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Mariarosaria Comunale

# Current account and REER misalignments in Central Eastern EU countries: an update using the macroeconomic balance approach


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# Contents

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## Abstract

Using the IMF CGER methodology, we make an assessment of the current account and price competitiveness of the Central Eastern European Countries (CEEC) that joined the EU between 2004 and 2014. We present results for the "Macroeconomic Balance (MB)" approach, which provides a measure of current account (CA) equilibrium based on its determinants together with misalignments in real effective exchange rates (REERs). We believe that a more refined analysis of the misalignments may useful for the Macroeconomic Imbalance Procedure (MIP). This is especially the case for these countries, which have gone through a transition phase and boom/bust periods since their independence. Because such a history may have influenced a country's performance, any evaluation must take account of each country's particular characteristics. We use a panel setup of 11 EU new member states (incl. Croatia) for the period 1994–2012 in static and dynamic frameworks, also controlling for the presence of cross-sectional dependence and checking specifically for the role of exchange rate regimes, capital flows and global factors.

We find that the estimated coefficients of the determinants meet with expectations. Moreover, the foreign capital flows, the oil balance, and relative output growth seem to play a crucial role in explaining the current account balance. Some global factors such as shocks in oil prices or supply might have played a role in worsening the current account balances of the CEECs. Having a pegged exchange rate regime (or being part of the euro zone) affects the current account positively. The real effective exchange rates behave in accord with the current account gaps, which clearly display cyclical behaviour. The CAs and REERs come close to equilibria in 2012 in most of the countries and the rebalancing is completed for some countries that were less misaligned in the past, such as Poland and Czech Republic, but also for Lithuania. When Foreign Direct Investment (FDI) is introduced as a determinant for these countries, the misalignments are larger in the boom periods (positive misalignments) whereas the negative misalignments are smaller in magnitude.

Keywords: real effective exchange rate, Central Eastern European Countries, EU new member states, fundamental effective exchange rate, current account.

JEL Classification: F31, F32, C23

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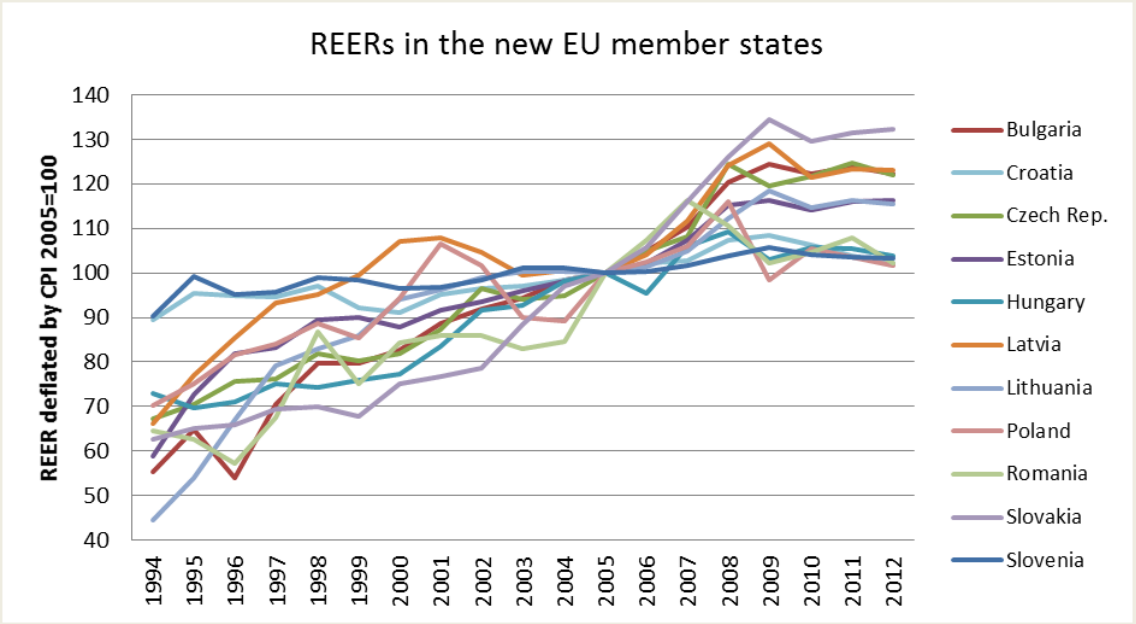
# 1 Introduction

Current Account (CA) imbalance is an important factor for the emergence of bubbles and cross-country transmission of financial crises (Ca' Zorzi et al, 2012), and it may also be a sign of serious macroeconomic and financial stresses (Obstfeld, 2012). It is therefore worth examining CA norms (as equilibrium CAs), which are based on CA fundamentals, to judge the CA in a medium-run perspective. In addition, the equilibrium real exchange rate is an important macroeconomic policy indicator since it enables an assessment of a country's external competitiveness. Investigating whether a country's exchange rate is close to its equilibrium value also helps one determine the future adjustment needs and possible trajectories of economic fundamentals. We believe that a more refined analysis of the misalignments in current accounts and real effective exchange rates may be of some use for improving the Macroeconomic Imbalance Procedure (MIP), which nowadays assess these variables on the basis on threshold levels. Moreover, this is especially useful for Central Eastern EU Countries (CEEC), which joined the EU between 2004 and 2014 and have gone through a transition phase and boom/bust periods since their independence. Because this may have influenced their performance, any evaluation of performance must take account of each country's particular characteristics.

Looking at the pattern of REERs in the CEECs (Figure 1), there is a clear appreciating trend in the REER, notably pronounced since EU accession (as of 2004). The trend levels off only in the rebalancing period after 2010.

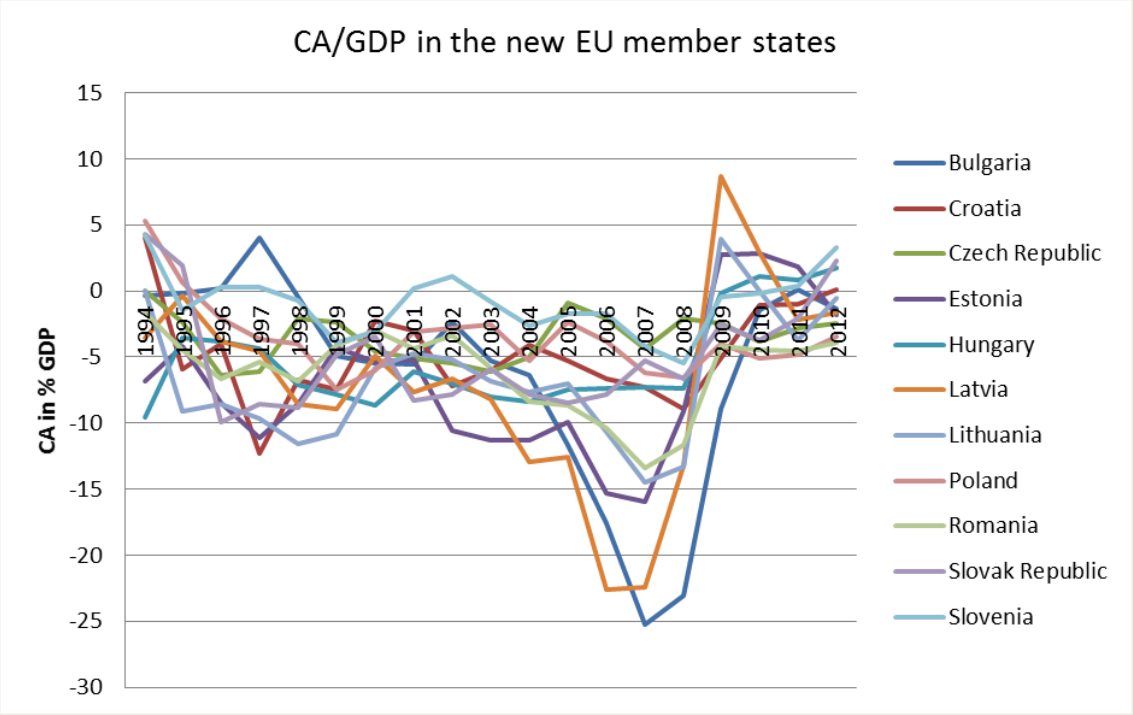
Figure 1 REERs in the new EU member states




Source: Eurostat

The CAs (Figure 2) are hugely negative for the CEECs in 2004–5. As reported by Rahman (2008), during the last 20 years, these countries, have on average run CA deficits considerably larger than the average CA deficit of other developing countries. The CA begins to adjust only from the onset of the crisis (2009), regardless of the exchange rate regime. The rebalancing seems to be completed in 2012 in most of the CEECs, as in the Baltic States and Hungary, for instance. We see only a modest rebalancing in Croatia.

Figure 2 Ratio of CA to GDP in the new EU member states




Source: International Monetary Fund, World Economic Outlook Database, October 2013

Following the standard IMF CGER (IMF Consultative Group on Exchange Rate Issues), "Macroeconomic Balance" (MB) approach as in Lee et al. (2008) for the estimation of real effective exchange rate (REER) misalignments, we make an assessment of the current account position and competitiveness of the Central Eastern EU new member states (CEECs). The IMF CGER consists of three different methodologies to calculate the misalignments: Macroeconomic Balance approach, a reduced-form "equilibrium real exchange rate" approach, and an "External Sustainability" approach. An analysis based on the reduced-form equilibrium real exchange rate approach for the EU28 and the CEECs is provided in Comunale (2015). We decided to apply the CGER methodology instead of the new External Balance Assessment (EBA) because the latter, which takes into account a much broader set of factors (including policies, cyclical conditions, and global capital market conditions) that may influence the current account and real exchange rate, does not provide a theoretical foundation for their inclusion in the setups all together, which may raise issues for the econometric analysis of CA determinants. In addition,

in computing the misalignments, the EBA methodology include some desirable (albeit ad-hoc for each country) values for the policy variables. The variables that are under policy control (fully or partially) are the fiscal balance, capital controls, social spending, reserve accumulation, and financial policies (proxied by private credit). Hence, the resulting misalignments would be driven by subjective valuations of these variables, which may in some cases and countries seriously complicate the analysis.

Hence, we present here the results for the Macroeconomic Balance (MB) approach from the IMF CGER, which provides a measure of current account equilibrium (norm) based on the coefficients of the CA determinants together with misalignments in the REERs derived from them[1]. We analyse these issues using a panel setup of 11 EU new member states for the period 1994–2012, in both static and dynamic frameworks, also controlling for the presence of cross-sectional dependence and checking specifically for the role of exchange rate regimes, capital flows and global factors.

This paper's contribution to the literature is four-fold. Firstly, we come up with results based solely on the CEECs in the EU, controlling for the presence of cross-sectional dependence. In this way we are able to provide more precise estimates of the coefficients of the determinants and the misalignment values than in the IMF CGER case (based on 184 countries). Moreover, the elasticity of exports and imports with respect to the REER, which is used in calculating REER misalignments, are based on euro zone data for the period 1994–2012. In our opinion, these are better proxies for the actual values than those in Lee et al. (2008) and Isard and Faruqee (1998) as well as in the IMF's Article IV, which are calculated on the whole sample of 184 countries and for a different time period. In an extension, we develop a dynamic model corrected for cross-sectional dependence, which can shed light on global factors affecting the CA in the CEECs. Secondly, we provide an analysis of the role of exchange rate regimes and an extension in which we use different types of foreign capital flows as CA determinants. These are crucial factors for the economies that have been taken into account in the last decades. Additionally, we calculate the misalignments using FDIs as determinants of the CAs, in the spirit of Medina et al. (2010) and we compare the related misalignments with a baseline setup. Furthermore, we analyse in depth the three Baltic States. We believe that such refined analysis may be useful for improving the Macroeconomic Imbalance Procedure (MIP), which now assesses the current accounts and real effective exchange rates based solely on threshold levels.

