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Twin Deficits in Small Open Baltic Economies

Summary: This paper analyzes the twin deficit hypothesis - simultaneous current account deficit and budget deficit - in three small open Baltic countries (Estonia, Latvia and Lithuania) running under certain forms of the fixed exchange rate regime. The idea of twin deficits is tested using the vector error correction model (VECM), Granger causality tests and forecast variance decomposition, involving three variables: current account, budget balance, and investments. The new estimates confirm significant long-run positive relation between budget balance and current account in Estonia and Lithuania on one hand and the negative one in case of budget balance and investments in all three considered countries. The results of the analysis are specific to each country as they depend on their particular macroeconomic background. The contribution was elaborated within the project VEGA 1/0973/11.

Key words: Twin deficit, Current account, Budget balance, Vector error correction model, The Baltic countries.

JEL: F32, H60.

Today's highly networked, more competitive, and globalized world is often referred as a world suffering from the global imbalances. The imbalances seem to tend to increase with time. Comparing current accounts and budget balances, we will find that some countries are facing high deficits, whereas others exhibit remarkable surpluses.

The question arises naturally whether it is possible to find a relation between current account balance and budget balance. From a theoretical point of view, it should make sense to apply the so-called twin deficit hypothesis introduced as a new economic term in the eighties into the body of economic literature (as an example, we cite later work by Colm Kearney and Mehdy Monadjemi 1990). It states that budget deficit is always accompanied by current account deficit. The hypothesis fits with observable facts, and in addition, it is consistent with the Mundell-Fleming model (Robert A. Mundell 1968) of the open economy. The model suggests that higher government expenditures increase domestic interest rates, which attracts the foreign capital inflows leading to domestic currency appreciation pushing down exports and increasing imports.

There are a number of studies examining the phenomenon of twin deficit. John D. Abell (1990) tested the relation between budget deficits and trade deficits using a vector autoregressive model, causality testing, and impulse response function. The study has revealed that budget deficits influence trade deficits, but the linkage appears to be rather indirect. On the contrary, the results of Walter Enders and Bong-Soo Lee (1990) obtained upon using the unconstrained vector autoregression do not

confirm the so-called Ricardian equivalence hypothesis in connection with the twin deficit hypothesis in the United States; on the other hand, they do not reject the independence of budget and current account deficits. Furthermore, Soyoung Kim and Nouriel Roubini (2009) used the vector autoregression and concluded that comovement of the current account and the fiscal balance in the United States is explained by output shocks. Kevin Grier and Haichun Ye (2009) studied twin deficits in the United States and revealed that there is no common pattern between two variables in the long run. However, the short-run dynamics uncover a persistent positive relation.

