

Alka Obadić

Faculty of Economics and Business,
University of Zagreb,
Croatia

✉ aobadic@efzg.hr

Tomislav Globan

Faculty of Economics and Business,
University of Zagreb,
Croatia

✉ tgloban@efzg.hr

Ozana Nadoveza

Faculty of Economics and Business,
University of Zagreb,
Croatia

✉ onadoveza@efzg.hr

Contradicting the Twin Deficits Hypothesis: The Role of Tax Revenues Composition

Summary: The general theory of twin deficits hypothesis does not consider specific characteristics of domestic tax systems, i.e. whether the revenue side of the budget is dominated by indirect or by direct taxes. The main hypothesis of the paper is that in countries with fiscal systems dominated by indirect taxes, the deterioration of the current account balance would imply higher fiscal revenues due to larger imports and consumption. The hypothesis is based on the characteristics of domestic tax systems of Bulgaria, Croatia, Poland and Romania in which indirect tax revenues account for the majority of total budget tax revenues. Results suggest that the co-movements of the current account and the fiscal balance cannot be explained by the twin deficit theory in countries with indirect tax-oriented systems. These results imply that only the structural economic transformation and export orientation of the economy may reverse the causality direction between two deficits.

Key words: Twin deficits, Budget deficit, Current account deficit, Indirect taxes, VAR.

JEL: E62, F32, H62.

There is a large body of literature, both theoretical and empirical, which confirmed that the hypothesis of twin deficits, i.e. the co-movement between budget and current account deficits, holds in reality. However, the general theory does not consider specific characteristics of domestic tax systems, i.e. whether the revenue side of the budget is dominated by indirect or by direct taxes. Moreover, very few authors considered the importance of the domestic tax system in determining the nature of the relationship between the two variables in their empirical papers. The purpose of this paper is to test the hypothesis that in countries with indirect tax-oriented systems, an increasing current account deficit will induce a rise in government revenues, thereby reducing the budget deficit. Thereby, this paper also debates and reconsiders the twin deficit hypothesis which suggests that a fiscal expansion should lead to a worsening of the current account balance and to an appreciation of the real exchange rate.

The hypothesis will be tested on a sample of four European emerging economies - Bulgaria, Croatia, Poland and Romania, in the period from 1999 to 2011, using a Vector autoregression (VAR) model. These four countries were selected since their budget revenues are dominated by indirect tax revenues. This means that a half of total tax revenues make indirect tax revenues, i.e. receivable taxes on production and imports.

The paper is structured as follows. Section 1 analyses the twin deficit literature and gives theoretical arguments for the empirical analysis. Section 2 describes the data and methodology used in order to test our main hypothesis. Section 3 reports the estimation results, while Section 4 concludes.

1. Literature Review and Theoretical Arguments

1.1 Twin Deficits Hypothesis

Many economic theorists focused in their work on the relationship between trade and budget deficits and the existence of twin deficits. The twin deficit hypothesis and different overlapping generations models suggest the existence of a positive link between the two deficits (Branko Urošević, Milan Nedeljković, and Emir Zildžović 2012, p. 273). The problem of twin deficits has been in the economic focus largely because of its important policy implications concerning the long-term viability of economic progress (Emmanuel Anoruo and Sanjay Ramchander 1998, p. 487).

Still, there are at least two explanations of the current account deficit which start from the observation that the counterpart to the current account deficit is an imbalance in domestic savings and domestic investment. Martin Feldstein (who served as chairman of the Council of Economic Advisers and as a chief economic advisor to President Ronald Reagan) popularized the conventional view (also known as the Keynesian proposition) held by many economists, which is sometimes referred as the problem of twin deficits. In Feldstein's view, the large U.S. government deficits attracted foreign investment, thus causing the deficit of the current account. However, the supporters of the Reagan Administration's macroeconomic policy opposed this view. They believed that the savings-investment imbalance, which caused the current account deficit, reflected a shift in the demand for investment goods in the U.S., which occurred due to the 1981 investment tax cuts (Daniel D. Bachman 1992, pp. 232-233). Moreover, Ali F. Darrat (1998) states that one can discriminate between four alternative, but equally reasonable hypotheses, each with different policy implications. These are that budget deficit cause trade deficits (the conventional view), that trade deficits cause budget deficits, that both variables (although highly correlated) are causally independent, and finally that there is a bidirectional causality between the two variables (Darrat 1998, p. 886).

In Feldstein's view, the policy recommendations are clear. If the Congress and the President do not reduce the budget deficit, the U.S. will continue to absorb a large portion of the rest of the world's savings. Since the capital account determines the current account, policies that do not address capital movements will not alter the current account deficit. On the other hand, the Reagan Administration did not view the current account deficit as a policy problem because, as the country accumulates debt to finance the current deficit, it accumulates capital and therefore the additional productive capacity to pay off the debt (Bachman 1992, p. 232).

