenegro.

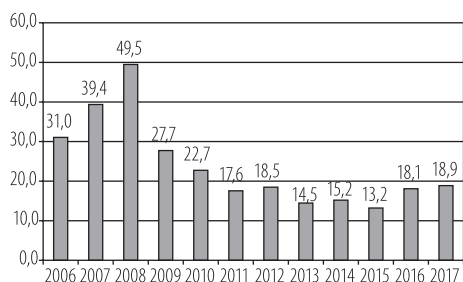
Aside from the abovementioned, some other drivers of CAD can be identified. The observed period will be the year 2006 and onwards. This is due to the fact that the country of Montenegro officially regained independence on 21 May 2006. Around and after that time (2006-2007) many positive economic trends took place (such as: growth of the purchasing power parity, FDI inflows, double-digit income from tourism growth rate etc.) that reflected on the balance of payment of the country. The need for goods (Fabris, 2004) resulting from the enhanced purchasing power parity of the inhabitants as well as from the steep growth of FDI inflows, the industry of Montenegro was unable to satisfy the country's needs, causing a strong increase in imports that were now far from the almost unchanged level of exports. Also, the level of agricultural production is inadequate to meet the local needs and a high demand for food products as a result of large inflow of tourists (Fabris, and Pejović, 2012). The subaccount of the balance of payments measured the expansion of income inflow from tourism that was a direct cause of FDI growth, income from transport and other services. That period was marked by the acceleration in investment activities, increased efforts in promoting Montenegro as a favourable destination and further investments into infrastructure. All of this led to the escalation of services related costs. When it comes to the factor income and current transfers, there was an uptrend in the level of income relating to the citizens working abroad, but there was also an



outflow noticed based on the interest rates on borrowings as well as on the transfer from domestic individuals to the abroad. Altogether, with the newly noticed economy-strengthening trend, the inflow of foreign financial assistance declined.

Between 2003 and 2007, the CAD kept on rising. According to the studies (Fabris and Kilibarda, 2008) “the current account deficit in 2007 was 1,007.5 million euros or 44.2% of GDP. Compared to the year before, it increased 89.7% or 17.7 percentage points measured by GDP.” Comparing 2006 to 2005, there was a similar trend of the rise, having the value “higher by 244.8% or 18 points measured by GDP.”

**Figure 2: Current account deficit of the payment balance, in % of GDP (period 2006-2017)**



Source: CBCG

since such a high level of the current account deficit could affect the financial stability of Montenegro as it was recognized as one of potential risks within the category of macroeconomic disturbances (Žugić and Fabris, 2014).

Fabris and Kilibarda (2008) offer a list of five most influential aspects of impact on the CAD:

1. Low level of exports;
2. Extremely high level of imports;
3. High scale of aggregate demand;
4. FDI inflows (where Montenegro was the leader among the group of European transiting industries, in years 2005-2007, according to the IMF);
5. High prices of agricultural-food products and energy products.

The same authors provide an important insight that, alongside the five reasons listed above, CAD is about to be an object of further impact of the continuation

Figure 2 shows the movement of the current account deficit as a percentage of GDP. In the period before the global financial crisis, the current account deficit had been extremely high and then it started decreasing later on, after the global crisis. However, due to the highway construction that brought about large imports of construction material and machinery, imports has started rising again as of 2016. The projections indicate that the deficit will gradually decline after the highway construction and return to its 2013-2015 levels. Expectations regarding such trending are very important

of integration processes of Montenegro towards European Union (as was the case with the World Trade Organization and the NATO accession). The potential accession to the Union would result in additional elimination of trade barriers to Montenegrin exporters. Negative effect (import growth) as an accession result would be negligible considering the existing openness of Montenegrin economy.

Connecting the detailed examination of current account deficit to the basic features of dollarized economies, it is safe to conclude that (Fabris and Kilibarda, 2008) the CAD of the balance of payments carries lower risk level compared to the situation in countries printing their own money. On the other hand, options for eliminating or decreasing this deficit are also lower as those countries are unable to utilize the currency exchange rate policy. Within the conditions of a dollarized and very open economy with low transaction costs, domestic and foreign products evolve to be substitutes to one another, and inhabitants are easily transferred from one to another. “Current account deficit can be perceived as a balanced answer of the system to the huge influx of foreign private capital and steep growth rate of loans. Together with the decrease of the capital inflow, a significant part of the deficit will have the self-correcting effect”.

