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# External imbalances in emerging and advanced European countries

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## ABSTRACT

This paper aims to explain some developments in current accounts across advanced and emerging European countries with a fixed exchange rate. Our main goal is to identify key factors affecting the external imbalances. This assessment of the cause of external imbalances will help us understand what has to be changed in European economies to recover the external balances going forward. We estimated a panel VAR model over the period 1999 to 2014 for a sample of 11 European countries that were split into two groups: advanced and emerging. The obtained results show that the real effective exchange rate has a negative effect on the current account balance in both groups of countries, although the effect is more pronounced in emerging than in advanced countries. Other variables such as the budget balance, economic growth, and output gap affect current account balance positively in advanced countries and negatively in emerging countries. Economic activity captured by output gap explains the highest portion of current account variations in emerging countries. In advanced countries, in addition to economic activity, the real exchange rate also plays a prominent role in current account imbalances.

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Current account balance; price competitiveness; fiscal balance; capital inflow; panel VAR

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## 1. Introduction

Increasing trade imbalances in the European Union have been neglected for a long time. The introduction of the euro in 1999 set the stage for the current account imbalances in some euro area, as well as in some emerging countries. On the brink of the global financial crisis, a number of euro area periphery and emerging European countries faced large and growing current account deficits. During 1999 to 2007, the current account balance of all periphery countries was worsening, except in Portugal where the current account deficit remained at an elevated level reached in early 2000. Most emerging Europe countries, especially ones with fixed exchange rate regimes, showed a similar behaviour. Current account deficits of these countries reached 25% of G.D.P. in the run-up to the financial crisis (Atoyan, Manning,

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& Rahman, 2013). The overall trend has seen the advanced countries as net exporters and the periphery and emerging countries as net importers. The main factor in understanding the current European crisis is the accumulation of current account imbalances during the pre-crisis period.

Large and widening current account deficits in the periphery and emerging European countries during the pre-crisis period have contributed to the economic contraction that followed. Advanced European countries with current account surpluses have suffered a decline in aggregate demand from the periphery and emerging countries. It is necessary to investigate current account behaviour and explain large imbalances during that period. Therefore, one of the main priorities for European governments is to find out how to avoid such excessive imbalances in the future.

Current account imbalances are related to capital movements between European Union countries. Empirical studies have confirmed the capital flow from advanced countries to less advanced countries within the eurozone (Schmitz & von Hagen, 2011), although this pattern does not characterise cross-country capital flows at the global level (Lane, 2008a). Explanations of eurozone external imbalances emphasise the role of financial integration and domestic demand growth. Blanchard and Giavazzi (2002) suggest that foreign borrowing is optimal for less advanced countries in a monetary union that expect to catch up with richer countries.

European Union accession was an opportunity for emerging European countries to reach faster income convergence followed by foreign capital flows. The two main explanations for worsening current account deficits for many European countries in the mid-2000s are export performance due to deterioration of competitiveness and a domestic demand-driven boom fuelled by capital flow-driven cheap credit. While the growth of various non-tradable sectors was built on high domestic demand based on this credit boom, large increases in wages and prices led by expectations of income convergence deteriorated the tradable sector in these economies.

As Lane and Pels (2012) explain, convergence and growth expectations are key determinants for current account determination. Growth theory tells us that these countries, where rate of return on capital is higher, will experience capital inflow from rich countries. The result will be growth in the poor countries and income convergence. Neoclassical theory tells us that if countries that are scarce in capital want to finance domestic fixed investment, they will borrow from abroad. Higher growth prospects for these countries will increase consumption and thus account deficits for capital-scarce countries are the result of the functioning of both mechanisms.

The convergence process among European Union countries resulted in higher expected incomes and external borrowing.<sup>3</sup> External borrowing and, hence, the current account deficit that reflects the excess of investment over domestic savings, increases with the expected income (which has increased as a result of convergence) and decreases with the interest rate. By boosting investment and productivity growth, while smoothing consumption during the convergence process, such imbalances would be an opportunity for less advanced European Union countries to participate in the process of financial integration through the common currency.