We find that the estimated coefficients are in line with expectations. The foreign capital flows, the oil balance and relative output growth seem to play a crucial role in explaining

[1] The equilibrium value coming from this procedure is called Fundamental Equilibrium Exchange Rate (FEER).

the current accounts. Some global factors such as shocks to oil prices or supply might have played a role in worsening the CA balances of the CEECs. Having a pegged exchange rate regime (or being part of the euro zone) affects the current account positively. The REERs behave in line with the current account gaps, which show a clear cyclical behaviour. We find large overvaluations in 2007 for Bulgaria, the Baltics and Romania (in line with the results in Rahman, 2008), followed by a rebalancing from 2010 onwards. The CAs and REERs come close to equilibria in 2012 in most of the countries. The rebalancing is completed for some countries that were less misaligned in the past like Poland and Czech Republic, but also Lithuania. When Foreign Direct Investment (FDI) is introduced as a determinant for these countries, the misalignments are larger, in the boom periods (positive misalignments); while the misalignments are smaller during the crisis (negative misalignments). Therefore, the effect of huge flows of FDIs in some of the CEECs seems to boost the CA in good times and reduce the CA misalignments in bad times. The REERs behave in similarly in his respect.

The rest of the paper is structured as follows. Section 2 provides an overview of various aspects of the literature. Section 3 lays out our methodology to calculate equilibrium values for the CA and REER, while Section 4 provides information on the data sources. Section 5 presents the diagnostics and estimation strategies. The results are presented in Section 6, with some extensions in Section 7. Section 8 concludes.

# 2 Literature review

There are three main literature strands related to our research question. The main one provides measures of equilibrium REER and the second relates to the long-run determinants of CA. The last one analyses the combinations of determinants and possible misalignments of REER and CA in our countries of interest.

As explained in Maeso-Fernandez et al. (2002) there are many ways to calculate the equilibrium REER, also widely used by the IMF in the Consultative Group on Exchange Rate Issues (CGER). In this paper, we present results for the Fundamental Equilibrium Exchange Rate (FEER), and an analysis based on the alternative: Behavioural Equilibrium Exchange Rate (BEER) for the EU (and sub-groups: core, periphery and CEECs) can be found in Comunale (2015)[2]. In the latter paper, the author explores the role of economic fundamentals included in

[2] The BEER has been developed in Clark and MacDonald (1999), Alberola et al. (1999, 2002), Alberola (2003) and Bénassy-Quéré et al. (2009, 2010) among others. In this method the importance of the determinants of REER are recognized, and they are used to calculate the "equilibrium". The misalignment will be simply the actual REER

the transfer effect theory (the trade balance or cumulative CA, the terms of trade and a proxy for the Balassa-Samuelson effect), in explaining medium/long-run movements in REERs in the EU over the period 1994–2012, using heterogeneous, co-integrated panel frameworks, both static and dynamic. The paper concludes that the relative importance of the transfer variable and the Balassa-Samuelson measure are crucial for the CEECs, and the related misalignments are still extremely wide and persistent (some countries, such as Czech Republic and Slovakia, still experienced misalignments of around 40% in 2010). The approach used in this paper is the Macroeconomic Balance (MB) approach (as named in IMF CGER) and indeed involves the so-called FEER, which is the rate that closes the gap between the Current Account norm (which is the equilibrium value based on the estimation of CA and its determinants) and the underlying Current Account normally based on IMF World Economic Outlook (WEO) medium-term projections.

The determinants of the current account are taken from Lee et al. (2008) and Medina et al. (2010). The latter study takes into account the role of FDI flows as well, which has been a crucial factor for the development of these economies during the transition period. The misalignment of the REER is calculated by dividing the difference between CA norm and underlying CA by the estimated CA elasticity.

There is a large body of literature, both theoretical and empirical, on the potential factors that can influence the dynamics of the CA, including: demographics, government fiscal policy, the catching-up potential, as well as various institutional characteristics that can affect the ability to borrow abroad by Government and private sector (see IMF CGER, 2006; Rahman, 2008; Calderon et al., 2002; Chinn and Prasad, 2003 and Bussière et al., 2010). Most of these variables are used in relative terms and constructed as deviations from the weighted averages of the main foreign trading partners. Concerning these long-run determinants of CA, we looked at the more recent models by Lee et al. (2008) and Medina et al. (2010). In these articles the determining factors are indeed the fiscal balance, old-age dependency ratio and population growth, the initial NFA, the oil balance, a relative income measure, relative output growth, and net FDI flows/GDP (in Medina et al., 2010). A more comprehensive analysis of CA determinants can be found in Ca'Zorzi et al. (2012).

The last strand of the literature taken into consideration here includes studies on the combination of determinants and possible misalignments of REER and CA in our countries of interest, based on the same approach as this paper. There are not many articles based on this

minus the equilibrium rate. The determinants are the "transfer problem" variables: the trade balance or the cumulative current account (as proxy for the Net Foreign Asset position) as in Lane and Milesi Ferretti (2004) and Ricci et al. (2013), as well as the terms of trade and a proxy for the Balassa-Samuelson effect.

method, compared with the literature on the BEER, which is quite extensive. Égert and Lahrèche-Révil (2003) provide an analysis of the FEER[3] in Czech Republic, Hungary, Poland, Slovakia and Slovenia (5 CEE countries), before they became part of the EU, by applying a VAR-based three-equation cointegration system. They find that these five countries behave differently: the Czech Republic, Poland and Slovakia experienced an excessive appreciation of REER; on the other side, Hungary and Slovenia show little sign of overvaluation during the period under study (1992:Q1 to 2001:Q2). Their results suggest that exchange rate regimes may play a role in exchange rate misalignments.

Rahman (2008) provides a study of CA developments in ten new EU member states: Czech Republic, Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia (there defined as European developing countries (EUR)). The full sample includes 21 industrial and 38 developing countries and the estimation period is from 1992 to 2006 for transition economies and from 1971 to 2006 for all the other countries. The author estimates the CA norms using the macroeconomic balance approach, including FDI and several dummies (remittance dummy; financial centre dummy; banking crisis dummy; Asian crisis dummy)[4]. The CA norms in this article are calculated using the regression coefficients from the EUR sample[5] (with investment included among the regressors) and historical values of the explanatory variables used in the CA norm regression. The CA misalignments are calculated by subtracting the CA norms from the actual CA balances. The author stresses that new EU members have behaved differently in terms of CA balances compared with other countries in the sample. As for the situation in 2006, Czech Republic, Hungary, Poland, Slovakia and Slovenia, have stabilized or improved their CA, while the opposite trend has held for the Baltics, Bulgaria and Romania.

Recently Ajevskis et al. (2012, 2015) conducted a comprehensive analysis of REER and CA gaps for Latvia only, using several different methods (including the FEER/Macroeconomic balance). Their results indicate that the Latvian REER, after appreciating during the boom years and subsequent adjustment afterwards, was close to its equilibrium level at the end of 2010.

[3] The real exchange rate is defined in effective terms against a basket including the dollar and the euro with the German mark as a proxy for the euro until 1999. Weights are derived from trade with the US and the EU.
[4] The author estimates this panel by Fixed Effect and Pooled OLS.
[5] To test for heterogeneity in the sample of developing countries, the CA regression is run for two separate samples, one where developing countries include only European developing countries (EUR), and the other where developing countries are drawn from outside Europe (NON-EUR). In both groups, the same 21 industrial countries are included as well.

# 3 Calculation of equilibrium rates and CA norms

The MB method starts with the estimation of CA determinants as in Lee et al. (2008), Medina et al. (2010) and Rahman (2008). These are also the main determinants in the subset of fundamentals taken into account in Ca' Zorzi et al. (2012). In this paper, the authors theoretically base their work on different models (see for instance the intertemporal model by Bussière et al., 2006 among others) in order to investigate them and their common features; then they choose the best model, using a transparent selection procedure, after which they apply the Bayesian Averaging of Classical Estimates (BACE) developed by Sala-i-Martin et al. (2004) to assess the probability of each model, and they also employ model combination techniques.

The factors considered here are the fiscal balance, old-age dependency ratio and population growth, the initial NFA, the oil balance, a relative income measure, the relative output growth, and the net FDI flows/GDP (considered in Medina et al., 2010). We also included two alternative specifications: one with a dummy variable for the peggers (1=peg) to control for exchange rate regimes and one in which all the different types of foreign investment flows are added as regressors.

As in Medina et al. (2010), we estimate the determinants of CA balances by using a linear reduced form model:

$$CA_{i,t} = \beta_i{}' X_{i,t} + \gamma_i dummy_{i,t} + \varepsilon_{i,t} \quad (1)$$

Here $CA$ is a vector of annual CA balances in percent of GDP for each country, and $X$ is the vector of fundamental variables. The vector of coefficients $\beta$ gives the sensitivity of the CA to the determinants, while the $\gamma$'s are the coefficients of the dummies. Here we have a dummy for the crisis/post-crisis period 2008–2012 and another dummy for the pegged regimes; both are time-varying.

In the second step (shown in equation (2)) we calculate the CA norm as the estimated $\beta$ coefficients for each factor multiplied by the projected variables taken from IMF WEO or the United Nations Department of Economic and Social Affairs (UNDESA)[6] as in the IMF GCER and Lee et al. (2008). For year 2012, the latest projections are for 2019 (as T+H), so we use for each year considered the projection for the 7th year ahead (H). In this calculation the dummies are not included.

$$CA\ norm_{i,t} = \widehat{\beta_i}\, X_{T+H} \quad (2)$$

[6] Also the projected variables, if taken relative to partners in the estimation, are in relative terms.

The CA gap (or misalignment) will thus be the difference between the CA norm and the underlying CA, which is the projected medium-term value of CA/GDP by IMF WEO, as in equation (3):

$$CA\ mis_{i,t} = CA\ norm_{i,t} - CA\ underlying_{i,T+H} \quad (3)$$

Then, in order to obtain the REER misalignments we need a measure of CA elasticity. This is calculated as

$$\varepsilon_{CA} = \left(\varepsilon_X \cdot {}^{X}/_{GDP}\right) - \left[(\varepsilon_M - 1) \cdot {}^{M}/_{GDP}\right] \quad (4)$$

where $\varepsilon_{CA}$ is the CA elasticity with respect to REER, $\varepsilon_X$ and $\varepsilon_M$ are respectively the elasticities of exports and imports (*vis-à-vis* the rest of the world) with respect to REER. To reflect the data of our sample better, the elasticity of exports and imports to the REER are taken from Comunale and Hessel (2014) and are based on euro zone data for the period 1994–2012. We decided to apply these values instead of those in Lee et al. (2008) and Isard and Faruqee (1998) and used in the IMF's Article IV, which are calculated on the whole sample of 184 countries and for a different time span.

Ultimately, the REER misalignments are given as the ratio of CA gap to the elasticity of CA (equation (5) and the FEER (as equilibrium REER) will be simply the actual REER minus the REER misalignment (equation (6)).

$$REERmis_{i,t} = {}^{CAmis_{i,t}}/_{\varepsilon_{CA}} \quad (5)$$

$$FEER_{i,t} = REER_{i,t} - REERmis_{i,t} \quad (6)$$

# 4 Data sources and description

The data used to estimate the model cover the period from 1994–2012 at annual frequency for 11 EU new member states (Croatia is included). The complete description of the variables and their sources is available in Annex 2.

The dependent variable for the MB method is the current account over GDP from IMF WEO. Among the regressors, the initial Net Foreign Asset position is taken from the External Wealth of Nation dataset, in the updated and extended version by Lane and Milesi-Ferretti (2007). The fiscal balance, old-age dependency ratio, population growth, real GDP per capita growth and GDP per capita PPP (taken as the ratio w.r.t. the US values) are used in relative terms with the same time-varying weights applied for the REER. The REER itself is the real effective exchange rate deflated by the CPI *vis-à-vis* 37 partners. These variables' data are from IMF WEO, WB WDI and UNCTAD. The data for the REER come from Eurostat. Finally, the oil balance and FDI/GDP, portfolio investments and other investments are taken from IMF WEO. As explained in the section above, the projected variables for the CA norm are from IMF WEO or UNDESA (for year 2012 the latest projections are for 2019)[7].