Mamdouh A. Alkswani (2000) analyzed this phenomenon in Saudi Arabia using the vector error correction model (VECM) and causality testing. He proved long-run relation between two variables and affirmed the causality running from trade deficit to budget deficit. This was confirmed also by Carlos F. Marinheiro (2008) who tested twin deficit hypotheses in Egypt. This causal direction is also confirmed by Emmanuel Anoruo and Sanjay Ramchander (1998). They investigated twin deficits in five developing Southeast Asian economies applying Granger causality test based on the vector autoregressive model. Ahmad Z. Baharumshah, Evan Lau, and Ahmed M. Khalid (2006) performed the vector autoregressive approach and variance decomposition for four ASEAN countries (Indonesia, Malaysia, the Philippines and Thailand) and detected long-run relation between budget and current account deficit. Moreover, the unidirectional causality running from budget deficit to current account deficit was confirmed for Thailand, whereas the bidirectional causality has been proven for Malaysia. Foued Chihi and Michel Normandin (2013) tested twin deficit hypothesis in 12 developing countries using vector autoregressive model, impulse response functions, and variance decomposition. Their results confirm the positive comovement between budgetary and current account deficits in many countries, which is mainly explained by shocks associated to internal conditions. Other authors analyzed twin deficits in European countries, such as Mohsen Bahmani-Oskooee (2007) for Spain. Sophia Kalou and Suzanna-Maria Paleologou (2012) confirmed twin deficits in Greece using the VECM with structural breaks. Emmanouil Trachanas and Constantinos Katrakilidis (2013) analyzed the twin deficits in 5 European countries characterized by important debts using asymmetric cointegration. They confirm the validity of twin deficit hypothesis in Portugal, Ireland, Greece and Spain and release the fact that restrictive fiscal policy is capable of maintaining the country's external position. Elif Akbostanci and Gül İpek Tunc (2002) estimated the VECM for Turkey and confirmed the long and short-run relation between two deficits and the fact that budget deficit causes the trade deficit. Budgetary and external imbalances were studied by António Afonso and Christophe Rault (2008) who used the panel cointegration and SUR (seemingly unrelated regressions) methodology to analyze the relation between current account, budget balance, and real effective exchange rate in the EU and OECD country groupings. However, they concluded that direct and close connection between budgetary and current account balances is not evident. Vince Daly and Jalal U. Siddiki (2009) used cointegration analysis to research long-term impact of fiscal deficit and real interest rate on current account balance in 23 OECD countries. They consider regime shifts and confirm the long-term relation between the variables in 13 countries. A similar problem was analyzed by

Srđan Redžepagić and Matthieu Llorca (2007) in the case of Central and Eastern European countries from 1999 to 2006. Other economists, for example, Michael Bergman (2011) underlined the importance of sound public finance especially in connection to financial and economic crises.

The main objective of the present paper is to analyze the twin deficits phenomenon in the three Baltic countries. Our analysis is based on the application of the VECM, Granger causality testing, and forecast variance decomposition. The paper is organized as follows. In the first section, we describe the data and provide additional details on methodology. The second section is devoted to the testing of stationarity of the endogenous variables, to the choice of the proper number of cointegration equations, and to the estimates of the long and short-run coefficients of the VECM. In the third section, we carry out the Granger causality testing and variance decomposition. Finally, conclusions are presented.

1. Data and Methodology

We have chosen three Baltic countries, that is, Estonia, Latvia and Lithuania, for our analysis as they present a sample of the most successful countries in the field of public finance administration. Nowadays, the public debt in Estonia is just 6% of GDP; in Latvia 37.8%; and in Lithuania 39%. Selection of the countries was also motivated by the fact that they are running under certain forms of the fixed exchange rate regime (Estonia: currency board to EUR 1992-2010; Latvia: conventional fixed peg arrangement to SDR (special drawing rights) and later to EUR; Lithuania: currency board to USD 1994-2002, currency board to EUR 2002-2011). Here, we assume that the relation between current account and budget balance is not biased by the exchange rate fluctuations (the inflation impact in this pure case of Bulgarian currency board was described by Xénia Mihaličová et al. 2011).

Moreover, it should be pointed out that chosen countries belong to small open economies with current trade openness ranging from 122.49% in Latvia to 180.52% in Estonia. Their openness is incomparably higher than the European Union (EU-27) average value of 85.89%. Estonia, Latvia and Lithuania belong to transition economies; thus, the foreign direct investments played an important role in their development during the last decades. This is why we expect that in these countries, the hypothesis of twin deficits takes place.

Furthermore, the observed investments/GDP ratio, which reaches average values ranging from 21.15% in Lithuania to 29.14% in Estonia during the period 1999-2011, is higher than that of the European Union (EU-27), which acquires an average of 20.17%. More detailed characteristics of the selected countries are shown in Table 1.

The problem of parallel current and budget deficits is not only important from the aspect of their current or perspective membership in the euro area but also in the view of their financial stability and ability to finance their debt service.