While imbalances may be a consequence of capital flows within the European Union due to the convergence process, they also reflect misallocation of capital, like unproductive investment financed by private-credit booms. In the pre-crisis period, in the mid-2000s,

driven by anticipations of high returns, capital flowed to the non-tradable sector in the emerging European countries, creating a demand shock, which led not only to an increase in unit labour costs but also to a build-up of current account deficits as a result of expanding imports. These economies experienced the growth of various non-tradable sectors due to high domestic demand, high wage increases, and price fuelled by expectations of fast income convergence, which worsened their tradable sector. The result was a huge build-up of debt, attached to poor debt-servicing capacity and deterioration of competitiveness. If these countries had not been euro area members or had not had fixed exchange rate regimes, their current accounts would have adjusted, mainly through a currency crisis and exchange rate depreciation.<sup>4</sup>

The ability to continue running current account deficits without private capital inflows allowed periphery and emerging European countries, through adjustment of their current accounts, to avoid balance of payments crises. As exchange rate adjustment is not an option they have to go through painful adjustments similar to those experienced by other countries in balance of payments crises.<sup>5</sup> Thus, imports decline and exports improve through wage adjustment in the tradable sector, and growth in trading partners is needed in current account adjustment.<sup>6</sup>

Analysis of key variables potentially associated with external imbalances and evaluation of their contribution to these imbalances is based on a panel vector autoregressive (P.V.A.R.) model. In order to find the diversity of the determinants of external imbalances, the panel V.A.R. models are estimated for the emerging and advanced countries separately. The empirical findings suggest that output gap plays a more important role in current account balance dynamics in the emerging countries. Changes in competitiveness, measured by real exchange rates, have not been a prominent factor of external imbalance in the emerging markets (contrary to the advanced countries). However, in both groups real appreciation deteriorates current accounts, although the effect in emerging countries is stronger and more persistent. Furthermore, the analysis of impulse response functions points to the different effects of shocks in fiscal variables and economic activity in these two groups.

Keeping in mind that external imbalances within the European Union are still an open question and that previous studies on this issue focus entirely on the euro area, this paper aims to add to the literature by extending the area of research analysing the key factors potentially associated with external imbalances, not only across the advanced eurozone, but over the emerging European countries as well.

Building on previous assessments, the hypothesis of our paper is that economic activity, captured by G.D.P. growth and output gap, has been the key driver of current account imbalances in eurozone advanced countries and the key driver of current account deficits in emerging European Union countries with fixed and stable exchange rate regimes. In the case of emerging countries this hypothesis is justified by the fact that current account deficits, as neoclassical theory suggests, have not been led by strong economic activity that would have to produce a long run current account rebalancing.

The paper is organised as follows: The next section reviews the literature related to external imbalances in the advanced and emerging European countries. The third section describes the data and discusses the expected correlations between the variables from a theoretical point of view. The fourth section outlines the empirical methodology and presents the results of panel V.A.R. estimation for both groups of countries. The fifth section concludes, discussing some policy implications of the empirical findings.

## 2. Literature review

While a large number of papers have explored the rising current account deficits in the euro periphery there are a few studies for emerging European countries. Blanchard and Giavazzi (2002) find that the current account deficits of some European countries, like periphery countries Portugal and Greece in the 1980s and 1990s, are part of the economic integration process in Europe. Namely, financial integration followed by reduced borrowing costs in the European Union gave an opportunity for poorer countries to borrow more. Goods market integration should stimulate the poorer countries to increase their exports to the richer countries and to repay the debt. Blanchard and Giavazzi conclude that the convergence mechanism leads to higher growth expectations in lower-income countries. The authors who followed up on work by Blanchard and Giavazzi (Hermann & Winkler, 2009; Lane, 2008a, 2008b, 2010) find that the common institutional framework in the European Economic Area allowed this pattern to emerge.

Most studies on the emerging Europe focus on capital flows rather than current account imbalances and try to find the answer to the question whether those flows and their economic impact reflect certain fundamentals or various excesses. Abiad et al. (2007) investigate capital inflows within Europe that enabled large current account imbalances prior to the crisis and conclude that they have been associated with a significant acceleration of income convergence. The authors focus on Europe and find strong evidence in favour of the conventional view of international capital flows, with its role as primarily influencing the income convergence process rather than raising the steady-state rate of growth. The 'downhill' flow of capital has reinforced the traditional European tendency towards income convergence. This transitional process, made possible by rapid financial integration, is self-limiting. With higher incomes, financial integration plays a smaller role in attracting foreign capital, reducing the growth impulse. Their findings suggest that European financial markets have performed their role of reallocating capital in the region.