# 5 Diagnostics and estimation strategy

In the MB approach, for the CA estimation, we used mainly a static setup[8]. The tests confirm the stationarity of our variables, with the exception of the relative old-age dependency ratio[9]. However, we also found the presence of cross-sectional dependence in our panel (Table 1 and 2). Therefore, we double-checked the stationarity of our variables using a second generation t-test proposed by Pesaran (2007), which is designed for analysis of unit roots in heterogeneous panel setups with cross-section dependence (called CIPS) [10] (Table 3), which confirmed the previous outcome, with some exceptions. We found high p-values for the relative old-age dependency ratio, oil balance/GDP, and real GDP per capita growth. These variables are non-stationary.

[7] Projections: from WEO IMF and UNDESA for demographics; Growth rates: average of 5 years (2014/2019 for real GDP per capita growth or 2015/2020 for population growth).
[8] The IMF also provided the dynamic approach in its article IV.
[9] As reported by Medina et al. (2010), the demographic variables may be non-stationary. They argue that these measures seem to be trending during the sample period, but the variables are bounded by construction and should be stationary over a longer period (in our case we only have data for 1994 to 2012).
[10] Null hypothesis assumes that all series are non-stationary. This t-test is also based on Augmented Dickey-Fuller statistics as IPS (2003) but it is augmented with the cross section averages of lagged levels and first-differences of the individual series (CADF statistics).

Table 1 Stationarity test: Im-Pesaran-Shin (IPS) panel unit root test

| | IPS t-bar -test | | | |
|---|---|---|---|---|
| Variable | No trend | | Trend | |
| | t-stat | p-value | t-stat | p-value |
| **CA/GDP** | **–3.5302** | **0.0002** | **–2.2432** | **0.0124** |
| fdi_gdp | –2.5494 | 0.0054 | –1.7618 | 0.0391 |
| portfolio investments_gdp | –3.3654 | 0.0004 | –1.6877 | 0.0457 |
| other investments_gdp | –1.8044 | 0.0356 | 0.4813 | 0.6849* |
| fiscal balance_gdp | –2.8469 | 0.0022 | –1.0241 | 0.1529* |
| old-age dependency ratio* | –0.4159 | 0.3388* | 2.7270 | 0.9968* |
| population growth | –5.5174 | 0.0000 | –3.1069 | 0.0009 |
| oil balance_gdp | –1.3445 | 0.0894 | –3.2789 | 0.0005 |
| real GDP per capita growth | –2.7540 | 0.0029 | –1.1282 | 0.1296* |
| GDP per capita PPP over US* | 1.5924 | 0.9444 | –0.3499 | 0.3632* |

Note: In the IPS-test, one lag has been imposed. IPS can be used in case of unbalanced panel, but requires that there are no gaps in each individual time series. Other tests require that the panels are strongly balanced. The variable in bold font is the dependent variable in our equation. Null hypothesis assumes that all series are non-stationary.
*** means non-stationarity for all series.**

Table 2 Cross-sectional independence test (Pesaran's test)

| Equation in Table 5 | Test | Probability |
|---|---|---|
| Column (1) | 6.182 | 0.0000 |
| Column (2a) | 6.620 | 0.0000 |
| Column (2b) | 6.476 | 0.0000 |
| Column (3a) | 6.534 | 0.0000 |
| Column (3b) | 2.596 | 0.0094 |

Note: Pesaran's test for cross-sectional dependence following the methods of Pesaran (2004). Pesaran's statistic follows a standard normal distribution and is able to handle balanced and unbalanced panels. It tests the hypothesis of cross-sectional independence in panel data models.

Table 3 Stationarity test: second generation t-test by Pesaran (2007) for unit roots in heterogeneous panels with cross-section dependence (CIPS)

| Variable | Z[t-bar] | p-value |
|---|---|---|
| **CA/GDP** | **–1.946** | **0.026** |
| fdi_gdp | –1.460 | 0.072 |
| portfolio investments_gdp | –3.383 | 0.000 |
| other investments_gdp | –3.461 | 0.000 |
| fiscal balance_gdp | –1.834 | 0.033 |
| old-age dependency ratio* | –0.168 | 0.433* |
| population growth | –4.277 | 0.000 |
| oil balance_gdp* | 0.137 | 0.554* |
| real GDP per capita growth* | –1.091 | 0.138* |
| GDP per capita PPP over US | –2.369 | 0.009 |

Note: Null hypothesis assumes that all series are non-stationary. One lag has been imposed. This t-test is also based on Augmented Dickey-Fuller statistics as IPS (2003) but is augmented with the cross section averages of lagged levels and first-differences of the individual series (CADF statistics)[11].
***means non-stationarity for all series.**

We tested for the presence of cointegration using the Westerlund (2007) error-correction-based panel cointegration test and found that the variables are not cointegrated[12] for the baseline setup (which is the one reported in Table 5 at Column 1). We could not perform such a test with more endogenous variables and so could not able check the other specifications.

Another test that was used to test for cointegration in our panel is the Pedroni test[13]. This is a procedure for heterogeneous panels, which allows for more regressors[14]. In this case, for the baseline and the specification with the NFA position (Column 1 and 2a in Table 5), the null hypothesis of no cointegration is strongly rejected. As reported by Wagner and Hlouskova (2009), the Pedroni test applying the ADF principle performs best; all the other tests (Westerlund's included) have very low power in many circumstances (and virtually none for $T \leq 25$, as in our case). The authors conclude that in a situation where the null hypothesis of no cointegration is important, the Pedroni test is the best choice.

[11] The command in Stata *-pescadf-* is by Piotr Lewandowski, Warsaw School of Economics, Institute for Structural Research.
[12] Robust p-values: Gt=0.53, Ga=0.25, Pt=0.34, Pa=0.36.
[13] The test has been conducted using the RATS command @pancoint. The test is described in Pedroni (1999) and Pedroni (2004).
[14] The maximum amount of regressors in case of Westerlund's test is six and in Pedroni's eight.

Table 4 Pedroni test for cointegration

| Equation in Table 5 | Panel group RHO-stat |
|---|---|
| Column (1) | 4.02* |
| Column (2a) – no crisis dummy | 4.56* |
| Column (2b) | (more than 8 endogenous variables) |
| Column (3a) | (more than 8 endogenous variables) |
| Column (3b) | (more than 8 endogenous variables) |

Note: This is a revised procedure for cointegration tests in heterogeneous panels with multiple regressors ("Pedroni tests"). We applied one lag (no trend). All reported values are distributed N (0,1) under **null of no cointegration**. For a very small panel (as here) Pedroni (2004) noted that group RHO-stat is better because less distortive and more conservative. If group RHO-stat Panel = –2.336 then p-value = 0.010 (Source: Maeso-Fernandez et al., 2004) with N=25. In my case (N = 11), we can apply 2-tail t-stat (Rho-stat is distributed approximately as Student's t distribution with n − 2 degrees of freedom under the null hypothesis): 10% with rejection of the null if it is higher than 1.860; 5% rejection if higher than 2.306; **1% rejection if higher than 3.355**.
***means cointegration.**

Given the presence of some non-stationary series and of cointegration in the main setups, estimations based on the Group Mean (GM)-Fully Modifed OLS (FMOLS) methodology were also performed. The GM-FMOLS estimator proposed by Pedroni (2000) is indeed eliminates this endogeneity bias between dependent variable and regressors, and it is less biased in the case of static, non-stationary and cointegrated panels, even for relatively small samples under a variety of scenarios (Pedroni, 2000). These estimated coefficients have been used to build the CA norms (see Annex 1, Table 7) as an alternative and extension to our main framework.

In addition, it is noteworthy that we decided not to use a dynamic setup for the calculation of the CA norm[15]. But the dynamic setup has been provided for comparison. This should be done by using the common correlated mean group estimator (CCEMG), which deals with cross-sectional dependence in dynamic panels and allows for heterogeneous coefficients, as explained in Pesaran and Tosetti (2011)[16]. This structure (also called interactive models or common factor models) introduces some time-varying unobserved common factors, which represent global factors (crisis or shocks for instance) or spillover effects across the individuals of the panel. The unobserved common factors are proxied by the cross-section averages of the dependent variable and of the regressors. The results for the main specifications are reported in Annex 1 (Table 8).

[15] In our opinion adding a lagged value of the explanatory variable in the study of the determinants of the variable itself to be used to compute the norm would be not correct. This is also because the norm would be computed by multiplying the coefficient relative to the lagged value of the CA by the lagged CA itself, together with the other determinants, which are the determinants of the lagged CA as well.
[16] The CCEMG estimator allows for the empirical setup with cross sectional dependence, time-variant unobservable factors with heterogeneous impact across panel members and fixes problems of identification. This estimator is designed for micro panel models with "large-T, small-N" (Roodman, 2009).

We decided to keep the structure and the estimation technique as in IMF Article IV estimations, Medina et al. (2010) and Lee et al. (2008) for comparison, in our main analysis. We construct the CA norms starting from these coefficients. We therefore apply the Fixed Effect estimator and the Pooled estimator as in Lee et al. (2008) but correct the standard error using the Driscoll-Kraay correction (Hoechle, 2007) for cross-sectional dependence. We also applied the framework as in Medina et al. (2010) estimating the coefficients with Pooled OLS. The misalignments computed using the CA norm values from the GM-FMOLS coefficients (setup á la Medina et al. (2010)) are also shown as an extension[17].

# 6 Results

## 6.1 Expected results

For the Macroeconomic Balance method (and FEER), we study the fundamentals of the CA. The impact of the fiscal balance should be positive, because it brings about an increase in savings. Only with full Ricardian equivalence would the private savings fully offset the changes in public savings, but there is no link. Both the old-age dependency ratio and population growth are expected to have a negative impact on the CA balance because both a high percentage of old people in the working population and an increasing number of children should have negative effects on savings. In this framework, the initial value of NFA is also included. Countries with negative NFA are expected to improve their CA positions to preserve long-term solvency, so the sign should be negative (Lane and Milesi-Ferretti, 2004). On the other hand, highly indebted countries typically record negative income flows, which weigh negatively on the CA (Ca' Zorzi et al., 2012). The sign of the oil balance depends on whether the country is an importer or exporter of oil (for importers, declining other imports implies a positive sign, see Medina et al. (2010)). The impact of the relative income should be positive because, as they approach the income level of the advanced economies (which means convergence), their CAs should improve. We expect to have a negative relative output growth coefficient which captures relative economic growth with respect to the partners, and stronger growth is often linked to a decline in CA; because of higher potential, the country can save less today.

We also added a crisis/post crisis dummy (common factor, years from 2008 to 2012) as a proxy for a structural break. A macroeconomic crisis may reduce the availability of

[17] See Section 7.

international financing and increase the CA temporarily, therefore we expect a positive sign for the dummy.

Lastly, FDI/GDP[18] (Medina et al., 2010 and Rahman, 2008) may get either a positive or negative sign. FDIs are more stable investments and less prone to sudden stops. If FDI is directed at financing CA deficits, this leads to a decline in CA over time, because the method of financing is less uncertain and allows the country to borrow and import more. However, if FDIs are oriented to more productive/export-directed sectors, an increase in their net flows to the country can boost its export performance and improve the CA.

In another extension, we use three types of flows at the same time: FDIs, which are normally associated with investments in a longer time perspective (this is not always the case in all the CEECs); portfolio investments and bank loans, which should be more closely related to short-term movements and sudden increases in demand and therefore in imports as well. We expect a negative sign for the coefficient for all the types of financing.

