Fiscal Imbalances and Current Account Adjustments in the European Transition Economies

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Abstract
Origins and implications of twin deficits occurrence in a large scale of countries seems to be a center of rigorous empirical as well as theoretical investigation for decades. The reality of persisting fiscal and current account deficits became obvious in many advanced as well as advancing, emerging and low-income countries seemingly without a direct association with the phase of business cycle or trends in key fundamental indicators. European transition economies experienced current account deficits during the most of the pre-crisis period. Despite generally improved economic environment and high rates of economic growth it seems that countries with weaker nominal anchor experienced periods of persisting fiscal imbalances during the most of the pre-crisis period. Crises period affected both fiscal stance of government budgets and current account pre-crisis levels and trends in all countries from the group. As a result, leading path of both indicators significantly changed.
In the paper we analyze effects of fiscal policies on current accounts in the European transition economies. Our main objective is to investigate causal relationship between fiscal policy discretionary changes and associated current account adjustments. We identify episodes of large current account and fiscal policy changes to provide an in-depth insight into frequency as well as parallel occurrence of deteriorations (improvements) in current accounts and fiscal stance of government budgets. From employed VAR model we estimate responses of current accounts in each individual country to the cyclically adjusted primary balance shocks.

Keywords: fiscal imbalances, current account adjustments, economic crisis, vector autoregression, impulse-response function

JEL Classification: C32, E62, F32, F41, H60

1. Introduction

Origins and implications of twin deficits occurrence in a large scale of countries seem to be a center of rigorous empirical as well as theoretical investigation for decades. The reality of persisting fiscal and current account deficits became obvious in many advanced as well as advancing, emerging and low-income countries seemingly without a direct association with the phase of business cycle or trends in key fundamental indicators. However, flows of capital resulted from excessive external imbalances followed by the periods of large current account deficits obviously strengthened intention of policy makers as well as academics to investigate the contribution of internal and external sources of current account imbalances to associated foreign debt accumulation.

European transition economies experienced periods of improved conditions for maintaining the overall macroeconomic stability during the last decade. Accelerated convergence toward western European countries associated with high real output growth rates implied increased intention to reduce excessive internal (fiscal deficit) and external imbalances (current account deficit) to maintain fast and sustainable economic growth. Despite relatively high rates of growth in export performance, all countries from the group experienced current account deficits during the most of the pre-crisis period.

Fast economic growth, EU membership as well as euro adoption perspectives strengthened appreciation pressures on nominal exchange rates in all European transition economies but countries with pegged exchange rate arrangements (Bulgaria, Estonia, Latvia and Lithuania) (Stavarek, 2012). At the same time, real exchange rates in all countries from

the group appreciated steadily regardless of adopted exchange rate arrangement while having relatively low negative interference with their export performance (Mirdala, 2013b). As a result, exchange rates leading path seems to have just negligible negative effects on the current account determination in the European transition economies during the last decade.

Despite generally improved economic environment and high rates of economic growth, countries with weaker nominal anchor experienced periods of persisting fiscal imbalances during the most of the pre-crisis period. As a result, sovereign debt accumulation in Czech republic, Hungary, Poland, Romania, Slovak republic and Slovenia resulted from persisting fiscal deficits. Contrary, in Bulgaria, Estonia, Latvia and Lithuania we have observed a significant improvement in the sovereign debt to GDP ratio followed by the periods of much more prudential fiscal discipline necessary to maintain a sustainability of tough exchange rate arrangement.

Crises period affected both fiscal stance of government budgets and current accounts pre-crisis levels and trends in all countries from the group. As a result, leading path of both indicators significantly changed. Negative implications of the economic and debt crisis revealed questions associated with disputable implications of fiscal incentives that seem to be contrary to the crucial need of the effective fiscal consolidation that is necessary to reduce excessive fiscal deficits and high sovereign debts. While the challenges addressed to the fiscal policy and its anti-cyclical potential rose steadily but not desperately since the beginning of the economic crisis, the call for fiscal consolidation became urgent almost immediately and this need significantly strengthen after the debt crisis contagion flooded Europe. Overall fiscal budgetary stance thus became determined by mutually contrary discretionary fiscal forces while remained affected by lagging recession. Economic crisis also intensified redistributive effects (cross-country expenditure shifting) that provided quite diverse and thus spurious effects on current account adjustments. Immediately after the beginning of the crisis the current accounts temporary deteriorated (with quite differing intensity in each particular economy). However, we have soon observed a positive trend (either improvement or stable outlook) in almost all countries reflecting intensified redistributive effects of the crisis on the cross-country expenditure shifting.

In the paper we analyze effects of fiscal policies on current accounts in the European transition economies. Our main objective is to investigate causal relationship between fiscal policy discretionary changes and associated current account adjustments. We identify episodes of large current account and fiscal policy changes to provide an in-depth insight into frequency as well as parallel occurrence of deteriorations (improvements) in current accounts and fiscal stance of government budgets. From employed VAR model we estimate responses of current accounts in each individual country to the cyclically adjusted primary balance shocks. To provide more rigorous insight into the problem of the current account adjustments according to discreet changes in fiscal policy associated with cyclically adjusted primary balance changes we estimate models for each particular country employing data for two subsequent periods 2000-2007 (pre-crisis period) and 2000-2012 (extended period). This approach should help us to examine specific features in the process of the current account determination according to the different overall macroeconomic conditions. We suggest that a comparison of the results for models with different time period is crucial to understand redistributive effects of the economic crisis in the view of changes in the cyclically adjusted primary balance determination capabilities toward current account adjustments in the group of ten countries from the past Eastern block.

Following the introduction, we provide brief overview of theoretical concepts referring to the relationship between fiscal policy changes and current account adjustments in Section 2. In Section 3 we provide an overview of the current empirical evidence about current account adjustments and fiscal policy stance. While the area of our research seems to

be well documented in current empirical literature it seems that causal relationship between fiscal policy changes and associated current account adjustments are unclear or even puzzled. In Section 4 we observe main trends in fiscal imbalances and current account adjustments in the European transition economies and highlight some general stylized facts about investigated causal relationship. At the beginning of the Section 5 we summarize key methodological remarks to episodes of large current account and fiscal policy changes. Subsequent analysis of large current account and fiscal policy episodes provides an in-depth insight into frequency as well as parallel occurrence of deteriorations (improvements) in current accounts and fiscal stance of government budgets. In Section 6 we provide a brief overview of the VAR model (recursive Cholesky decomposition is applied to identify structural shocks) that we employ to investigate responses of the current account to negative one standard deviation cyclically adjusted primary balance shocks. In Section 7 we discuss main results.

2. Current Account Determination (Intertemporal Approach)

While empirical evidence on twin deficits in countries considering macroeconomic performance and different stages of business cycle seems to be limited, economic theory provides a robust background on the current account and fiscal stance determination revealing their causal relationship.

In models of closed economy macroeconomics total output is expressed by the following equation:

$$Y = C + I + G \tag{2.1}$$

This general expenditure side approach to the total output in closed economy has several crucial implications. One of them is a concept of domestic savings (S) represented by the portion of the overall output (Y) that is not spent neither by households (C) nor government (G):

$$S = Y - C - G \tag{2.2}$$

In closed economy overall savings are equal to overall investments (I) as a key general equilibrium assumption:

$$S = I \tag{2.3}$$

As it seems, it is possible to increase a total wealth of the economy only by internal accumulation of new capital.

However, in opened economy it is necessary to highlight mutual interconnections between domestic economy and rest of the world. Thus, equation (2.1) has to be rewritten to include a portion of total output exported abroad (X) as well as a portion of domestic income spent on goods imported from abroad (V) following way:

$$Y = C + I + G + (X - V) = C + I + G + CuA \tag{2.4}$$

In common literature net export $(X - V)$ is substituted by current account (CuA) that we can express from the equation (2.4) as follows:

$$CuA = Y - (C + I + G) = Y - A \tag{2.5}$$

As we can see, current account is determined by total output as well as domestic absorption $(A = C + I + G)$. Current account surplus $(CuA > 0)$ thus represents a

surplus of total income over total expenditures, while current account deficit $(CuA < 0)$ represents a surplus of total expenditures over total income.

As mentioned above, while in closed economy total savings are equal to total investments, in opened economy this assumption does not seem to be necessarily true provided that we may consider different interactions among savings, investments and current account. It seems that country may increase overall savings through the current account surpluses while current account deficits tend to decrease overall savings.

For the opened economy it is necessary to rewrite equation (2.3):

$$S = I + CuA \tag{2.6}$$

We may conclude that the only source of capital for domestic investments in closed economy is represented by domestic savings while opened economy may accumulate domestic capital base as well as improve its international investment position due to foreign capital inflows associated with current account deficits. As a result, domestic economy may increase investments without corresponding increase in savings. It is an example of so called intertemporal trade when country with the current account deficit increases its consumption today at a cost of sacrificed (smaller) consumption in the future. Equation (2.6) thus may be rewritten to the following expression:

$$CuA = S - I \tag{2.7}$$

If domestic savings exceed domestic investments then excessive savings are exported abroad. Domestic savings are now equal to domestic investments increased by net foreign investments $(S = I + I_F)$. Positive net foreign investments will be associated with the current account surplus. Similarly, if domestic investments exceed domestic savings then sources of domestic investments have to be acquired from abroad (foreign savings). Negative net foreign investments are now associated with the current account deficit.

Until now we assumed that budget of a government is balanced and we did not differentiate savings of private and public entities. Private savings represent a portion of disposal income that is not spent on current consumption but is saved to be used on purchases in the future. Equation (2.2) we can now rewrite as follows:

$$S_P = Y - T - C \tag{2.8}$$

where T represents overall tax revenues. Savings of a government are calculated as net overall tax revenues less government expenditures.

$$S_G = T - G \tag{2.9}$$

Relationship between savings and investments can be now expressed the way that reflects opened economy conditions as well as decomposition of total savings in the economy on private and public:

$$S_P = I + CuA - S_G = I + CuA + (G - T) \tag{2.10}$$

Following equation (2.10) it seems that private investments are equal to the sum of total domestic investments, current account balance and fiscal policy stance (represented by government budget balance). Fiscal deficit thus reflects negative government savings and is a measure of public borrowings requirements necessary to cover public expenditures.

Equation (2.10) can be rearranged as follows:

$$CuA = (S_P - I) - (G - T) \text{ or } (X - M) = (S_P - I) - (G - T) \tag{2.11}$$

Equation (2.11) reveals final formula of the current account determination in opened economy considering an intertemporal approach. Balance of the current account is equal to the sum of net investments of the private sector (excess of private savings over private investments) and government budget balance (surplus or deficit). Following this finding it implies that country with the current account deficit either suffers from lack of domestic savings to cover its investments and/or has fiscal deficit. As a result, it is suggested for governments willing to reduce current account deficit to keep in mind that such an effort may be really difficult without a reduction of fiscal deficit at the same time.

3. Overview of the Literature

Bussiere, Fratzscher and Muller (2004) analyzed the current account determination in 33 countries employing an intertemporal approach via regression analysis considering effects of fiscal stance of government as well as real exchange rate deviations. Authors suggest that current account balances of countries included in the model are close to their structural current account positions confirming a validity of the intertemporal approach. Abbas, Bouhga-Hagbe, Fatás, Mauro and Velloro (2011) examined relationship between fiscal policy and current account on a large sample of advanced and emerging economies using a variety of statistical methods: panel regressions, an analysis of large fiscal and external adjustments, and VAR. Authors suggest that a strengthening in the fiscal balance by 1 percentage point of GDP is associated with a current account improvement of 0.3-0.4 percentage point of GDP. The evidence is stronger especially in emerging and low-income countries, when the exchange rate is flexible, when the economies are more open, when output is above potential or initial debt levels are above 90 percent of GDP. Javid, Javid and Arif (2010) investigates the effects of fiscal policy or government budget deficit shocks on the current account and the other macroeconomic variable for Pakistan over the period 1960-2009 by employing SVAR model. Authors suggest that expansionary fiscal policy shock improves the current account and depreciates the exchange rate. The rise in private saving and the fall in investment contribute to the current account improvement while the exchange rate depreciates. Schnabl and Wollmershäuser (2012) the role of diverging fiscal policy stances on current account (im)balances in Europe since the early 1970s under alternative institutional monetary arrangements by employing pooled panel regressions. Authors concludes that divergent fiscal policy stances are an important determinant of intra-European current account imbalances both before and after euro introduction Authors highlight that after the year 2001 there is evidence that current account imbalances have been encouraged by an expansionary ECB monetary policy stance. Fidrmuc (2002) defined twin deficits as a cointegrating relationship between the current account, the fiscal balance and investment. Author investigated that both current accounts and fiscal balances have been displaying a significant degree of hysteresis. His paper shows that while twin deficits emerged in the 1980s there seems to be a lack of evidence for twin deficits in the 1990s. On the sample of OECD countries as well as emerging economies with data between 1970 and 2001 author revealed that the countries which pursue sustainable fiscal policies also display a high flexibility of the current account.

