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THE LINK BETWEEN THE GOVERNMENT BUDGET AND THE CURRENT ACCOUNT IN THE BALTIC COUNTRIES

Abstract

The main aim of the article is theoretical and empirical analysis of the causal relationship between the budget balance and the current account balance in the Baltic countries (Latvia, Lithuania and Estonia) in the period 1999-2010. In the paper are used methods based on the literature study of international economics and international finance as well as econometric methods (Vector Autoregressive Model – VAR). The results of investigation clearly point at the existence of negative relationship between fiscal and current account balances in the analyzed countries. At the same time it was revealed stronger impact of the current account balance on the government balance than the impact of the government balance on the current account balance in Latvia, Lithuania and Estonia.

JEL classification code: F32 , H6, F41

Keywords: government balance, current account, VAR model.

Introduction

The alleged link between the balance of state budget and the balance of current account caused intense debate among economists in developed and developing countries, particularly in the 80s and 90s of the twentieth century (Pahlavani, Saleh 2009). An issue concerning the relationship between these macroeconomic variables is also relevant today, mainly due to the deepening economic problems in many the EU member states, associated with the increase of internal and external imbalances in these economies.

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According to the hypothesis called as a twin deficits hypothesis, budget deficit leads to the current account deficit (Kumhof, Laxton 2009; Misala 2007; Marinheiro 2006; Hallwood, MacDonnald 2003; Makin 2002). On the other hand, according to the perverse hypothesis of twin deficits, the current account deficit contributes to the government deficit (Kumhof, Laxton 2009; Pahlavani, Saleh 2009; Siddiqui 2007; Tumpel-Gugerell, Mooslechner 2003). Moreover, in accordance with the Ricardian equivalence hypothesis, the budget deficit does not affect or affects negatively the current account balance but in accordance with the hypothesis of Feldstein-Horioka (1980) the budget deficit and the current account balance interact mutually.

1. The relationship between the balance of government budget and the balance of current account in the light of theory

The starting point to clarify the relationship between the balance of government budget and the balance of current account is well-known equation of national income, expressed by the following formula:

$$Y = C + I + G + (X + M) \tag{1}$$

where:
Y – national income;
C – private consumption;
I – investment expenditures;
G – government expenditure;
X – exports of goods and services;
M – imports of goods and services.

On the other hand, deliberately ignoring the balance of interest and dividends and the foreign transfers, current account balance can be represented by the following expression:

$$CA = (X - M) \tag{2}$$

If a country imports more than exports the current account deficit appears, which is financed by foreign loans taken out by the state or the private sector. Hence, in a country with the current account deficit, the net foreign debt also increases. Thus, a country with the current account deficit imports „the current consumption and (or) investments" (if investments goods are imported), and „exports future consumption and (or) investments expenditures".

Referring to the equation of national income, national savings in an open economy can be expressed by the following formula:

$$S = Y - C - G + CA \tag{3}$$

where:
S – savings.

Alternatively, the above equation can be written in the form of following equation:

$$S = I + CA \tag{4}$$

where:
I – investments that can be expressed by the formula:

$$I = Y - C - G \tag{5}$$

Analyzing the national savings, it is essential to distinguish savings generated by the private sector (S_p) and generated by the public sector (S_g).

$$S = S_p + S_g \tag{6}$$

Private savings are the part of personal disposable income (income after tax), which is not consumed. Therefore, private savings can be written as follows:

$$S_p = Y_d - C = (Y - T) - C \tag{7}$$

where:
Y_d – disposable personal income;
T – taxes.

In turn, public savings are the difference between the government revenue (taxes) and budget expenditures, which include government purchases (G) and government transfers (R) and can be written according to the formula:

$$S_g = T - (G + R) = T - G - R \tag{8}$$

Thus, referring to the expression (6) domestic savings can be presented in the form of expression:

$$S = S_p + S_g = (Y - T - C) + (T - G - R) = I + CA \tag{9}$$

Thus, finally, current account balance can be presented in the following form:

$$CA = S_p - I - (G + R - T) \tag{10}$$

The above formula shows that, if it is assumed a constant difference between private savings and investments, then the changes in the balance of state budget are reflected in the changes in the balance of current account, which in turn means the occurrence of twin deficits hypothesis. However, if there is no constant relationship between saving and investments, then the change in the fiscal balance is fully offset by changes in the size of savings. This situation results from the fact that the increase in budget deficit leads to an increase in national savings due to the expected increase in taxes in the future (to reduce the public deficit), which in turn does not lead to an increase in consumer spending and to the deficit of current account. Thus, in this case, does not appear the phenomenon of twin deficits (Mukhtar, Zakaria, Ahmed 2007).