Vamvakidis (2009) concludes that the convergence trend of emerging Europe is based on strong fundamentals and is expected to continue, although at a slower pace. In the pre-crisis period, the growth-enhancing reforms have been successfully implemented in most countries where growth has been driven mostly by productivity improvements and investment. The Baltic countries have accumulated larger external imbalances than the rest of the region. External imbalances in southeastern Europe are smaller, although sizable and deteriorating. These economies lag behind in structural reforms, with a deficient capacity to adjust quickly to shocks. Hermann and Winkler (2009) consider current account imbalances in the context of income convergence and compare emerging Asia with emerging Europe. Based on panel analysis, they find that financial market characteristics are main determinants of current account dynamics. Catching-up countries with more integrated financial markets are able to borrow abroad, allowing an increase in domestic investment relative to domestic savings. Their results confirm that the relationship between financial integration and the current accounts depends on the level of income. Europe's convergence model based on large current account deficits was thus a result of a more developed and more integrated financial sector. Rahman (2008) investigates current account developments in new member states of the European Union to determine whether rapid widening current account deficits in these countries were driven by fundamentals. It proves that the force behind this rapid widening has been a private investment boom. Both foreign direct investments and domestic

credit growth contributed to the boom. For a number of emerging European countries the current accounts widened much more than what could be expected from the fundamentals. Cyclical factors, such as the output gap, and structural factors, such as cost-competitiveness of the tradable sector and financial deepening, explain the large current account divergence from the norms found in these countries. Purfield and Rosenberg (2010) examine current account adjustment in the Baltic countries during the 2008 to 2009 crises. In response to this shock, these countries performed an internal devaluation through fiscal and nominal wage adjustment to save financial sector stability.

Lane and Pels (2012) re-examine the behaviour of external imbalances during the pre-crisis period and assess how large imbalances emerged. Examining both member and non-member countries of the euro area, they find that many forces were common to both groups. However, the convergence effect is significantly stronger for members of the euro area, and is mainly performed through lower savings rates and higher investment rates for lower-income countries.

Focusing on sectorial savings and investment, Atoyan et al. (2013) find important cross-country differences in current account developments. The authors investigate current account developments in Europe, with a comparative focus on the euro area periphery and emerging European countries with fixed exchange rate regimes. They find that similar dynamics played out in these two groups during pre-crisis years, when a strong private sector led a domestic demand boom and created large current account imbalances. For emerging Europe, rising investment played a stronger role than declining savings, while in the case of the euro area periphery, current account imbalances were mostly a result of a decline in private sector savings. The public sector did not contribute to external imbalances in emerging Europe. However, the absence of a counter-cyclical fiscal policy during the boom years failed to dampen overheating and create the necessary policy space to offset the economic downturn that followed. Faster adjustment in emerging Europe has been facilitated not only by sudden capital outflows, but also through wage adjustment and faster adjustment in the public sector. Wage adjustment was enabled by more flexible labour markets, and large fiscal adjustment was forced by a lack of financing and pressure to continue market confidence. At the same time, lower levels of household indebtedness helped with the return of private sector consumption. This in turn enabled output and domestic demand to rebound much quicker than in the euro area periphery.

All this suggests that a sound understanding of the causes of the European external imbalances is very important as different diagnostics point to different policy implications for addressing the risks associated with such imbalances. In that context it is essential to determine which factors affect current accounts.