The second variable of the two ones examined within the model is the economic growth of Montenegro. Like in the case with the CAD, the definition of growth, structure and yearly movement trend of this variable are presented in the following lines.

Economic growth, according to the basic definitions, represents an increase in goods and services produced *per capita* over a certain period. It is, therefore, only natural for countries to encourage their economic growth in many different ways. Additionally, it is expected for underdeveloped and developing countries to show higher rates of economic growth than the ones that have a higher “starting point” in the shape of already well-developed economies. Montenegro is not an exception, recording high growth rates in the years after gaining independence and continuing this trend in the years to follow (Table 2), with several years of negative figures that were the result to the crisis. As published by the Ministry of Economy on their official website, in the document named “Industrial policy until 2020”, the trend of important economic prosperity was present in Montenegro during the early 2000s. Namely, economic growth at that time (2006, 2007 and 2008) was above 6%. This trend was suddenly interrupted by the financial crisis that started affecting Montenegro at the end of 2008 and peaked during 2009, when economic growth declined 5.7%. The recovery started in the following years, to reach 1.8% of real growth in 2014 (Table 2) that resulted in GDP *per capita* of 5,356.7 euros. Expressed in the purchase power parity terms, GDP *per*

*capita* was at the level of 42% of the EU average and 3% above the average for Western Balkan countries.

Table 2 includes data about growth. It should be noted that the information on economic growth for the years 2017, 2018 and 2019 are all forecasts made by the Ministry of Finance. The Report of the World Bank (Bank, 2017) from October last year indicates: “Montenegro’s economy is expected to grow by an average of 3.2% annually in 2017-2019 driven by public investments and personal consumption. While the growth of investment will slow down as the Bar-Boljare highway construction gets to its closure, its contribution to growth will remain strong throughout the projection period.” Significant information derived from the same Report connects growing of the public debt to the economic outlook: “The positive economic outlook faces high but moderating risks. Growing public debt calls for a decisive implementation of the recently adopted fiscal consolidation program to create the space for an orderly servicing of the large (above 16% of GDP) refinancing needs in the 2019-2021 period. External imbalances are still high, adding to an already high external vulnerability. Enhancing policy predictability and accelerating the pace of structural reforms would be needed for their moderation.”

**Table 2: Main macroeconomic indicators, % (with GDP data for the period 2012-2019)**

	2012	2013	2014	2015	2016	2017	2018 (projection)	2019 (projection)
GDP growth*	-2.7	3.5	1.8	3.4	2.9	4.3	3.0	2.7
Inflation (average)*	4.1	2.2	-0.7	1.5	-0.3	2.4	2.6	1.9
Government balance/GDP*	-6.5	-6.4	-3.1	-7.6	-3.1	-5.6	-3.2	-0.9
Current account balance/GDP	-15.3	-11.4	-12.4	-11	-16.2	-16.3	n.a.	n.a.
Net FDI/GDP	-14.5	-9.6	-10.2	-16.9	-9.4	-11.4	n.a.	n.a.
External debt/GDP**	156.4	156.3	163.3	162.2	159.6	n.a.	n.a.	n.a.
Gross reserves/GDP	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Credit to private sector/GDP***	54.4	54.2	52.1	50.5	49.2	49.4		

\* Ministry of finance projections for 2018 and 2019

\*\* Preliminary data for external debt for 2016.

\*\*\* Credit to private sector refers to banks' loans extended to resident nonfinancial sector, households and nonprofit organizations.

From the latest country assessment report generated by the EBRD, foreign direct investments constitute the key growth driver of the Montenegrin economy. Similar conclusion was noted within the Working paper generated by the Central Bank of Montenegro from 2008: “Foreign direct investments as a driving force of

economic development of Montenegro” (Fabris et al 2008). Having this in mind, Montenegro has shown openness towards welcoming new foreign capital into the market by providing the necessary legal infrastructure. “In general, Montenegrin regulation on foreign investments is very liberal. There are no barriers for the repatriation of profit, dividends, interests and founding capital. Foreign investor can manage the company or transfer the management right to another party. National treatment is guaranteed to the foreign investors. Foreign investments may be in the form of money, securities, goods, services and/or rights. Domestic physical entities can acquire a treatment of the foreign investor if they have lived abroad for a minimum of one year, prior to the investment. Foreign investors are guaranteed the protection from expropriation of property, but if the expropriation is required for the national interest, they have the right on the compensation in the amount of the full market price. In case of the change of the Law on Foreign Investment after the investment has been made, foreign investors have the right to apply solutions that are more favourable for them from the old or new law (Fabris et al, 2008).