For our analysis, we used quarterly time series of current account (CA), budget balance (BB), and investments (INV) covering the period 1999Q1 to 2011Q2. Data (see Figure 1) were retrieved from the Eurostat database and were consequently seasonally adjusted by the X12-ARIMA method. The negative correlation between

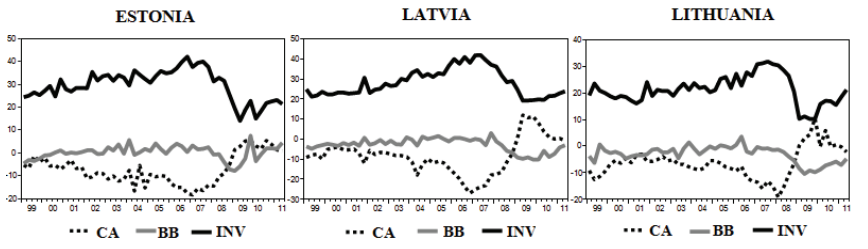
current account and investment is obvious in all countries. On the other hand, the correlation between budget balance and current account seems to be positive. This relation stands in the center of our analysis. This intuitive step is also supported by the practice of Aleksander Aristovnik (2005) who exploited the panel data for twin deficit analysis in the selected transition economies during the period 1990-2003.

Table 1 The Country Characteristics

	Pop.	GDP	Openness	INV	FDI	BB	CA	FA	Savings
EE	1.3	15973	180.52 %	29.14 %	9.67 %	0.20 %	-6.81 %	5.84 %	22.73 %
LV	2.2	20050	122.49 %	28.48 %	4.60 %	-3.11 %	-8.42 %	7.62 %	20.09 %
LT	3.2	30705	157.44 %	21.15 %	3.46 %	-3.21 %	-6.28 %	4.73 %	14.70 %
EU27			85.89 %	20.17 %	3.00 %	-2.76 %			

Note: EE = Estonia; LV = Latvia; LT = Lithuania; pop. = population (millions persons) - at 1 January 2011; GDP (millions €) - in 2011; openness = (exports + imports)/GDP*100 - in 2011; INV = investments (as % of GDP) - average 1999-2011; FDI = direct investments in reporting country (as % of GDP) - average 2004-2011; BB = budget balance (as % of GDP) - average 1999-2011; CA = current account (as % of GDP) - average 1999-2011; FA BOP = financial account of balance of payments (as % of GDP) - average 1999-2011; savings = (as % of GDP) - average 1999-2011.

Source: Eurostat (2012a, b, c)[1], own calculations.



Note: CA - current account, BB - budget balance, INV - investments; data are expressed as % of GDP.

Source: Eurostat (2012a, b, c), own editing.

Figure 1 The Temporal Evolution of the Current Account, Budget Balance and Investment in Estonia, Latvia and Lithuania 1999-2011

Most authors who analyzed the twin deficit hypothesis in transition countries (e.g., Rault and Afonso 2009; Gancho T. Ganchev 2010; Hubert Gabrisch 2011) neglected the role of private investments in the twin deficit econometric models. In distinction to them, in our model variants, we are in accord with the Feldstein-Horioka puzzle (Martin Feldstein and Charles Horioka 1980). By pointing out the role of the foreign direct investment in the Eastern European economies over the last decades,

[1] **Eurostat.** 2012a. "General Government Revenue and Expenditures." http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_q_ggnfa&lang=en (accessed January 7, 2012).
Eurostat. 2012b. "Current Account. Balance of Payments by Country." http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=bop_q_c&lang=en (accessed January 7, 2012).
Eurostat. 2012c. "Gross Capital Formation. GDP and Main Components." http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=namq_gdp_c&lang=en (accessed January 7, 2012).

we avoid the omission of investments as has been done by Aristovnik (2005) and Alberto Bagnai (2006, 2010).

The validity of the twin deficit hypothesis has been analyzed using the VECM, Granger causality testing, and variance decomposition. We realize that relatively small number of observations (in our case, 50) may influence significance of our results. Nevertheless, such practice is in line with other authors (see Paresh K. Narayan, Seema Narayan, and Arti Prasad 2008; Ugur Soytas and Ramazan Sari 2009).