According to the traditional approach (called as an Keynesian absorption approach) in situation when the economy is in a state of full employment, increase in the budget deficit leads to the current account deficit as a result of an increase in aggregate demand for goods and services, both domestic and imported (Charusheela 2005). The classic approach to this issue claims that a substantial and sustained fiscal deficit significantly affects the size of savings and investments, the prices of production factors, income distribution, exchange rate and foreign trade. Alternative explanation of the twin deficits hypothesis is quantitative approach to this issue, referring to the Mundell-Fleming model (1962). According to the Mundell-Felming model, the budget deficit resulting from fiscal expansion causes the current account deficit by the increase of interest rates in the country, leading to an inflow of foreign capital and domestic currency appreciation.

Another view on the relationship between the balance of government budget and the balance of current account is based on the assumption that the twin deficits are not related or negatively correlated. According to this approach, known as the Ricardian equivalence hypothesis, the budget deficit does not change interest rates and exchange rate and does not affect the savings and consumption and consequently does not affect the balance of current account. Thus, under Ricardian equivalence hypothesis, the balance of state budget and the balance of current account are mutually independent or even negatively related (Makin 2002).

On the other hand, according to another approach concerning the relationship between the balance of government budget and the balance of current account there is assumed the reverse (perverse) causal link between these balances than those which points the twin deficits hypothesis (Enders and Lee 1990). Namely, the increase in the current account deficit causes a slower economic development and consequently the budget deficit.

Finally, the fourth possible causal relationship between the balance of government budget and the balance of current account is bi-directional relationship between these balances. In order to clarify this relationship it can be used Feldstein-Horioka hypothesis, according to which domestic savings and investments are highly correlated in the long-run, despite the relatively high international mobility of capital (Arrow 2005). Hence, based on expression (10), a high degree of correlation of national savings and investments must mean the parallel changes in the budget deficit and the current account deficit, which ultimately can be presented by the following expression.

$$CA = S_p - I + B \tag{11}$$

where:
B – the balance of state budget.

2. The balance of government budget and the balance of current account in the light of the results of selected empirical studies

Empirical analysis on the relationship between the balance of state budget and the balance of current account published mainly in foreign economic literature can be divided into four groups. In the first group of analysis the budget deficit is treated as the cause of the current account deficit. Thus, the budget deficit in the country leads to the corresponding current account deficit (Abell 1990; Bachman 1992; Cash 1994; Islam, 1998; Piersanti 2000; Leachman, Francis 2002, Cavallo 2005, Erceg, Guerrieri, Gust 2005; Misala 2007). The second group of analysis treats the current account deficit as the cause of the budget deficit. In this case, the current account deficit leads to the budget deficit but not vice versa (Anoruo, Ramchander 1998; Khalid, Guan 1999; Alkswani 2000; Kim, Kim, 2006; Marinheiro 2008).

Moreover, in the third group of studies authors prove the absence or negative causal relationship between the budget deficit and the current account deficit (Enders and Lee 1990, Evans and Hasan 1994; Kaufmann, Scharler, Winckler 2002).

To the fourth group of studies can be included works that indicate the bi-directional causal relationship between the fiscal balance and the current account balance. On the one hand the government deficit affects the current account deficit, but on the other hand, the current account deficit affects the government deficit (Laney, 1984; Miller, Russek 1989, Boucher 1991, Evans 1993; Papaioannou, Yi 2001; Kaufmann, Scharler, Winckler 2002; Baharumshah, Lau 2007).

Darrat (1988) presented empirical evidence confirming the existence of bi-directional causality between the government deficit and the current account deficit. Using quarterly data covering the period 1960-1984, he stated that in the United States took place a significant impact of the government deficit on the current account deficit and an even greater impact of the current account deficit on the level of the government deficit. Similar results obtained Islam (1998), analyzing the twin deficits hypothesis in Brazil during 1973-1991. He confirmed the presence of two-way relationship between the fiscal deficit and the current account deficit in Brazil.