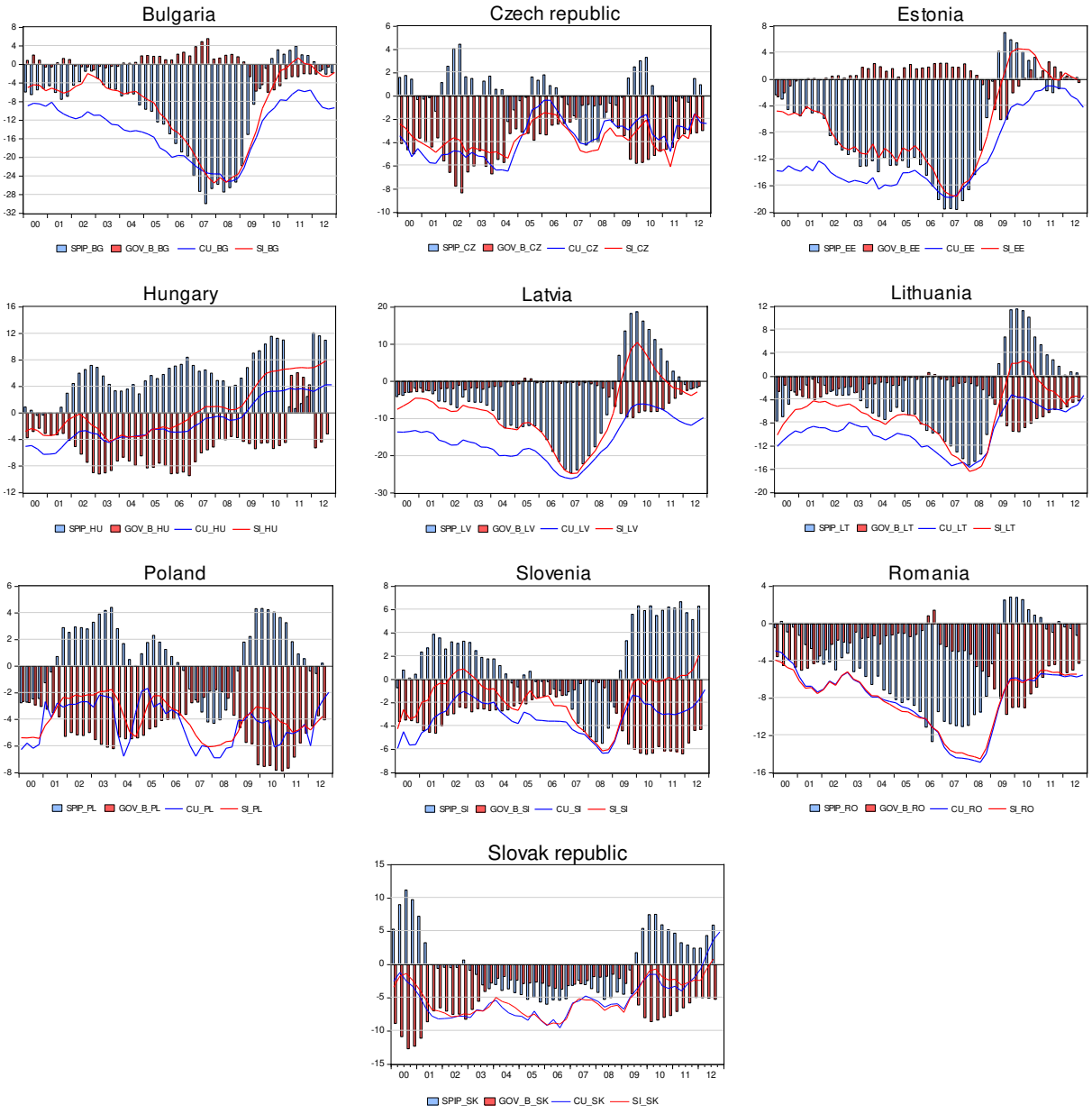
4. Overview of Main Trends in Fiscal and Current Account Imbalances

During the first decade since the initiation of the transition process at the beginning of the 1990s the European transition economies experienced periods of excessive current account deficits. In line with an intertemporal approach it is clear that observed current account imbalances reflected a negative trend in the investment-saving ratio. While current account adjustments revealed crucial and generally expected implications of the continuously rising international economic and financial integration of the European transition economies

(increased indebtedness, lacking competitiveness, fiscal imbalances, foreign capital inflows, etc.), there seems to be still enough room to investigate partial effects of dynamic changes in the key current account determinants to observe associated current account adjustments.

Figure 1 provides a brief overview of main trends in the current account and private, public as well as overall investments-savings balances in the European transition economies.

Figure 1 Overview of Current Account and Private, Public and Overall Net Savings-Investments Positions (2000Q1-2012Q4)



Note: Endogenous variables: Private savings less private investments (SPIP), primary balance (GOV_B), current account (CU) and overall savings less investments are expressed as percentage share in GDP.
Source: Compiled by author based on data taken from IMF - International Financial Statistics (September 2013).

Intertemporal approach clearly suggests that the current account imbalance originate in the corresponding savings-investments gap. Despite some differences, we have observed quite similar trend in the leading paths of current accounts and savings-investments gaps in all countries from the group. However, expenditure shifting effects associated with current

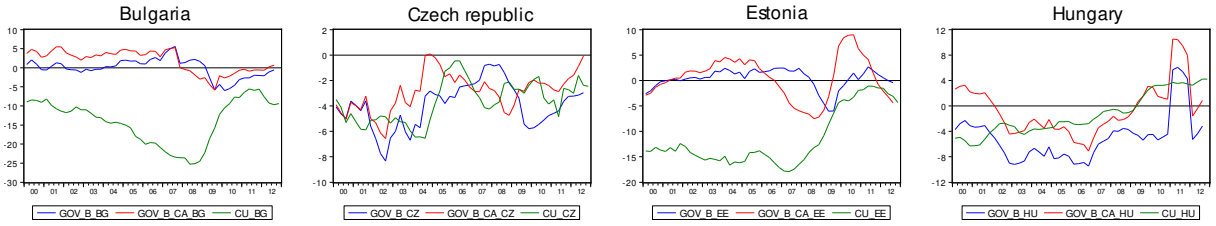
account imbalances in each individual country do not seem to be determined solely by the internal imbalances between savings and investments. It seems that countries with rigid exchange rate arrangements (Bulgaria, Estonia, Latvia and Lithuania - the group of so-called "peggers") experienced periods with generally higher discrepancies in GDP shares of both indicators though the leading paths of both indicators seem to be quite similar revealing some common patterns in the main trends. However, the beginning of the crisis period (2008-2009) clearly reduced differences in the shares. We suggest that an absence of the exchange rate flexibility and persisting real exchange rate appreciation contributed to the overall competitiveness deterioration and thus accelerated a negative trend in the current account imbalances even more than we would expect from the savings-investments gaps.

Prudential fiscal discipline and excessive current account deficits in countries with rigid exchange rate arrangements (this negative trend accelerated in the second half of the pre-crisis period) revealed significant imbalances between private savings and private investments. As a result, fiscal discipline tightening together with exchange rate based anchoring provided a convenient vehicle for spreading internal imbalances in the private sector across the borders causing high current account deficits. In countries with flexible exchange rate arrangements (Czech republic, Hungary[1], Poland, Slovenia and Slovak republic - the group of so called "floaters") the situation during the pre-crisis period seems to be quite different though not uniform. In the Czech republic, Hungary, Poland and Slovenia persisting negative savings-investments imbalances originated in excessive fiscal deficits. The situation in Romania changed over time. The negative trend in savings-investments GDP shares initially originated in the fiscal imbalances though it was soon replaced by the private sector expansion. Similar scenario, though with higher initial fiscal deficits and less imbalanced growth of the private sector, was observed in the Slovak republic.

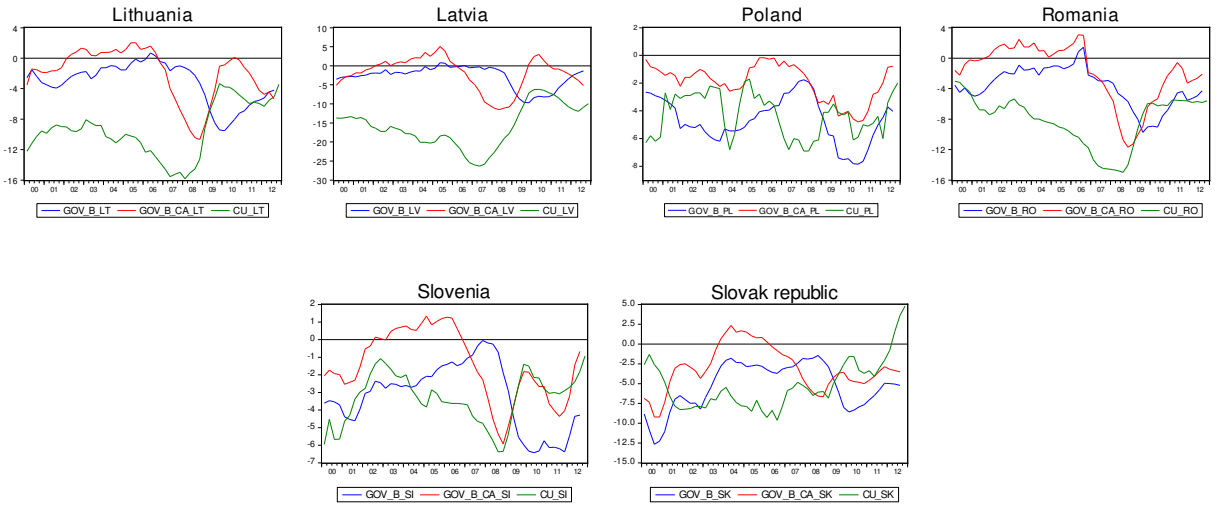
Crisis period significantly changed not only current account and savings-investments gaps leading paths but also relative contributions of public and private sectors to both internal and external imbalances. Even countries with prudential pre-crisis fiscal policies could not avoid the trend of significant divergence in public (deterioration) and private (large improvement) savings-investments gaps associated with significant improvement in the current account stance and overall savings-investments balances.

Figure 2 provides a brief overview of main trends in fiscal and current account imbalances in the European transition economies. The problems of persisting fiscal imbalances (fiscal deficits) seem to be much more frequent in countries with weak nominal anchor that is why Baltic countries and Bulgaria experienced much "healthier" fiscal stance of the general government.

Figure 2 Overview of Fiscal and Current Account Imbalances (2000Q1-2012Q4)



[1] Hungarian forint operated during pre-crisis period in de facto fixed peg regime, but due to substantial range for fluctuations provided by wide horizontal bands it was included in the group of countries, so called "floaters".

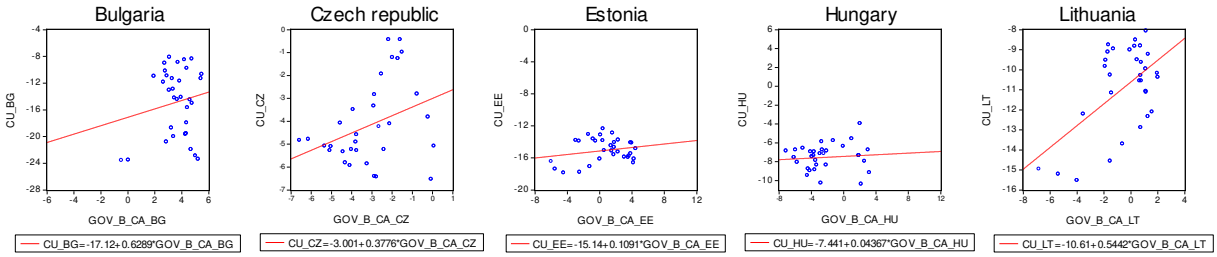


Note: Endogenous variables: Primary balance (GOV_B), cyclically adjusted primary balance[2] - CAPB (GOV_B_CA) and current account (CU) are expressed as percentage share in GDP.
Source: Compiled by author based on data taken from IMF - International Financial Statistics (September 2013).

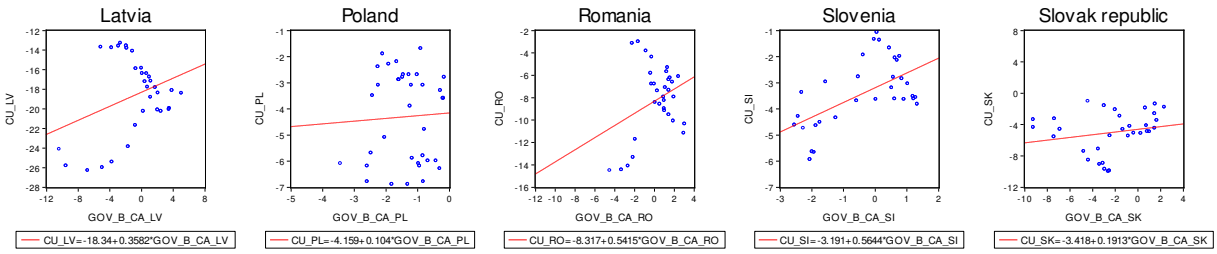
Individual countries experienced current account deficits during the most of the period of intensified convergence (since the beginning of 2000s) toward western European countries. It seems that countries with tightly managed exchange rates (Bulgaria, Slovenia and Baltic countries) and weak overall macroeconomic performance (Romania and Bulgaria) experienced excessive current account deficits with generally negative outlook during the most of the pre-crisis period. While at the beginning of the crisis period current accounts in all countries from the group generally improved, CAPB initially deteriorated as an immediate response to the crises effects followed by subsequent improvements initiated by increased consolidation efforts of governments to prevent an excessive sovereign debt accumulation.

Figure 3 reveals relationship (simple linear regression) between fiscal and current account imbalances in the European transition economies during a pre-crisis period. We have observed a positive correlation during the pre-crisis period between both indicators in all countries from the group. Despite a relative diversity in associated multipliers it seems that deterioration in CAPBs caused an increase in the current account deficits.

Figure 3 Fiscal Imbalances and Current Account Dynamics (2000Q1-2007Q4)



[2] Cyclically adjusted primary balance (CAPB) was employed as a more convenient proxy for a fiscal policy stance in comparison to a net budgetary position due to its neutrality against cyclical effects on revenue and expenditure sides of government budget. At the same time, CAPB is more appropriate indicator of discrete changes in the fiscal policy and associated effects on the government budget.



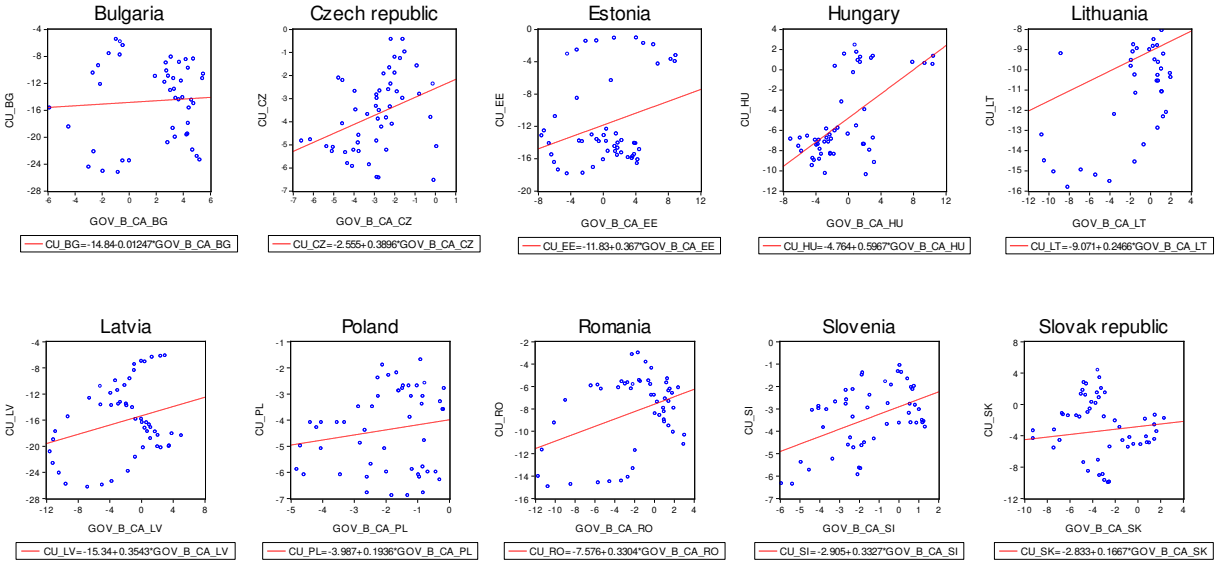
Note: Endogenous variables: Cyclically adjusted primary balance - CAPB (GOV_B_CA) and current account (CU) are expressed as percentage share in GDP.
Source: Compiled by author based on data taken from IMF - International Financial Statistics (September 2013).