The application of the VECM assumes all considered time series to be integrated of order 1. Then, the model combines two types of variables: stationary first-differenced variables that represent short-term fluctuations and stationary linear combination of the variables in levels that represent long-term equilibrium. The situation is modelled by the following equation:

$$c + \beta_3 t + \beta_0 CA_t + \beta_1 BB_t + \beta_2 INV_t = \xi_t \quad (1)$$

where c is the constant term, β_i is the element of the cointegration vector, ξ_t is the equilibrium error, CA_t denotes current account of the balance of payments, BB_t denotes budget balance, and INV_t denotes investment in time t. We set $\beta_0 = 1$. The system of the VECM equations reads:

$$\Delta CA_t = c_1 + \sum_{i=1}^{p} b_{1i}\Delta CA_{t-i} + \sum_{i=1}^{p} g_{1i}\Delta BB_{t-i} + \sum_{i=1}^{p} d_{1i}\Delta INV_{t-i} + \alpha_1\xi_{t-1} + u_{1t}\,, \quad (2)$$

$$\Delta BB_t = c_2 + \sum_{i=1}^{p} b_{2i}\Delta CA_{t-i} + \sum_{i=1}^{p} g_{2i}\Delta BB_{t-i} + \sum_{i=1}^{p} d_{2i}\Delta INV_{t-i} + \alpha_2\xi_{t-1} + u_{2\,t}\,, \quad (3)$$

$$\Delta INV_t = c_3 + \sum_{i=1}^{p} b_{3i}\Delta CA_{t-i} + \sum_{i=1}^{p} g_{3i}\Delta BB_{t-i} + \sum_{i=1}^{p} d_{3i}\Delta INV_{t-i} + \alpha_3\xi_{t-1} + u_{3t}\,. \quad (4)$$

Here, coefficient α_j expresses the sensitivity of the j-th endogenous variable with respect to the deviation from the long-term equilibrium (error) ξ_{t-1}. Then, the short-term fluctuations (differences) of dependent variables are determined by its memory (short-term fluctuation from the past), error correction mechanism correcting the deviations from the equilibrium, and the random term u_j; p indicates the maximum lag. By the Δ, we denote the first differences of the corresponding variables. The meaning of the remaining coefficients c_j, b_{ji}, g_{ji}, and d_{ji} becomes clear through the context.

2. Stationarity Testing and the VECM

First, the stationarity of all endogenous variables entering the VECM has been tested. We used the Augmented Dickey-Fuller test and Elliott-Rothenberg-Stock (ERS)

(Graham Elliott, Thomas J. Rothenberg, and James H. Stock 1996) Point-Optimal GLS test (see Table 2).

We have chosen the ADF to follow the Juan J. Dolado, Tim Jenkinson, and Simon Sosvilla-Rivero (1990) methodology, which enables the identification of the drifts and deterministic trends, respectively.

Table 2 Testing of Stationarity in Estonia, Latvia and Lithuania

Estonia

	Augmented Dickey-Fuller test				Elliott-Rothenberg-Stock test			
	Level		First differences		Level		First differences	
	C, T, L	t-stat	C,T, L	t-stat	C, T, L	p-stat	C, T, L	p-stat
CA	C,T,L=3	-2.229	C,L=0	-12.029***	C,T,L=3	8.696	C,L=0	1.439***
BB	C,T,L=0	-4.157***	C,L=0	-10.571***	C,T,L=0	6.066*	C,L=0	1.355***
INV	C,T,L=0	-1.967	C,L=0	-8.3240***	C,T,L=0	16.887	C,L=0	1.081***