However, foreign direct investments are not the only driver of the country’s economic growth. The aforesaid policy document of the Ministry of Economy indicates that the “key sectors/areas in which Montenegro has comparative advantages with strong potential for export increase are: energy, food industry, metal industry, wood industry and tourism.” Aside from these, few others should be added to the list, such as: “construction and transportation, ICT and business services”, as sectors able to provide necessary support to the strategic sectors.

#### **4. Econometric methodology and Data**

To analyse the dynamics of the current account deficit and economic growth relationship in Montenegro, we first used the traditional unit root tests of ADF and KPSS in order to show that all variables used in analysis are not I(2). Secondly, by using Autoregressive Distributed Lag (ARDL) bounds testing approach, developed by Pesaran et al. (2001), we examine the long term relationship between the variables, estimate the long and short term relationship between current account deficits and economic growth and infer the causal relationships based on a dynamic error correction model (ECM).

#### 4.1. Unit root testing

Even though the ARDL bounds test approach does not require all variables to be I(1) as the Johansen framework, we determine the order of integration to ensure that the variables are not I(2) stationary so as to avoid spurious results. To examine the unit root properties of the variables, we perform ADF and KPSS tests. The null hypothesis of the ADF test indicates that the variable in question is nonstationary, but, that of KPSS test and state that variable is stationary. Thus, performing them together, we provide evidence for the cross validation of the results.

#### 4.2. The ARDL bounds testing

After determining the order of the integration of the variables, we use the ARDL approach because of its well know advantages of the applicability in the presence of I(0) or I(1) variables, providing super consistent results in a small sample case and not suffering from endogeneity problem.

Regarding the relationship between the current account deficit to GDP ratio (*cadgdp*) and economic growth (*gdpgrowth*), we specify the following equation:

$$gdpgrowth_t = \beta_0 + \beta_1 cadgdp_t + u_t \quad (1)$$

Where *gdpgrowth* is the growth rate of GDP, *cadgdp* is the ration of current account deficit to GDP and *u* is error term.

Eq. (1) cannot be estimated correctly by using Ordinary Least Square because of the possibility that the spurious results may exist when variables are specified in the level or non-stationary form. Thus, we have test to determine whether a long run relationship exists among the variables in the model by using ARDL bounds testing approach. ARDL. An ARDL framework of equation (1) can be written as follow:

$$\Delta gdpgrowth_t = \alpha_0 + \sum_{i=1}^p \theta_i \Delta cadgdp_{t-i} + \delta_1 cadgdp_{t-1} + \delta_2 gdpgrowth_{t-1} + u_t \quad (2)$$

Where  $\alpha_0$  is the drift component and  $u_t$  is the white noise error term. Also, the term with summation sign represented the error correction dynamics and the second part of the equation with  $\theta_i$  corresponds to long runrelationship.

In order to test for the existence of a long-run relationship between current account deficits and economic growth, we estimate Eq. (2) by ordinary least squares (OLS) and then carry out an F-test for the joint significance of the coefficients of

the lagged levels of the variable. Thus, the null hypothesis of no cointegration among the variables in Eq. (2) is:

$$H_0 : \delta_1 = \delta_2 = 0$$

Against the alternative hypothesis of cointegration

$$H_1 : \delta_1 \neq \delta_2 \neq 0$$

By adopting the ARDL approach, we can estimate the short and long-run dynamic relationships. Therefore, equation (2) can be rewritten as the error correction version of ARDL model as follows:

$$\Delta gdp_{growth}_t = \alpha_0 + \sum_{i=1}^p \theta_i \Delta cadgdp_{t-i} + \gamma ecm_{t-1} + u_t \quad (3)$$

Where  $ecm_{t-1}$  is the error correction term which has to be negative and statistically significant. It shows the speed of adjustment the speed back to long run equilibrium following a short run shock.