Khalid and Guan (1999) analyzed the causal relationship between the budget deficit and the current account deficit in five economically developed countries (USA, UK, France, Canada, Australia) and in five developing countries (India, Indonesia, Pakistan, Egypt, Mexico) in the period 1950-1994, using the cointegration method. The results confirmed the existence of a causal link between the budget deficit and the current account deficit in four of the five developing countries, while similar relationships were not observed in the developed countries.

Moreover, Piersanti (2000) using Granger-causality test examined the relationship between the current account deficit and the budget deficit in seventeen selected countries of the Organization for Economic Cooperation and Development (OECD) in the period 1970-1997. Research results confirmed the existence of twin deficits hypothesis in most OECD countries. Similarly, results obtained Akbostanci and Tunc (2001) who verified the existence of twin deficits hypothesis in Turkey during the period 1987-2001, using a vector error correction model.

However Kumhof and Laxton (2009) showed that the sustained increase in the budget deficit that occurs in large countries contributed to a significant increase in real interest rate in the world economy. Consequently, this led to short-run deterioration in the balance of current account by about 50 percent of the budget deficit and long-term deterioration in the balance of current account by 75 percent of the budget deficit in a large economy, such as the United States and by 100 percent in small open economies.

Siddiqui (2007) analyzed the relationship between the budget deficit and the current account deficit in the six countries of South Asia (Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka) during the period 1960-2004 by using the vector error correction model. The results of analysis indicated the presence of the twin deficits hypothesis in four of the six examined economies. The results of research also suggested that the probability of the phenomenon of twin deficits is greater in developing countries than in developed countries. Moreover, among the three analyzed countries (Nepal, Pakistan and Sri Lanka) author also confirmed the presence of the perverse hypothesis of twin deficits.

Similar results obtained Lau, Baharumshah and Khalid (2006) who analyzed the relationship between the budget deficit and the current account deficits in four Asian countries (Indonesia, Malaysia, Philippines and Thailand) in the period 1976-2000. Namely, they proved the presence of long-run relationship between the budget deficit and the current account deficit. They confirmed the existence of the twin deficits hypothesis in the case of Thailand, the perverse hypothesis of twin deficits in the case of Indonesia and the Feldstein-Horioka hypothesis in the other two countries.

Marinheiro (2006) examined the relationship between the fiscal deficit and the current account deficit in Egypt during the period 1974-2002 and using a vector autoregressive model. He demonstrated the presence of the perverse hypothesis of twin deficits thereby confirming a one-way influence of the current account deficit on the fiscal deficit. On the other hand, Nickel and Vansteenkiste (2008) examined the relationship between the current account and the government balance in 22 industrialized countries in the period 1981-2005 and they found that in relatively high debt countries this relationship turned negative but insignificant, suggesting that a rise in the government deficit does not result in a rise in the current account deficit. Hence, these results suggested that households in indebted countries tend to become Ricardian.

Summing up, the vast majority of empirical studies concerned the relationship between the budget deficit and the current account deficit indicates that there are significant causal links between these deficits.

3. The relationship between the balance of government budget and the balance of current account in the Baltic countries in the period 1999-2010

In the economic literature there are used several different econometric models by means of which economists attempt to analyze the relationship between the budget deficit and the current account deficit. In this study, to analyze the relation between the balance of government budget and the balance of current account in the Baltic countries during 1999-2010 is used an econometric model which is presented by the following expression:

$$CAD = f(BD) \tag{12}$$

where:
CAD – the balance of current account in the country, expressed in home currency (current account balance in relation to GDP);
BD – the primary balance of government budget in the country, expressed in home currency (the budget balance in relation to GDP).

All the above mentioned time series had a quarterly frequency and covered the period from the first quarter of 1999 to the second quarter of 2010. Before the model structural parameters were estimated, it was necessary to isolate a seasonal factor from the time series. The occurrence of the seasonal factor in the time series could lead to difficulties in interpreting changes in a given phenomenon in the analyzed period. To remove from the time series the seasonal fluctuations, the TRAMO/SEATS procedure was applied (see Figure 1).