Latvia

	Augmented Dickey-Fuller test				Elliott-Rothenberg-Stock test			
	Level		First differences		Level		First differences	
	C, T, L	t-stat	C,T, L	t-stat	C, T, L	p-stat	C, T, L	p-stat
CA	C,T,L=1	-1.367	C,L=0	-5.186***	C,T,L=1	14.041	C,L=0	1.124***
BB	C,T,L=0	-2.679	C,L=0	-10.299***	C,T,L=0	9.092	C,L=0	1.414***
INV	C,T,L=0	-1.250	C,L=0	-8.253***	C,T,L=0	24.559	C,L=0	2.060**

Lithuania

	Augmented Dickey-Fuller test				Elliott-Rothenberg-Stock test			
	Level		First differences		Level		First differences	
	C, T, L	t-stat	C,T, L	t-stat	C, T, L	p-stat	C, T, L	p-stat
CA	C,T,L=3	-2.898	C,L=1	-3.803***	C,T,L=3	1.67***	C,L=1	3.010*
BB	C,T,L=0	-2.809	C,L=1	-7.666***	C,T,L=0	8.673	C,L=1	1.594***
INV	C,T,L=0	-2.107	C,L=0	-7.908***	C,T,L=0	11.641	C,L=0	2.015**

Note: C = constant (intercept); T = trend; L = number of lags; *, **, *** statistical significance at the levels 1, 5, 10% respectively; null hypothesis: time series has a unit root; 5% level is chosen as a criterion to accept/reject the alternative hypothesis; optimal lag determination according to Schwarz Info Criterion; unit root test Elliott-Rothenberg-Stock point optimal test (Elliott, Rothenberg, and Stock 1996).

Source: Own calculations.

Respecting the presence of these deterministic elements in the time series, we applied the ERS test to use its good small sample characteristics and high power.

Results of the unit root tests showing that variables are considered nonstationary in levels but stationary in their first differences lead us to the opinion that time series are integrated processes of the first order, which is crucial in performing the cointegration analysis (see Table 2). With the Johansen Trace cointegration test (Soren Johansen and Katarina Juselius 1990) as our basis, we identified one equilibrium cointegration equation (see Table 3) in all countries.

Estimated long-term cointegration coefficients β_i and error correction coefficients α_i of the VECM are presented in Table 4. Almost all long-term β_i coefficients are statistically significant, and the corresponding coefficients have the same signs.

Table 3 The Results of the Unrestricted Cointegration Rank Test (Trace)

Estonia

Hypothesized no. of CE(s)	Eigenvalue	Trace statistic	0.05 critical value	Prob.**
None *	0.407	37.085	29.797	0.006
At most 1	0.204	12.987	15.494	0.115
At most 2	0.051	2.444	3.841	0.117

Latvia

Hypothesized no. of CE(s)	Eigenvalue	Trace statistic	0.05 critical value	Prob.**
None *	0.463	52.478	42.915	0.004
At most 1	0.287	23.863	25.872	0.087
At most 2	0.165	8.296	12.517	0.228

Lithuania

Hypothesized no. of CE(s)	Eigenvalue	Trace statistic	0.05 critical value	Prob.**
None *	0.479	50.915	50.915	42.915
At most 1	0.245	20.196	20.196	25.872
At most 2	0.137	6.931	6.931	12.517

Note: Trend assumption: linear deterministic trend; lags (in first differences): L = 3 (Estonia and Latvia) and L = 2 (Lithuania); * denotes rejection of the hypothesis at the 0.05 level; ** MacKinnon-Haug-Michelis p-values (James G. MacKinnon, Alfred A. Haug, and Leo Michelis 1999); trace test indicates 1 cointegrating eqn(s) at the 0.05 level.

Source: Own calculations.