We then test the presence of serial correlation and heteroscedasticity in the errors of model and whether we correctly specify the functional form of the model and errors are normally distributed or not. Also, we check the stability of parameters by using cumulative (CUSUM) and cumulative sum of squares (CUSUMSQ).

#### 4.3. The ECM Granger causality

After examining the long term relationship between the variables, we can perform the Granger causality test to determine the causality between the variables by using the error correction version of ARDL model given Eq. (3). In his seminal paper, Granger (1969) suggested that if there is co-integration between the variables in the long-run, this should be taken as an indication of either unidirectional, bidirectional or neutral causality relationships between the variables. The statistically significant relationship in first differences of the variables (the joint  $\chi^2$  test for the first differenced lagged independent variables) is taken as an evidence on the direction of short-run causality. To determine the existence of long-run causality between variables, one must test statistical significance of coefficient of lagged error correction term by using the t-test statistic. The significance of coefficient of lagged error correction term indicates the long-run causality.

## 5. Empirical results

By carrying out traditional unit roots, we prove that neither of the variables used in the study is  $I(2)$ . And then, we adapt ARDL bounds testing approach to test the existence of long run relationship among the variables.

### 5.1. Cointegration analysis

After determining the order of the integration of the variables, we test the presence of long-run relationship between variables. To test existence of such relationship, we first determine optimal lag length by using Akaike information criterion (AIC) due to its superiority over the Schwartz Bayesian criterion (SBC). Table 3 reveals the results of the co-integration between the variables.

**Table 3: The results of ARDL cointegration test.**

Model	Optimal lag length	F-statistics	Bound critical values		Outcome
			I(0)	I(1)	
$gdp_{growth}=f(cadgdp)$	(4,5)	4.861694*	3.62	4.16	CI

Note: \* denotes the rejection of the no cointegration at 1% level of significance.

F-test results in Table 3 indicate that we reject the null hypothesis of no cointegration between variables, since computed value of F-statistics, 4.861694, is greater than  $I(1)$  bound value of 4.16. Thus, we concluded that variables are cointegrated which implies that there is a long-run relationship between the variables.

We obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. Table 4 reveals the results of long- and short-run estimates.

**Table 4: Long-run and short-run estimations**

<i>Dependent variable = gdpgrowth</i>			
Variable	coefficient	t-statistic	Prob. values
<b>Long-run results</b>			
constant	12.68374	3.113127	0.0144
<i>cadgdp</i> *	0.545921	2.645915	0.0294
<b>Short-run results</b>			
D(RGDPG(-1))*	-0.331925	-3.777886	0.0005
D(RGDPG(-2))	-0.088213	-0.860458	0.3943
D(RGDPG(-3))*	-0.504757	-4.843243	0.0000
D(CADGDPRATIO)	0.084946	1.315316	0.2248
D(CADGDPRATIO(-1))*	-0.669528	-3.930688	0.0044
D(CADGDPRATIO(-2))*	-0.529744	-3.704340	0.0060
D(CADGDPRATIO(-3))*	-0.381958	-3.237186	0.0119
D(CADGDPRATIO(-4))*	-0.319595	-4.556737	0.0019
ecm(-1)*	-1.078737	-4.269819	0.0027
<b>Test</b>	<b>Test statistic</b>		<b>Probability</b>
Normality	0.3233		0.850739
Functional form (Ramsey RESET)	0.644623		0.5577
Heteroscedasticity (White test)	10.06668		0.646
Serial correlation (LM test)	6.503		0.2159
CUSUM	Stable		
CUSUMSQ	Stable		

Note: \* denotes the rejection of null hypothesis at 1% level of significance.

The estimated current account deficit to GDP ratio in the long-run relationship is significant and has a negative impact on GDP growth rate at the 5% level. We also estimate the short run effect through the error correction mechanism (ECM). The short run results are illustrated in Table 4 (in lower segment) reveal that there is a positive relationship between current *gdpgrowth* and current period *cadgdp*. But, this positive relationship is statistically significant. On the other hand, the first, second, third and fourth previous period *cadgdp* have a negative and significant effects on *gdpgrowth* at a 1% level of significance implying that past periods current account deficit GDP ratios have a negative impact on current inflation. The short run results mostly indicate a negative relationship between changes in the CAD GDP ratio and the GDP growth rate. But, in the long-run, the effect of the CAD GDP ratio on GDP growth is positive implying that the Montenegrin economy is heavily dependent on the current account deficits to grow possible because of the heavy reliance on imports of raw material and intermediate goods.