However, while correlation analysis between CAPBs and current accounts revealed positive relationship in all countries, a comparison of results with simple regression analysis investigating a relationship between fiscal primary balances (not cyclically adjusted) and current accounts provides interesting implications of business cycle changes during the pre-crisis period. Following mixed results of identified relationship between primary fiscal balances and current accounts (associated coefficients for primary fiscal balance were generally lower and even negative in some countries) we suggest that cyclical effects on primary fiscal balances reduced an intensity of fiscal distortions and their transmission on external imbalances.

Results of simple regression doesn't seem to provide clear results considering the size of the country, its openness, the size of the government as well as the fiscal stance during the pre-crisis period.

Figure 4 provides an overview of mutual relationship between fiscal and current account imbalances in the European transition economies during an extended period. It seems that correlation between both indicators changed as a result of crisis related effects.

Figure 4 Fiscal Imbalances and Current Account Dynamics (2000Q1-2012Q4)



Note: Endogenous variables: Cyclically adjusted primary balance - CAPB (GOV_B_CA) and current account (CU) are expressed as percentage share in GDP.
Source: Compiled by author based on data taken from IMF - International Financial Statistics (September 2013).

In Bulgaria, Lithuania, Latvia, Romania, Slovenia, Slovak republic we observed lower positive correlation between CAPBs and current accounts. Despite general improvement in the leading path of both indicators we suggest that crisis period accelerated mutually contrary

expenditure shifting effects. As a result, direct channels of expenditure based causal relationship between CAPB and current account may seem to be reduced, though still significant. However, more rigorous investigation of changes in CAPB and their contribution to current account adjustments in the European transition economies is provided in Sections 5 and 7. Rest of the countries (Czech republic, Estonia, Hungary, Poland) experienced intensified convergence of both indicators resulting in higher correlations of their leading paths.

An overview of the main trends in internal and external imbalances in the European transition economies revealed some stylized facts about relative contributions of public and private sectors to the leading path of savings-investments gaps and current account balances. Despite an observation of some crucial patterns in mutual relationships between both indicators it seems that the relative importance of substantial characteristics of each individual country (size of economy, overall openness, performance, exchange rate arrangement etc.) in determining sources and key implications of both internal and external imbalances requires more rigorous investigation.

5. Large Changes in Fiscal Policy and External Balances (Event Study)

5.1 Methodological Notes to Large Changes in CAPB and Current Account

Observation of periods associated with large changes in CAPB and current account requires some introduction to the methodology that will be employed. Changes in CAPB as well as the current account are usually addressed to the adjustments on one of the sides determining their overall balance (or dynamics) or both at the same time. The balance of the government budget is determined by the set of fiscal arrangements on the side of revenues and/or expenditures followed by an improvement or deterioration in the fiscal stance. The balance of current account is determined by the competitiveness effects associated with expenditure cross-country shifting via export (inflows) and/or import (outflows) dynamics.

There seems to be several approaches to measure large fiscal changes and to evaluate effects of fiscal episodes. For example, Alesina and Ardagna (2009) identify three types of fiscal adjustment episodes to analyze episodes of fiscal consolidation. For the purpose of our study we employ this methodology revised (adapted) by Abbas, Bouhga-Hagbe, Fatás, Mauro and Velloso (2011) who investigated episodes of large fiscal and current account changes. However, we slightly adjusted key measures to suit better for our sample of countries. As a first it is necessary to emphasize that we focus on large and continuous changes in fiscal stances and current accounts. Durability of adjustments is thus crucial to avoid misleading effects of short-term volatility. At the same time, there are no sharp reversal movements[3] in the main trend allowed during identified episodes of large changes to presume a continuity of fiscal or current account adjustments. We suggest that investigation of key features of large and continuous changes in both indicators may provide some insights into empirical validity of the intertemporal approach.

Extracted episodes of large fiscal stance and current account changes will be identified by to following measure: (1) Continuous cumulative improvement (deterioration) in CAPB or current account by at least 2 percent of GDP share. (2) Improvement (deterioration) of real output by at least 1.5 percent on annual base within identified episode of large CAPB or current account adjustment. However, we have observed relatively low interconnection between rates of real output growth and dynamics in CAPBs and current accounts that is why we identify episodes of large changes in CAPB and current account with and without real

[3] However, small reversals are allowed (up to 20 percent in reverse direction again the main trend) to preserve a substantial quantity of identified periods. In original study from Abbas, Bouhga-Hagbe, Fatás, Mauro and Velloso (2011) no reversals in the trend are allowed at all.

output growth rates interference separately. We also investigate large changes in overall savings-investments gap to GDP ratios as well as private savings-investments gap to GDP ratios following measure (1) to observe more detailed mechanism of intertemporal approach in the European transition economies during the pre-crisis and crisis periods.

5.2 Cyclically Adjusted Primary Balance

To assess detailed overview of large fiscal policy changes and their effects, it is necessary to estimate an influence of fiscal adjustments based on tax and/or expenditures changes on fiscal balance. However, it seems to be necessary to reveal changes on revenues and expenditures sides of government balance associated with automatic effects induced by changes in macroeconomic environment and effects of discretionary fiscal policy actions. In first case, i.e. a cool-down of real output growth may be followed by a cut in government revenues (due to reduced tax capacity of an economy in the time of crisis) and an increase in government expenditures (i.e. due higher unemployment benefits). As a result, deterioration of a fiscal balance will occur. At the same time, similar effects on the fiscal balance will be followed by discretionary taxes cuts or expenditures increases. Fiscal stance of a government budget may thus reflect mixed effects of automatic changes in budgetary revenues and expenditures associated with business cycle fluctuations as well as discretionary changes on both sides of government budgets associated with discretionary fiscal policy actions.

To eliminate effects of a business cycle to the fiscal stance of a government budget it is necessary to eliminate influence of cyclical movements of fiscal variables. As a result of filtered business cycle impacts, together with some other adjustments (i.e. exclusion of interest payable on the side of government expenditures), cyclically adjusted primary balance (CAPB) will be calculated. Empirical literature provides many approaches to calculate CAPB. In general, main algorithm follows the same procedure: (1) estimation of the potential GDP, (2) determination and calculation of key revenues and expenditures categories responses to the fluctuations in cyclical GDP, (3) adjustments in budgetary revenues and expenditures according to the cyclical effects in both sides of government budget. As a result we obtain cyclically adjusted structural or primary balance. On the other hand we have found some differences in step (2) in current empirical literature reflecting relative diversity in approaches employed to estimate income elasticities of main budgetary variables (on both revenue and expenditure sides). At the same time, most studies calculated cyclical component in real output by estimating potential output (and output gap) using simple HP filter[4] or potential employment based on detrending NAIRU calculations.

Bouthevillain et al. (2001) calculated fiscal elasticities using econometric regressions or derivation from tax or expenditures laws and from detailed information on the distribution of income and revenue. Altăr, Necula and Bobeica (2010) estimated tax and revenues elasticities by applying methodology similar to that employed by OECD and by the European Commission. Authors decomposed main components of revenue and expenditure budgetary sides using linear system of equations. Girouard and André (2005) calculated income elasticities of four different types of taxes while on the expenditure side there is only single item - unemployment related transfers - that authors treated as cyclically sensitive.

Günaydın and Uğraş Ülkü (2002) employed vector-error correction (VEC) model to estimate income elasticities of budgetary components. Provided there is a long-run equilibrium (cointegration) between GDP and budgetary variables, expected elasticity coefficients are represented by normalized cointegrating coefficient derived from cointegrating equations.

[4] Despite a wide criticism of Hodrick-Prescott (HP) filter for inducing a spurious cycle in the time series (i.e. it cannot reflect an impact of structural breaks) as well as for poor approximation near the endpoint (so called endpoint bias), it still represents one of most frequently used filter in the current empirical literature.

To cyclically adjust a government budget, that is to estimate the underlying fiscal position when cyclical and/or automatic components are removed we follow a VEC methodology implemented by Günaydın and Uğraş Ülkü (2002).

Cyclically adjusted primary balance (CAPB) is calculated by subtracting the cyclical component $\left(B^C\right)$ from the primary government balance $\left(PB\right)$:

$$CAPB_t = PB_t - B_t^C = PB_t - \sum_{i=1}^{n} B_{t,i}^C \tag{5.1}$$

where $\left(PB\right)$ represents actual government budget balance $\left(B\right)$ less interests payable $\left(E^I\right)$:

$$PB_t = B_t - E^I \tag{5.2}$$

and $\left(B_{t,i}^C\right)$ represents a cyclical component of each of *n* revenue and expenditure budgetary categories included in the model given by the following equation:

$$B_{t,i}^C = B_{t,i} \,.\, e_i \,.\, Y_t^{gap} \tag{5.3}$$

where $\left(e_i\right)$ represent individual elasticities of each particular budget category (that responds automatically to real output fluctuations) included in the model and $\left(Y^{gap}\right)$ represents output gap expressed as a percentage of GDP.

5.3 Income Elasticities of Budgetary Categories

In our model we include three types of budget revenues (revenues from direct taxes, indirect taxes and social contributions) and one budget expenditure category (unemployment related transfers) that seem to respond to short-run (cyclical) movements in real output. As a result, we expect that selected fiscal variables automatically respond to the cyclical fluctuations in real output.

To estimate income elasticities of budgetary categories we expect that there is a long-run equilibrium relationship (cointegration) between each included fiscal variable and real output. Cointegration methodology introduced by Johansen (1988, 1991) and Johansen and Juselius (1990) will be employed to estimate the long-rum equilibrium relationships between different types of budgetary variables and real output in the European transition economies. Johansen method is applied to the unrestricted vector autoregression (VAR) model that can be written by the following moving average representation of *n* non-stationary variables containing *p* lagged values:

$$Y_t = \mu + A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + \varepsilon_t \tag{5.4}$$

where Y_t is a $n \; x \; 1$ vector of the contemporaneous endogenous variables, μ is a $n \; x \; 1$ vector of the constants, A_i are $n \; x \; n$ polynomial variance-covariance matrix, $\varepsilon_t \sim N_n\left(0, \sum_{\varepsilon}\right)$ is a $n \; x \; 1$ normalized vector of exogenous shocks (innovations) to the model representing unexplained changes in the variables.

If at least two of the variables are cointegrated of the order one (I(1)) the VAR representation in the equation (5.4) can be rewritten by subtracting Y_{t-1} to the following vector error correction model (VECM):

$$\Delta Y_t = \mu + \Pi Y_{t-p} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \tag{5.5}$$

where ΔY_t is a $n\ x\ 1$ vector of the first differences of stochastic variables Y_t, $\Pi = \sum_{i=1}^{p} A_i - I$, $\Gamma_i = -\sum_{j=i+1}^{p} A_j$, I is $n\ x\ n$ identity matrix.

Presented VECM contains information on both short-term and long-term adjustments to changes in Y_t included in estimated Γ and Π respectively. Γ is a $n\ x\ n$ matrix that represents the short-term dynamic - adjustments to changes in Y_t. Π is a $n\ x\ n$ matrix consisting of the long-run coefficients - the cointegrating relationships (cointegrating vectors) and of the error correction term. Π can be decomposed as follows:

$$\Pi = \alpha\beta' \tag{5.6}$$

where α represents $n\ x\ r$ a loading matrix containing coefficients that describe the contribution of the r long-term (cointegrating) relationships in the individual equations and denotes the speed of adjustment from disequilibrium, while β is a $n\ x\ r$ matrix of long-run coefficients and represents the r linearly independent cointegrating vectors (each column of β is the cointegrating vector). The number of cointegrating relations among variables of Y_t is the same as the rank (r) for the matrix Π. If it has a full rank, the rank $r = n$ and it means there are n cointegrating relationships and that all variables are I(0). If a vector Y_t is a vector of endogenous variables that are I(1), then all terms in equation (5.5) are I(0), and ΠY_{t-1} must be also stationary for $\varepsilon_n \sim \text{I}(0)$ to be white noise. If the matrix Π has reduced rank, $r < n$, there are $n-1$ cointegrating vectors and even if all endogenous variables in the model are I(1), the level-based long-run component would be stationary. VECM requires that there exists at least one cointegrating relationship.

In order to find a presence of cointegrating (long-run) relationships, we use trace test and maximum eigenvalue test. Determination of rank and estimation of the coefficients are computed as maximum likelihood estimation. The corresponding likelihood-ratio test statistics are:

$$\lambda_{trace}(r) = -T\sum_{i-r+1}^{n} \ln\left(1-\hat{\lambda}_i\right) \qquad \lambda_{\max}(r, r+1) = -T\ln\left(1-\hat{\lambda}_{r+1}\right) \tag{5.7}$$

where r is the number of cointegrating vectors under the null hypothesis and $\hat{\lambda}$ is the estimated value for the *ith* ordered eigenvalue from the Π matrix. Under the trace statistic, the null hypothesis that the number of cointegrating vectors is less than or equal to r is tested against the alternative that there are more than r vectors. Whereas under the maximum eigenvalue test the null hypothesis that there are r cointegrating vectors is tested against the alternative of $r+1$ cointegrating vectors.