## 6.2 Results for the new EU member states

In Table 5, we can see the results of the different specifications in Columns 1–3. Column (2b) extends the setup by Lee et al. (2008) by adding a fixed exchange rate regime dummy, while in Column (3b) we also use other types of foreign capital flows together with the FDIs.

In all the specifications, the coefficients get the correct sign. The only coefficient that is significant across the specifications is relative output growth. Population growth matters if foreign capital flows are not included among the regressors. Oil balance is a key determinant in all the specifications, except when all the types of flows are used. The coefficient of the convergence variable (GDP per capita PPP of the country of interest over the GDP per capita in PPP of the US) is, however, much lower (or even not significant in the last two columns) than the growth of real GDP per capita. Therefore, the marginal impact of growth is predominant and tends to reduce the CA balances of these economies, while the convergence component is still not the key factor. The fiscal balance plays an important role in increasing the CA (or in lowering the deficit) only when flows (only FDIs or all the types of foreign capital flows)[19] are added to the framework. Therefore we find an increase in savings as well when foreign capital

[18] The investments over GDP (as gross fixed investments) are instead included in the analysis of the fundamentals in Ca'Zorzi et al. (2012). They argue that investment should lead to productivity gains in the future and, because of higher expected wealth, this should result in a current account deficit. Moreover, an increase in domestic demand, induced by the investment, is associated with a worsening of the foreign trade balance. In the case of the CEECs the main source of investments has been, and still is, from abroad. Therefore we decided to include foreign investments in our analysis.

[19] See Table 5, Column 3a and 3b.

flows into a country. However, the magnitude of the savings is much lower than one of the flows, and the negative components prevail.

We also include in an alternative specification a dummy variable for the peggers (1=peg) to control for the exchange rate regime (Column 2b, Table 5). In this case the coefficient is positive. Therefore in equilibrium the peggers should have smaller CA deficits than the floaters, which transmit into negative CA gaps (calculated as the equilibrium CA minus the actual CA).

Lastly, in the specifications in Column (3a) and (3b) we included different types of foreign capital flows. In both the cases the FDIs get a negative and significant coefficient[20], in line with the expected results for developing countries. If we add other types of foreign investments (which have been crucial for instance for the Baltic States), their coefficients are negative and significant as well. This effect probably works through an increase in the domestic demand rather than via an increase in wealth expectation due to an increase in productivity. This increase in demand can indeed be brought about by investments, which are associated with a worsening of the trade balance and therefore of the current account.

As a first robustness exercise[21], we run the setup á la Medina et al. (2010) for the period before the crisis of 1994–2007. The coefficients of the FDIs and GDP per capita growth are still negative, significant, and similar in magnitude to those for the full sample, and the importance of the oil balance coefficient increases. The NFA at time zero instead becomes negative and significant for data from 1994 to 2007. This is in line with Lane and Milesi-Ferretti (2004); hence CEECs with initial negative NFA are expected to improve the CA position to preserve long-term solvency.

[20] The result for the FDI/GDP coefficient is very robust. We find the same outcome both in sign and magnitude, if we run the regression as in Column (1), i.e. by using the Fixed Effects estimator and adding the FDIs or if we drop the Baltic States. These results are available upon request.
[21] The results for the sample 1994-2007 are available upon request.

Table 5 CA determinant estimates for MB methodology

| | Lee et al. (2008) FE | Lee et al. (2008) POLS | Lee et al. (2008) POLS + dummy fixed regime | Medina et al. (2010) POLS | Medina et al. (2010) POLS + different flows |
|---|---|---|---|---|---|
| | (1) | (2a) | (2b) | (3a) | (3b) |
| Variables | ca_gdp | ca_gdp | ca_gdp | ca_gdp | ca_gdp |
| nfa_gdp (t=0) | | –0.00996 | –0.0210 | –0.0144 | –0.0102 |
| | | (0.0115) | (0.0128) | (0.0123) | (0.00775) |
| fdi_gdp | | | | –0.435*** | –0.523*** |
| | | | | (0.139) | (0.0685) |
| portfolio investments_gdp | | | | | –0.433*** |
| | | | | | (0.0516) |
| other investments_gdp | | | | | –0.501*** |
| | | | | | (0.0431) |
| fiscal balance_gdp | 0.103 | 0.145 | 0.0882 | 0.258* | 0.157** |
| | (0.165) | (0.0875) | (0.0979) | (0.137) | (0.0600) |
| old-age dependency ratio | –0.373 | –0.397 | –0.459 | –0.297 | –0.146 |
| | (0.619) | (0.280) | (0.275) | (0.241) | (0.0889) |
| population growth | –2.968** | –1.730** | –1.763** | –0.983 | –0.270 |
| | (1.024) | (0.743) | (0.767) | (0.613) | (0.522) |
| oil balance_gdp | 0.883** | 0.756** | 0.872*** | 0.412** | 0.166 |
| | (0.359) | (0.280) | (0.287) | (0.171) | (0.160) |
| real GDP per capita growth | –0.595** | –0.695*** | –0.706*** | –0.635*** | –0.305*** |
| | (0.213) | (0.177) | (0.167) | (0.151) | (0.0591) |
| GDP per capita PPP over US | | 0.0239* | 0.0234* | 0.00927 | 0.00554 |
| | | (0.0134) | (0.0127) | (0.0147) | (0.00747) |
| crisis dummy | 0.0340 | 0.0220 | 0.0228 | 0.0111 | –0.00274 |
| | (0.0204) | (0.0159) | (0.0160) | (0.0162) | (0.00548) |
| peg dummy | | | 0.0122** | | |
| | | | (0.00443) | | |
| Constant | –0.0435*** | –0.0105 | –0.0174* | –0.0117 | –0.00161 |
| | (0.0119) | (0.00964) | (0.00989) | (0.0120) | (0.00539) |
| Observations | 171 | 171 | 171 | 171 | 170 |
| R-squared | 0.376 | 0.409 | 0.417 | 0.495 | 0.758 |
| Number of groups | 11 | 11 | 11 | 11 | 11 |

Note: Standard errors in parentheses (Driscoll-Kraay correction for CSD) *** p<0.01, ** p<0.05, * p<0.1. Other investments are mainly bank loans. The crisis dummy is equal to 1 in the period 2008-2012. The peg dummy is equal to 1 in case of a *de facto* fixed regime (or if the country is in the euro zone) in a certain year. Column (2b) and (3b) are alternative specifications/extensions of the setups in (2a) and (3a).

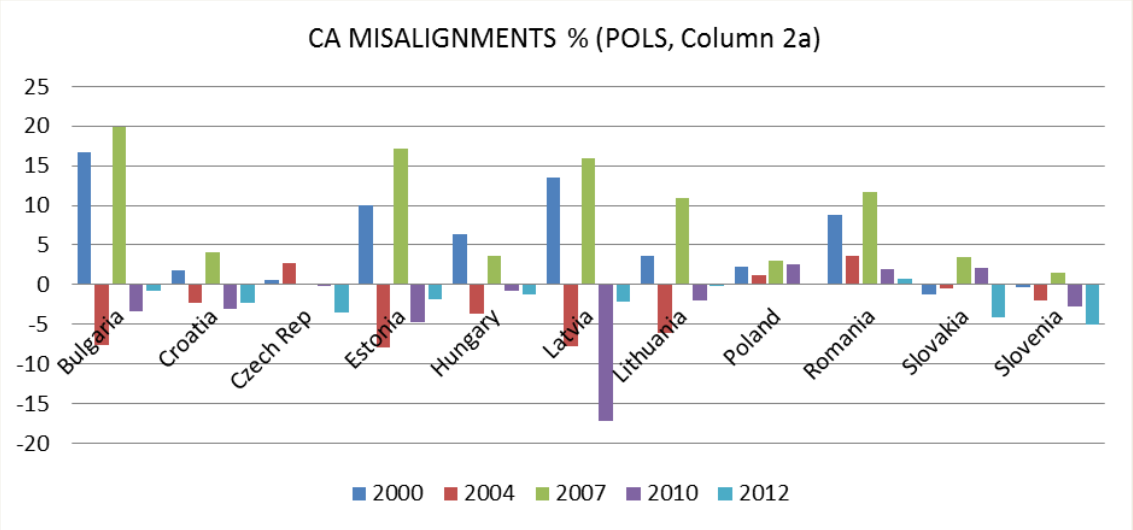
Concerning the misalignments of CA and REER, these are very different from those generated by the BEER method (as in Comunale, 2015). The difference in misalignments between Lee's approach and Medina's are mainly in magnitude instead. The peaks of REER misalignments (2007) follow the behaviour of CA gaps. The "actual"/projected CA is higher than the equilibrium CA, and the REER tends to be positively misaligned, i.e. is overvalued in real terms (which means that the country is less price competitive compared to what it should be in equilibrium). In 2010 and 2012 we can see a rebalancing in the CA, which also reduces the magnitude of the REER misalignments in the recent periods. Therefore, the REERs after the appreciation of the boom years are moving close to the equilibrium values. This conclusion is in line with the previous literature, as for instance in Ajevskis et al. (2012) for the Latvian case, and the situation in the boom period follows the outcome in Rahman (2008) for the European developing countries.

When Foreign Direct Investments (FDI) is introduced as a determinant for these countries, the misalignments are larger in the boom periods (positive misalignments); while in some cases the misalignments are smaller during the crisis (negative misalignments). Therefore, the effect of huge flows of FDIs in some of the CEECs seems to boost the CA in good times and reduce the CA misalignments in bad times. The REERs behave similarly in this case. This is probably due to the fact that FDI flows increase in boom periods, influencing the CA through an increase in domestic demand and imports, while in the crisis and recovery periods, the flows tend to decrease less than other flows or even slightly increase as in the case of the Baltics, Slovakia and Slovenia after 2009[22] (and therefore the stock of inflows does not change much, confirming the more permanent role of this type of flow[23]). This is the case even if the FDIs into the region are mainly from EU countries[24]. Hence, in crisis times the trade balance part of the CA changes less if we control for FDI net inflows.

Looking at the difference in exchange rate regimes, we notice that peggers[25] experience generally larger misalignments than floaters across the sample. The exception is Romania, whose misalignments in CA and REER are comparable to the peggers in magnitude, but not in cyclicality. Croatia here is treated as an acceding country, because our data run up to 2012. The Croatian misalignments are not as big as those of other peggers.

[22] Source: IMF WEO (see Annex).
[23] The higher values of FDI stocks in the last 10 years are experienced in Czech Republic, Hungary, Romania and Slovakia, the lowest in the Baltics. The data are from UNCTAD, UNCTADstat (Inward foreign direct investment stock, annual, 1980-2012).
[24] Source: UNCTAD Bilateral FDI Statistics (2014).
[25] Peggers (or euro area members) are Bulgaria, Croatia, Estonia, Latvia, Lithuania, Slovakia and Slovenia. Countries with floating regimes are Czech Republic, Hungary, Poland and Romania.