### 3. Data and sample selection

Based on economic theory and previous research we selected the real G.D.P. growth rate (GR), the output gap (YGAP), real effective exchange rate (REER) and budget balance (BB) as a set of macroeconomic determinants relevant in an explanation of current account balance (CAB). CAB and BB are expressed as a percentage of G.D.P. YGAP measures deviation of current G.D.P. from potential G.D.P. in percentage terms. Accordingly, we assume that current account balance can be expressed as

$$CAB = f(GR, BB, YGAP, REER) \quad (1)$$



The real G.D.P. growth rate captures economic activity, which can be enhanced by an increase in domestic demand or export, but has an ambiguous effect on current accounts. Namely, demand-driven growth is associated with higher imports and deterioration of external balances. Export-driven growth is in line with a restored current account balance. According to this, a positive relationship between the real G.D.P. growth rate and the current account balance is expected in export-oriented countries. In contrast, demand-driven countries have a lower propensity to export, which makes a negative relationship between the real G.D.P. growth rate and the current account balance more plausible.

Other important determinants of current account balances are price and non-price competitiveness of domestic products. The real effective exchange rate is widely used as a price competitiveness indicator since it considers variations in relative prices. Its higher values indicate higher relative prices of domestic goods and corresponding deterioration in the competitive country position, and hence a worsening of the current account balance, (Cesaroni & De Santis, 2015). Thus, it is expected that there is a negative relationship between exchange rate and current account balance.

The third important determinant of current accounts is the output gap, which is defined as a deviation of the current G.D.P. from a potential one, and is included in the model for two reasons. First, it is an indicator of medium-term (dis)equilibrium. Secondly, as there is a higher pressure on domestic prices in demand-driven growth compared to export-driven growth, a strong positive relationship between YGAP and REER is expected in emerging countries, and consequently a negative relationship between YGAP and CAB. In this case REER is strongly affected by domestic factors.<sup>7</sup>

Another variable used in this study is fiscal balance, defined as the difference between fiscal revenues and government spending. The reason for using fiscal balance (BB) as a CAB determinant arises from the familiar investment-saving relation in an open economy given as

$$PRIVATESAVINGS + BB - INVESTMENTS = CAB \quad (2)$$

However, the overall effects of fiscal balance on CAB depend on its influence on private savings and investments. Keeping in mind that a budget deficit has ambiguous effects on overall savings and investments, the effects of a variable BB on CAB cannot be predicted in advance.<sup>8</sup> However, some analyses based on the twin deficit hypothesis suggest that higher levels of public savings across countries tend to be associated with larger current account surpluses (Cesaroni & De Santis, 2015).

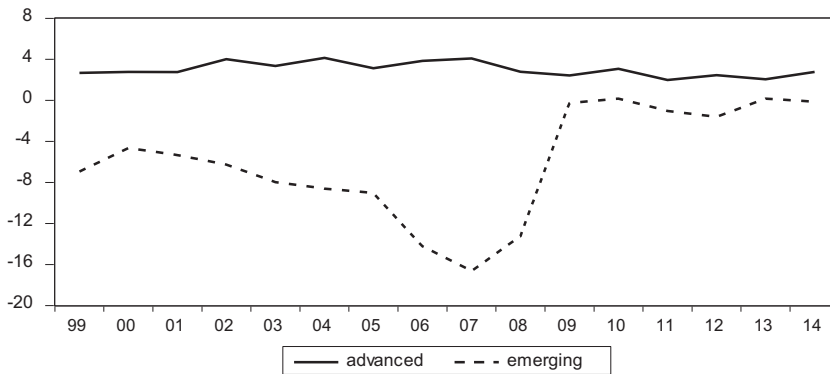
In emerging economies higher domestic demand stimulates economic activity, creating an increase in GR and YGAP, resulting in a positive relationship between variables. Higher domestic demand deteriorates current accounts but also creates pressures on the domestic price level, which leads to a real appreciation and creates a positive relationship between GR and REER in emerging countries. Finally, if the budget revenues are sensitive to domestic demand, there is a possibility that the variables GR and BB are also related. If sensitivity is high, a decrease in domestic demand reduces budget revenues, creating a high budget deficit.

There is also a possibility of reverse causality between CAB and other variables, since higher exports increase CAB as well as GR, and decrease BB. Higher imports decrease CAB, which is related to higher domestic demand (and an increase in GR), BB and domestic price level (an increase in REER).