Provided that time series for direct tax revenues, indirect tax revenues, social contributions, unemployment related transfers and real output are I(1)[5] we estimate four different VEC models employing quarterly data for the period 2000Q1-2012Q4 (52 observations) for government expenditures, real output, inflation, tax revenues and short-term interest rates drawn from IMF database (International Financial Statistics, September 2013). Time series for direct tax revenues, indirect tax revenues, social contributions, unemployment related transfers and real output were seasonally adjusted. Tests for the cointegration were computed using two lags as recommended by the AIC (Akaike Information Criterion).

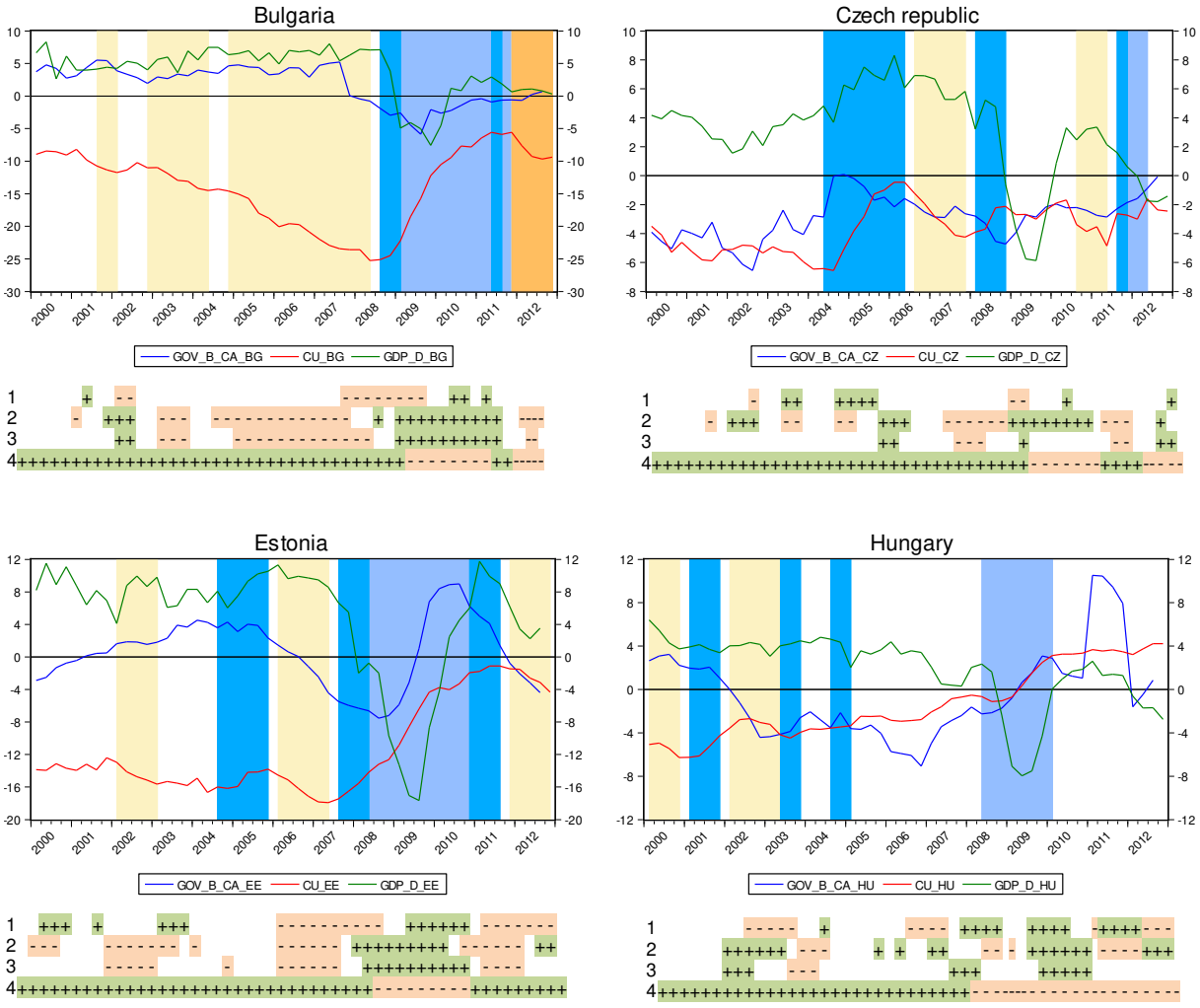
[5] Detail results of unit root test are not reported here to save space. Like any other results, they are available upon request from the author.

Results of both Johansen cointegration procedures (trace statistics and maximum eigenvalue statistics) confirmed our hypothesis about existence of one long-run equilibrium (cointegrating) relationship between each fiscal variable and real output. Normalized cointegrating coefficients derived from each cointegrating equation represent elasticity coefficients of each fiscal category with respect to real output.

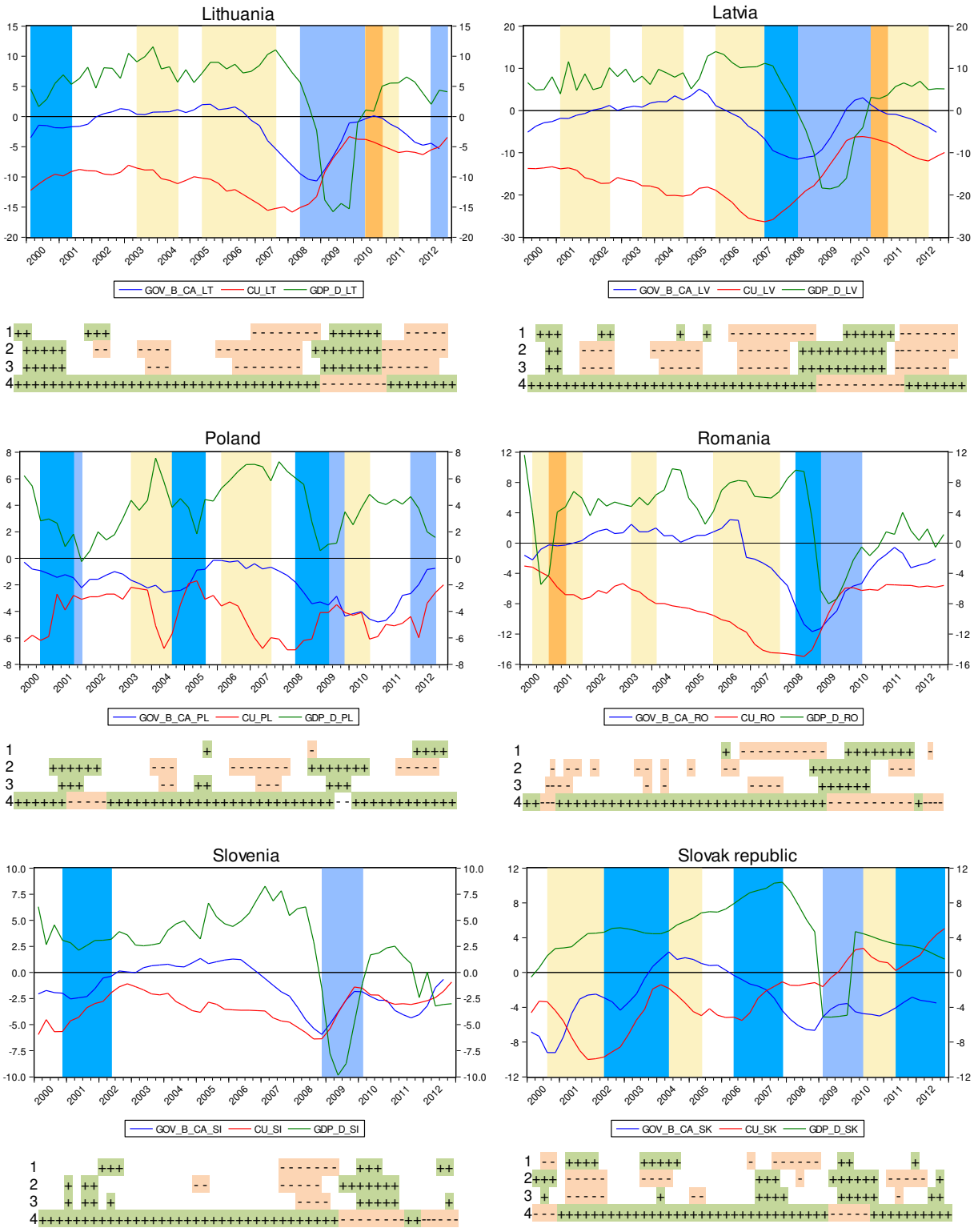
5.4 Episodes of Large Current Account and Fiscal Changes

In this section we analyze occurrence as well as substantial features of episodes containing large current account and fiscal changes in the European transition economies since 2000. Substantial changes in current accounts and CAPBs will be identified according to associated trends in the real output to observe possible interferences with the performance of the countries. At the same time we identify large changes in private savings-investments gap to GDP ratio and overall savings-investments gap to GDP ratio[6] and indicate possible causalities and implications according to an intertemporal approach.

Figure 5 Episodes of Large Current Account Changes (2000Q1-2012Q4)



[6] Rule for identification of large changes in the private savings-investments gap to GDP ratio and the overall savings-investments gap to GDP ratio follows just condition (1) from the section 5.1 for a proposed identification scheme. Otherwise we identified much lower occurrence of both episodes.



Note: Variables - cyclically adjusted primary balance - CAPB (GOV_B_CA) and current account (CU) are expressed as percentage share on GDP. Real output growth rate (GDP_D) is expressed as percentage change of the annual real GDP over the corresponding period in previous year.

Data in tables below each sub-figure represents large changes (+ for improvement, - for deterioration) in (1) cyclically adjusted primary balance (CAPB), (2) private savings-investments gap to GDP ratio (SPIP) and (3) overall savings-investments gap to GDP ratio (SI). Last raw represents (4) annual changes in real output. For (1), (2) and (3) each individual sign (+ or -) represents a large change during one year (four quarters) backward.

CU (-) (with negative real GDP interference) CU (-) (w/o negative real GDP interference)

CU (+) (with positive real GDP interference) CU (+) (w/o positive real GDP interference)

Source: Author's calculation.

Figure 5 reveals identified large current account changes. Individual countries from the group experienced several episodes of continuous current account adjustments that in total represent 66 episodes of which 35 refer to the current account improvement and 31 to the current account deterioration. We found that during more than 62 percent of episodes the current account adjustments did not interfere with the real output leading path (either positively or negatively). This result is contrary to conclusions proposed by i.e. Abbas, Bouhga-Hagbe, Fatás, Mauro and Velloso (2011).

Bulgaria experienced 8 large continuous current account changes: 4 improvements (2 episodes with and 2 episodes without GDP interference) and 4 deteriorations (3 episodes with and 3 episodes without GDP interference). Episodes of large current account changes were associated with corresponding SPIP and SI episodes. Large CAPB episodes were less frequent and were partially associated with large current account changes during the crisis period.

Czech republic experienced 6 large continuous current account changes: 4 improvements (3 episodes with and 1 episode without GDP interference) and 2 deteriorations (both 2 episodes without GDP interference). Large and durable current account improvement in the first half of the period was associated with corresponding CAPB episode. In the second half of the period (and especially during the crisis period) large current account changes were especially followed by lagged corresponding episodes of SPIP adjustments.

Estonia experienced 7 large continuous current account changes: 4 improvements (3 episodes with and 1 episode without GDP interference) and 3 deteriorations (all 3 episodes without GDP interference). During the first half of the period we observed a parallel occurrence of current account deterioration SPIP and SI episodes while CAPB episodes doesn't seem to affect current account adjustments (similarly just like in Bulgaria - we suggest it is especially due to a tightened fiscal discipline conducted under strict exchange rate anchoring). Crisis period seem to strengthened an occurrence of current account episodes and CAPB, SPIP, SI episodes, though with persistent lags.

Hungary experienced 6 large continuous current account changes: 4 improvements (3 episodes with and 1 episode without GDP interference) and 2 deteriorations (both 2 episodes without GDP interference). Episodes of large current account changes in the middle of the first half of the period were associated with a lagged occurrence of SPIP, SI and CAPB episodes. At the same time it seems that large changes of domestic (private and public) components of SI adjustments followed contrary trends with a dominance of SPIP effects. The only crisis period current account episode was associated with slightly lagged continuous changes in both CAPB and SPIP.

Lithuania experienced 7 large continuous current account changes: 3 improvements (1 episode with and 2 episodes without GDP interference) and 4 deteriorations (1 episode with and 3 episodes without GDP interference). Despite initial short CAPB episode we found that large current account adjustments were not associated with continuous CAPB changes during the most of the pre-crisis period (the last pre-crisis one was followed with a significant lag). On the other hand current account episodes strictly corresponded to SPIP episodes. Parallel occurrence of corresponding current account and CAPB, SPIP, SI episodes became much more frequent during the crisis period (similarly just like in Bulgaria and Estonia).

Latvia experienced 7 large continuous current account changes: 2 improvements (1 episode with and 1 episode without GDP interference) and 5 deteriorations (1 episode with and 4 episodes without GDP interference). Similarity with Lithuania's pre-crisis current account episodes scenario is obvious. Interconnection between current account and SPIP (as well as SI) episodes is clear. Situation changes during the crisis period though CAPB episodes slightly lagged behind large and continuous current account changes.