Figure 3 CA and REER misalignments using the MB methodology (POLS from Lee et al, 2008)



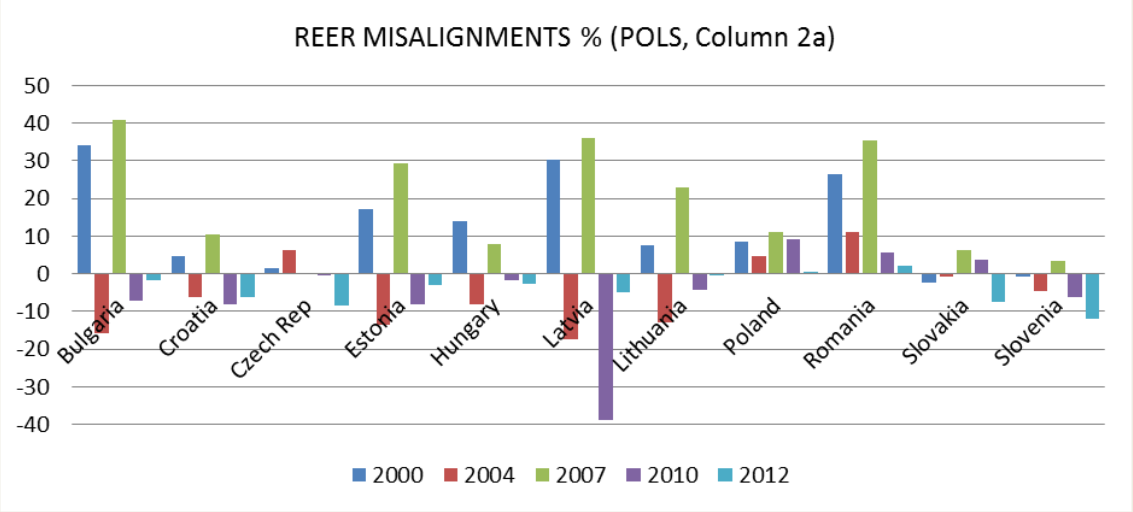
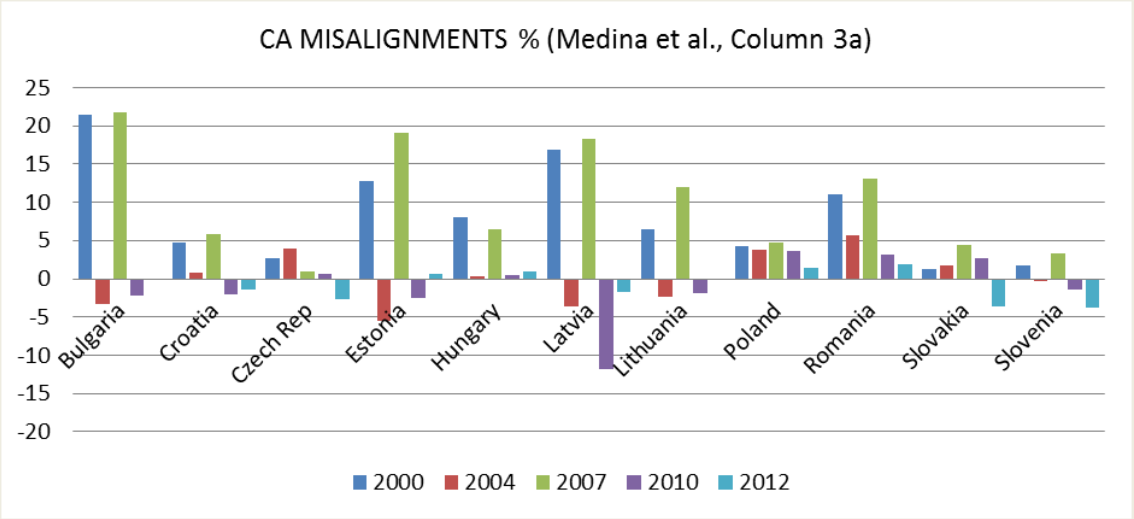
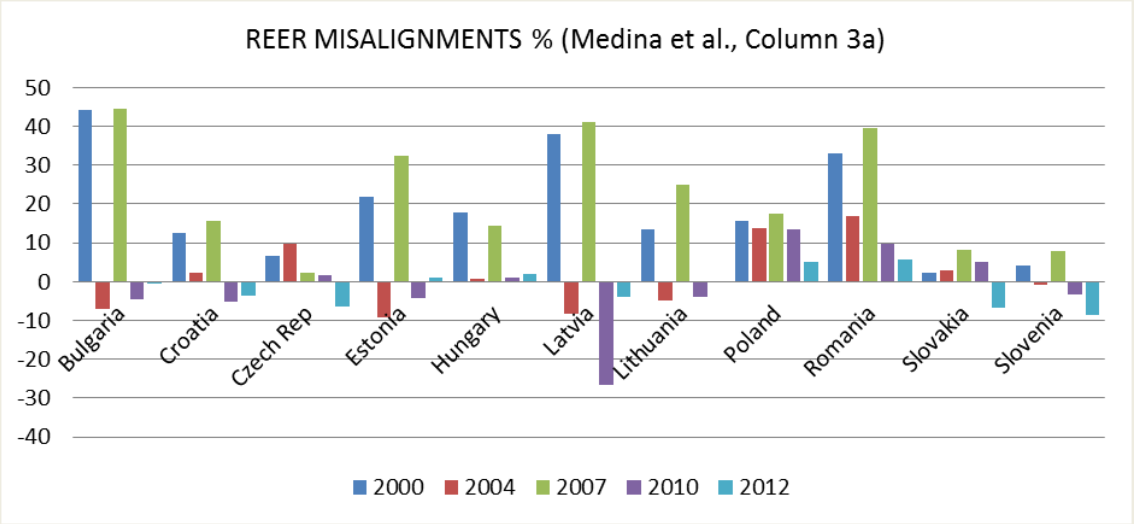



Figure 4 CA and REER misalignments using MB methodology (Medina et al, 2010: FDI/GDP is included in the regressors)




If we look at the CA equilibrium values, i.e. norms, in the most recent year available, the larger deficits (more than 4%) are for Bulgaria, Croatia, Czech Republic and Latvia. The only country that should have a CA surplus as an equilibrium value is Estonia (0.7%) when FDI is taken into account. This means that in this particular case, the FDIs would have brought an increase in exports in equilibrium. Actually the CA misalignment experienced in Estonia in 2012 is just slightly positive (the actual CA is lower than the CA norm). If we calculate the CA norm for 2007 instead, Estonia experienced a very high and positive CA norm, while Latvia, Bulgaria and Czech Republic had negative CA norms. Therefore capital does not always flow down-stream in the case of CEECs, i.e. with greater capital needs and an increase in imports a country gets a larger current account deficit. In any case, when FDI is included, the CA norms are smaller in magnitude in the negative cases and decreased from 2007 to 2012 in most of the countries. These differences are large wide for Hungary and Estonia.

Table 6 CA norm (i.e. equilibrium value) in 2012 and 2007

| | CA NORM in 2012 (%) | | CA NORM in 2007 (%) | |
|---|---|---|---|---|
| | POLS | MEDINA (with FDI) | POLS | MEDINA (with FDI) |
| Bulgaria | –4.01 | –3.36 | –5.30 | –3.44 |
| Croatia | –4.37 | –3.39 | –3.24 | –1.36 |
| Czech Rep | –4.41 | –3.56 | –4.28 | –3.42 |
| Estonia | –1.68 | 0.70 | 1.27 | 3.06 |
| Hungary | –2.66 | –0.61 | –3.67 | –0.80 |
| Latvia | –4.08 | –3.76 | –6.50 | –4.23 |
| Lithuania | –2.03 | –1.82 | –3.51 | –2.46 |
| Poland | –3.28 | –2.06 | –3.19 | –1.48 |
| Romania | –2.65 | –1.43 | –1.71 | –0.34 |
| Slovakia | –1.69 | –1.17 | –1.77 | –0.83 |
| Slovenia | –3.46 | –2.09 | –2.71 | –0.80 |

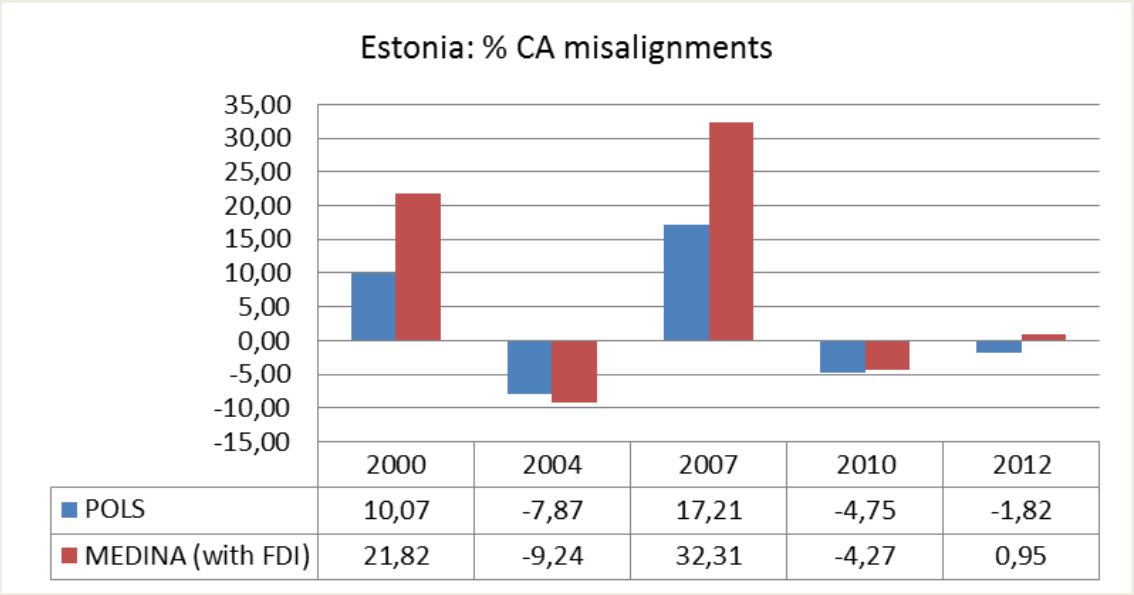
Note: We calculate the CA norm as the coefficients from the determinants multiplied by the projected variables from IMF WEO or UNDESA (for year 2012 the latest projections are for 2019). No dummies are included in this calculation.

Lastly, we focus on the situation in the Baltics, as an interesting case study in the area. The cyclicality in both CA and REER misalignments is clear in this case. Latvia experienced the largest swing in both the misalignments, while the differences in the Lithuanian case were smaller. This was probably due to the fact that Latvia showed the largest CA deficit among the Baltic States in 2007: 22% of GDP; while in Lithuania it was of 14% of GDP and in Estonia 16% of GDP. Moreover, Latvia was the only Baltic country that in September 2008 asked for EU-IMF funding assistance (sufficiently large support package: €7.5 billion, incl. €3.1bn European Commission, €1.7bn IMF, €1.8bn Nordics). This may have influenced the CA and REER toward the largest reduction in misalignments in 2010, because in the calculation of CA norm this external bailout funding is not included[26] and the actual CA in 2010 was therefore much lower than the norm. The REER followed again the CA behaviour and was negatively misaligned, by more than 26% (if FDI is included). This real undervaluation, which means an

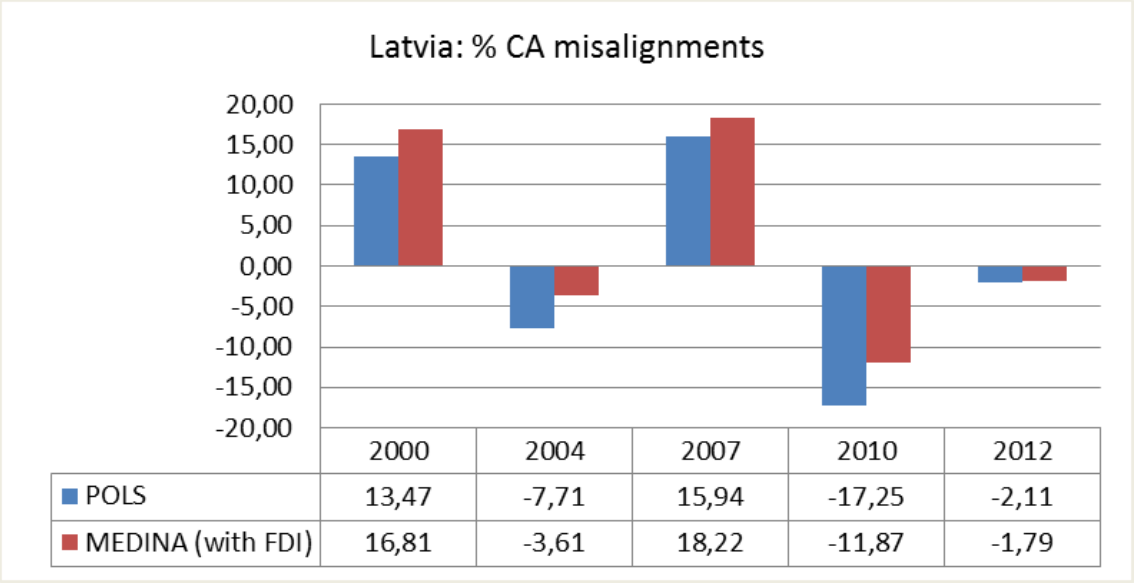
[26] We decided to keep the same regressors, as for the other CEECs, in the case of Latvia, for consistency. The external bailout funding is not included by the IMF in the net foreign capital flows categories.

increase in country's competitiveness, might also have helped Latvia in recovering via an increase in exports and thus in the trade balance[27]. In 2012 Latvia had still showed negative misalignments but by only 2–4%. In 2012 we can see a tendency towards the equilibrium in CA and REER indeed in all the countries. Estonia has a positive misalignment again in the CA and REER (around 1%).