Following from the discussion above, the underlying analytical framework in this paper acknowledges the endogeneity of the current account balance and other variables included

in the analysis. We considered two groups of European countries, known as advanced and emerging. A group of advanced countries, also known as ‘core countries in the eurozone’, includes Austria, Belgium, Finland, France, Germany, and the Netherlands. The second group includes emerging European Union countries both inside and outside the eurozone: Bulgaria, Estonia, Latvia, Lithuania, and Croatia.<sup>9</sup>

Since the objective of our analysis is the medium-term variations of the current account balance, we analysed annual data from 1999 to 2014. Data for the real effective exchange rate (REER) and budget balance (BB) are from European commission (Eurostat database). The European commission (Ameco database) database is the source for the current account balance (CAB) and output gap (YGAP). Real G.D.P. growth rate (GR) data for all countries except Lithuania are taken from The World Bank (World Development Indicators), while for Lithuania, GR data comes from the United Nations (undata) database. Country-averaged values of all variables (Figures 1–5) and summary statistics (Table 1) reveal some stylized facts about the groups:

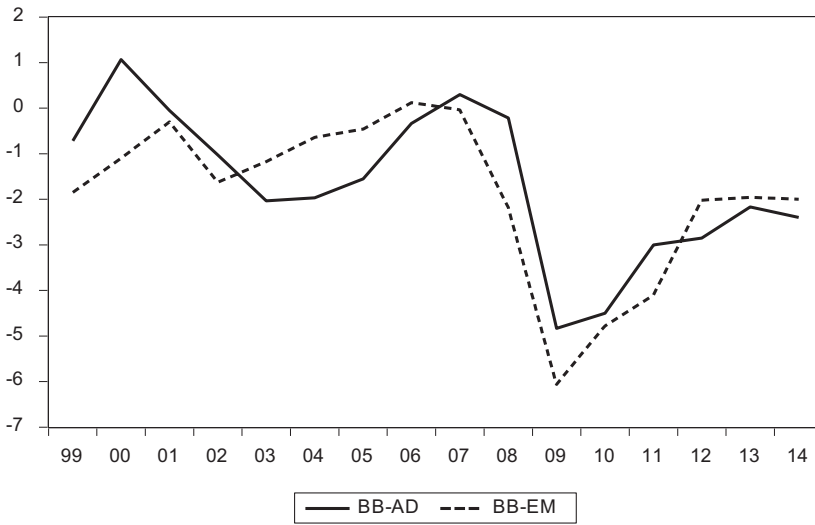


**Figure 1.** Average current account imbalances in advanced and emerging European countries (in percentage of G.D.P., 1999 to 2014). Source: Authors’ calculations based on AMECO data.

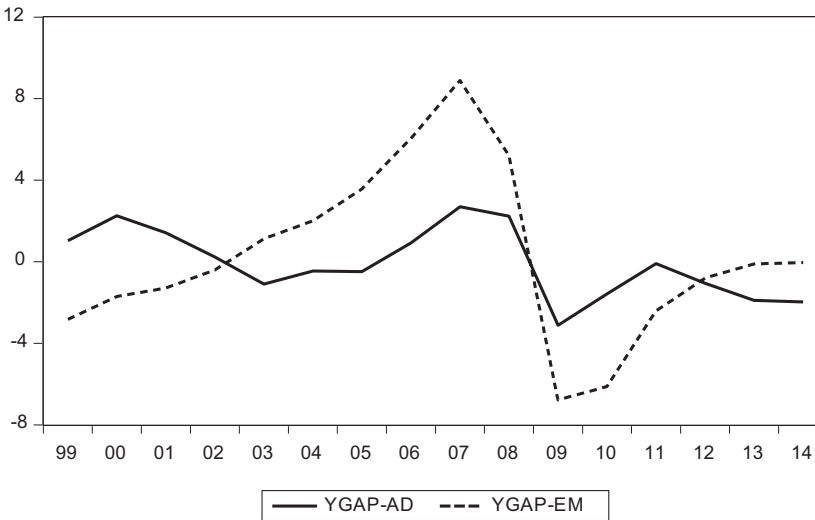


**Figure 2.** Average real effective exchange rate for advanced and emerging European countries (indices, 1999 = 100). Source: Authors’ calculations based on EUROSTAT data.