Mohsen Bahmani-Oskooee (1992) tested three different approaches to a country's balance of payments. The purpose of his paper was to identify which of this policy tools has a long-run relation with U.S. trade balance. The author employed two measures of U.S. external balance, the trade balance and the current account, both in real terms. As a measure of fiscal tool, the author relays on real full-

employment budget, while as a measure of monetary policy the author uses real M1 and real M2 aggregates. To determine whether the elasticity approach receives any long-term support, the author employed three different measures of exchange rate. Quarterly data over the 1971:Q1-1989:Q2 period were used to carry out the analysis. A cointegration technique was used to determine which policy tool has a long-run relationship with U.S. current account and the trade balances. The main conclusion of the paper is that while full-employment budget is cointegrated with the current account and the trade balance, the M2 monetary aggregate is marginally cointegrated only with the trade balance (Bahmani-Oskooee 1992, p. 93).

Using the same data and equations as Bahmani-Oskooee (1992), Ki-Ho Kim (1995) argued that his results are not valid due to the methodology employed. Precisely, he showed that out of twelve time series that Bahmani-Oskooee concluded to be unit roots using Augmented Dickey-Fuller (ADF) methodology, three do not have a unit root when Kwiatkowski-Phillips-Schmidt-Shin (KPSS) procedure is employed. Furthermore, Kim (1995) employs Johansen's approach in estimating the cointegration relationship, in contrast to Engle-Granger tests employed in Bahmani-Oskooee (1992). The author verifies that the trade balance is not cointegrated with the full-employment budget and that both the current account and trade balances have a long-run relationship with the M2 aggregate and the terms of trade, respectively.

Bahmani-Oskooee (1995) extended his previous work and Kim's multivariate models using the Johansen-Juselius cointegration technique. He employs Perron's test to check for the stationarity of time series, emphasizes that cointegration results obtained by the Johansen-Juselius technique are sensitive to the number of lags and states that Kim (1995) has arbitrarily included only four lags without testing it. This analysis showed that although all three policy variables belong to the cointegrating vector, fiscal policy variable is relatively more important as a long-run determinant of the U.S. current account.

Bachman (1992) used four variables (Federal Government surplus, gross domestic investment, U.S. relative to foreign productivity, and the estimated risk premium) to represent the causal agent for each of the four hypotheses introduced by Darrat (1998). The results showed that only the Federal budget deficit explains the evolution of the current account. Feldstein's twin deficit hypothesis proved to be superior by every measure of the performance of the VARs (Bachman 1992, p. 239).

The twin deficit hypothesis has been empirically proved by many authors. Estimates by Roel Beetsma, Massimo Giuliodori, and Franc Klaassen (2007) suggest that the government spending increase in the selected EU countries (Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Germany, Greece, the Netherlands, Portugal, Spain, Sweden, and the U.K.) produces a 0.7 *per cent* of GDP impact budget deficit, thereby pointing to the potential relevance of the twin deficits hypothesis (Beetsma, Giuliodori, and Klaassen 2007, p. 11). On the sample of 17 Organisation for Economic Co-operation and Development (OECD) countries over the period 1978-2009, John C. Bluedorn and Daniel Leigh (2011) found that a 1 *per cent* of GDP fiscal consolidation reduces the external current account deficit-to-GDP ratio by about 0.6 percentage point within two years. Thus, reducing the current account deficit by 1 *per cent* of GDP would require a fiscal consolidation of about 1.7 *per cent* of GDP (Bluedorn and Leigh 2011, p. 600). S. M. Ali Abbas et al. (2010) ana-

lyzed the sample of more than 100 countries, and concluded that an improvement in the fiscal balance of 1 *per cent* of GDP improves the current account balance by 0.2-0.3 percentage points of GDP. Effects gradually disappear, becoming insignificant after 2-4 years. The impact is longer-lasting in emerging than in advanced countries.

Nikolina E. Kosteletou (2013) confirmed the twin deficit hypothesis for EU countries. She concluded that an expansionary fiscal policy worsens the current account in eurozone countries with current account deficits (Greece, Portugal, Spain, Italy, France, Cyprus and Slovenia). However, she found that the opposite direction effect also holds. Namely, as we argue in this paper, she confirmed the existence of reverse causality (from the current account to the government budget).

