The causal relationship between government revenue and expenditure: evidence from Albania

Tatjana MOCKA
Teaching assistant at European University of Tirana
tatjana.mocka@uet.edu.al

Abstract

A sound fiscal policy is important to promote price stability and sustain growth in output and employment. Fiscal policy is regarded as an instrument that can be used to lessen short-run fluctuations in output and employment in many debates of macroeconomic policy. It can also be used to bring the economy to its potential level. If policymakers understand the relationship between government expenditure and government revenue, without a pause government deficit can be prevented. Hence the relationship between government expenditure and government revenue has attracted significant interest. The relationship between government revenue and government expenditure has been an important topic in public economics, given its relevance for policy especially with respect to the budget deficit. Besides the theoretical arguments about this relation, vast empirical literature is also available all over the world. The main purpose of the study is to examine the causal relationship between government revenues and expenditures of the Albania government over the period from 1986 to 2017 using Granger causality and VECM tests methodology, which provides channels of causation between government revenues (GR) and government expenditures (GE). The empirical results show a bidirectional causality running between revenues and expenditure. This result supports lend support to the fiscal synchronization hypothesis, implying that government of Albania makes its revenues and expenditures decisions simultaneously. Thus, the policy maker should pay attention to the bidirectional causality between government expenditures and revenues which might complicate the government's efforts to control the budget deficit and may contribute in explaining the high national debt figure.

Keywords: *Government expenditure, Government revenue, Unit root tests, VECM model, Error correction model.*

Introduction

To take a good decision and to improve their societies, the governments need to design the budget. To do its functions a government uses budget as a planning and financial tool. One of the debates of public finance is to find the relationship between government revenue and expenditure and considerable theoretical and empirical research has been carried out on this issue. If policymakers understand the relationship between government expenditure and government revenue, without a pause government deficit can be prevented. Hence the relationship between government expenditure and government revenue has attracted significant interest. This is because the relationship between government revenue and expenditure has an impact on the budget deficit. Over the past three decades, many studies have investigated the relationship between government revenue and government expenditure. Understanding the relationship between government revenue and government expenditure is important from a policy point of view, especially for Albania, which is suffering from persistent budget deficits. There is a budget deficit while the government revenues are less than the government expenditures. Vice versa, when the government expenditures less than its revenues it is said that the government has budget surplus.

Scope and objectives of the study

Sometime the governments to reduce the unemployment rate at their societies use the budget deficit policy but having the budget deficit in the long period not only is a policy but also is a problem for society that it needs to solve. To solve this problem the government should reduce its expenditures or it should increase its revenues resources. The budget revenue resources should be stationary and they must have the lowest fluctuations. To achieve these aims the government should know the relationship between government revenues and expenditures. It has been observed that in some cases revenue increase or expenditures reduction effect on its corresponding variable and makes the adopted policy ineffective. So before to decide about reducing of the expenditure or increasing revenues it is important to know the amount of dependences of those variables that effect on the government expenditures. To obtain the appropriate financial policy to reduce or remove budget deficit it is necessary to find the relationship between government revenues and expenditures. The main purpose of this paper is to investigate the relationship between government revenue and expenditure in Albania for the period from 1986-2017.

Research question, hypothesis and methodology of the study

Research question

Is there a causal relationship between government revenue and expenditure in Albania?

Hypothesis

H: There is a causal relationship between government revenue and expenditure in Albania.

Data

The study uses annual data and covers the period of 1986 to 2017. We select these periods because time series data on government revenue and government expenditure for Albania are only available for these periods. The data are obtained from Bank of Albania (BoA) and International Monetary Fund databases (IMF data). Government revenue (GR, % of GDP) and government expenditure (GE, % of GDP) are the two variables used in our estimation. The logarithm of the government expenditures and the logarithm of government are used in the empirical analysis. The transformation of the series to logarithms is intended to eliminate the problem of heteroscedasticity.