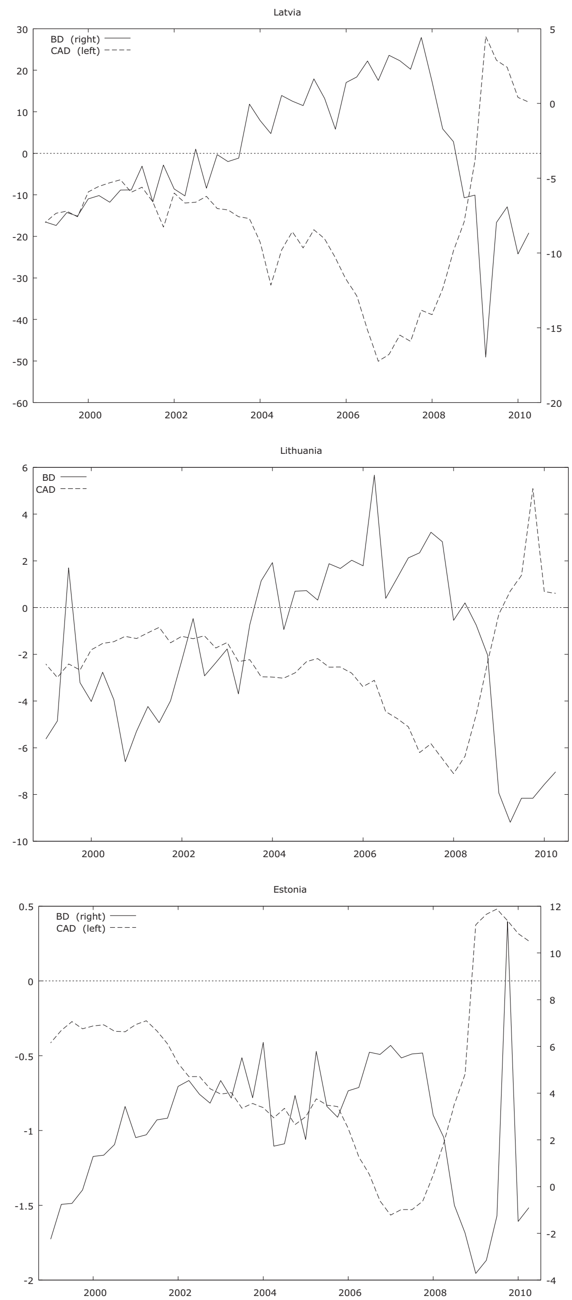

Fig. 1. The balance of government budget and the balance and current account in Latvia, Lithuania and Estonia in the period 1999-2010 [in %]

Source: Own calculations based on International Financial Statistics (2010).

Calculated on the basis of the above data the correlation coefficients between the balance of government budget and the balance of current account in the period 1999-2010 indicated the presence of high and negative linear relationship between these variables in all the Baltic states. This means that the improvement of the balance of government budget in the given country accompanied by deterioration of the balance of current account in the analyzed period (see Table 1).

Table. 1. Correlation coefficients between the balance of government budget and the balance and current account in Latvia, Lithuania and Estonia during the period 1999-2010

	Latvia	
BD	CAD	
1,0000	-0,85	BD
	1,0000	CAD
	Lithuania	
BD	CAD	
1,0000	-0,74	BD
	1,0000	CAD
	Estonia	
BD	CAD	
1,0000	-0,54	BD
	1,0000	CAD

Source: Own calculations based on International Financial Statistics (2010).

Conclusions of causal interdependence on the basis of a simple correlation analysis, however, is inappropriate since this analysis does not distinguish, for example, fiscal policy shocks from the effects of the business cycle associated with technical innovation. For example, the improvement of the economic situation in the country leads on the one hand to a decrease in the budget deficit (as a result of automatic stabilizers of economy) and on the other hand to the current account deficit (as a result of increase in the volume of imports). Hence, too simplified and inappropriate analysis from a methodological point of view would rather suggest the presence of negative relation between these variables (Rybiński 2007).

Before the model estimation it was necessary to specify stationarity of the analyzed time series. To this purpose the Augmented Dickey-Fuller Test (ADF) was used. Among the analyzed variables used in model were time series with integration rows 0 and 1. Hence the lack of stationarity of time series forced the modification of the functional form of the model, in order to bring the stationarity of these variables. This modification consisted in replacing the volume of variables by their first differences. Finally, in order to analyze the relationship between the balance of government budget and the balance and current account in the Baltic countries there was used vector autoregressive model (VAR) indicating short-run causal relationship between variables.