Table 4 Estimated α and ß Coefficients of the VECM

Estonia

Cointegration equation	Variables				
	Current account	Budget balance	Investment	Constant	Trend (t)
Cointegration vector ß	1.000000	-0.299182 [-2.24782]	1.044569 [28.2253]	-23.67000	–
Error correction vector α	1.000000	-0.299182 [-2.24782]	1.044569 [28.2253]		– –

Latvia

Cointegration equation	Variables				
	Current account	Budget balance	Investment	Constant	Trend (t)
Cointegration vector ß	1.000000	-0.285385 [-0.74496]	1.322448 [8.32834]	-25.28042	-0.184698 [-3.05279]
Error correction vector α	-0.831992 [-3.95488]	0.136499 [0.85758]	0.133935 [0.63040]		

Lithuania

Cointegration equation	Variables				
	Current account	Budget balance	Investment	Constant	Trend (t)
Cointegration vector ß	1.000000	-0.450786 [-2.66505]	1.265582 [15.7318]	-18.30371	-0.139717 [-6.34664]
Error correction vector α	-0.771209 [-2.32572]	0.138039 [0.75011]	-0.591199 [-1.49594]		

Note: t-statistics in [ ]; number of lags L = 3 (Estonia, Latvia) and L = 2 (Lithuania); α - short term error correction coefficients; ß - (β_1, β_2, β_3) cointegration vector of long term equilibrium.

Source: Own calculations.

After reformulating the cointegration relation (1), we obtain the following equilibrium:

$$CA_t + \beta_2 INV_t = -c - \beta_1 BB_t - \beta_3 t \quad (5)$$

where the right-hand side coefficients have the opposite sign to the ones estimated in the cointegration vector. Then, the positive sign of estimated $-\beta_1$ linked to the budget balance shows that the twin deficit hypothesis is valid in the long run. Otherwise, the budget deficit is accompanied by the current account deficit and *vice versa*.

We found that the signs of the constants and trends in the cointegration vector are negative in all analyzed cases. By moving them to the right-hand side of the Equation (5), we can interpret them as the factors incorporating domestic savings and foreign investments flowing into a country to cover the needs of current account and domestic investments.

Moreover, the long-term reaction of current account to changes of the budget balance is as follows: in the case of Estonia, if the share of the budget deficit on GDP increases by one percentage point, then the share of the current account deficit will increase by 0.299 points in the long run. In the case of Latvia, the change is 0.285 points. For Lithuania, we have a change of 0.451 points. In all analyzed cases, these coefficients are positive but strictly less than 1. It means that the extension of the budget balance deficit is partly covered by the extension of importations, and at the same time, it is satisfied also by the production of domestic goods and services. Finally, we can conclude that there is a positive relation between the deficits of the budget balance on one side and the current account on the other side. This relation seems to be statistically significant in the case of Estonia and Lithuania, although less significance is found when applying the Latvia data. In our study, we use the Latvian case as a realization of the statistical type II error. Furthermore, we have observed a negative relation between current account and investment as they are competing for the same sources.

3. Granger Causality and Variance Decomposition

Causality between analyzed variables was tested by the VEC Granger causality test. The results indicate that current accounts in Estonia and Latvia are significantly influenced by the lagged budget balance and investments. However, statistically significant unidirectional relation between independent and dependent variables is not confirmed for Lithuania (see Table 5).

Nevertheless, the VEC Granger causality test explains only short-run relation. Consequently, we estimate the forecast variance decomposition, taking into account both the short and long-term point of view.

For Estonia, with lags L = 1 - 12, it seems that the current account is explained by budget balance, and its impact on the current account is increasing with time. Budget balance explains about 40% of the current account variability (L = 7 - 12). Investments explain almost 20% of the current account variance. Budget balance seems to be independent from the current account and only partially dependent on investments (approximately 10%), which can be interpreted by the relative rigidity of the government's policy in achieving economic goals. Investments are, to a large

extent, explained by both budget deficit and current account at the level of around 40% (see Figure 2). This fact can be explained by the presence of the substitution effects in the current account vs. investment relation and the action of the crowding out effects.