The negative and statistically significant estimate of the  $ecm(-1)$  coefficient provides another evidence for established long run relationship between changes in current account deficit GDP ratio and GDP growth rate. According to estimated value of  $ecm(-1)$  coefficient, it will take less than a year to reach the stable path of equilibrium implying that the adjustment process is very fast for the Montenegrin economy. At the same time, since absolute value of  $ecm(-1)$  coefficient is greater than one, disequilibrium starts again within the year.

The short run model passes through all diagnostic tests. According to the p-values of chi-square tests which test the null hypothesis of normal distribution of errors, correctly specified functional form, no serial correlation and homoscedastic errors, we fail to reject the null hypothesis implying that good specification of the models, normally distributed errors with no serial correlation and homoscedastic variances. Also, since the plots of CUSUM and CUSUMSQ statistics are well within the critical bounds, we conclude that the coefficients of the error-correction model are stable implying that the coefficients seem to follow a stable pattern during the estimation period; thus, one can use these coefficients for policy decision-making purposes.

After finding that our model passes through all diagnostic tests, we can use our model to detect the causal relationship between  $gdpgrowth$  and  $cadgdp$ . The statistically significant long-run relationship between the variables indicates that there is Granger causality in at least one direction which is determined by the Chi-square test and the lagged error correction term. The short-run causal effect is represented by the Chi-square-statistic on the explanatory variables while the t-statistic on the coefficient of the lagged error-correction term represents the long-run causal relationship (Odhiambo, 2009; Narayan and Smyth, 2006). Table 5 reveals the results of both short run and long run Granger causalities.

**Table 5: Results of the Granger causality tests**

Variables	Short-run causality (F-stat)	Long-run causality (t-stat.)
$cadgdp \rightarrow gdpgrowth$	14.95316	-4.269819*

Note: \* denotes the rejection of null hypothesis of no causality in the long-run at 1% level of significance.

The results of the Granger causality tests indicate that there is a unidirectional causality running from the ratio of current account deficit to GDP and GDP growth rate both in the short-run and long-run. The results of long-run causality imply that causality runs interactively through the error-correction term from the CAD GDP ratio to GDP growth rate.

## 6. Conclusion

In this study, we have examined the relationship between two important indicators of economic stability and growth of the country. The goal of the research was to determine if there was a correlation between the named two variables both in the long as well as in the short run. It was also crucial to determine if the model within the paper is reliable and could hence be used for policy-generating purposes.

It has been concluded from passing all statistical tests related to the matter that the model is stable. In other words, the coefficients seem to follow a stable pattern during the estimation period. As a result, the model proves to be usable for decision-making purposes, and its results to be relevant and merit.

The model itself consists of dependent variable (GDP growth rate) and the independent one (CAD GDP ratio). The results of the econometric analysis prove the existence of both short and long term relationship between the two named variables (Table 4).

The short run results mostly indicate a negative relationship between changes in current account deficit GDP ratio and GDP growth rate. This means that any increase of the value of independent variable (current account deficit GDP ratio) will result in decrease of the rate of GDP growth and vice versa. It is an easily comprehensible fact that short term implication of enlargement of current account deficit GDP ratio will cause GDP growth to drop, as the effects of this economic policy are not likely to be visible in the short run. It does take time for the effects of this measure to cause positive impact on GDP. Additionally, as it was stated above, previous period *cadgdp* ratios have a negative effect on GDP growth. The rationale behind this finding is that during the past period CAD GDP ratios had a negative impact on current inflation.

The long term effect of the current account deficit to GDP ratio on GDP growth is positive. The constant ( $\beta_0$ ) is positive, as is the ( $\beta_1$ ). The interpretation would be that: with the increase of CAD GDP ratio of 1 measuring unit, the GDP growth rate would grow by 0,5459. This positive and tight correlation could be explained by overlapping structure of the constituents of CAD and the drivers of GDP growth (such as: tourism, energy sector, agriculture etc.). Montenegro's economy is, therefore, dependent on the current account deficits in order to grow. Another possible explanation of this relation could be the previously indicated possible heavy reliance of its economic growth on imports of raw material and intermediate goods.