For the purposes of the analyses, in the case of Latvia and Lithuania two lags (two quarters) between explanatory variables and in the case of Estonia three lags (three quarters) between variables were adopted. The choice of lag lengths was in line with results of the information criteria of the Akaike, Schwartz-Bayesian and the Hannan-Quinn models. According to these criteria, models with two and three lag length were characterized by the biggest information capacity. The next step of analysis was estimation of the structural parameters of the model. Related results of parameter estimations were presented in the below table (see Table 2).

Table. 2. Results of the parameter estimation of the VAR model

Latvia

OLS estimates, observations 1999:4-2010:2 (T = 43)
Log-likelihood = -225.9412
Determinant of covariance matrix = 125.60462
AIC = 10.8810
BIC = 11.2087
HQC = 11.0018
Portmanteau test: LB(10) = 33.8003, df = 32 [0.3806]

Equation 1: BD

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
BD_1	-0.620616	0.17414	-3.5639	0.00098
BD_2	-0.179317	0.180857	-0.9915	0.32756
CAD_1	-0.14096	0.0639915	-2.2028	0.03359
CAD_2	0.0394618	0.0664254	0.5941	0.55589

Mean dependent var	-0.031872	S.D. dependent var	2.833639
Sum squared resid	246.3984	S.E. of regression	2.513545
R-squared	0.269461	Adjusted R-squared	0.213266
F(4, 39)	3.596311	P-value(F)	0.013716
rho	0.013721	Durbin-Watson	1.965456

Equation 2: CAD

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
BD_1	-0.457144	0.436263	-1.0479	0.30115
BD_2	-1.41392	0.453093	-3.1206	0.00339
CAD_1	0.197167	0.160315	1.2299	0.22611
CAD_2	-0.175163	0.166412	-1.0526	0.29901

Table 2 Cont'd

Mean dependent var	0.610586	S.D. dependent var	7.040985
Sum squared resid	1546.466	S.E. of regression	6.297060
R-squared	0.262956	Adjusted R-squared	0.206261
F(4, 39)	3.478524	P-value(F)	0.015974
rho	0.010016	Durbin-Watson	1.979308

Lithuania

OLS estimates, observations 1999:4-2010:2 (T = 43)
Log-likelihood = -147.67288
Determinant of covariance matrix = 3.2961394
AIC = 7.2406
BIC = 7.5683
HQC = 7.3614
Portmanteau test: LB(10) = 30.1823, df = 32 [0.5588]

Equation 1: BD

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
BD_1	-0.380756	0.133942	-2.8427	0.00708
BD_2	-0.272988	0.128453	-2.1252	0.03996
CAD_1	-0.661648	0.249651	-2.6503	0.01156
CAD_2	-0.580269	0.3205	-1.8105	0.07793

Mean dependent var	-0.203099	S.D. dependent var	2.059134
Sum squared resid	129.7370	S.E. of regression	1.823894
R-squared	0.278658	Adjusted R-squared	0.223170
F(4, 39)	3.766467	P-value(F)	0.011021
rho	0.077998	Durbin-Watson	1.808072

Equation 2: CAD

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
BD_1	-0.0856707	0.0825596	-1.0377	0.30581
BD_2	-0.109061	0.0791763	-1.3774	0.17623
CAD_1	-0.0712774	0.15388	-0.4632	0.64580
CAD_2	0.221323	0.19755	1.1203	0.26942

Mean dependent var	0.070302	S.D. dependent var	1.150450
Sum squared resid	49.29050	S.E. of regression	1.124215
R-squared	0.116673	Adjusted R-squared	0.048725
F(4, 39)	1.287819	P-value(F)	0.291470
rho	-0.069533	Durbin-Watson	2.101866

Table 2 Cont'd

Estonia
OLS estimates, observations 2000:1-2010:2 (T = 42)
Log-likelihood = -63.641188
Determinant of covariance matrix = 0.070989638
AIC = 3.6020
BIC = 4.0984
HQC = 3.7839
Portmanteau test: LB(10) = 35.3036, df = 28 [0.1612]