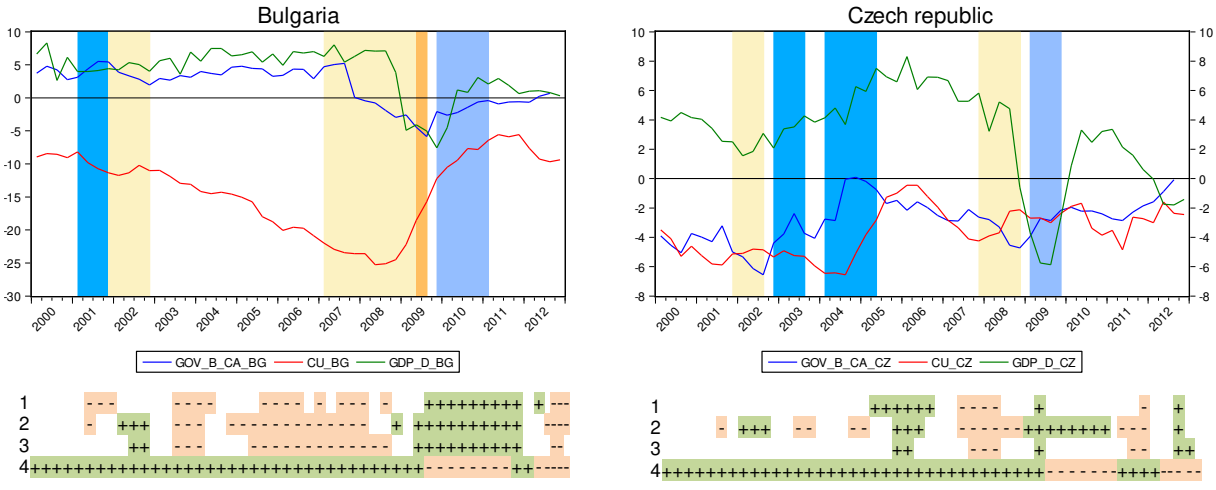
Poland experienced 9 large continuous current account changes: 6 improvements (3 episodes with and 3 episodes without GDP interference) and 3 deteriorations (all 3 episodes without GDP interference). During the first half of the period we observed a parallel occurrence of current account deterioration and SI episodes. However, only one current account episode (2005) was associated with short CAPB episode while the rest of them occurred in parallel with large SPIP changes. Despite general improvement in parallel occurrence of current account episodes as well as SPIP and CAPB changes, SPIP and CAPB episodes tended toward divergent adjustments.

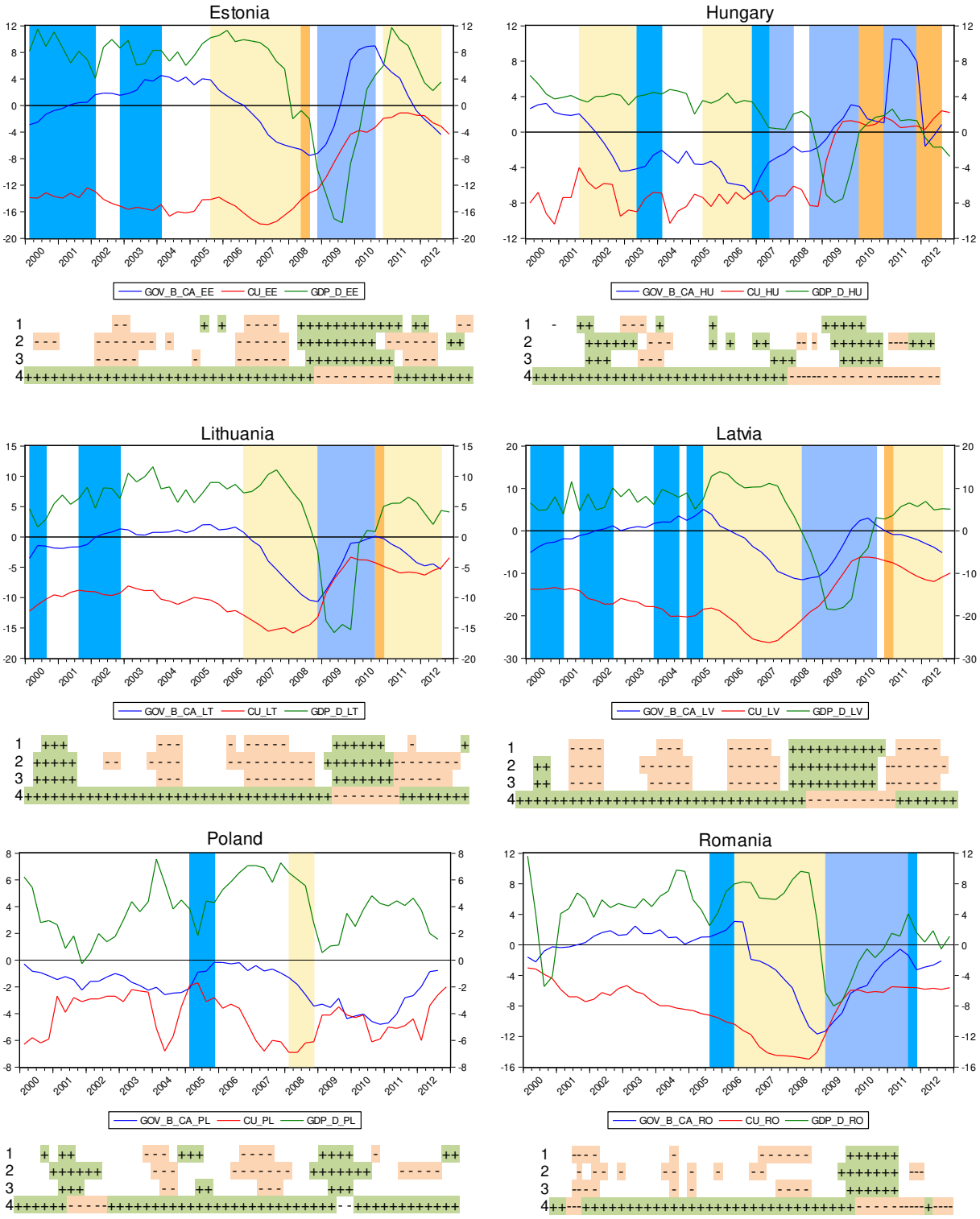
Romania experienced 7 large continuous current account changes: 2 improvements (1 episode with and 1 episode without GDP interference) and 5 deteriorations (1 episode with and 4 episodes without GDP interference). Deteriorating current account episodes during the whole pre-crisis period were associated purely with large SPIP changes causing SI adjustments (despite the last that clearly preceded CAPB deterioration at its beginning). While an episode of continuous current account improvement at the beginning of the crisis period occurred again in parallel with large positive SPIP episode, there also seem to be a substantial, though lagged, occurrence of the episode with large CAPB improvement.

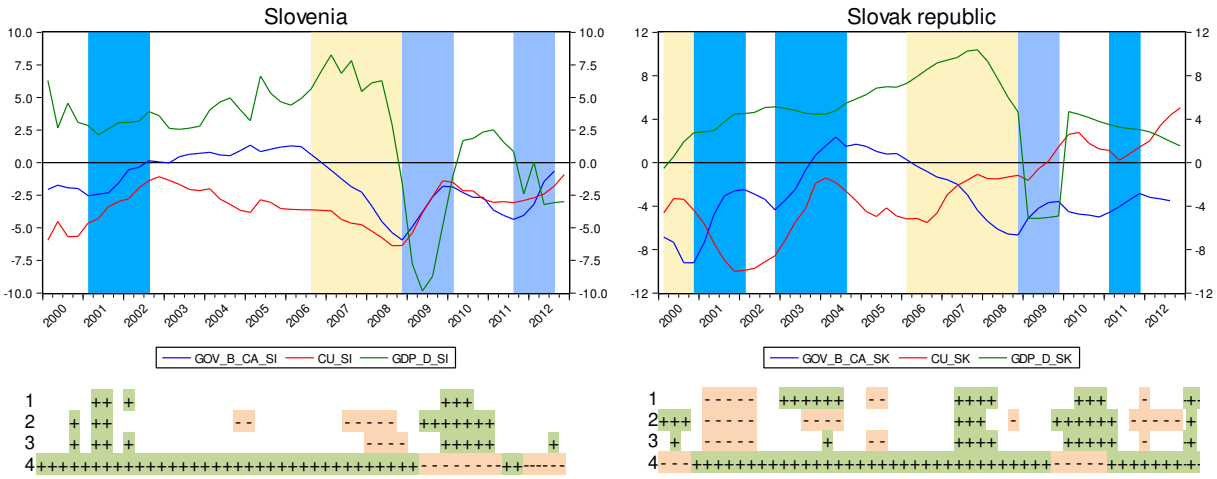
Slovak republic experienced 7 large continuous current account changes: 4 improvements (3 episodes with and 1 episode without GDP interference) and 3 deteriorations (all 3 episodes without GDP interference). Large changes in CAPB and SPIP followed contrary trends during pre-crisis period. However, episodes of large SI changes generally reflected associated large continuous current account changes and thus appear to be clearly parallel. Occurrence of volatile current account episodes (shifting of positive and negative episodes) intensified during the crisis period and occurred in parallel with SPIP episodes.

Slovenia experienced 2 large continuous current account changes: 2 improvements (1 episode with and 1 episode without GDP interference) and no deteriorations. A rare occurrence of continuous large current account episodes reflects a relative SI stability during the pre-crisis period. Episode of the current account improvement at the beginning of the period occurred in parallel with positive SPIP and SI changes as well as subsequent, though lagged, CAPB episode (this scenario happened again at the beginning of the crisis period). However, negative CAPB, SPIP and SI episodes don't seem to be associated with corresponding current account episodes.

Figure 6 Episodes of Large Fiscal Policy Changes (2000Q1-2012Q4)




Estonia
GOV_B_CA_EE
CU_EE
GDP_D_EE
Hungary
GOV_B_CA_HU
CU_HU
GDP_D_HU
Lithuania
GOV_B_CA_LT
CU_LT
GDP_D_LT
Latvia
GOV_B_CA_LV
CU_LV
GDP_D_LV
Poland
GOV_B_CA_PL
CU_PL
GDP_D_PL
Romania
GOV_B_CA_RO
CU_RO
GDP_D_RO



Note: Variables - cyclically adjusted primary balance - CAPB (GOV_B_CA) and current account (CU) are expressed as percentage share on GDP. Real output growth rate (GDP_D) is expressed as percentage change of the annual real GDP over the corresponding period in previous year.
Data in tables below each sub-figure represents large changes (+ for improvement, - for deterioration) in (1) current account (CU), (2) private savings-investments gap to GDP ratio (SPIP) and (3) overall savings-investments gap to GDP ratio (SI). Last raw represents (4) annual changes in real output. For (1), (2) and (3) each individual sign (+ or -) represents a large change during one year (four quarters) backward.
CAPB (-) (with negative real GDP interference) CAPB (-) (w/o negative real GDP interference)
CAPB (+) (with positive real GDP interference) CAPB (+) (w/o positive real GDP interference)
Source: Author's calculation.

Figure 6 reveals identified large fiscal changes. Individual countries from the group experienced several episodes of continuous fiscal adjustments (represented by adjustments in CAPB) that in total represent 55 episodes of which 32 refer to the fiscal stance improvement and 23 to the fiscal stance deterioration. We found that during almost 53 percent of episodes adjustments in CAPB did not interfere with the real output leading path (either positively or negatively).

Bulgaria experienced 5 large continuous fiscal changes: 2 improvements (1 episode with and 1 episode without GDP interference) and 3 deteriorations (1 episode with and 2 episodes without GDP interference). CAPB episodes seem to be rare during a pre-crisis period and while their interference with either GDP or current account was generally low. Large CAPB changes intensified during the crisis period. Parallel occurrence of CAPB episodes and current account, SPIP as well as SI episodes became obvious.

Czech republic experienced 5 large continuous fiscal changes: 3 improvements (2 episodes with and 1 episode without GDP interference) and 2 deteriorations (both 2 episodes without GDP interference). Fiscal episodes occurred with few quarters lag behind SPIP episodes that seems to neutralize these mutually contrary trends on the overall SI balance (we have observed no large SI episode during the first half of the period) during the pre-crisis period. Effects associated with the beginning of the crisis period resulted in parallel occurrence of CAPB, current account SPIP as well as SI episodes of the same direction, though with different intensity and durability.

Estonia experienced 6 large continuous fiscal changes: 3 improvements (2 episodes with and 1 episode without GDP interference) and 3 deteriorations (1 episode with and 2 episodes without GDP interference). Despite relatively high occurrence of CAPB episodes, associated interactions with large current account adjustments were not obvious though CAPB deteriorating episodes were followed by corresponding SPIP and SI episodes. However, situation significantly changed during the crisis period. We identified large

continuous CAPB changes with parallel occurrence of current account as well as SPIP and SI episodes.

Hungary experienced 9 large continuous fiscal changes: 5 improvements (2 episodes with and 3 episodes without GDP interference) and 4 deteriorations (2 episodes with and 2 episodes without GDP interference). Negative large CAPB episodes were associated with lagged (first) or not significant (second) current account deteriorations. Remaining pre-crisis continuous CAPB changes was not followed by equivalent current account adjustments. At the same time, all pre-crisis CPAB episodes were associated with opposite SPIP and SI changes that probably neutralize effects of the fiscal stance changes. Only initial CAPB episode during the crisis period was parallel with large current account, SPIP and SI changes. Remaining CAPB episodes were followed just by lagged SPIP episodes.

Lithuania experienced 6 large continuous fiscal changes: 3 improvements (2 episodes with and 1 episode without GDP interference) and 3 deteriorations (1 episode with and 2 episodes without GDP interference). Occurrence of large CAPB episodes (despite initial one) was not strictly parallel with continuous current account changes during the pre-crisis period. However, we observed a significant intersection of current account, SPIP and SI episodes. Parallel occurrence significantly improved during the crisis period though the last large CAPB change was associated with less dynamic current account deterioration.

Latvia experienced 8 large continuous fiscal changes: 5 improvements (4 episodes with and 1 episode without GDP interference) and 3 deteriorations (1 episode with and 2 episodes without GDP interference). Large CAPB episodes were not associated with continuous current account changes during the most of the pre-crisis period (despite the last one). However, we observed a clear improvement in parallel occurrence of episodes in all indicators (CAPB, current account, SPIP, SI) during the crisis period.

Poland experienced 2 large continuous fiscal changes: 1 improvement with GDP interference and 1 deterioration without GDP interference. Large fiscal episodes in Poland were really rare. Both two continuous fiscal changes did not occur in strict parallel with current account episodes. First CAPB episode lagged slightly and second one significantly behind current large account changes. We did not observe any large CAPB episode during the crisis period.

Romania experienced 4 large continuous fiscal changes: 3 improvements (2 episodes with and 1 episode without GDP interference) and 1 deterioration without GDP interference. Country did not experience any parallel occurrence of large CAPB and current episodes during the pre-crisis period. However, the situation significantly changed during the crisis period. We observed a parallel occurrence of two large CAPB and current account changes (one deterioration and one improvement).