Figure 5a CA misalignments in the Baltic States

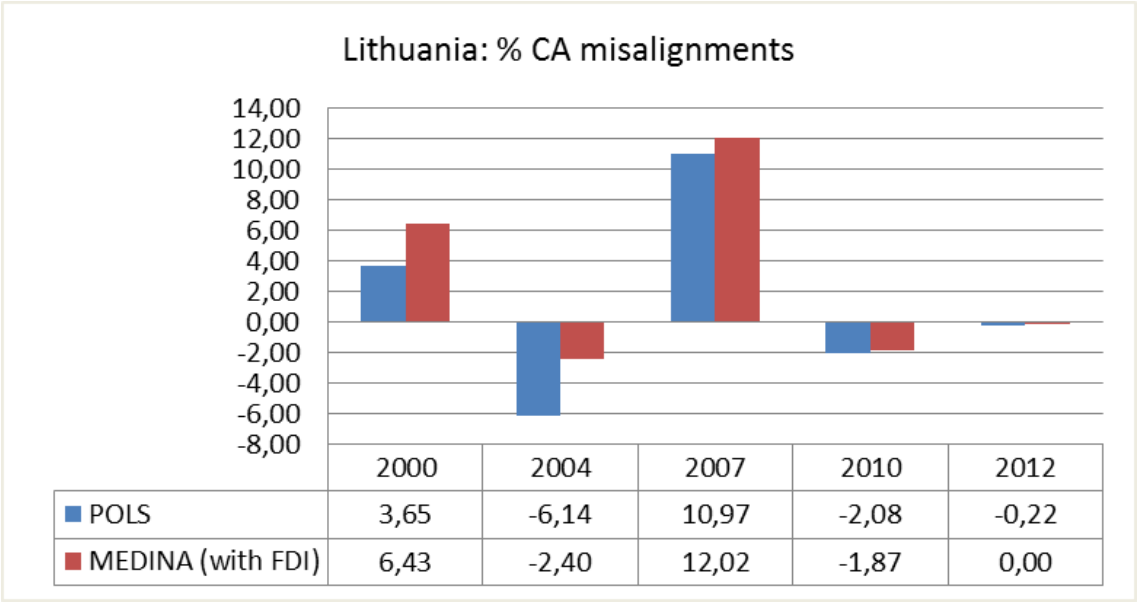



| | 2000 | 2004 | 2007 | 2010 | 2012 |
|---|---|---|---|---|---|
| POLS | 10,07 | -7,87 | 17,21 | -4,75 | -1,82 |
| MEDINA (with FDI) | 21,82 | -9,24 | 32,31 | -4,27 | 0,95 |



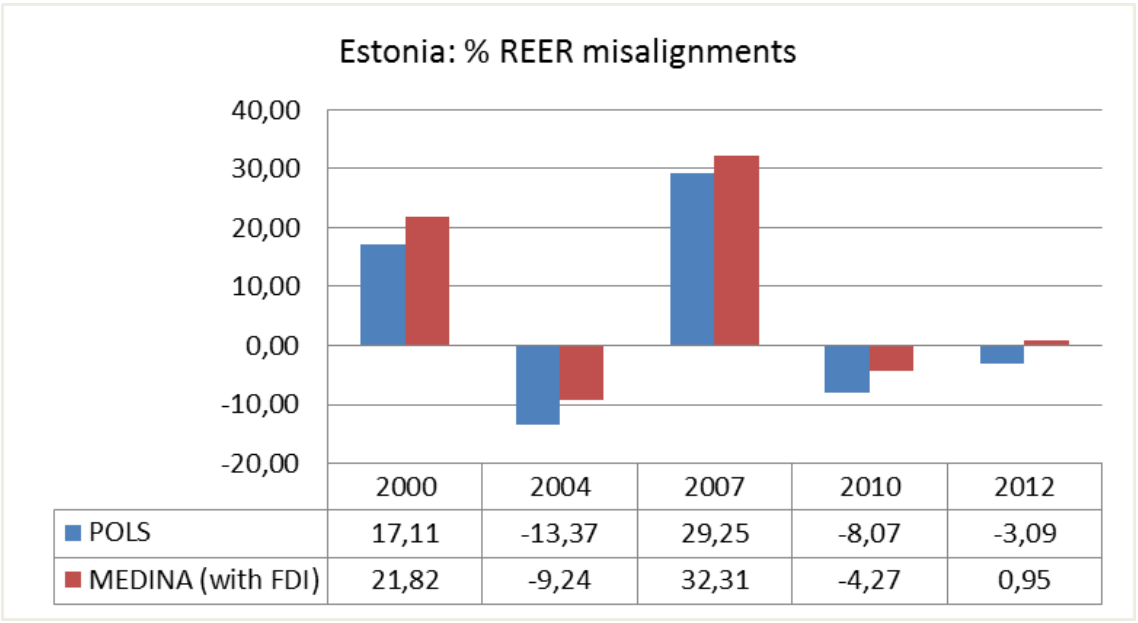

| | 2000 | 2004 | 2007 | 2010 | 2012 |
|---|---|---|---|---|---|
| POLS | 13,47 | -7,71 | 15,94 | -17,25 | -2,11 |
| MEDINA (with FDI) | 16,81 | -3,61 | 18,22 | -11,87 | -1,79 |

[27] The recovery in the CA can be explained by the joint influence of an increase in competitiveness (here, a decline in REER) and a cyclical component in the financial variables (see Comunale and Hessel, 2014).

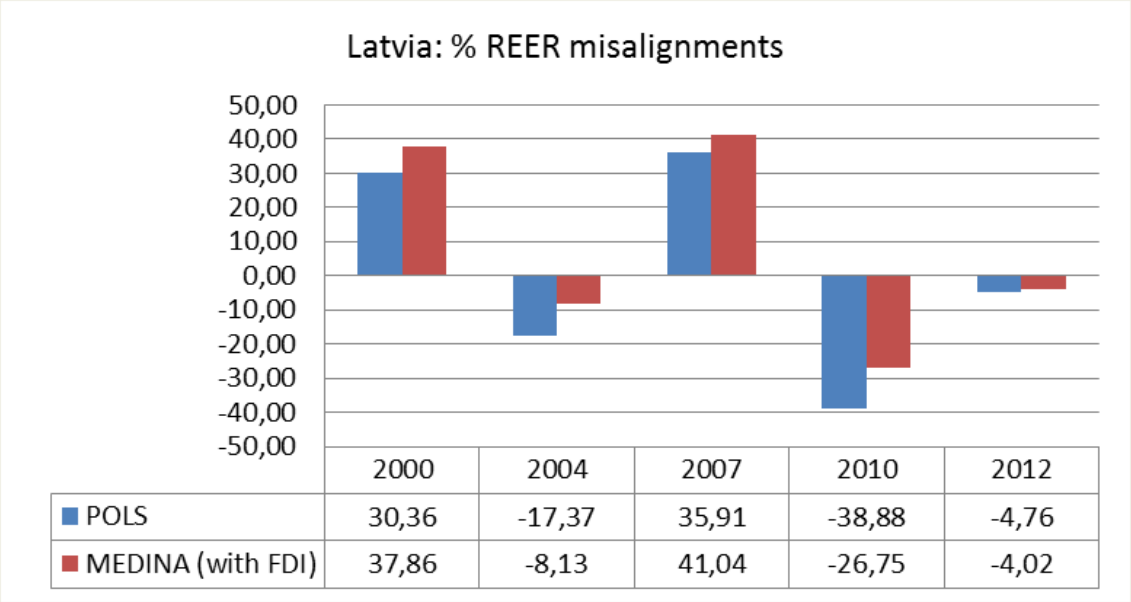



| | 2000 | 2004 | 2007 | 2010 | 2012 |
|---|---|---|---|---|---|
| POLS | 3,65 | -6,14 | 10,97 | -2,08 | -0,22 |
| MEDINA (with FDI) | 6,43 | -2,40 | 12,02 | -1,87 | 0,00 |

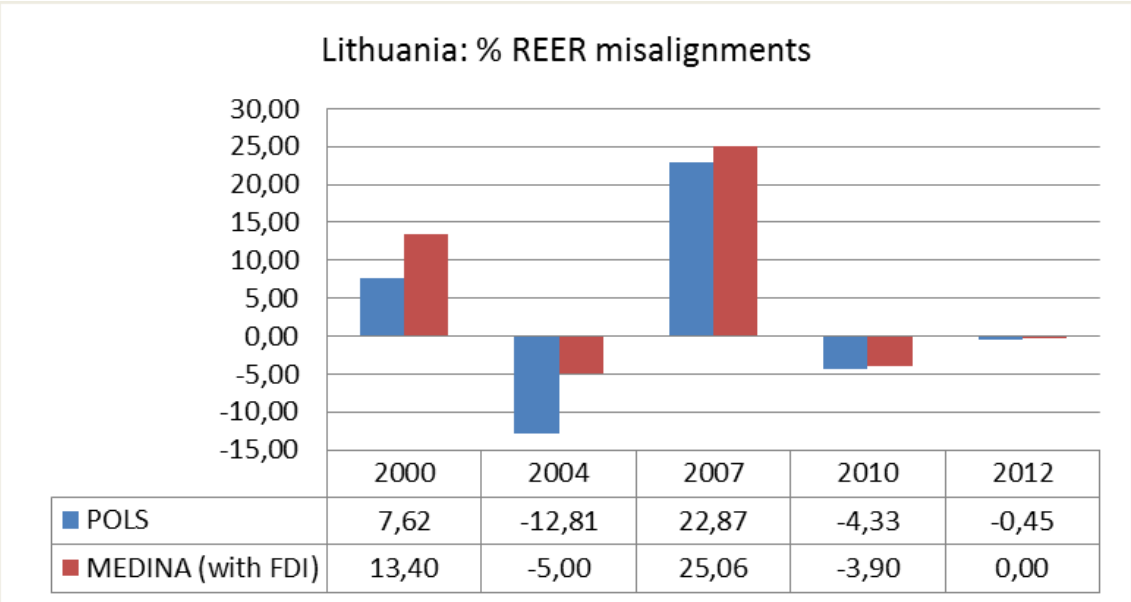
Figure 5b REER misalignments in the Baltic States




| | 2000 | 2004 | 2007 | 2010 | 2012 |
|---|---|---|---|---|---|
| POLS | 17,11 | -13,37 | 29,25 | -8,07 | -3,09 |
| MEDINA (with FDI) | 21,82 | -9,24 | 32,31 | -4,27 | 0,95 |




| | 2000 | 2004 | 2007 | 2010 | 2012 |
|---|---|---|---|---|---|
| POLS | 30,36 | -17,37 | 35,91 | -38,88 | -4,76 |
| MEDINA (with FDI) | 37,86 | -8,13 | 41,04 | -26,75 | -4,02 |