Econometric methodology

To examine the relationship between government revenue and expenditure in Albania, a two-step procedure is adopted. The first step investigates the existence of a long-run relationship between the variables through a co-integration analysis. The second step explores the causal relationship between the series. If the series are non-stationary and the linear combination of them is nonstationary, then standard granger's causality test should be employed. But, if the series are nonstationary and the linear combination of them is stationary, Error Correction Method (ECM) should be adopted. For this reason, testing for co-integration is a prerequisite to implement the causality test.

We perform our analysis in two steps. First, we test for unit root vs. stationarity. Then we test for no co-integration vs. co-integration. The objective of unit root test is to empirically examine whether a series contains a unit root. Since many macroeconomic series are non-stationary *(Nelson and Plosser 1982)*, unit root test is useful to determine the order of integration of the variables and, therefore, to provide the time-series properties of data. If the series contains a unit root, this means that the series is nonstationary. Otherwise, the series will be categorized as stationary. To implement a more rigorous test to verify the presence of a unit root in the series, an Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test are employed.

a) Unit root test

To model the variable in a manner that captures the inherent characteristics of its time-series, we use the Akaike Information Criterion (AIC) to determine the lag structure of the series. This test represents a wider version of the standard Dickey-Fuller test (1979).

b) Co-integration test

To test for causality between the series (GR) and (GE) through the ECM, it's necessary to verify if the two series are co-integrated. Two or more variables are said to be co-integrated if they share a common trend. In other words, the series are linked by some long-run equilibrium relationship from which they can deviate in the short-run but they must return to in long-run, i.e. they exhibit the same stochastic trend (Stock and Watson, 1988). Co-integration can be considered as an exception to the general rule which establishes that, if two series are both I (1), then any linear combination of them will yield a series is integrated of a lower order in this case, in fact, the common stochastic trend is cancelled out, leading to something that is not spurious but that has some significance in economic terms. The existence of a co-integration relationship between the series (GR) and (GE) was verified implementing a unit root ADF and PP tests on the residuals from the two long-run regressions between the levels variables, estimated through the OLS method:

$$GR=\beta_0+\beta_1 GE+\boldsymbol{\varepsilon}_t$$
$$GE=\beta_0+\beta_1 GR+\boldsymbol{\varepsilon}_t$$

In the language of co-integration theory, regression such as equations above are known as co-integrating regressions and the slope parameters and β_0 and β_1 are known as the co-integrating parameter (Gujarati and Sangeetha, 2007). However, Johansen and Juselius procedure is considered better than Engle-Granger even in a two variables context and has better small sample properties since it allows feedback effects among the variables. The Johansen technique enables us to test for the existence of non-unique Co-integration relationships in more than two variables cases. The Johansen procedure of Co-integration is a test of the rank of the matrix $\prod$. Two tests statistics are suggested to determine the number of Co-integration vectors determined based on a likelihood ratio test (LR): the trace test and the maximum eigenvalues test statistics.

c) Causality Test

Given the results from co-integration test, the causality relationship between (GR) and (GE) should be tested through the implementation of an ECM.

Before proceeding with it, the standard Granger (1969), the concept of "causality" assumes a different meaning with respect to the more common use of the term. The statement (GR) Granger causes (GE) or vice versa, in fact, does not imply that (GR) and (GE) is the effect or the result of (GR) and (GE), but represents how much of the current (GR) and (GE) can be explained by the past values of (GR) and (GE) and whether adding lagged values of (GR, GE) can improve the explanation.

d) Error Correction Model

Once the variables in a VAR system are co-integrated, following Johansen–Juselius, we can use a vector error-correction models (VECM) in which an unconstrained VAR is used to assess the direction of Granger causality and to estimate the speed of adjustment to the deviation from the long-run equilibrium between government revenue (GR) and Expenditure (GE). The error correction model is based on the two following equations:

$$\Delta GR_t = \beta_0 + + + \beta_3 \eta_{t-1} + \varepsilon_i$$
$$\Delta GE_t = \beta_0 + + + \beta_3 \mu_{t-1} + \varepsilon_i$$

Where (η_{t-1}) and (μ_{t-1}) represent the error-correction term lagged residual from the co-integration relations. The error correction terms (η_{t-1}, μ_{t-1}) will capture the speed of the short run adjustments towards the long run equilibrium. Furthermore, the error correction model equations allow testing for short run as well the long run causality between government expenditure and revenues. The short run causality is based on a standard F-test statistic to test jointly the significance of the coefficients of the explanatory variable in their first differences. The long run causality is based on a standard t-test. Negative and statistically significant values of the coefficients of the error correction terms indicate the existence of long run causality.