Equation 1: BD

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
BD_1	-0.671463	0.129021	-5.2043	<0.00001
BD_2	-0.550444	0.173597	-3.1708	0.00310
BD_3	-0.0671085	0.233195	-0.2878	0.77517
CAD_1	-5.90193	2.17817	-2.7096	0.01025
CAD_2	-4.05394	2.10094	-1.9296	0.06157
CAD_3	11.9951	2.04207	5.8740	<0.00001

Mean dependent var	-0.018231	S.D. dependent var	3.209854
Sum squared resid	164.4151	S.E. of regression	2.137074
R-squared	0.610800	Adjusted R-squared	0.556744
F(6, 36)	9.416237	P-value(F)	3.18e-06
rho	0.298280	Durbin-Watson	1.386369

Equation 2: CAD

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
BD_1	-0.0161257	0.010375	-1.5543	0.12887
BD_2	-0.0190609	0.0139595	-1.3654	0.18059
BD_3	-0.0149254	0.018752	-0.7959	0.43129
CAD_1	0.15662	0.175154	0.8942	0.37716
CAD_2	0.174762	0.168944	1.0344	0.30783
CAD_3	0.0352864	0.164209	0.2149	0.83107

Mean dependent var	0.013982	S.D. dependent var	0.185776
Sum squared resid	1.063158	S.E. of regression	0.171849
R-squared	0.252999	Adjusted R-squared	0.149249
F(6, 36)	2.032117	P-value(F)	0.086547
rho	-0.028334	Durbin-Watson	2.053321

Source: Own calculations.

Based on data presented in table 2 it should be noted that the average elasticity of changes in the government balance to changes in the current account balance in the Baltic states ranged from -5.90 to 11.99. Significantly lower was average elasticity of changes in the current account balance to changes in the government balance in Latvia, Lithuania and Estonia. Namely, this ratio ranged from -1.41 to -0.01. Thus, the data presented in the table above indicated that changes in the current account balance in substantially larger degree determined the changes in the government balance in the Baltic countries in the short-run.

The next stage of analysis was an estimation of the impact of the government balance on the current account balance and the impact of the current account balance on the government balance in the Baltic countries during 1999-2010. The measurement was made by means of so-called impulse response function of the current account balance and the government balance to one unit changes in these variables (see Figure 2).

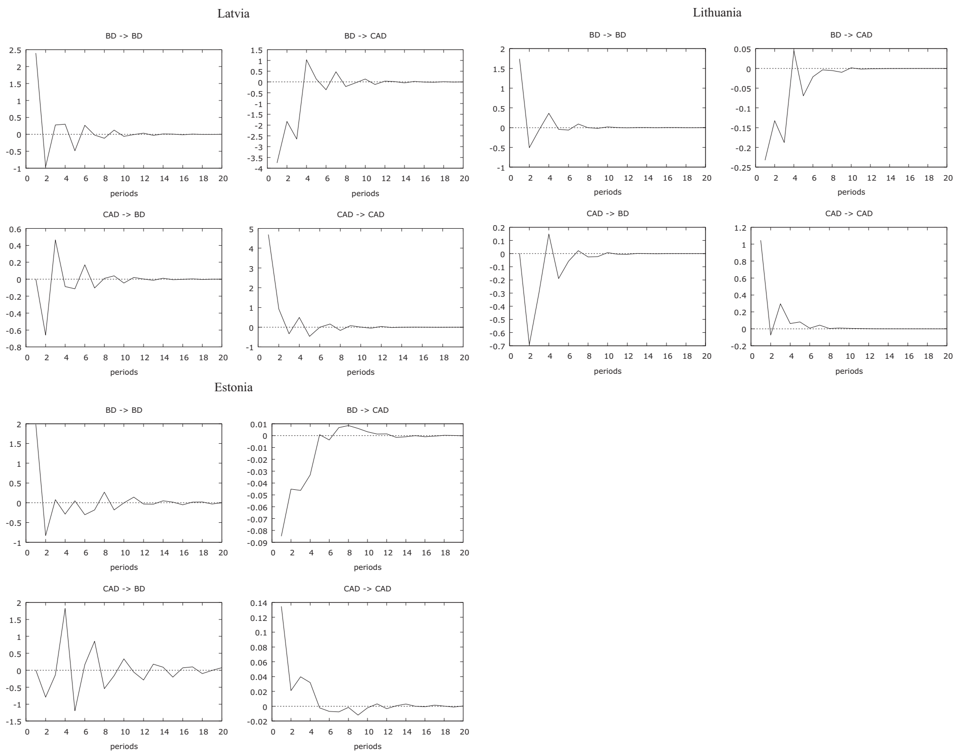

Fig. 2. Impulse response function of the current account balance and the government balance in Latvia, Lithuania and Estonia during 1999-2010

Source: Own calculations based on International Financial Statistics (2010).