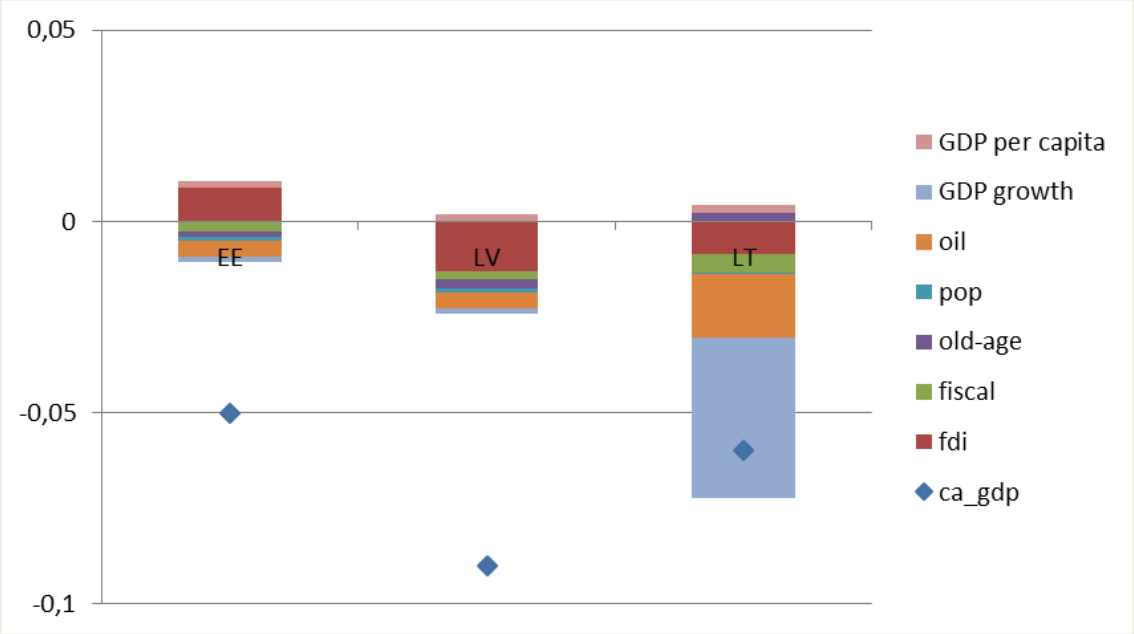



| | 2000 | 2004 | 2007 | 2010 | 2012 |
|---|---|---|---|---|---|
| POLS | 7,62 | -12,81 | 22,87 | -4,33 | -0,45 |
| MEDINA (with FDI) | 13,40 | -5,00 | 25,06 | -3,90 | 0,00 |

We thus calculated the contributions of each of the factors in determining the CA in the Baltic States in the periods 2004–2007 and 2008–2012 using the coefficients from the setup with FDIs (Column (3a), Table 5). The FDI component is crucial for Estonia, in order to have a lower CA deficit growth rate in the boom period, while FDIs contribute negatively to the rates for Lithuania and Latvia. The real GDP per capita growth relative to the partners is instead key for Lithuania. This means that the stronger growth after EU accession led to a sizeable decline in savings and an increase in demand and imports in Lithuania. The growth component has been important instead for Estonia and Latvia in the post-crisis period, limiting the rebalancing of the CA. The internal devaluation, mainly via a huge decrease in public spending and salaries, helped all the Baltic States on their way towards the equilibrium. Indeed the fiscal balance plays

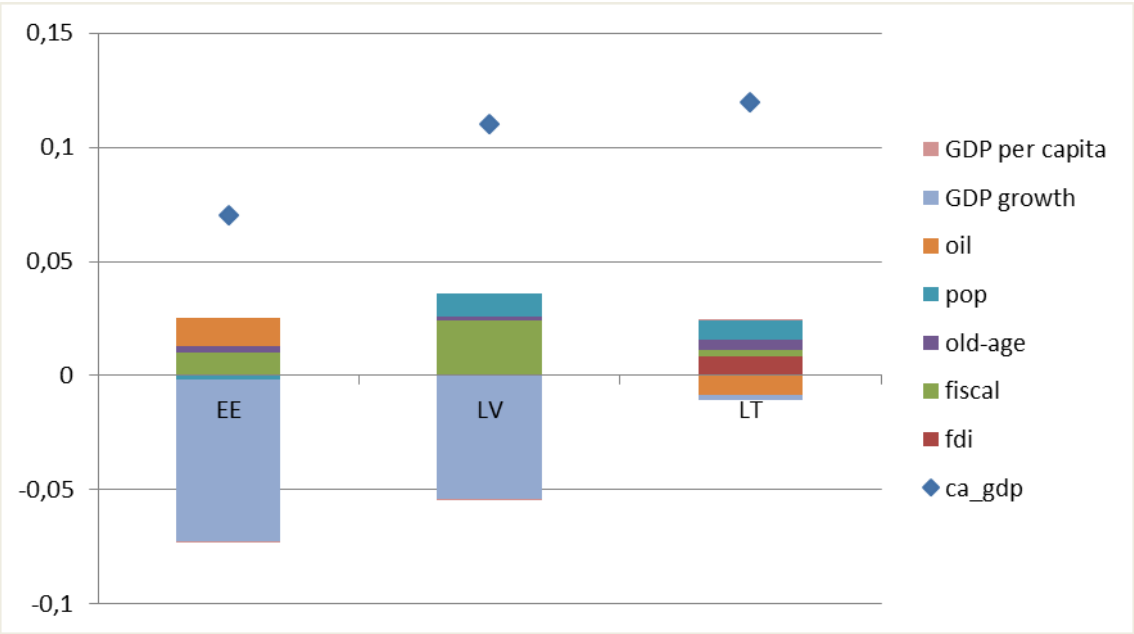
a key role especially in Latvia. In Lithuania the rebalancing of the CA was more a joint result of a change in fiscal policy, increasing with more productive FDIs and aging/population factors.

Figure 6 Factor analysis for the Baltic States 2004–2007, using Medina et al. (2010) setup




Note: These are the coefficients of the determinants multiplied by the difference in the value of the variables. Ca_gdp is the difference of CA over GDP in the period (2004–2007). On the y-axis: the difference in the CA over GDP in the period (2004–2007) are expressed as a percentage, 0.05 is equal to 5%.

Figure 7 Factor analysis for the Baltic States 2008–2012, by using Medina et al. (2010) setup




Note: These are the coefficients of the determinants multiplied by the difference in the value of the variables. Ca_gdp is the difference of CA over GDP in the period (2008–2012). On the y-axis: the difference in the CA over GDP in the period (2008–2012) are expressed as a percentage, 0.05 is equal to 5%.

# 7 Extensions: cointegrated static setup and dynamic setup

In Annex 1, the estimations based on the GM-FMOLS are also provided (Table 7) as an extension of our baseline framework. The fiscal balance has the correct sign and it is significant, as it is for old-age dependency ratio, growth of real GDP per capita, and oil balance. The dummy variable for the crisis has the correct sign as well and becomes significant**.** The sign of FDI is still negative but the magnitude is much smaller with respect to the setup estimated by pooled OLS. On the other hand, the population growth shows a positive (but not significant) coefficient, which is not what we expected. The sign of GDP per capita in PPP over the US, i.e. the relative income, is negative and significant.

The misalignments computed by using the CA norm values from these GM-FMOLS coefficients (setup á la Medina et al. (2010), Table 7 Column (3c) in Annex 1) are also shown here as an extension. The misalignments for the CA and REER are wider than in our baseline framework. The cyclicality in the misalignments is reduced. Moreover, with this approach, there is an increase in the misalignments after 2010 in some member states like the Baltics, Bulgaria and Croatia. This can be considered a recovery period for these countries and the CA deficit may already be starting to widen because of an increase in domestic demand (and relative imports) and FDI flows. The REER misalignments again seem to follow the behaviour of the CA, although in this case the cyclicality is more evident. The larger misalignments in the boom period can be seen for Bulgaria, the Baltics (especially Latvia), Poland and Romania. In 2012 they are still very large for Poland and Romania.

Lastly, we estimate the dynamic setups using the common correlated mean group estimator (CCEMG), which deals with cross-sectional dependence in dynamic panels and allows for heterogeneous coefficients, as explained in Pesaran and Tosetti (2011). We perform this exercise for the specifications from Lee et al. (2008) formerly estimated with fixed effects and pooled OLS (Column 1 and 2a, Table 5) and from Medina et al. (2010) with FDIs (Column 3a, Table 5). The results are presented in Table 8 in Annex 1.

In these estimations the unobserved common factors are proxied by the cross-section averages of the dependent variable and of the regressors. The main variable, which seems to determine the CA, is the oil balance, as in the static setup; however the unobserved factors play an important role. In the more complete framework, borrowed from Medina et al. (2010), factors related to oil balance, the CA itself and real GDP per capita growth are significant as well. The signs for the unobserved oil balance factor and real GDP per capita growth are the opposite of the expected ones (Table 8, Column (3)). Therefore, while a decrease in import values and/or quantities may have had a positive effect on the CA, and some global factors like shocks in oil

prices or supply might have played a role in the opposite direction, i.e. worsening the CA balance of the CEECs. The relative GDP per capita growth is not significant in our specifications here, but the coefficient for the related unobserved factor is instead positive and significant, which might suggest a role for spillovers among the members. An increase in GDP per capita of partners can affect positively the CA via a rise in foreign demand which leads to a more exports and a better trade balance for the country.

# 8 Conclusions and policy implications

Following the standard IMF CGER methodology (see Lee et al. 2008) for the estimation of real effective exchange rate (REER) misalignments, we made an assessment of the current account position and competitiveness of the Central Eastern EU new member states (CEECs). We analysed these issues using a panel setup of 11 EU new member states for the period 1994–2012 in static and dynamic frameworks, also controlling for the presence of cross-sectional dependence and checking specifically for the role of exchange rate regimes, capital flows and global factors.

The estimated coefficients are in line with the expectations. Furthermore, the foreign capital flows, the oil balance, and relative output growth seem to play a crucial role in explaining the current accounts. In addition, while a decrease in import values or/and quantities of oil can have had a positive effect on the CA, some global factors such as shocks to oil prices or supply might have played a role in the opposite direction, worsening the CA balance of the CEECs. Having a pegged exchange rate regime (or being part of the euro zone) affects positively the current account. The REERs behave in line with the current account gaps, which show a clear cyclical behaviour. We find a large overvaluation in 2007 for Bulgaria, the Baltics and Romania (in line with Rahman, 2008), followed by a rebalancing from 2010 onwards. The CAs and REERs are moving close to equilibria in 2012 in most of the countries. The rebalancing is completed for some countries less misaligned in the past like Poland and Czech Republic, but also in the case of Lithuania. When Foreign Direct Investment (FDIs) is introduced as a determinant for these countries, the misalignments are larger in the boom periods (positive misalignments) but smaller during the crisis (negative misalignments). Therefore, the effect of huge flows of FDI in some of the CEECs seems to boost the CA in good times and reduce the CA misalignments in bad times. The REERs also behave similarly in this case.

The main policy implication involves the future behaviour (in terms of an increase of REERs or a decrease in CA deficit norms). Are further actions to rebalance the CAs needed? Should we look at a balanced CA (as close to zero as possible), at a defined threshold, or at the

CA norm, which can differ from zero and can change over time, as shown in the paper? In the latter case, the CAs in the CEECs seem to be very close to their equilibrium values in 2012, however they need to be monitored for instance in the context of the Macroeconomic Imbalance Procedure (MIP). This procedure itself can be improved by using the proper misalignments measures, for both CAs and REERs[28]. We believe that a more refined analysis of the misalignments in current accounts and real effective exchange rates may be useful for improving the Macroeconomic Imbalance Procedure (MIP), which is now based on threshold levels. Moreover, this is especially useful for Central Eastern EU Countries (CEECs), which joined the EU between 2004 and 2014 and went through a transition phase since their independence. This factor may have influenced their performances, so that any judgement may have to take account of country-specific characteristics.