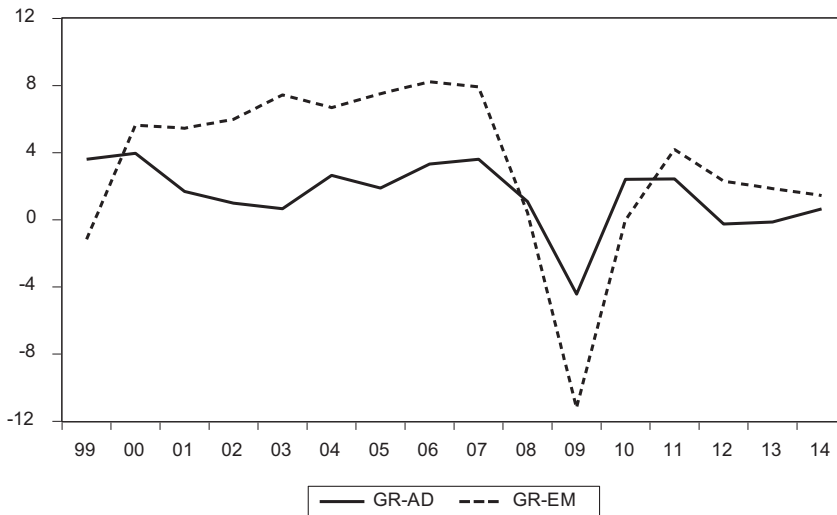


**Figure 3.** Average budget balance for advanced and emerging European countries (in percentage of G.D.P.). Source: Authors' calculations based on EUROSTAT data.



**Figure 4.** Average output gap for advanced and emerging European countries (in percentage). Source: Authors' calculations based on AMECO data.

- (1) In the pre-crisis period (2000 to 2008), the time-varying average of G.D.P. growth rates in emerging countries is almost twice as high as in advanced European Union countries (Table 1 and Figure 5). The same applies to the period 2011 to 2014, but a slowdown and decline in economic activity in 2008 and 2009 makes the average growth rate for emerging countries negative compared to advanced countries. Average growth rates in advanced countries show stagnation or weak economic recovery in the post-crisis period.



**Figure 5.** Average G.D.P. growth rate for advanced and emerging European countries (in percentage). Source: Authors' calculations.

**Table 1.** Summary statistics for advanced and emerging European countries.

Advanced countries in pre-crisis period					Emerging countries in pre-crisis period				
Variable	Mean	SD	Min	Max	Variable	Mean	SD	Min	Max
CAB	3.36	2.78	-1.75	8.15	CAB	-9.29	5.43	-24.50	-0.86
GR	2.35	1.41	-0.72	5.64	GR	5.41	3.84	-5.65	11.62
BB	-0.65	2.53	-4.80	6.90	BB	-0.86	2.09	-5.00	2.90
YGAP	0.88	1.58	-2.52	4.601	YGAP	2.24	4.21	-4.83	13.95
REER	99.99	1.65	94.35	104.67	REER	100.12	8.13	79.37	122.69
Advanced countries in post-crisis period					Emerging countries in post-crisis period				
Variable	Mean	SD	Min	Max	Variable	Mean	SD	Min	Max
CAB	2.47	3.84	-2.52	9.86	CAB	-0.45	2.93	-8.87	7.87
GR	0.12	2.58	-8.27	4.09	GR	-0.29	5.89	-14.74	8.26
BB	-3.29	1.84	-7.20	0.70	BB	-3.49	3.13	-9.10	1.20
YGAP	-1.62	1.31	-5.13	0.98	YGAP	-2.72	4.01	-11.59	2.19
REER	101.2	1.82	98.10	104.18	REER	117.30	7.14	103.07	128.28

Source: Author's calculations.

- (2) Current account surplus in advanced countries is stable, with an average value of 3.36% of G.D.P. in the pre-crisis period and 2.47% of G.D.P. in the post-crisis period (Table 1). In contrast, the average current account deficit in emerging economies deteriorated steadily between 2000 and 2007 (with a maximum of 16% in 2007) with an average value of 9.29%. A decrease in average current accounts is observed between 2007 and 2009, but in the period 2009 to 2014 it amounts to about 0% of G.D.P. (Figure 1). During the period of crisis, the average current account deficit in emerging countries was about 0.45% of G.D.P. (Table 1).