Veronika Šuliková, Marianna Siničáková, and Denis Horváth (2014) analysed the twin deficit hypothesis in three small open Baltic countries (Estonia, Latvia and Lithuania) during the period 1999:Q1-2011:Q2. Conclusions based on the Vector error correction model (VECM) indicate the validity of the twin deficit hypothesis in the case of Estonia and Lithuania. However, the findings concerning Latvia are more ambiguous since the positive relation between the deficits of the budget balance on one side and the current account on the other is less significant than in Estonia and Lithuania.

The study of Anoruo and Ramchander (1998) found reverse causality between “twin” variables. They found that the trade deficit causes fiscal deficit, while *vice versa* does not hold, in all countries in the sample (five developing countries in Southeast Asia - India, Indonesia, Korea, Malaysia and the Philippines), except Malaysia where a bi-directional relationship is documented. Mamdouh A. Alkhatib Alkswani (2000) confirms the existence of a long-run equilibrium relationship between the deficits and affirms the direction of causality from trade deficit to budget deficit or existence of inverse causality. Hrvoje Jošić and Mislav Jošić (2011) also confirmed the inverse twin deficits hypothesis for Croatia over the period 1995-2010. The results of Sandra Krtalić and Ana Grdović Gnip (2011) and Daniel Tomić (2013) speak more in favour of the Ricardian equivalence. However, their analysis, based on the forecast error variance decomposition, revealed that the exogenous shock in the trade deficit explains 5 *per cent* of the forecast error variance of the budget deficit in Croatia in the same period of the shock.

1.2 The Theory of “Twin Divergence”

There is another strand of literature that dealt with the possibility that budget and current account deficits do not necessarily need to move in the same direction, and tried to find reasons for this phenomenon (also known as the Ricardian equivalence hypothesis). According to Soyoung Kim and Nouriel Roubini’s (2008) estimates for U.S., the correlation between the current account and the primary government budget balance in the 1973-2004 period was negative (-0.16). This confirms that the government budget and the current account balances do not need to move in the same direction in general. They found that the “twin divergence”, rather than “twin deficits”, is the more regular pattern for the data over the whole sample period (Kim and Roubini 2008, p. 366). Moreover, Piotr Misztal’s (2012) results of analysis indicate the occurrence of negative causal relationship between the government balance and the current account balance in Latvia, Lithuania and Estonia.

However, the possible linkage between the structure of the economy, the structure of the tax system and the current account balance was introduced by Guste Santini (2005). Using the example of Croatia, he argued that the functioning of the production process in European transition economies is often based on the import dependency growth of all sectors. In that case, a fixed exchange rate has a function of tax income growth, which is evident from the foreign trade deficit and tax income movements.

In that context, Santini and Sandra Bebek (2010) further states that the temporal division of taxes onto the past, present and future makes it possible to identify the extent to which the current account balance influences tax revenues and thus, *ceteris paribus*, the budget deficit. Taxes on past income, which include inheritance taxes, gift taxes, net wealth taxes, real estate taxes and taxes on capital transactions represent taxation of the previously accumulated savings. They indicate savings realized in the previous period, i.e. the “spillover” from the past to the present. Surplus in the current account balance, under the unchanged tax system, represents state savings. Taxes on present represent taxation of current income. Finally, taxes on future represent taxes on the basis of public debt (negative saving). This is possible due to the current account deficit. Higher taxes on imports mean higher tax revenues, since this type of taxation becomes more pronounced (Santini 2005), which means that in countries with indirect tax-oriented budget revenues systems the twin deficit hypothesis will not work neither in terms of Keynesian proposition nor Ricardian equivalence hypothesis. Budget and trade deficits are linked, but the direction of the causality is reversed, because of the important role of the indirect taxes in this economy, the trade deficit causes the budget deficit.

2. Data and Methodology

At the beginning of the transition process, countries of Central and Eastern Europe faced the situation of significant unemployment growth, high inflation and the decline in industrial production. Considering the inability to finance needed investments domestically due to low levels of national savings, these countries needed foreign capital to restructure the economy, intensify investment projects, finance growing domestic demand and sustain economic growth during the transition period. Capital flows brought the much needed liquidity for financing investment projects, privatization and enhancing export capacities of transition economies, but also contributed to the development and efficiency of domestic financial markets (İnci Ötker-Robe et al. 2007; Jürgen von Hagen and Iulia Siedschlag 2008; Aleksander Aristovnik 2013).

However, large capital inflows simultaneously had some aggravating consequences on the macroeconomic stability of transition countries. Unlike in other regions of emerging countries, like developing Asia or Latin America, the current account deficit rose in all European transition countries in parallel with growing capital inflows. The rising current account deficits were a consequence of the strong growth in domestic demand, which was financed by the inflow of foreign loans, and also a consequence of the real appreciation of domestic currencies, all of which stimulated the consumption of mainly imported goods (Aristovnik 2008; Daria Zakharova 2008; Bas B. Bakker and Anne-Marie Gulde 2010).