Literature Review

Theoretical Literature Review

The causal relationship between revenues and government expenditure is a classic problem of Public Economics. There are four propositions that can potentially explain observed spending revenue behavior. The propositions are briefly discussed as follows: Friedman leads the *tax and spend* school, which contends that raising taxes will simply lead to more spending. Friedman (1982) [*cited in Narayan (2005: 1205)]* puts his point in the following way: "You cannot reduce the deficit by

raising taxes. Increasing taxes only results in more spending, leaving the deficit at the highest level conceivably accepted by the public. Political rule number one is government spends what government receives plus as much more as it can get away with". Also, *Milton Friedman (1982)* suggests cutting taxes as a remedy to budget deficits, since taxes have a positive causal impact on government expenditure. According to Friedman, a cut in tax leads to higher deficits, which should influence government to reduce its level of spending, *(Moalusi, 2004)*. *Buchanan and Wagner (1977, 1978)* put forward an alternative version of the tax and spend hypothesis. In contrast to *Friedman (1978)*, they argue that tax increases would lead to spending reductions. The building block of the *Buchanan and Wagner (1977, 1978)* version of the tax and spend hypothesis is that taxpayers suffer from fiscal illusion. According to the authors, tax cuts lower the perceived price of government provided goods and services by the public, which in turn boosts the public demand for these goods and services. However, the public may incur even higher costs. One reason for this is the indirect inflation taxation that results if the government resorts to excessive money creation. Another reason is higher interest rates associated with government debt financing may crowd out private investment. To reduce expenditures, Buchanan and Wagner favor limiting the ability of the government to resort to deficit financing. In sum, while tax changes as before drive spending changes, the relationship between the two is a negative one. The second school known as spend-and-tax school is built on the tenet that expenditure causes revenue proposed by *Peacock and Wiseman (1961, 1979)*. According to the *spend and tax* hypothesis, the level of spending is first determined by the government and then tax policy and revenue are adjusted to accommodate the desired level of spending. A version of this hypothesis is suggested by *Roberts (1978)*, and *Peacock and Wiseman (1979)* according to whom crisis situations (due to for example wars, natural disasters, or deep recessions) justify temporary increases in expenditures and taxes to pay for them. However, tax increases may become permanent; reflecting an upward adjustment in the level of tax tolerance of the citizens and their attitude towards the proper size of the government after the crisis has passed. This in turn allows for a permanent increase in the level of government expenditures. Another version of this hypothesis is based on the works of *Barro (1974, 1979, and 1986)*. In his tax smoothing hypothesis, government spending is considered as an exogenous variable to which taxes adjust. Moreover, the intertemporal budget constraint requires that an increase in current expenditures be matched by higher future taxes. Barro, therefore, rejects the notion that the taxpayers suffer from fiscal illusion. Quite the contrary, within the framework of the Ricardian equivalence theorem, he maintains that taxpayers are sophisticated, or rational, enough to see that an increase in the current debt in nothing but a delayed form of taxation. Taxpayers are, therefore, expected to fully capitalize the future tax liability. As pointed out

by *von Furstenberg et al. (1992)*, changes in spending can precede changes in taxes if a political majority raises pre-election expenditures, which are then paid for by subsequent post-election tax increases, or if they cut taxes as a compensation for earlier decisions to restrain expenditures. Since it is changes in expenditures that drive changes in taxes in this scenario, the preferred approach to fiscal deficit reduction relies on cutting expenditures. *Fiscal synchronization* hypothesis as the third school of thought argues that governments may change expenditure and taxes concurrently *(Meltzer & Richard, 1981; Musgrave, 1966)*. This implies bidirectional causality between government expenditure and revenue. Under the fiscal synchronization hypothesis, citizens decide on the level of spending and taxes. This is done through comparing the benefits of government to citizen's marginal cost, *(Narayan, 2005)*. Barro's (1979) tax smoothing model provided further credence to the fiscal synchronization hypothesis. His model was based on the Ricardian equivalence view that deficit financed government expenditure today results in future tax increases, *(Narayan, 2005)*. The implication of this hypothesis is that causal relationship between government revenue and spending is bidirectional.