Slovak republic experienced 6 large continuous fiscal changes - 4 improvements (3 episodes with and 1 episode without GDP interference) and 2 deteriorations (both 2 episodes without GDP interference). We identified mixed results of CAPB and current account episodes occurrence during the pre-crisis period. First large CAPB change (deterioration) was followed by the current account change of the same direction with a significant lag, clearly interfering with following CAPB episode (improvement). Parallel occurrence of CAPB and current account changes was observed only during the second episode of the CPAB improvement. During the crisis period we identified only one large current account improvement thought clearly lagging behind CAPB episode. The rest of the crisis continuous CAPB and current account changes followed contrary trends.

Slovenia experienced 4 large continuous fiscal changes: 3 improvements (1 episode with and 2 episodes without GDP interference) and 1 deterioration without GDP interference. Both pre-crisis CAPB episodes occurred in parallel with current account episodes. While the

first large CAPB change was followed by the lagged current account episode, the second CAPB episode was not associated with a significant current account adjustment.

Examination of current account episodes in the European transition economies revealed some crucial implications of large and continuous current account changes. We have observed a strong evidence of large current account (CU) changes and overall savings-investments gap to GDP ratio (SI) parallel occurrence. While changes in public (CAPB[7]) and private (SPIP) savings-investments gap to GDP ratio generally corresponded with initiated large current account adjustments, in minor cases we have observed either contrary trend in both categories or magnitude of change did not meet a condition (1) to be considered as a large continuous change. SPIP episodes seem to be generally more frequent than CAPB episodes and thus provide more accurate interpretation of causal relationship between large and continuous current account changes and corresponding adjustments in SI balance. This investigation is even more relevant in countries with strong exchange rate anchor (in countries from the group of "peggers") and more prudential fiscal policy. Lower occurrence of large changes in the fiscal stance in these countries during the pre-crisis period thus corresponds with our general expectations.

Examination of fiscal episodes in the European transition economies revealed some crucial implications of large and continuous fiscal changes. Low impact of large CAPB changes on the real output was caused by reduced GDP interference with internal (fiscal) imbalances due to high real output growth rates followed by an intensified convergence during the first half of the period. At the same time it seems that crisis period associated with deterioration effects on overall demand (both internal and external) reduced exposure of GDP to internal (fiscal) imbalances too. We also observed persisting disproportions between CAPB and SGSI revealing substantial effects of the business cycle on the budgetary components.

Table 1 summarizes revealed episodes of large continuous current account and CAPB changes in the European transition economies since 2000. The number of episodes with improved current accounts was slightly higher that the number of episodes with improved CAPB. This difference is significantly higher in case of deteriorating episodes.

Table 1 Episodes of Large Current Account and Fiscal Changes (2000Q1-2012Q4)
(Brief Overview of Episodes Types Occurrence)

	current account changes					fiscal changes				
	improvement		deterioration		total	improvement		deterioration		total
	with GDP interference	w/o GDP interference	with GDP interference	w/o GDP interference		with GDP interference	w/o GDP interference.	with GDP interference	w/o GDP interference	
Bulgaria	2	2	1	3	8	1	1	1	2	5
Czech republic	3	1	0	2	6	2	1	0	2	5
Estonia	3	1	0	3	7	2	1	1	2	6
Hungary	3	1	0	2	6	2	3	2	2	9
Lithuania	1	2	1	3	7	2	1	1	2	6
Latvia	1	1	1	4	7	4	1	1	2	8
Poland	3	3	0	3	9	1	0	0	1	2
Romania	1	1	1	4	7	2	1	0	1	4
Slovak republic	3	1	0	3	7	3	1	0	2	6
Slovenia	1	1	0	0	2	1	2	0	1	4
total	**21**	**14**	**4**	**27**	**66**	**20**	**12**	**6**	**17**	**55**
average durability (in quarters)	**5.15**	**6.07**	**3.36**	**5.04**		**4.89**	**6.42**	**2.67**	**7.63**	

Note: Data represents a number of episodes of large current account and fiscal changes.
Source: Author's calculation.

[7] While CAPB is not accurate measure for a calculation of overall net public (savings-investments) position, it was employed in this section to reveal intertemporal effects of discrete changes in the fiscal policy stance.

Occurrence of current accounts episodes types is clearly distributed between the crisis and pre-crisis periods. The most of episodes associated with large current account deteriorations occurred during the pre-crisis period revealing generally expected proposition of an intertemporal approach for converging economies catching-up western European countries. All countries experienced episodes of large current accounts improvement at the beginning of the crisis period as an immediate result of deteriorating effects affecting domestic demand. However, subsequent higher occurrence of contrary large current account episodes demonstrates accelerated redistributive effects of the crisis associated with short-term expenditure shifting across countries causing higher volatility in current account balances.

Occurrence of CAPB episodes seems to be distributed across the whole period more uniformly. However, episodes of large CAPB improvements tend to be more frequent during the pre-crisis period. Moreover, durability of continuous CAPB improvements is clearly higher in Baltic countries (with rigorous exchange rate anchoring) highlighting a commitment to conduct prudential fiscal policies necessary to maintain a sustainability of tough exchange rate arrangement. At the same time, episodes of large fiscal policy improvements helped to reduce persisting SI disequilibrium caused by deteriorating SPIP imbalances in the whole group of "peggers". In countries with flexible exchange rate arrangements ("floaters") we observed some sort of alteration in episodes of CAPB improvement and deterioration in the medium-term period. All countries (except for Hungary) experienced large deteriorating episode at the beginning of the crisis period followed by improving episode (except for Poland) with differing lag revealing a crucial need of a fiscal consolidation.

Table 2 summarizes detailed overview of intertemporal effects associated with episodes of large continuous current account and CAPB changes and associated adjustments in SI, SPIP and SGIG balances in the European transition economies since 2000. Average length of the current account episode was more than 5.2 quarters (episodes of the current account improvement (5.4 quarters) were slightly more durable that episodes of the current account deterioration (5.16 quarters)) and the CAPB episode more than 5.6 quarters (episodes of the CAPB deterioration (6.95 quarters) were significantly more durable than episodes of the CAPB improvement (4.85 quarters)). Average change of the current account is -0.96 percent of GDP consisting of 3.38 percent of GDP for positive episodes and -4.34 percent of GDP for negative episodes. Average change of CAPB is -1.41 percent of GDP consisting of 3.16 percent of GDP for positive episodes and -4.57 percent of GDP for negative episodes.

Table 2 Episodes of Large Current Account and Fiscal Changes (2000Q1-2012Q4)
(Detailed Overview of Intertemporal Effects)

Type of episode	number of episodes	duration (quarters)	Δ	NX			S-I			SP-IP			SG-IG		
				+	-	net	+	-	net	+	-	net	+	-	net
CU	66	5.20	-0.96	6.51	-7.47	-0.96	6.36	-7.31	-0.95	4.24	-3.09	1.16	2.18	-4.29	-2.11
CU (+)	35	5.40	3.38	4.89	-1.51	3.38	4.85	-1.56	3.29	3.93	-1.31	2.62	0.91	-0.26	0.65
CU (-)	31	5.16	-4.34	1.62	-5.96	-4.34	1.51	-5.76	-4.25	0.31	-1.78	-1.46	1.26	-4.03	-2.77
CAPB	55	5.65	-1.41	3.51	-4.62	-1.11	2.86	-4.00	-1.14	1.18	0.18	1.36	1.64	-4.10	-2.46
CAPB (+)	32	4.85	3.16	2.26	-0.20	2.06	2.14	-0.12	2.02	-1.01	0.31	-0.70	3.15	-0.39	2.76
CAPB (-)	23	6.95	-4.57	1.25	-4.42	-3.17	0.72	-3.88	-3.16	2.19	-0.13	2.06	-1.51	-3.71	-5.22

Note: Data in first column represents a number of CU (current account) and CAPB (cyclically adjusted primary balance) large changes (episodes), in second column an average duration in quarters followed by estimated changes expressed as GDP shares.
Source: Author's calculation.

Relative contribution of private and public savings-investments balances to the overall SI stance reflected in the current account improvement and deterioration episodes seems to be quite different. Around 78 percent of the average current account balance during large current account improvements is associated with SPIP balance and thus minor contribution of SGIG. On the other hand, a contribution of SPIP to the average current account balances during large current account deteriorations is only 34 percent revealing much higher impact of SGIG. Our findings seem to be contrary to the key outcomes proposed by Abbas, Bouhga-Hagbe, Fatás, Mauro and Velloro (2011)[8] who revealed that changes in the current account during average episode are driven almost exclusively by SPIP balance in advanced economies while in emerging and low-income countries it is around three-fourth of the change in the current account. Much higher contribution of SGIG to the current account deterioration reveals substantial causal relationship between deteriorating fiscal episodes and current account deteriorations. We suggest that this observation originates in weaker fiscal discipline in countries from the group of "floaters" during the pre-crisis period and associated crowding-out effects that contributed to the current accounts deterioration. Significant contribution also refers to the intensive deterioration in the fiscal stance in most countries from the group at the beginning of the crisis period. The lack of fiscal discipline in countries without explicit strong nominal anchor also reveals questions associated with fiscal sustainability after euro adoption.

Large CAPB improvements and deteriorations revealed significant responsiveness of large current account adjustments to the fiscal incentives (0.65+). The ratio is slightly higher for CAPB deteriorating episodes. Responsiveness of the current account is slightly higher during deteriorating episodes that in our sample of countries occurred typically at the beginning of the crisis period. Deterioration in overall demand (for domestic as well as foreign goods) together with accelerated negative trend in CAPB intensified contrary trends in current account and fiscal balances. CAPB large changes were associated with contrary adjustments in SPIP balances. As a result, private savings offset around 32 percent of CAPB changes (fiscal impulse) for episodes of CAPB improvements and around 48 percent of CAPB changes for episodes of CAPB deteriorations. Offsetting effects are clearly visible in most countries during initial load of effects of the crisis period.

6. Econometric Model Specification

VAR models represent dynamic systems of equations in which the current level of each variable depends on past movements of that variable and all other variables involved in the system. Residuals of vector ε_t represent unexplained movements in variables (effects of exogenous shocks hitting the model); however as complex functions of structural shocks effects they have no economic interpretation. Structural shocks can be still recovered using transformation of the true form representation into the reduced-form by imposing a number of identifying restrictions. Applied restrictions should reflect some general assumptions about the underlying structure of the economy and they are obviously derived from economic theory. There are two general (most used) approaches to identify VAR models. (I) Cholesky decomposition of innovations implies the contemporaneous interactions between exogenous shocks and the endogenous variables are characterized by a Wald causal chain. Ordering of endogenous variables then reflects expected particular economy structure following general economic theory assumptions. However, the lack of reasonable guidance for appropriate ordering led to the development of more sophisticated and flexible identification methods - (II) structural VAR (SVAR) models. Identifying restrictions implemented in SVAR models reflect theoretical assumptions about the economy structure more precisely.

[8] However, authors covered period 1970-2007 in their study avoiding effects of the crisis period to the fiscal balances.

We employ a VAR methodology to analyze effects of CAPB changes on current account adjustments in the European transition economies. Cholesky decomposition of variance-covariance matrix of reduced-form VAR residuals is implemented to estimate effects of CAPB deterioration on current accounts responses. While authors in many referencing studies employed panel data (VAR) models with fixed effects we still tend to estimate a multivariate VAR for each individual country to investigate possible implications of different exchange rate arrangements and thus contribute to the fixed versus flexible exchange rates dilemma.

True model is represented by the following infinite moving average representation:

$$X_t = A_0\varepsilon_t + A_1\varepsilon_{t-1} + A_2\varepsilon_{t-2} + \ldots = \sum_{i=0}^{\infty} A_i\varepsilon_{t-i} = \sum_{i=0}^{\infty} A_i L^i\varepsilon_t = A(L)\varepsilon_t \qquad (6.1)$$

where X_t represents n x 1 a vector including endogenous variables of the model, $A(L)$ is a n x n polynomial consisting of the matrices of coefficients to be estimated in the lag operator L representing the relationship among variables on the lagged values, ε_t is n x 1 vector of identically normally distributed, serially uncorrelated and mutually orthogonal errors (white noise disturbances that represent the unexplained movements in the variables, reflecting the influence of exogenous shocks):

$$E(\varepsilon_t) = 0, \quad E(\varepsilon_t\varepsilon_t') = \Sigma_\varepsilon = \mathrm{I}, \quad E(\varepsilon_t\varepsilon_s') = [0] \quad \forall t \neq s \qquad (6.2)$$

Vector X_t consists of six endogenous variables - real output $(y_{r,t})$, government budgetary stance $(g_{b,t})$, current account (cu_t), short-term nominal interest rates $(ir_{n,t})$ and real exchange rate $(er_{r,t})$. In the five-variable VAR model $(X_t = [y_{r,t}, g_{b,t}, cu_t, ir_{n,t}, er_{r,t}])$ we assume five exogenous shocks that contemporaneously affect endogenous variables - demand shock $(\varepsilon_{y,t})$, fiscal shock $(\varepsilon_{g_b,t})$, current account shock $(\varepsilon_{cu_n,t})$, monetary policy shock $(\varepsilon_{ir_n,t})$ and real exchange rate shock $(\varepsilon_{er_r,t})$.

Structural exogenous shocks from equation (6.1) are not directly observable due to the complexity of information included in true form VAR residuals. As a result, structural shocks cannot by correctly identified. It is then necessary to transform true model into following reduced form

$$X_t = C(L)Y_{t-1} + e_t \qquad (6.3)$$

where $C(L)$ is the polynomial of matrices with coefficients representing the relationship among variables on lagged values and e_t is a n x 1 vector of normally distributed errors (shocks in reduced form) that are serially uncorrelated but not necessarily orthogonal:

$$E(e_t) = 0, \quad \Sigma_u = E(e_t e_t') = A_0 E(\varepsilon_t\varepsilon_t') A_0' = A_0 A_0', \quad E(e_t e_s') = [0] \quad \forall t \neq s \qquad (6.4)$$

Relationship between reduced-form VAR residuals (e_t) and structural shocks (ε_t) can be expressed as follows:

$$e_t = A_0\varepsilon_t \qquad (6.5)$$

As we have already noted at the beginning of the section we implement a Cholesky identification scheme to correctly identify structural shocks. In order to identify our model

there must be exactly $n^2 - \left[\left(n^2 - n\right)/2\right]$ relationships among endogenous variables of the model, where *n* represents a number of variables. We have to impose $\left(n^2 - n\right)/2$ restrictions on the matrix A_0 based on the Cholesky decomposition of the reduced-form VAR residual matrix that define matrix A_0 as a lower triangular matrix. The lower triangularity of A_0 (all elements above the diagonal are zero) implies a recursive scheme (structural shocks are identified through reduced-form VAR residuals) among variables (the Wald chain scheme) that has clear economic implications and has to be empirically tested as any other relationship. Identification scheme of the matrix A_0 implies that particular contemporaneous interactions between some exogenous shocks and some endogenous variables are restricted reflecting causal (distribution) chain of interaction transmission. It is clear that the Wald causal chain is incorporated via convenient ordering of variables.