Over the last 15 years, Bulgaria, Croatia, Poland and Romania have run a current account deficit on the basis of which they realized substantial tax revenues (Figure 1). Rising current account deficits were a consequence of the strong growth in domestic demand in all the analysed countries (by both households and enterprises), which was financed by foreign capital inflows, and also a consequence of the real appreciation of domestic currencies (Figure 2). These developments stimulated the consumption of mainly imported goods.

The majority of the current account deficit in these countries was a consequence of the trade deficit, which was primarily the result of stagnation in goods exports and a rise in imported goods. Since 2009, as a result of the global economic crisis, we have been witnessing a reduction in imports of goods and rising commodity exports and therefore gradually shrinking trade deficits. Thus, the decline in imports of goods contributed to the reduction of customs revenues which put further pressure on the deterioration of the budget balance.

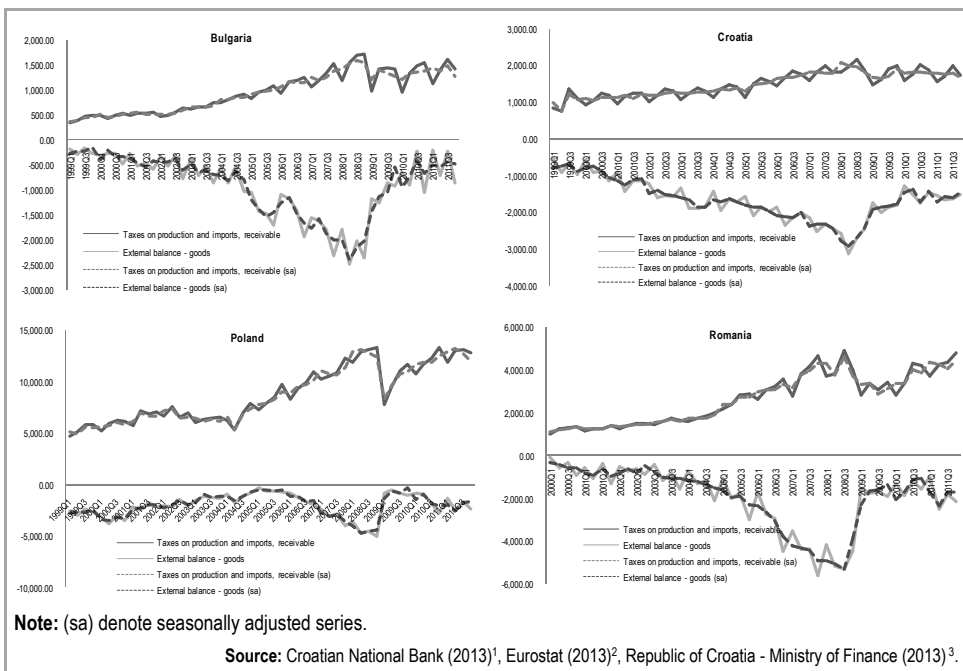


Figure 1 Receivable Taxes on Production and Imports vs. External Balance of Goods, 1999:Q1-2011:Q4 (Millions of EUR)

¹ **Croatian National Bank.** 2013. Statistical Data. <http://www.hnb.hr/statistika/estatistika.htm> (accessed April 25, 2013).

² **Eurostat.** 2013. <http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes> (accessed April 25, 2013).

³ **Republic of Croatia - Ministry of Finance.** 2013. Statistics and Reports. <http://www.mfin.hr/en/statistics-and-reports> (accessed April 25, 2013).

Data on tax revenues and external balance of goods, given in Figure 1, suggest a negative connection between the current account and budget balances in four selected countries, i.e. that the deterioration of the current account balance causes higher fiscal revenues.