Finally, fourth school, *fiscal neutrality* school, proposed by *Baghestani and McNown (1994)* believe that none of the above hypotheses describes the relationship between government revenues and expenditure. Government expenditure and revenues are each determined by the long run economic growth reflecting the institutional separation between government revenues and expenditure that infers that revenue decisions are made independent are expenditure decisions. A major advocate of this view is *Wildavsky (1988)* who maintains that separate institutions such as the executive and legislative branches of the US government participate in the budgetary process to determine the level of taxation and spending. Budgeting can be incremental and adjustments can be made on the margin if these separate institutions reach a consensus on the fundamentals. In this case there is no causality between the two variables, and hence they are independent of one another.

Empirical Literature Review

Numerous empirical studies available on revenue and expenditure nexus all over the world but there is no consensus about the linkage between these variables. Though over the last three decades several studies have been carried out in different countries to investigate the issue in the public economics, findings vary from country to country and within the country. Considerable empirical works have been done with respect to the four above mentioned hypotheses. Using different econometric methods, studies have reached to different results. Different studies have focused on different countries, time periods, and have used different proxy variables for government revenue and expenditure. The empirical outcomes of these

studies have been varied and sometimes conflicting. The results differ even on the direction of causality and it is long-term versus short term impact on government policy. We now move on to review some of the empirical studies of the relationship between government revenue and expenditure.

Hasan and Lincoln (1997) carried out a research on this issue for United Kingdom by using cointegration technique and quarterly data from 1961-1993 was used for this purpose. This study reveals that government tax revenue Granger causes government expenditures and vice versa. *Shah and Baffes (1994)* in their study for Latin American countries concluded bidirectional causality between government revenue and expenditure for Argentina over the 1913-1984 periods and for Mexico over the 1895-1984 periods; while for Brazil they found unidirectional causality running from revenue to expenditure. *Owoye (1995)* investigated the issue for the G7 countries. He found bidirectional causality for five of the seven countries and for Japan and Italy he found causality running from revenue to expenditure. *Abdul Aziz and Shah Habibullah (2000)* investigated causality between taxation and government spending by using an application of Toda-Yamamoto approach in Malaysia for the period 1960 to 1997. Their evidence generally supports the existence of bidirectional causality between government spending and tax revenues. *Kollias and Makrydakis (2000)* examined tax and spending relationship in four countries namely; Greece, Portugal, Spain, Ireland which are comparatively poorer countries in European Union. They found that cointegration prevails in only Greece and Ireland cases and whereas there is no long run relationship in the models for Spain and Portugal. Moreover, bidirectional causality between government spending and revenue exists in Greece and Ireland. As far as Spain and Portugal cases are concerned, in the former country, causality runs from revenue to expenditure and in the later country, there is no causal link between these two important fiscal variables. *Chang et al (2002)* conducted a study to examine this relationship in ten industrialized countries including three newly industrialized Asian economies namely, Taiwan, South Korea and Thailand. In this study, GDP variable is also included in the model as a control variable along with government expenditures and tax variables and Johansen cointegration technique is exercised for analysis. They claimed that cointegration among the variables prevails for seven countries and found causality from government revenues to government expenditures for UK, USA, South Korea, Japan and Taiwan whereas causality runs from government expenditures to revenues for South Africa and Australia. This study also found independence between revenues and expenditures for New Zealand and Thailand. *Maghyereh and Sweidan (2004)* examined tax-spend, spend-tax and fiscal synchronization hypothesis for Jordan using annual time series data from 1969 to 2002. The authors used real GDP as control variable along with real government expenditures and real government revenues and