The negative and statistically significant estimate of the  $ecm(-1)$  coefficient provides another evidence for established long term relationship between changes in the CAD GDP ratio and the GDP growth rate. According to the estimated value of  $ecm(-1)$  coefficient, it will take less than a year to reach the stable path of equilibrium implying that the adjustment process is very fast for the Montenegrin economy. At the same time, since the absolute value of  $ecm(-1)$  coefficient is greater than one, disequilibrium starts again within a year.

The concluding thought is that the policy makers will have to account for a short term negative impact of the current account deficit to GDP ratio on GDP growth. In case their economic goal is to cause an increase in GDP growth, then the long run nature of this relationship will come in handy. If, however, they find the idea of decreasing dependence of GDP growth from the CAD GDP ratio appealing, then the reliance on imports of raw material and intermediate goods should be decreased.

## References

1. Asanović, Ž., (2017) "An Analysis of the Determinants of Systemic Banking Crises in Southeast European Countries", *Journal of Central Banking Theory and Practice*, vol 7, No 2, pp 165-186.
2. Fabris, N., Vukajlovic-Grba D., Radunovic T. and Jankovic J. (2004) "Economic policy in dollarized economies with a special review of Montenegro", *Central Bank of Montenegro, Working paper no. 1*.
3. Fabris, N. and Pejović, I. (2012) "Montenegrin agriculture: diagnosis and policy recommendations". *Economics of Agriculture/ vol 59, No 4*, pp 657-674.
4. Fabris, N., Kilibarda B., Kalezić Z., Radunovic M. and Rakocevic M. (2008) "Strane direktne investicije kao pokretač privrednog razvoja Crne Gore", *Central Bank of Montenegro, Working paper no. 16*.
5. Fabris, N., Kilibarda, B. (2008) "Analiza održivosti deficita tekućeg računa Crne Gore", *Radna studija br. 14, Centralna banka Crne Gore*, Podgorica.
6. Granger, C. W. J. (1969) "Investigating Causal Relations by Econometric Models and Cross-spectral Methods", *Econometrica*, Vol. 37, No. 3, pp. 424-438.
7. Ivanović, M. (2015), "Determinants of Credit Growth: The Case of Montenegro", *Journal of Central Banking Theory and Practice*, vol 5, No 2, pp 101-118.
8. Kilibarda, B. (2013) "Net errors and omissions" Analiza održivosti deficita tekućeg računa Crne Gore", *Central Bank of Montenegro, Working paper no. 23*.
9. Kovac, O. (1994) "Platni bilans i međunarodne finansije", Centar za ekonomske studije CES, MECON, Beograd.
10. Narayan, P.K, Smyth, R., 2006. "Higher education, real income and real investment in China: evidence from granger causality tests". *Education Economics* 14,107-125.
11. Odhiambo, N.M. (2009) "Electricity consumption and economic growth in South Africa: A trivariate causality test". *Energy Economics*, 31, 635-640.
12. Pesaran, M.H., Shin, Y. and Smith, R.J. 2001. "Bounds testing approaches to the analysis of level relationship". *Journal of Applied Economics* 16: 289-326.
13. Vukovic, D. B., Hanic, E., & Hanic, H. (2017). "Financial integration in the European Union — the impact of the crisis on the bond market". *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 12(2), 195–210. doi: 10.24136/eq.v12i1.10.
14. World Bank Group (2018) "Vulnerabilities Slow Growth", *Western Balkans Regular Economic Report*, No. 13.

15. Živković, O. and Bjelić, P., (2017) “An Analysis of International Trade of Montenegro Using Statistics on the Operations of Transnational Corporations’ Affiliates”, *Journal of Central Banking Theory and Practice*, vol 6, No 1, pp 145-163.
16. Žugić, R. and Fabris, N. (2014) „Framework for Preserving Financial Stability in Montenegro“, *Journal of Central Banking Theory and Practice*, vol 3, issue 1, pp 27-41.