For Latvia, the evolution of investigated variables is captured in Figure 2. The variance decomposition shows that investments explain about 50% of the current account variability (by lag L = 12). The impact of budget balance is very small and even decreasing with time. In addition, current account explains approximately 10% and investment more than 20% of the budget balance variability. Investments are influenced by current account up to 60%, but they are relatively independent from budget balance (see Figure 2).

Table 5 The Summary of the VEC Granger Causality Tests

Estonia

	Dependent (explained) variable Y					
		Current account (CA)		Budget balance (BB)		Investment (INV)
Independent variable	BB	18.019***	CA	5.343	BB	1.691
	INV	13.737***	INV	3.072	CA	5.589
	JOINT	29.251***	JOINT	7.576	JOINT	9.291

Latvia

	Dependent (explained) variable Y					
		Current account (CA)		Budget balance (BB)		Investment (INV)
Independent variable	BB	12.719***	CA	1.701	BB	2.564
	INV	9.3154**	INV	1.879	CA	4.284
	JOINT	19.278***	JOINT	6.771	JOINT	6.027

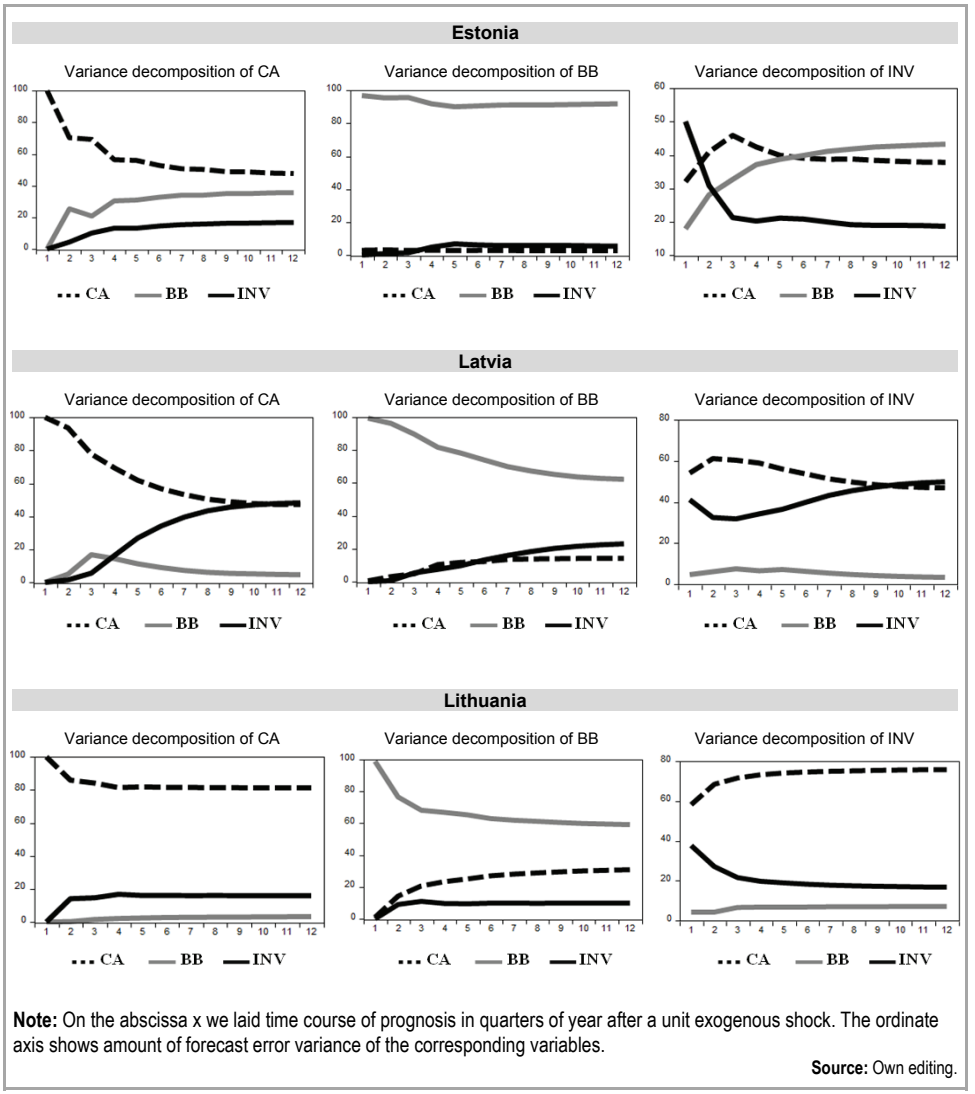
Lithuania

	Dependent (explained) variable Y					
		Current account (CA)		Budget balance (BB)		Investment (INV)
Independent variable	BB	2.151	CA	0.605	BB	1.485
	INV	1.285	INV	1.103	CA	0.705
	JOINT	3.377	JOINT	7.161	JOINT	2.018

Note: Chi Square statistics; *, **, *** statistical significance at 1, 5 and 10 % level; null hypothesis: independent variable(s) does not cause dependent variable; lag L = 3 was used for Estonia and Latvia, lag L = 2 was used for Lithuania.

Source: Own calculations.

For Lithuania, the variance decomposition implies that current account is only partly influenced by investments, as they explain about 20% of the current account variability. Current account explains about 30% of the budget balance variability. The saving effect of lagged impact of current account on budget balance is obvious. Moreover, current account explains up to about 80% of investment variability (see Figure 2).



Note: On the abscissa x we laid time course of prognosis in quarters of year after a unit exogenous shock. The ordinate axis shows amount of forecast error variance of the corresponding variables.

Source: Own editing.

Figure 2 The Variance Decomposition of Current Account, Budget Balance and Investment

4. Conclusion