Ultimately, when adjustments are needed in the CAs, are the REER and its components the proper instruments to use (the financial cycle may be just as important[29])? We are currently working on an analysis that rests on a closer interaction between misalignments in the REER, the CA and financial gaps.

[28] In the Macroeconomic Imbalance Procedure, the REERs and CAs are also included but are judged only based on threshold levels. For more details, see the related section in the EU Commission, DG Ecfin website: http://ec.europa.eu/economy_finance/economic_governance/macroeconomic_imbalance_procedure/index_en.htm.
[29] See in Comunale and Hessel (2014).

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# Annex 1

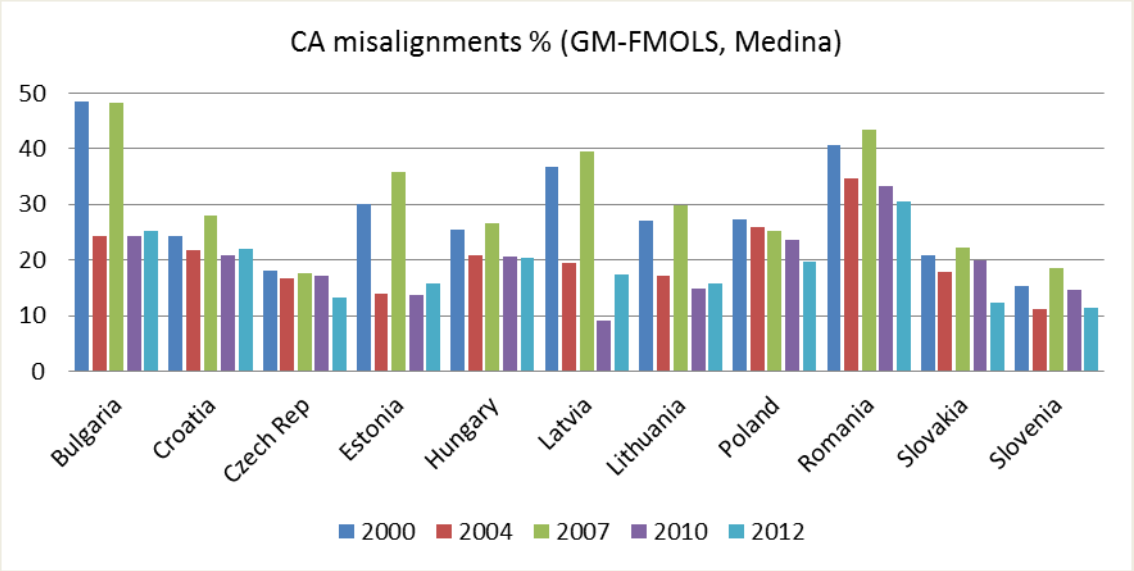
Table 7 GM-FMOLS estimations of CA determinants

| | Lee et al. (2008) POLS | Lee et al. (2008) Baseline GM-FMOLS[30] | Medina et al. (2010) POLS | Medina et al. (2010) FMOLS[31] |
|---|---|---|---|---|
| | (2a) | (2c) | (3a) | (3c) |
| Variables | ca_gdp | ca_gdp | ca_gdp | ca_gdp |
| fdi_gdp | | | –0.435*** | –0.076*** |
| | | | (0.139) | (0.044) |
| fiscal balance_gdp | 0.145 | 0.346*** | 0.258* | 0.489*** |
| | (0.0875) | (0.075) | (0.137) | (0.06) |
| old-age dependency ratio | –0.397 | –0.169*** | –0.297 | –0.411*** |
| | (0.280) | (0.58) | (0.241) | (0.41) |
| population growth | –1.730** | 0.999 | –0.983 | 1.726 |
| | (0.743) | (0.66) | (0.613) | (0.68) |
| oil balance_gdp | 0.756** | 0.780*** | 0.412** | 0.334*** |
| | (0.280) | (0.13) | (0.171) | (0.11) |
| real GDP per capita growth | –0.695*** | –0.427*** | –0.635*** | –0.484*** |
| | (0.177) | (0.05) | (0.151) | (0.05) |
| GDP per capita PPP over US | 0.0239* | –0.293*** | 0.00927 | –0.216*** |
| | (0.0134) | (0.03) | (0.0147) | (0.030) |
| crisis dummy | 0.0220 | 0.039*** | 0.0111 | 0.018*** |
| | (0.0159) | (0.001) | (0.0162) | (0.001) |
| Constant | –0.0105 | –0.740*** | –0.0174* | –0.350*** |
| | (0.00964) | (0.04) | (0.00989) | (0.04) |

Note: Standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. In Column (2a) and (3a) are reported the results by using POLS with correction for cross-sectional dependence as in Lee et al. (2008) and the setup from Medina et al. (2010) as in Table 5. In Column (2c) and (3c) are reported the GM-FMOLS estimations taken with 1 lag for the regressors and calculated by the command @panelfm in RATS**.**

[30] Here nfa_gdp (t=0) is not included, because in that case @panelfm cannot be used (it created a non-invertible matrix).
[31] Here nfa_gdp (t=0) is not included, because in that case @panelfm cannot be used (it created a non-invertible matrix).

Figure 8 CA and REER misalignments using MB methodology (GM-FMOLS for the model á la Medina et al. (2010))



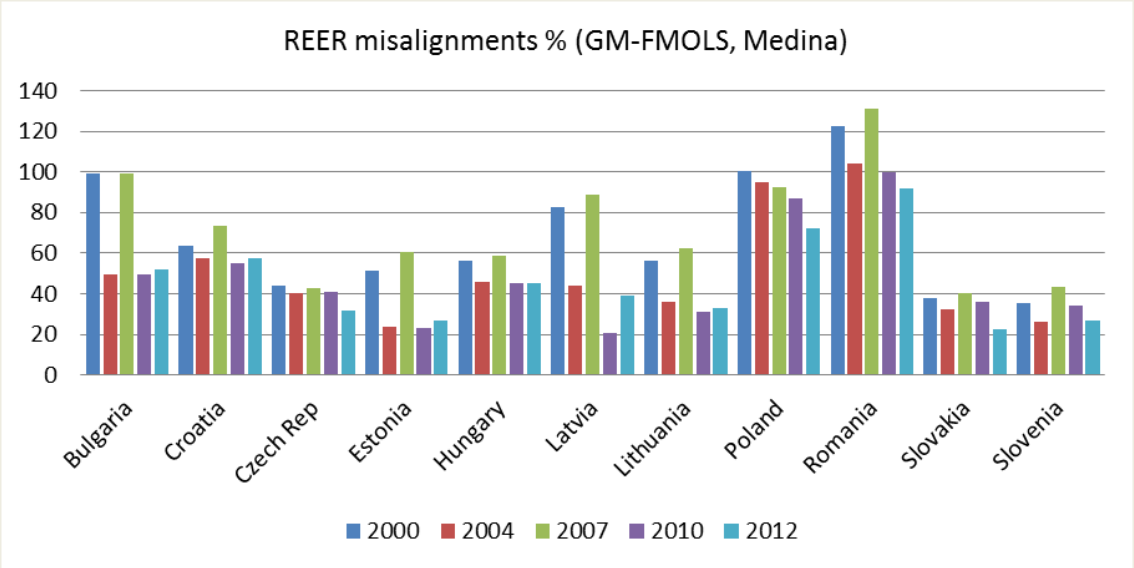



Table 8 Common correlated mean group (CCEMG) estimations of CA determinants

| | Lee et al. (2008) Baseline (former FE) CCEMG | Lee et al. (2008) (former POLS) CCEMG | Medina et al. (2010) (former POLS) CCEMG |
|---|---|---|---|
| | (1) | (2) | (3) |
| Variables | ca_gdp | ca_gdp | ca_gdp |
| L1.ca_gdp | 0.0847 | 0.482 | 0.107 |
| | (0.321) | (0.321) | (0.309) |
| fdi_gdp | | | –0.158 |
| | | | (0.151) |
| fiscal balance_gdp | –0.285 | 0.623 | 0.170 |
| | (0.417) | (0.557) | (0.197) |
| old-age dependency ratio | –1.083 | –2.455 | –0.703 |
| | (0.738) | (1.779) | (0.791) |
| population growth | 1.227 | 6.485* | 1.034 |
| | (2.237) | (3.567) | (1.178) |
| oil balance_gdp | 1.329 | 2.035* | 1.355*** |
| | (0.815) | (1.061) | (0.407) |
| real GDP per capita growth | –0.0870 | –0.137 | –0.620 |
| | (0.514) | (0.621) | (0.409) |
| GDP per capita PPP over US | | –0.157 | 0.0889 |
| | | (0.210) | (0.145) |
| crisis dummy | 0.0077 | –0.00795 | –0.0180 |
| | (0.0307) | (0.0309) | (0.0290) |
| Constant | –0.0598 | 0.0349 | –0.00511 |
| | (0.0900) | (0.298) | (0.145) |
| **Significant unobserved factors** | | | |
| Related to ca_gdp | 0.712* | 0.879*** | 0.786** |
| | (0.412) | (0.276) | (0.313) |
| Related to population growth | 6.77** | | |
| | (2.860) | | |
| Related to oil balance_gdp | | | –1.987* |
| | | | (1.074) |
| Related to real GDP per capita growth | | | 0.909** |
| | | | (0.501) |

Note: Standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Here are reported the CCEMG estimations (Stata command *–xtmg-* by Markus Eberhardt).

# Annex 2 Data description and sources

| | |
|---|---|
| Countries | Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia |

| | Sources | Description |
|---|---|---|
| reer | Eurostat | REER 2005=100. Deflator: CPI ; vis-à-vis 37 partner countries |
| ca_gdp | IMF WEO | CA in million USD / over GDP in current USD |
| nfa_gdp (t0) | Updated EWN (Lane and MF, 2007) | nfa_gdp in 1993, otherwise the first year available (Croatia 1996) |
| fdi_gdp | IMF WEO (net inflows) | Foreign Direct Investments in current USD. Inflows. Over GDP in current USD. From Medina et al., 2010 |
| portfolio investments_gdp | IMF WEO (net inflows) | Portfolio Investments in current USD. Inflows. Over GDP in current USD. |
| other investments_gdp | IMF WEO (net inflows) | Other Investments (mainly bank loans) in current USD. Inflows. Over GDP in current USD. |
| fiscal balance_gdp | IMF WEO | General government revenue minus expenditure over GDP (relative to partners) |
| old-age dependency ratio | WB WDI | population > 65y/population between 15–65 (relative to partners) – from Chinn & Prasad, 2003 or Medina et al., 2010 |
| population growth | WB WDI | Population growth (annual %) (relative to partners) |
| oil balance_gdp | IMF WEO[32] | Ratio of Oil Balance to nominal GDP in current USD |
| real GDP per capita growth | UNCTAD | Real GDP growth rates per capita, (relative to partners) |
| GDP per capita PPP over US | IMF WEO | Log of GDP per capita, PPP (constant 2005 international $) over GDP per capita, PPP of US |
| crisis dummy | dummy | from 2008 to 2012 =1 |
| peg dummy | dummy | Countries with a pegged exchange rate regime or in the euro area = 1 |

Note: Projections: from WEO IMF and UN DESA for demographics; Growth rates: avg of 5 years (2014/2019 for real GDP per capita growth or 2015/2020 for population growth)

[32] Starting with the October 2013 WEO, the value of oil imports (TMGO) and value of oil exports (TXGO) countries' data are no longer be available in the external WEO Database.

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2015
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