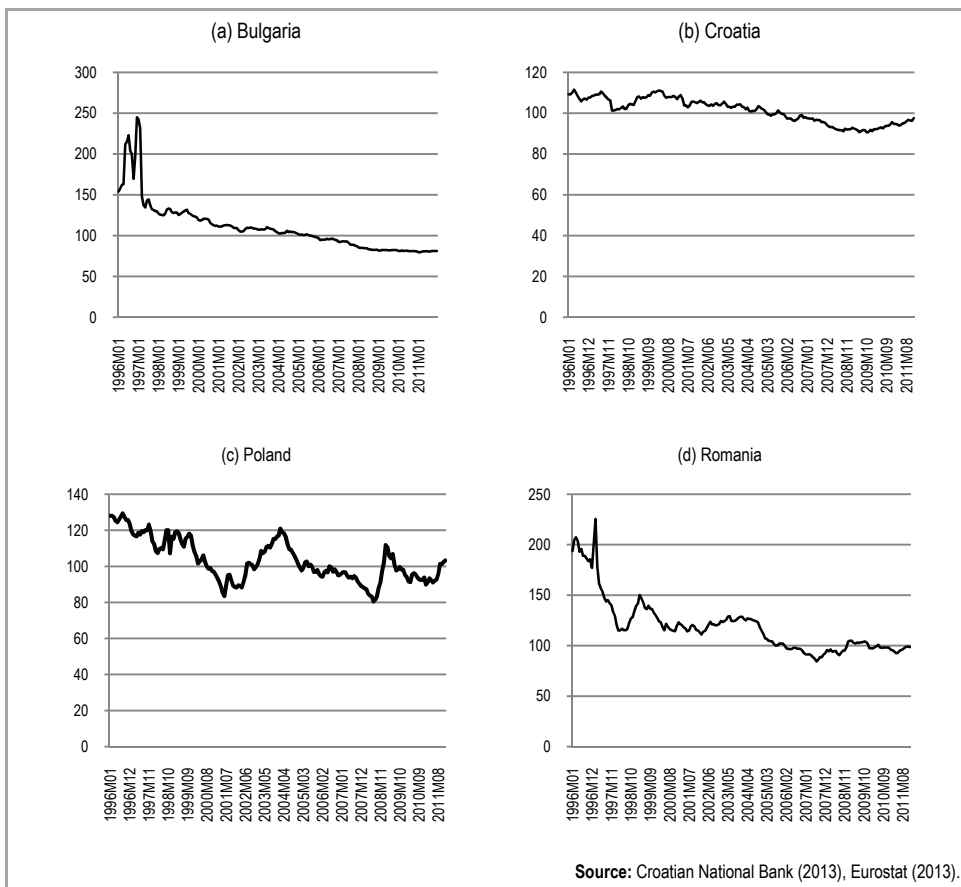


Figure 2 Real Effective Exchange Rate Movements in Selected Countries (2005=100), 1996:M01-2011:M12

The reasons for this relationship may be found in the structure of their tax systems. Figure 3 reveals a crucial difference between the characteristics of tax systems in the U.S. and the selected EU (OECD member states) countries and those in Croatia, Bulgaria, Poland and Romania. The indirect tax revenues in 2011 accounted for only 9.2 per cent and, on average, 33 per cent of total budget tax revenues in the U.S. and the selected EU countries, respectively. On the other hand, by the end of 2011, indirect tax revenues accounted for 54 per cent of Bulgarian, 43 per cent of Polish, 46 per cent of Romanian and 49 per cent of Croatian total budget tax revenues, respectively.

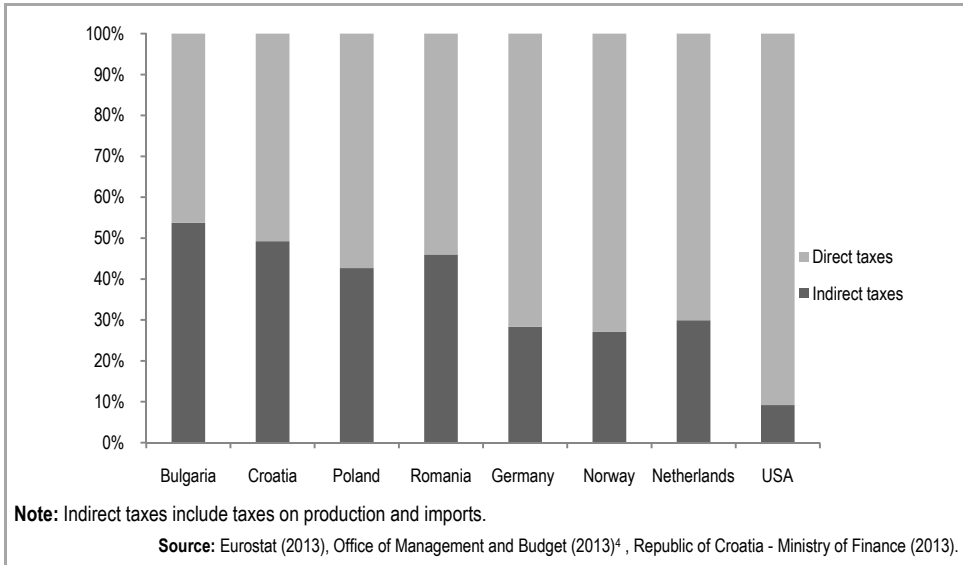


Figure 3 Indirect Tax Revenues Share in Total Budget Tax Revenues, 2011

The unrestricted VAR model, developed by Christopher A. Sims (1980), is used in order to investigate if the positive external balance of goods shock (a rise in the current account surplus, or a decline in its deficit) induces negative responses of receivable taxes on production and imports in selected European emerging countries, and *vice versa*. In general, the VAR model in a structural form is given by:

$$G(L)y_t = e_t, \quad (1)$$

where $G(L)$ is a matrix polynomial in the lag operator L , y_t is an $n \times 1$ data vector, and e_t is an $n \times 1$ white-noise error term. In Equation (1) e_t are serially uncorrelated. Reduced form VAR model can be estimated from the VAR model in a structural form:

$$y_t = B(L)y_{t-1} + u_t, \quad (2)$$

where $B(L)$ is a matrix polynomial in lag operator L and $\text{var}(u_t) = \Sigma$. In order to simplify interpretation and to find the Vector moving average (VMA) representation in which innovations are orthogonal, it is required to determine a matrix G such that $G^{-1}\Sigma(G^{-1})' = I$.

In this paper the residuals are decomposed in a triangular fashion, i.e. in a Cholesky decomposition (Walter Enders 2010). In this case, G becomes a lower triangular matrix. Subsequently, variable whose dynamics is assumed to precede the other is positioned first.

The analysis will be conducted over the quarterly data in the period from 1999:Q1 to 2011:Q4. Due to data unavailability in the case of Bulgaria the analysis will be conducted over the period from 2000:Q1 to 2012:Q4. The variables that enter

⁴ **Office of Management and Budget.** 2013. Historical Tables. <http://www.whitehouse.gov/omb/budget/Historicals> (accessed February 7, 2013).

the VAR system, the external balance of goods (variable *EXTERNAL*) and receivable taxes on production and imports (variable *TAX*) are in first differences, since both time series are integrated of order one. The formal proof of the non-stationarity of series in levels, and the stationarity of differenced series, is given in Table 1, which reports the results of the ADF unit root test. Data on both variables have been retrieved from Eurostat and, in case of Croatia, from the National Bank and Ministry of Finance databases. Moreover, both series have been seasonally adjusted prior to the analysis.

Table 1 Results of ADF Unit Root Tests (t-Statistics)

Bulgaria				
	<i>EXTERNAL</i>	<i>TAX</i>	Δ <i>EXTERNAL</i>	Δ <i>TAX</i>
Trend and constant	-0.85	-1.91	-7.48**	-8.48**
Constant	-1.37	-1.30	-7.28**	-8.50**
None	-0.63	0.93	-7.35**	-8.04**
Croatia				
	<i>EXTERNAL</i>	<i>TAX</i>	Δ <i>EXTERNAL</i>	Δ <i>TAX</i>
Trend and constant	-3.84*	-2.80	-9.13**	-11.88**
Constant	-3.79**	-1.64	-9.14**	-11.59**
None	-2.05*	0.50	-9.23**	-11.17**
Poland				
	<i>EXTERNAL</i>	<i>TAX</i>	Δ <i>EXTERNAL</i>	Δ <i>TAX</i>
Trend and constant	-2.15	-2.82	-6.67**	-7.34**
Constant	-2.17	-1.18	-6.74**	-7.42**
None	-1.25	0.77	-6.80**	-7.26**
Romania				
	<i>EXTERNAL</i>	<i>TAX</i>	Δ <i>EXTERNAL</i>	Δ <i>TAX</i>
Trend and constant	-1.65	-2.38	-4.63**	-9.21**
Constant	-1.80	-0.92	-4.60**	-9.31**
None	-0.79	0.95	-4.64**	-8.75**

Note: Lag length is based on Schwarz information criterion. (**), (*) denotes rejection of the null hypothesis of non-stationarity at 1 per cent (5 per cent) level of significance.

Source: Authors' calculations.

In addition, a dummy variable *CRISIS* (equals 1 in 2008:Q4, 0 otherwise) has been added to the model to account for the impact of the financial crisis. Since our assumption is that a positive shock in external balance of goods will create a subsequent negative response in tax revenues, the Cholesky ordering of variable is set as follows:

$$y_t = \begin{pmatrix} \Delta EXTERNAL \\ \Delta TAX \end{pmatrix}. \tag{3}$$

The co-movements of external balance of goods and receivable taxes on production and imports will be explained by interpreting the Impulse response functions (IRF) and variance decomposition derived from the VAR model. The size of the effects will not be considered as the analysis seeks to reveal only the direction of influences.