Considering lower triangularity of a matrix A_0 the equation (6.5) can be rewritten as follows:

$$\begin{bmatrix} e_{y_r,t} \\ e_{g_b,t} \\ e_{cu,t} \\ e_{ir_n,t} \\ e_{er_r,t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{y_r,t} \\ \varepsilon_{g_b,t} \\ \varepsilon_{cu,t} \\ \varepsilon_{ir_n,t} \\ \varepsilon_{er_r,t} \end{bmatrix} \tag{6.6}$$

Correct identification of exogenous structural shocks reflecting Cholesky ordering of variables denotes following assumptions:

- Real output doesn't contemporaneously respond to the shock from any other endogenous variable of the model.
- Government budgetary stance doesn't contemporaneously respond to current account, interest rates and exchange rate shocks, while it is contemporaneously affected only by the real output shock.
- Current account doesn't contemporaneously respond to interest rates and exchange rate shocks, while it is contemporaneously affected by real output and government budgetary stance shocks.
- Interest rates don't contemporaneously respond to the current account shock, while it is contemporaneously affected by real output, government budgetary stance and current account and inflation shocks.
- Exchange rate is contemporaneously affected by the shocks from all of the endogenous variables of the model.

After initial period endogenous variables may interact freely without any restrictions.

Estimated VAR model is used to compute impulse response functions to analyze responses of the current account to the negative one standard deviation CAPB shock in the European transition economies. To check the robustness of empirical results we estimate the model considering different ordering of the endogenous variables in models with time series for two different periods (pre-crisis period - model A (2000Q1-2007Q4) and extended period - model B (2000Q1-2012Q4)):

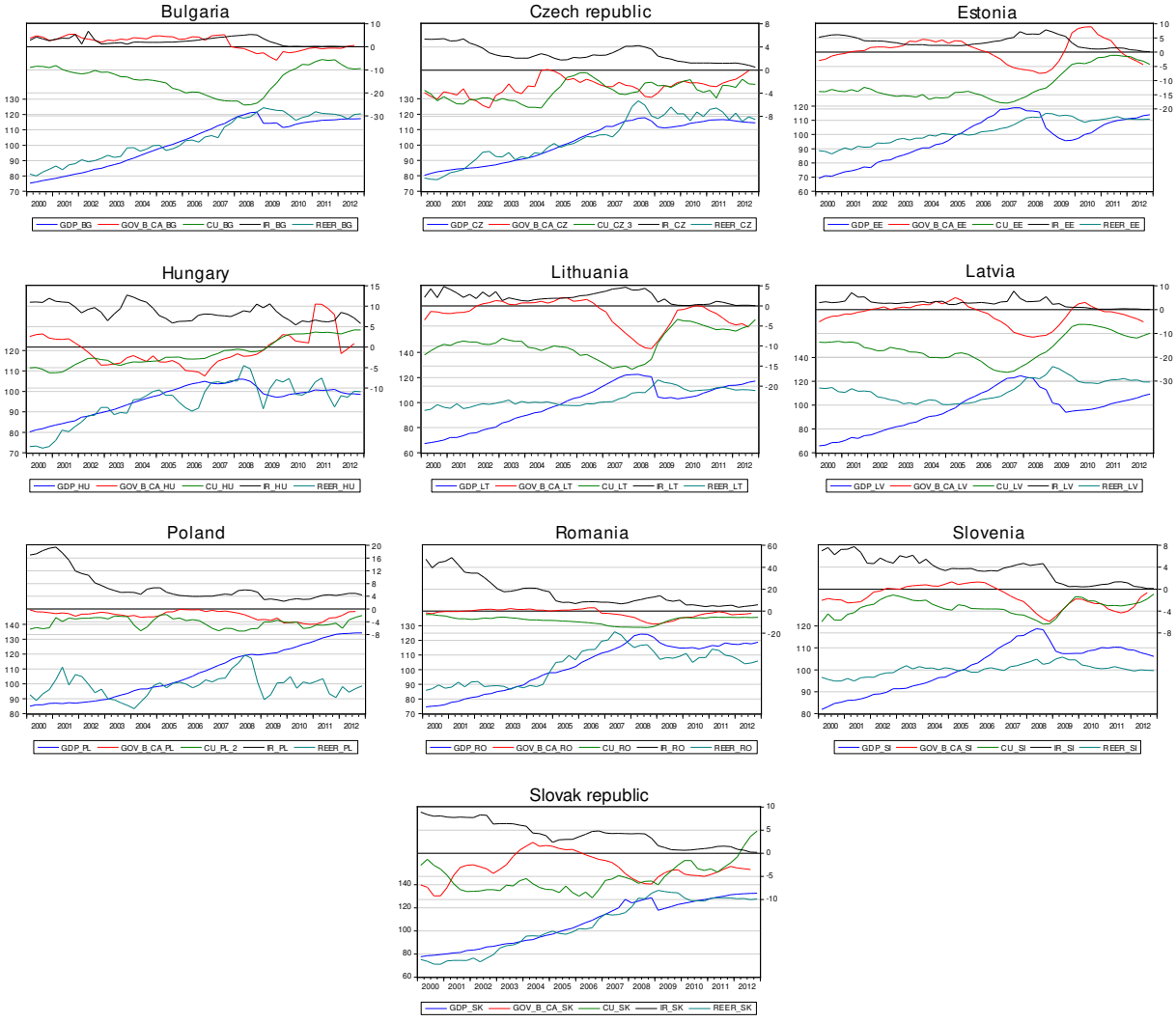
- model A1, B1 $\left(X_t = \left[y_{r,t}, g_{b,t}, cu_t, ir_{n,t}, er_{r,t}\right]\right)$
- model A2, B2 $\left(X_t = \left[y_{r,t}, er_{r,t}, g_{b,t}, ir_{n,t}, cu_t\right]\right)$
- model A3, B3 $\left(X_t = \left[y_{r,t}, g_{b,t}, ir_{n,t}, er_{r,t}, cu_t\right]\right)$

Investigation of the current account responses to the CAPB changes reveals importance of discretionary changes to the cyclically adjusted budgetary components and their cross-country redistributive effects (through the current account adjustments).

7. Data and Results

To estimate effects of CAPB changes on current account adjustments in the European transition economies we employed quarterly data for period 2000Q1-2007Q4 (model A) consisting of 32 observations and for period 2000Q1-2012Q4 (model B) consisting of 52 observations for the following endogenous variables - real output (nominal GDP deflated by GDP deflator), CAPB (see sections 5.2 and 5.3 for methodology), current account of the balance of payments, short-term interest rates (interbank offered rates with 3 months maturity[9]), real exchange rate (CPI based real effective exchange rate) (Figure 7).

Figure 7 Real Output, Cyclically Adjusted Primary Balance, Current Account, Interest Rates, Real Effective Exchange Rates (2000Q1-2012Q4)



Note: Endogenous variables - real output (GDP) and real effective exchange rate (REER) are expressed as indexes (left axis in figures) (2005 = 100). Cyclically adjusted primary balance (CAPB), current account (CU) and interest rates (IR) are expressed in percentage (right axis in figures).
Source: Compiled by author based on data taken from IMF - International Financial Statistics (September 2013).

[9] Short-term interest rates in Estonia, Slovak republic and Slovenia we replaced by EURIBOR after euro adoption in each particular country (2007, 2009 and 2011).

Estimation of two models is in line with the primary objective of the paper to reveal a relationship CAPB changes and current account adjustments considering possible implications of the crisis period on estimated results. Time series for endogenous variables were drawn from Eurostat - Government Finance Statistics (September 2013) and IMF database - International Financial Statistics (September 2013). Time series for real output and current account were seasonally adjusted.

To correctly identify exogenous shocks hitting the model as well as to compute impulse-response functions it is necessary VAR model to be stationary. To check stationarity of the model it is necessary to test the time series for unit roots and cointegration.

A. Testing Procedures

Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were computed to test endogenous variables for the unit roots presence. Both ADF and PP tests indicate that most of variables are non-stationary on values so that the null hypothesis of a unit root presence cannot be rejected for any of time series. Testing variables on first differences indicates that time series are stationary. We may conclude that variables are integrated of order 1 I(1).

Because there are endogenous variables with a unit root on values it is necessary to test time series for cointegration using the Johansen and Juselius cointegration test (we found reasonable to include variables I(0) for testing purposes following economic logic of expected results). The test for the cointegration was computed using three lags as recommended by the AIC (Akaike Information Criterion) and SIC (Schwarz Information Criterion).

Results of Johansen cointegration tests confirmed our results of unit root tests. Both trace statistics and maximum eigenvalue statistics (both at 0.05 level) indicate that there is no cointegration among endogenous variables of the model.

To test the stability of VAR models we also employed a number of diagnostic tests. We found no evidence of serial correlation, heteroskedasticity and autoregressive conditional heteroskedasticity effect in disturbances. The model also passes the Jarque-Bera normality test, so that errors seem to be normally distributed. VAR models seem to be stable also because inverted roots of the model for each country lie inside the unit circle. Detailed results of time series testing procedures are not reported here to save space. Like any other results, they are available upon request from the author.

Following results of the unit root and cointegration tests we estimated the model using variables in first differences so that we can calculate impulse-response functions for all ten European transition economies. Following the main objective of the paper we focus on interpretation of responses of the current account to the negative one standard deviation CAPB (decrease in CAPB) shock.

We also observe effects of the crisis period on the current account responses to the CAPB shock in the European transition economies by comparing results for estimated models using time series for two different periods - model A (2000Q1-2007Q4) and model B (2000Q1-2012Q4). Changed ordering of variables didn't seem to affect results of the analysis. Considering that impulse-response functions are not very sensitive to the ordering of endogenous variables we present results of both models (model A1 and B1) with default ordering of endogenous variables (detailed results for models A2, A3, B2, B3 are available upon request from the author).

B. Regression Results

Table 3 provides an overview of estimated regression results with CAPB as proxy for the discrete fiscal policy stance in the European transition economies since 2000 for two different periods 2000-2007 (model A) and 2000-2012 (model B).

Table 3 Regression Results of Current Account on Cyclically Adjusted Primary Balance

	(1) CAPB (Model A)	(2) CAPB (Model B)
Bulgaria	-0.1047** [0.0504]	-0.0938** [0.0787]
Czech republic	-0.1742** [0.1257]	-0.1140** [0.1452]
Estonia	-0.2332** [0.1251]	-0.1937*** [0.2133]
Hungary	-0.1907** [0.1138]	-0.1557* [0.1687]
Lithuania	-0.2633** [0.1353]	-0.2051** [0.2299]
Latvia	-0.2213** [0.127]	-0.1779** [0.1839]
Poland	-0.0519** [0.0348]	-0.0436** [0.0492]
Romania	-0.0810* [0.0549]	-0.0653** [0.0937]
Slovak republic	-0.1579** [0.0786]	-0.0977*** [0.0921]
Slovenia	-0.1499** [0.0703]	-0.0792** [0.1085]

Note: Standard errors in square brackets. * denotes significance at 1%, ** at 5% and *** at 10%.
Source: Author's calculation.

Results of both regressions revealed that effects of deteriorating CAPBs on the current account balances are significant mostly at 5 percent level. CAPB deterioration is followed by the current account deterioration though with a different intensity in each particular country from the group. Effects of CAPB changes also vary according to the baseline period. On average, a decrease in CAPB at 1 percent point caused current account deterioration at a range of 0.05-0.26 percent points for model A and 0.07-0.20 percent points for model B. Countries with large (Poland) and weak (Bulgaria and Romania) performing economies (experienced generally lower deteriorating effect on their current accounts (0.05-0.10 percent points). In countries with pegged exchange rates ("peggers") we observed higher regression coefficients (0.22-0.26 percent points) than in countries with flexible exchange rate arrangements (0.14-0.19 percent points). However, the size of the economy seems to be more crucial for estimated results because Poland and Romania are clearly out of the range revealed for "floaters". Our results confirmed general theoretical expectations about higher sensitivity of external equilibrium to fiscal incentives under fixed exchange rates. Large discrete changes and associated CAPB adjustments in these countries are more likely to interact with current account dynamics.

Crisis period reduced exposure of external imbalances to CAPB initiated adjustments in internal imbalances in all countries from the group. Estimated regression coefficients ranged from 0.04 to 0.21 percent points. However, this effect is significantly smaller in a group of three large or weak performing economies. On the other hand, more significant decrease was investigated in the group of "floaters" with Hungary near the results for "peggers" with less intensive decrease in regression coefficients. Despite euro adoption in Slovenia (2007) and Slovak republic (2009), regression results for a model B (2000-2012) do not provide any empirical evidence about similar patterns in regression coefficients comparable with the results for countries in the group of "peggers".

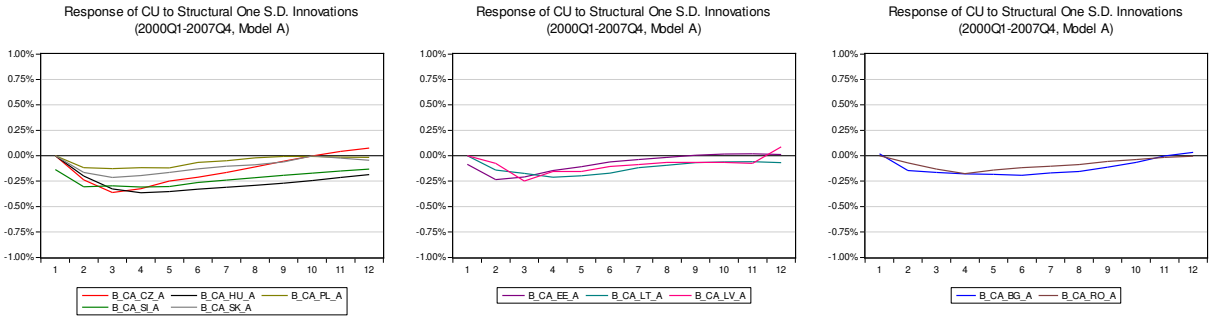
Intensified co-movements of fiscal and current account imbalances during the crisis period resulted in accelerated redistributive effects of the crisis on cross-country expenditure

shifting associated with increased volatility in current account balances that seem to be less affected or exposed to the large CAPB changes (as indicated by decreased regression coefficients in all countries in model for an extended period). This suggestion is also supported by higher standard deviations of estimated regression coefficients in all countries from the group (the most significant in the Baltic countries).