Granger causality test based on Multivariate ECM. They conclude evidence in favor of bidirectional causality between revenue and expenditure. The result also suggests that there is long-run interdependence between output and fiscal variables indicating effectiveness of fiscal policy in Jordan. *Carneiro et al. (2005)* investigated this issue for Guinea-Bissau over the period 1981 to 2002. They found that Guinea-Bissau's experience is consistent with the "spend - tax" hypothesis. *Barua (2005)* examined revenue and expenditure causality in Bangladesh by using annual data over the period 1974-2004. The results of Johansen test suggest that there is a long-run relationship between government expenditure, revenue and GDP and the Granger Causality test on the corresponding Vector Error Correction (VEC) model suggests that there is no causal relationship between revenue and expenditure in the short run. It is also observed that the short run relation extends from both the fiscal variables to GDP, and not the other way around. *Tsen and Kian-Ping (2005)* examined this relationship in Malaysia for the period from 1965 – 2002. Augmented Dickey-Fuller and Phillips-Perron Unit root tests, Johansen cointegration and error correction models were applied to data. The results supported tax-spend hypothesis. Government revenue was found to Granger cause expenditure in Malaysia. In another study, *Narayan and Narayan (2006)* found tax and spend hypothesis for Mauritius, El Salvador, Chile, Paraguay and Venezuela. For Haiti, there is evidence for supporting the fiscal synchronization hypothesis, while for Peru, South Africa, Guatemala, Guyana, Uruguay and Ecuador there is evidence of neutrality by application of the Toda and Yamamoto (1995) test for Granger causality. *Nyamongo et al. (2007)* in a study of the government revenue and expenditure nexus in South Africa found different results. A monthly data was used, and modified unit root test and Vector Error Correction Model (VECM) were applied on data. It was found that government revenue and expenditure are cointegrated, and a long-run relationship exists between them. Applying Granger causality through VECM model, it was found bidirectional Granger causality which supports fiscal synchronization hypothesis. In the short-run no Granger causality was found between variable, suggesting fiscal neutrality hypothesis in South Africa for the period of study. The study *Wolde-Rufael (2008)* for 13 African countries by using Toda and Yamamoto causality test show the direction of causation are mixed and his empirical evidence suggests that there was a bidirectional causality running between expenditure and revenue for Mauritius, Swaziland and Zimbabwe; no causality in any direction for Botswana, Burundi and Rwanda; unidirectional causality running from revenue to expenditure for Ethiopia, Ghana, Kenya, Nigeria, Mali and Zambia; and an un-directional causality running from expenditure to revenue for Burkina Faso only. *Chaudhuri and Sengupta (2009)*, by using an error-correction model and Granger causality test for southern states in India reported that the tax-spend hypothesis is supported by the

analysis and the spend-tax hypothesis is valid for some states. *Ravin thirakumaran (2011*) examined the relationship between government revenue and expenditure in Sri Lanka for the period from 1977-2009. A time series methodology of Engle-Granger's approach of cointegration and error correction model framework is investigated. The study concluded that bidirectional causality exists between government revenue and expenditure and there is long-run equilibrium between the two variables in Sri Lanka economy. *Subhani et al. (2012)* found the opposite causality direction confirming the tax-spend hypothesis. They studied the causality direction between government expenditure and revenue for Pakistan. Annual data for the period from 1979-2010 were used, and Granger causality was applied to variables in question. The paper found that government revenue Granger cause government expenditure in Pakistan for the period under investigation. The evidence on the relationship between government revenue and expenditure for Iran is scarce. *Zonnoor, S. H (1995)* examined the growth of government expenditures and revenues in Iran over the period of 1970 - 1990 considering conventional theories as to the nature of public sector economic activity. In his study, simple forms of government expenditure and tax functions are estimated. They also examined the speed of the adjustment process by estimating a simple disequilibrium model of government expenditures and receipts. Using a constant shares model as well as a constant marginal shares model, they compared the pattern of expenditures and the revenues structure before and after the Iran's revolution. *Elyasi and Rahimi (2012)* found bidirectional causality between government revenue and expenditure in Iran. Annual data for the period from 1963-2007 were used, and variables were tested for stationarity. The paper included a comprehensive list of studies on causality between government revenue and expenditure for country specific and for multi-countries studies. The evidence cited on the direction of causality is mixed in those studies. Different data sets, econometric methodologies and different country characteristics are some of reasons cited for the different results on the direction of causality.