3. Results

An unrestricted VAR model with the Cholesky ordering of variables, as indicated in Equation (2), was estimated for each of the four European emerging countries with

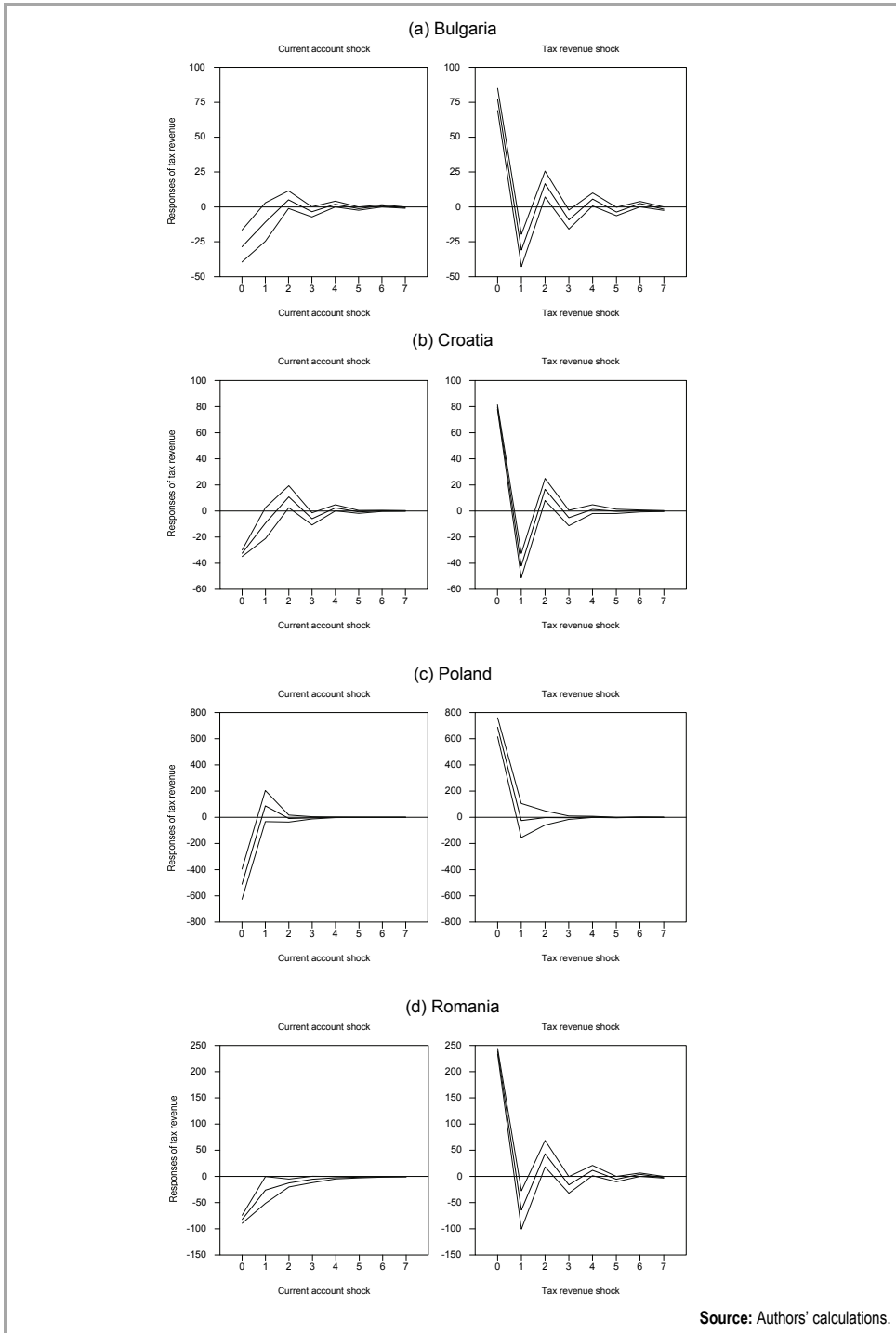


Figure 4 Impulse Response Functions of Tax Revenues (ΔTAX)

indirect tax-oriented systems - Bulgaria, Croatia, Poland and Romania. The number of lags in the model for each country has been determined based on the minimization of the Akaike information criterion. The diagnostic verification of the model leads to the conclusion that it satisfies all assumptions about the distribution of error terms. Results of the tests for the presence of autocorrelation and heteroskedasticity of residuals are available upon request.

Figure 4 presents IRF using Monte Carlo algorithm to calculate the error bands for all four countries. Only responses of tax revenues to a shock in the external balance of goods (current account) and a shock to itself are displayed. In Bulgaria, a positive unit shock in the balance of goods account creates a statistically significant negative response in tax revenues. The reaction occurs and is significant instantaneously, i.e. in the same quarter the balance of goods shock takes place. The shock ceases to be significant afterwards and eventually dies off after 2 years (Figure 4, Panel a). Tax revenues in Croatia react to a balance of goods shock in a similar fashion. Tax revenues shrink instantly after the current account balance increases. However, the initial negative reaction of tax revenues briefly turns positive after two quarters, and then gradually dies off (Figure 4, Panel b).