C. Impulse-Response Functions

An investigation of CAPB effects on current account adjustments in the European transition economies includes estimation of current account responses to the negative one standard deviation CAPB shock employing quarterly data for two subsequent periods 2000-2007 (model A) and 2000-2012 (model B). Results seem to be sensitive to the exchange rate arrangement as well as the size of the economy.

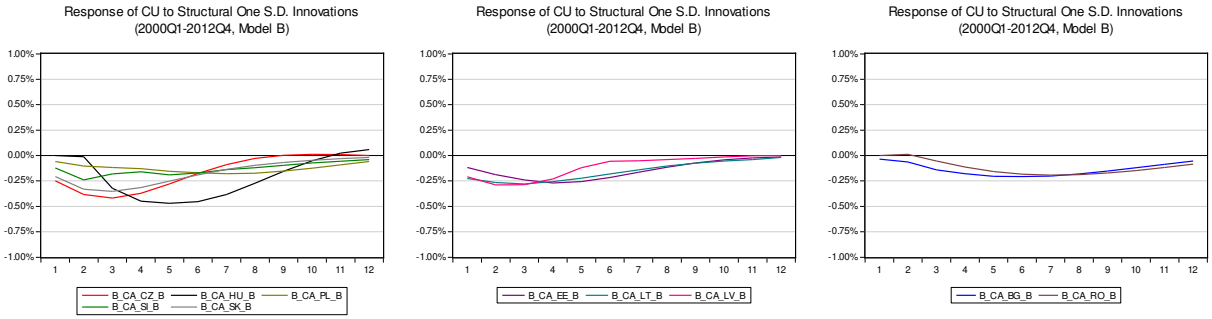
Figure 8 Responses of Current Account to CAPB Shocks (2000Q1-2007Q4) (Model A)



Note: Curves represent responses of current accounts (CU) to the negative one standard deviation cyclically adjusted primary balance (CAPB) shock in each country from the group of the European transition economies.
Source: Author's calculation.

In the figure 8 we summarize results of impulse-response functions of current account balances to the negative (decrease in) CAPB shocks in the model with time series for the pre-crisis period (model A1) in the European transition economies. Estimates of current account responsiveness to the Cholesky negative one standard deviation CAPB shock reveals interesting implications of exchange rate regime choice as well as particular role of the size of the economy in model with time series for a pre-crisis period. Unexpected change in the fiscal stance (CAPB deterioration) was followed by the current account deterioration in all countries from the group. However, we have observed some different patterns in the current account responsiveness among countries. CAPB shock caused slow current account deterioration in Bulgaria and Romania. Negative effect of the shock culminated during the second year since the shock while it has died out within the fourth year. While the response pattern (intensity of the shock) in another big economy, Poland, is quite similar, it is a durability of the deteriorating effect that seems to be reduced (effect of the shock was neutralized at the beginning of the third year). Negative response of the current account to the CAPB shock seems to be the most significant in countries from the group of "floaters". Moreover, a negative effect culminated till the end of the first year after the shock though its durability seems to differ in each individual country. Current account deterioration after the CAPB shock in the group of "peggers" seems to be slightly reduced in comparison with previous group of countries. Finally, negative CAPB shock deteriorated current accounts in all countries from the group just temporarily. Effect of the shock seems to be neutral in the long run.

Figure 9 Responses of Current Account to CAPB Shocks (2000Q1-2012Q4) (Model B)



Note: Curves represent responses of current accounts (CU) to the negative one standard deviation cyclically adjusted primary balance (CAPB) shock in each country from the group of the European transition economies.
Source: Author's calculation.

In the figure 9 we summarize results of impulse-response functions of current account balances to the negative (decrease in) CAPB shocks in the model with time series for the extended period (model B1) in the European transition economies. It seems that crisis period affected short-term responsiveness of the current account to the CAPB shock in each individual country. In Baltic countries ("peggers") current accounts deteriorated immediately after the negative CAPB shock. While intensity of the response remained generally unchanged it seems that a load time of the effect as well as its durability slightly reduced. In the group of "floaters" we examined few different patterns of changes in the current account responses. Despite generally reduced lag (except for Hungary and Slovenia) in the current account negative response, its immediate (or short-term) dynamics seems to be increased (Hungary, Czech republic, Slovak republic). Clearly reduced durability of the current account deterioration was observed in all countries but Poland with response pattern much more similar to the one revealed in the countries with big or weak performing economies. Except for a slightly increased lag in the current account response in Hungary, its short-term dynamics clearly increased though the effect of the shock culminated with a one year lag in comparison with a whole group of "floaters". Countries with big or weak performing economies experienced slightly lagged loading phase in the current account deterioration in comparison with the pre-crisis period. Negative effect culminated at the end of the second year while its durability slightly increased.

8. Conclusion

Current account adjustments revealed crucial implications of the continuously rising international economic and financial integration of this group of countries (increased indebtedness, lacking competitiveness, fiscal imbalances, foreign capital inflows, etc.). However, there is still enough room to investigate partial effects of dynamic changes in key current account determinants to observe associated current account adjustments.

Changes in the fiscal policy stance associated with changes in CAPB affected current accounts in the European transition economies. Despite some differences, we have observed similar trend in the leading paths of current accounts and savings-investments gaps that clearly follow main outcomes of an intertemporal approach. However, expenditure shifting effects associated with current account imbalances in each individual country do not seem to be determined solely by internal balance between savings and investments. Countries from the group of "peggers" experienced periods with generally higher discrepancies in CAPB and current account balances. The beginning of the crisis period clearly reduced these misalignments. In the group of "floaters" we examined persisting negative SI imbalances originated in excessive fiscal deficits.

Occurrence of episodes of large CAPB changes seems to be uniformly distributed across the whole period. Durability of continuous CAPB improvements is clearly higher in Baltic countries (with rigorous exchange rate anchoring) highlighting a commitment to conduct prudential fiscal policies necessary to maintain a sustainability of tough exchange rate arrangement. In countries with flexible exchange rate arrangements ("floaters") we observed some sort of alteration in episodes of CAPB improvement and deterioration in the medium term period. All countries (except for Hungary) experienced large deteriorating episode at the beginning of the crisis period followed by improving episode (except for Poland) with differing lag revealing a crucial need of a fiscal consolidation. Large CAPB improvements and deteriorations revealed significant responsiveness of large current account adjustments to the fiscal incentives (0.65+) in the whole group of countries. The ratio is slightly higher for CAPB deteriorating episodes.

Regression results indicate that a decrease in CAPB at 1 percent point caused current account deterioration at a range of 0.05-0.26 percent points for model A (2000-2007) and 0.07-0.20 percent points for model B (2000-2012). However, the current account interference to CAPB changes seems to be lowest in big and low performing countries, followed by the group of "floaters" and then "peggers". Crisis period reduced exposure of external imbalances to CAPB changes resulted in decreased regression coefficients in all countries.

Results of impulse-response functions revealed some differences in responses of current accounts in each country to the negative one standard deviation CAPB shock. While big and low performing economies experienced slow and less intensive current account deterioration, "peggers" experienced less dynamic current account deterioration with smaller durability and "floaters" experienced more dynamic and more durable current account deterioration. Crisis period slightly changed short-term response patterns in all countries. Durability of the current account deterioration in big and low performing economies together with "peggers" slightly increased while immediate response increased in both groups of countries with pegged and flexible exchange rate arrangements. Despite euro adoption in Slovenia (2007) and Slovak republic (2009), regression results as well as impulse-response functions do not provide any empirical evidence about similar patterns comparable with the results for countries from the group of "peggers" in the model for extended period.

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References

ABBAS, S.M. ALI, BOUHGA-HAGBE, J., FATÁS, A., MAURO, P., VELLOSO, R.C. (2011) Fiscal Policy and the Current Account, *IMF Economic Review* 59(4): 603-629

ALTÃR, M. - NECULA, C. - BOBEICÃ, G. (2010) Estimating the Cyclically Adjusted Budget Balance for the Romanian Economy. A Robust Approach, *Romanian Journal of Economic Forecasting* 13(2): 79-99

ARGHYROU, M.G., CHORTAREAS, G. (2008) Current Account Imbalances and Real Exchange Rates in the Euro Area, *Review of International Economics*, 9(5): 747-764

BOUTHEVILLAIN et al (2001) Cyclically Adjusted Budget Balances: An Alternative Approach, [European Central Bank Working Paper No. 77/2001] Frankfurt am Main, European Central Bank, 73 p.

BUSSIERE, M., FRATZSCHER, M., MULLER, G.J. (2004) Current Account Dynamics in OECD and EU Acceding Countries - An Intertemporal Approach, [European Central Bank, Working Paper, No. 311/2004] Frankfurt, European Central Bank, 38 p.

CALDARA, D., CAMPS, C. (2008) What are the Effects of Fiscal Policy Shocks, [*European Central Bank Working Paper* No. 877/2008] Frankfurt am Main, European Central Bank, 47 p.

CORSETTI, G., GERNOT, J.M., (2006) Budget Deficits and Current Accounts: Openness and Fiscal Persistence, *Economic Policy*, 21(48): 597-638

CORSETTI, G., MÜLLER, G. (2006) Twin Deficits: Squaring Theory, Evidence and Common Sense. *Economic Policy* 48: 597-638

FIDRMUC, J. (2002) Twin Deficits: Implications of Current Account and Fiscal Imbalances for the Accession Countries, *Focus on Transition*, 2: 72-83

GIROUARD, N. - ANDRÉ, Ch. (2005) Measuring Cyclically-Adjusted Budget Balance for EOCD Countries, [*Organization for Economic Cooperation and Development Working Paper* No. 21/2005] Paris, Organization for Economic Cooperation and Development, 42 p.

GLICK, R., ROGOFF, K. (1995) Global versus Country-specific Productivity Shocks and the Current Account, *Journal of Monetary Economics*, 35(1): 159-192

GRUBER, J.W., KAMIN, S. (2005) Explaining the Global Pattern of Current Account Imbalances, Board of Governors of the Federal Reserve System, *International Finance Discussion Papers* 846, 2005.

GÜNAYDIN, E. - UĞRAŞ ÜLKÜ, Z. (2002) Cyclically Adjusted Primary Balance: The Case of Turkey, VI. International Conference in Economics, September 11th-14th, Ankara, Turkey, 52 p.

HASSAN, M. (2004) Budget Deficits and the Current Account Balance: New Evidence from Panel Data, *Journal of Economics and Finance*, 28(1): 39-45

CHINN, M.D., PRASAD, E.S. (2003) Medium-term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration, *Journal of International Economics*, 59(1): 47-76

JAVID, A.Y., JAVID, M., ARIF, U. (2010) Fiscal Policy and Current Account Dynamics in Case of Pakistan, *The Pakistan Development Review*, 49(4): 577-592

KIM, S., ROUBINI, N. (2008) Twin Deficit or Twin Divergence? Fiscal Policy, Current Account and Real Exchange Rate in the US, *Journal of International Economics* 74: 362-383

KUMHOF, M., LAXTON, D. (2009) Fiscal Deficits and Current Account Deficits, [International Monetary Fund, Working Paper, No. 237/2009] Washington, International Monetary Fund, 35 p.

LANE, P.R. (2010) External Imbalances and Fiscal Policy, [Institute for International Integration Studies, Working Paper, No. 314/2010] Dublin, Trinity College Dublin and CEPR, 24 p.

LEE, J., CHINN, M.D. (2006) Current Account and Real Exchange Rate Dynamics in the G7 Countries, Journal of International Money and Finance, 25(2006): 257-274

MIRDALA, R. (2013a) Lessons Learned from Tax versus Expenditure Based Fiscal Consolidation in the European Transition Economies, *Journal of Applied Economic Sciences*, 8(1): 73-98

MIRDALA, R. (2013b) Current Account Adjustments and Real Exchange Rates in the European Transition Economies, *Journal of Applied Economic Sciences*, 8(2): 210-227

OBSTFELD, M., ROGOFF, K.S. (2005) Global Current Account Imbalances and Exchange Rate Adjustments, *Brookings Papers on Economic Activity*, 36(1): 67-123

OBSTFELD, M., ROGOFF, K. (1995) The Intertemporal Approach to the Current Account, [National Bureau of Economic Research Working Paper No. 4893] New York, National Bureau of Economic Research, 75 p.

ROUBINI, N. (1988) Current Account and Budget Deficits in an Intertemporal Model of Consumption and Taxation Smoothing. A Solution to the Feldstein-Horioka Puzzle? [National Bureau of Economic Research Working Paper No. 2773] New York, National Bureau of Economic Research, 52 p.

RUSEK, A. (2013) The Competitiveness Dynamics in the Eurozone, *Global Journal of Management and Business Research Finance*, 13(5): 33-38

SCHNABL, G., WOLLMERSHÄUSER, T. (2012) Fiscal Divergence and Current Account Imbalances in Europe, [CESifo, *Working Paper* No. 4108] Munich, CESifo, 38 p.

SEK, S.K., CHUAH, C.L. (2013) The Dynamic of the Current Account in Emerging East-Asian: Does Exchange Rate Matter? *International Journal of Trade, Economics and Finance*, 2(4): 293-299

SOYOUNG, K., ROUBINI, N. (2008) Twin Deficit and Twin Divergence? Fiscal Policy, Current Account, and Real Exchange Rate in the U.S., *Journal of Economic Literature*, 74: 362-383

STAVÁREK, R. (2013) Cyclical Relationship between Exchange Rates and Macro-fundamentals in Central and Eastern Europe, *Economic Research* (*Ekonomska istraživanja*), 26(2): 83-98

UROŠEVIC, B. (2012) Jackknife Model Averaging of the Current Account Determinants, *Panoeconomicus*, 59(3): 267-281