According to the above figures it was found that the improvement of the current account balance in the Baltic countries led to a gradual deterioration of the government balance during two quarters after the shock, followed by its stabilization after ten quarters. On the other hand, the improvement of the government balance led to an immediate deterioration of the current account balance in Latvia, Lithuania and Estonia during the first quarter after the shock and then to its stabilization after twelve quarters.

The final stage of analysis was decomposition of the residual variance of the current account balance and the government balance in the Baltic states in order to estimate the impact of changes in the government balance and the current account balance on the variability of the current account balance and the government balance respectively. Relevant results of the calculations were presented in Table 3.

Table. 3. Decomposition of the residual variance for the government balance and the current account balance in the Baltic countries

	Decomposition of variance for BD		Decomposition of variance for CAD	
Latvia				
period	BD	CAD	BD	CAD
2	93,9	6,1	43,3	56,7
4	91,2	8,8	52,4	47,6
6	91,1	8,9	52,3	47,7
8	90,9	9,1	52,5	47,5
10	90,9	9,1	52,6	47,4
12	90,9	9,1	52,6	47,4
14	90,9	9,1	52,6	47,4
16	90,9	9,1	52,6	47,4
18	90,9	9,1	52,6	47,4
20	90,9	9,1	52,6	47,4
Lithuania				
period	BD	CAD	BD	CAD
2	87,3	12,7	6,1	93,9
4	85,3	14,7	8,4	91,6
6	84,5	15,5	8,7	91,3
8	84,5	15,5	8,7	91,3
10	84,5	15,5	8,7	91,3
12	84,5	15,5	8,7	91,3
14	84,5	15,5	8,7	91,3
16	84,5	15,5	8,7	91,3
18	84,5	15,5	8,7	91,3
20	84,5	15,5	8,7	91,3

Table 3 Cont'd

	Decomposition of variance for BD		Decomposition of variance for CAD	
Estonia				
period	BD	CAD	BD	CAD
2	87,9	12,1	33,2	66,8
4	54,1	45,9	37,0	63,0
6	46,8	53,2	37,0	63,0
8	43,1	56,9	37,2	62,8
10	42,7	57,3	37,1	62,9
12	42,5	57,5	37,1	62,9
14	42,4	57,6	37,1	62,9
16	42,2	57,8	37,1	62,9
18	42,2	57,8	37,1	62,9
20	42,2	57,8	37,1	62,9

Source: Own calculations.

Based on data from the above table it can be noted that changes in the current account balance accounted for approximately from 8.8% to 45.9% of the variation in the government balance after one year and from 9.1% to 57.8% after five years. A relatively high share in explanation for the variation in the government balance in the Baltic countries had an inertia factor (lagged changes in the government balance). On the other hand, changes in the government balance explained from 8.4% to 52.4% of the variation in the current account balance in the Baltic states after four quarters and from 8.7% to 52.6% after twenty quarters. Moreover, the largest share in explanation for the variation in the current account balance in the Baltic countries had an inertia factor (lagged changes in the current account balance).

Conclusions

Results of the analysis clearly indicate the occurrence of negative causal relationship between the government balance and the current account balance in Latvia, Lithuania and Estonia during 1999-2010. Thus, in the Baltic countries there was confirmed existence of the Ricardian equivalence hypothesis. In the case of Ricardian equivalence hypothesis, relatively high public debt level should be associated with a stable or even negative relationship between the government balance and the current account balance. Therefore, it was totally rejected the existence of twin deficits hypothesis, the perverse hypothesis of twin deficits and Feldstein-Horioka hypothesis.

Results of the analysis indicate that changes in the current account balance determined in substantially larger degree the changes in the government balance in the Baltic countries in the short-run. The average elasticity of changes in the government balance to changes in the current account balance ranged from -5.90 to 11.99 but the average elasticity of changes in the current account balance to changes in the government balance was from -0.41 to -0.01 in these countries.

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