Romania records the longest reaction of tax revenues to a balance of goods shock. The strongest reaction is felt in the initial period of the shock, but then it remains significantly negative throughout the first three quarters after the positive current account shock (Figure 4, Panel d). Finally, tax revenues in Poland react strongly and reduce sharply immediately after their balance of goods improves. However, the reaction is brief and ceases to be significant after one quarter (Figure 4, Panel c).

Overall, the results of the IRF analysis point to the conclusion that in all four analysed countries tax revenues significantly decline after a positive shock in external balance of goods, which is in line with the set hypothesis. However, the negative reaction of tax revenues is relatively short-lasting, i.e. it is the strongest during the quarter in which the current account shock occurs, after which it gradually dies off. These results point to the conclusion that the twin deficit theory cannot explain the movement of the current account and the budget balance in case indirect taxes dominate the country's tax revenues.

The variance decomposition is given in Table 2. Again, only the tax revenues variable is reported. Variance decomposition analysis confirms the findings of IRF. In Bulgaria and Romania the external balance of goods explains somewhat more than 10 *per cent* of tax revenues variation throughout the first two years after the current account shock. In Croatia, that share is slightly higher and is around 13 *per cent*. The remaining 87 *per cent* of tax revenues variance is explained by its own variation. However, the impact of a shock in external balance of goods on tax revenues in Poland is fairly more significant than in other countries. Namely, current account movements explain 36 *per cent* of variation of Poland's tax revenues, only one quarter after the shock. It should be noted that a stable structure of the variance is achieved after only three or four quarters in each country, and the variance decomposition does not change significantly even two years after the shock.

Table 2 Variance Decomposition of Tax Revenues (ΔTAX)

Bulgaria		
Step	$\Delta EXTERNAL$	ΔTAX
1	10.740	89.260
2	11.170	88.830
4	11.271	88.729
8	11.276	88.724
Croatia		
Step	$\Delta EXTERNAL$	ΔTAX
1	13.707	86.293
2	11.792	88.208
4	12.905	87.095
8	12.957	87.043
Poland		
Step	$\Delta EXTERNAL$	ΔTAX
1	36.289	63.711
2	36.908	63.092
4	36.893	63.107
8	36.893	63.107
Romania		
Step	$\Delta EXTERNAL$	ΔTAX
1	10.481	89.519
2	10.743	89.257
4	10.679	89.321
8	10.676	89.324

Source: Authors' calculations.

These results further confirm the set twin divergence hypothesis. While the IRF revealed the direction and significance of the reaction of tax revenues to a shock in external balance of goods, the variance decomposition analysis testifies to the non-negligible influence of changes in the current account on the tax revenue variance in all analysed countries.

In order to check for the robustness of results, models with different lag lengths have been estimated, but the results remain unchanged. Moreover, if the two variables are normalized by the GDP levels, results change very little, i.e. only in terms that the response of ΔTAX to a shock in $\Delta EXTERNAL$ in Romania becomes insignificant. The results of the robustness checks are available upon request.

4. Conclusion

This paper dealt with the twin deficit theory and econometrically tested the hypothesis that in countries with indirect tax-oriented systems, the improvement in the external balance of goods, i.e. the increase in the current account balance, will result in a reduction of tax revenues and, consequently, higher budget deficits. Lower imports and consumption resulting from the improvement in country's external trade positions will result in lower revenues from customs and value added tax. The analysis is performed on four European emerging countries whose tax systems are dominated by indirect taxes - Bulgaria, Croatia, Poland and Romania. The research used quarterly time series data covering the period from 1999:Q1 to 2011:Q4.

Results of the unrestricted VAR model obtained in this paper confirm the set hypothesis. Tax revenues significantly decline after an improvement in external balance of goods in all four countries. Impulse response functions and variance decom-

position analyses indicate that the reaction of tax revenues is strongest in the initial period, i.e. during the same quarter in which the current account shock occurs, and then gradually dies off. Therefore, results suggest that the co-movements of the current account and the fiscal balance cannot be explained by the twin deficit theory in the countries with indirect tax-oriented systems.

The economic implications of the results of this paper are very important. In countries with fiscal systems dominated by indirect taxes, reduction of the trade deficit would lead to an increase in the budget deficit. In that context, only the structural economic transformation and exports-oriented model of economic growth, that would lead to employment growth and thus increase the share of direct taxes in the budget revenue, may reverse the causality direction between two deficits, thereby making the Keynesian proposition more valid.

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