The paper has been devoted to the analysis of twin deficits in the Baltic countries during the period 1999Q1-2011Q2. The VECM, VEC Granger causality, and forecast variance decomposition have been applied. Results are different for each analyzed country according to its macroeconomic particularities (e.g., budget discipline). The VECM results demonstrate consistently the validity of the twin deficit hypothesis in the case of Estonia and Lithuania. On the other hand, the findings concerning Latvia are more ambiguous.

The VEC Granger causality analysis indicates that the current account is explained by lagged budget balance and investments in Latvia and Estonia. The situation is quite different from Lithuania, where current account seems to be independent from budget balance and/or investments. Lithuanian results are also confirmed by variance decomposition. The source of these findings can be the fact that Lithuania attracted the least volume of foreign direct investments and created the lowest ratio of investments to GDP comparing to other Baltic countries.

The long-term relation explained by the forecast variance decomposition shows that the current account variance may be explained by the budget balance in Estonia and Latvia. However, the impact of budget balance on current account is not confirmed in case of Lithuania. The budget balance in Latvia and Lithuania is fairly well explained by current account (around 20%), but the exception is Estonia, where budget balance is almost independent from current account and investment. The VECM findings coincide with the fact that fiscal policy of Estonia is more prudent (QFinance 2012) than those of fellow Baltic republics, Latvia and Lithuania.

The results of budget balance independence in Estonia are in line with the so-called government effectiveness index (measuring the quality of policy formulation and implementation and the credibility of the government commitment). Government effectiveness index is the highest in Estonia (84.76), if we compare with Latvia and Lithuania. Simultaneously, Estonian budget balance is positive during recent years, and according to results of variance decomposition, we can conclude that budget balance evolution does not depend on other economic factors (e.g., current account and investments). Furthermore, Latvia and Lithuania seems to be very similar in government effectiveness index (69.52 in Latvia and 73.33 in Lithuania) (INSEAD 2011[2]).

[2] **INSEAD - The Business School for the World.** 2011. "The Global Innovation Index 2011. Accelerating Growth and Development." http://www.wipo.int/export/sites/www/freepublications/en/economics/gii/gii_2011.pdf.

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