Data analysis

In this section, first we see the results of the primary analysis of the data series. Basically, the time series data has a trend; it was proved by the graphs of government revenue (GR) and government expenditure (GE) during the period from 1986 to 2017. The results of unit root test are discussed below with the output of Augmented Dickey-Fuller test. To see the long run relationship, co-integration results also elaborated. Finally, the direction of causality will be analyzed. Table 1 shows the descriptive statistics of these two series.

TABLE 1: Descriptive statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
LGR	1.438455	1.414972	1.725912	1.139879	0.127467	0.729534	3.88868
LGE	1.539027	1.500166	1.80618	1.342423	0.114044	1.110222	3.319527

Source: Author calculations, 2017

Testing unit roots

The first step in empirical work was to determine the degree of integration of both variables. The ADF and PP unit root test with intercept and with intercept and trend are adopted to check whether the variables contain a unit root or not. The results of ADF and PP test are reported in the table 2 for the level as well as for the first difference of each of variable.

TABLE 2: Results of ADF and PP test

Series	With intercept		With intercept and trend	
Levels	ADF	PP	ADF	PP
LGR	-2.981038	-2.960411	-3.58753	-3.562882
	[-4.501702]	[-2.202375]	[-3.64426]	[-2.057865]
LGE	-2.963972	-2.960411	-3.58753	-3.562882
	[-2.126779]	[-1.756954]	[-3.64426]	[-2.057865]
First difference				
ΔLGR	-2.963972*	-2.963972*	-3.56838*	-3.568379*
	[-4.3069]	[-4.26084]	[-4.44722]	[-4.448241]
ΔLGE	-2.981038*	-2.963972*	-3.59503*	-3.568379*
	[-3.965384]	[-4.217476]	[-4.95291]	[-4.559386]

Note: *test critical values which denotes significant at 5% level.
The number in parenthesis is the (t) statistic value.
Source: Author calculations, 2017

The result shows that the null hypothesis that the series contain unit root cannot be rejected in both cases at zero order levels. But the hypothesis of a unit root is strongly rejected for the differenced series of both variables. Given the consistency and ambiguity of the results from this testing approach, we conclude that the series

under investigation are I (1). This reveals that all both the government revenue and expenditure are non-stationary in its levels and stationary in first difference.

Testing Co-Integration and Error Correction Mechanism

Since the first difference series are stationary, we can examine the existence of co-integration between government revenue and expenditure. Johansen-Juselius procedure is used to test for co-integration between government expenditure and revenues. Table 3 presents the result of the trace test (**λ** trace) and maximum eigenvalues test (**λ** max) statistics for the existence of long run equilibrium between the government expenditure and revenues.

TABLE 3: Co-integration test

Null hypothesis	**λtrace**	Prob.	**λmax**	Prob.
r = 0	15.94236 [15.49471]	0.0428	9.865624 [14.2646]	0.2209
r ≤ 1	6.076734 [3.841466]	0.0137	6.076734 [3.841466]	0.0137

*terms in [ ] indicates 5% level critical value
Source: Author calculations, 2017

The null hypothesis of no co-integration (r=0) based on the trace test between government expenditure and revenues is rejected at (5%) level of significance. But the null hypothesis of no co-integration (r=0) based on the maximum eigenvalues test between government expenditure and revenues is not rejected. However, the null hypothesis that (r ≤ 1) could not be rejected. The estimated two tests indicate that there is only one co-integration vector.

Causality tests

The above analysis suggests that there exists a long-run relationship between government revenue and expenditure in Albania. But in order to determine which variable causes the other, granger causality test was used. The granger causality test results are presented in table 4.

TABLE 4: Granger casuality test

Regression	Lag	F-statistics	P-Value	Granger causality
LGE on LGR Null hypothesis: LGR does not granger cause LGE	1	4.34907	0.0463	YES

LGR on LGE Null hypothesis: LGE does not granger cause LGR	1	2.93034	0.0380	YES

Source: Author calculations, 2017

As shown in table 4, GR on GE is statistically significant at the 5% level, implying that there is causality running from GR to GE. The F-statistics imply that the null hypothesis GR does not granger cause GE can be rejected at the 5% significance level. This means, higher revenue would lead to higher government expenditure. On the other hand, GE on GR is statistically significant at 5 % level and the F-statistics imply that the null hypothesis that GR does not granger cause GE can be rejected at the 5 % significance level. This indicates that a increases in expenditure would induce higher revenue. Therefore, the study reveals bidirectional causation between government revenue and expenditure in Albania, which is running from revenue (GR) to expenditure (GE) and vice versa. Above findings lend support to the fiscal synchronization hypothesis, implying that government of Albania makes its revenue and expenditure decisions simultaneously.

Vector Error Correction Model (VECM)

The vector Error Correction Model (VECM) is used to generate the short run dynamics. The number of lags in the model is one lag. Table 5 reports the results of vector error correction model. The findings from VECM are similar the ones resulting from the application of standard Granger causality test. Table 5 presents the error correction models estimations. The error terms (η_{t-1}, μ_{t-1}) in both equations are statistically significant and negative at (5%) level of significance based on (t) test statistics which indicate that there is bidirectional causality between government expenditure and revenues in the short run. Therefore, there is bi-directional causality between government expenditure and revenues in the long as well as in the short run.

TABLE 5: Vector error correction model

Regression	ΔLGR	ΔLGE
CONSTANT	-0.006286 [-0.56245]	-0.005807 [-0.54356]
η_{t-1}	-0.657538 [-2.11952]	
μ_{t-1}		-0.575836 [-2.46854]
ΔLGR_{-1}	0.191926 [0.76261]	0.185241 [0.77003]

ΔLGE_{-1}	0.129054 [0.42621]	0.095366 [0.32950]
R^2	0.242365	0.085621
S.E	0.060599	0.057925

Source: Author calculations, 2017

The value of (η_{t-1}) indicates the speed of adjustment of any disequilibrium towards long-run equilibrium eighty five percent of the disequilibrium in (GR) is corrected each year, as well. The value of (μ_{t-1}) indicates the speed of adjustment of any disequilibrium towards long-run equilibrium fifty seven percent of the disequilibrium in (GE) is corrected each year. In addition, the significant error terms in both equations support the existence of a long run equilibrium relationship between (GR) and (GE). Furthermore, the estimates of the VECM indicate the existence of bidirectional causality running between (GR) and (GE). The result of VECM emphasizes the bidirectional Granger causality between government revenue and expenditures which consists with the fiscal synchronization hypothesis.

Conclusion

This study tried to investigate the relationship between government revenues and expenditures in Albania for the period 1986-2017 using co-integration and Granger causality tests. Determining which hypothesis best characterizes an economy in more than intellectual exercise because it can potential contribute towards of a solution to the problem of growing budget deficits. Based on empirical results we can accept the fiscal synchronization hypothesis. In addition, our empirical results further discover that there is a stable long-run equilibrium relationship between government revenues and expenditures, although, they may be in disequilibrium in the short run, as well, there exists bidirectional causality running between government revenue and government expenditure, implying that government makes simultaneously its revenues and expenditures. This means that we can't reject the hypothesis that an increase in government revenue would lead to higher expenditure in Albania, at the same time; we can't reject the hypothesis that an increase in government expenditure would induce higher government revenue. The bidirectional causality between government expenditures and revenues might complicate the government's efforts to control the budget deficit and may contribute in explaining the high national debt figure.

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