The dynamic of current accounts reflects sources of growth in both country groups. Advanced countries are more export-oriented (with the main export market being the European Union), while growth in emerging countries was mainly demand-driven. We have emphasised some reasons why current account balance could be deteriorating, but from IS relation (2) it is obvious that current account deficit mirrors the excess of investment

over domestic savings. Investment growth was stimulated via foreign capital inflow (from advanced countries) mainly in internationally unchangeable goods such as retail or real estate. The outcome is deteriorating export competitiveness, strong import growth, and a worsening of current accounts, which causes growth of gross external as well as public debt. With the global recession in 2008 the periphery and emerging European countries had to reduce reliance on foreign borrowing, and started to cut back on domestic spending. The result of that process was an improvement in their current account balances.<sup>10</sup>

- (3) Economic activity affects price level. In capital exporting countries the increase in price level was moderate. Contrary to advanced markets, where the REERs were more stable, high real appreciation prevailed in emerging countries and had unfavourable effects on price competitiveness for export goods and deteriorating CAB. The deterioration in economic activity across these economies during the crises stopped price increases and caused deflation pressures. With their stable or fixed nominal exchange rate regimes it prevents stronger REER changes (Figure 2). Average REER in advanced countries in both periods (pre- and post-crises) was almost the same (about 100%) and similar to the emerging markets in the pre-crisis period. In the post-crisis period, average REER stabilised in emerging markets, bringing REER levels to the 2009 level (Table 1).
- (4) In addition to the current accounts and price levels, economic activity has also affected the fiscal variables. Both groups of countries are faced with a budget deficit with similar dynamics (Figure 3). Average budget deficit with the values of 0.7% and 0.9% of G.D.P. (for advanced and emerging countries, respectively) in the pre-crises period increased almost three times in the post-crisis period (3.3% for advanced and 3.5% for emerging countries) (Table 1). This can be attributed to the worsening of economic activity and an increase in certain expenditures such as unemployment benefits or fiscal stimulus during recessions. The economic slump between 2007 and 2009 deteriorated the fiscal position more in emerging countries. After 2009 the fiscal position in both groups has improved, which can partly be attributed to fiscal consolidation carried out in the European Union countries.
- (5) Output gap reflects a deviation of the current G.D.P. from natural output. It is relatively stable in advanced countries during the overall period, with a moderately negative trend and a sudden drop in 2009 (Figure 4). Movements in the output gap suggest that advanced countries were near medium-term equilibrium in the pre-crisis period. The large increase in YGAP in emerging markets indicates that the deflationary gap decreased and turned into an inflationary gap in 2002 to 2003. The average value of YGAP is about 2.2% above potential G.D.P. in emerging countries compared to 0.9% in advanced countries (Table 1). A decrease in current G.D.P. below the potential one is expected in both groups of countries in a time of recession. During the crisis the average G.D.P. in emerging countries was 2.7%, and in advanced 1.6% lower than the natural G.D.P.

Figure 4 shows that both groups of countries have not yet achieved medium-term equilibrium, although the largest decline of YGAP was in 2008 to 2009. The drop in YGAP is especially emphasised in emerging countries as a result of domestic demand contraction. Although advanced countries were also faced with a decline in domestic demand, the decrease in YGAP for that group was lower but with a slightly negative trend during the period 2009 to 2014.

In conclusion, the economic activity in emerging countries was based on investment and a credit boom fuelled by capital movements from the advanced countries. The increase in private and public consumption and investment was manifested in current account deficits. This catching-up process was accompanied by rapid price increase in the emerging countries, undermining the countries' competitiveness. Prices increased slightly in capital-exporting countries but much more in capital-importing countries.

#### 4. Empirical methodology

To assess the relative importance of the main factors driving the current account balance in selected eurozone countries we use a panel data vector autoregression (P.V.A.R.) model. The panel VAR methodology follows the same logic of a standard V.A.R. approach, which treats all the variables in the system as endogenous, adding a cross-sectional dimension allowing for unobserved individual heterogeneity. The P.V.A.R. model takes the following reduced form

$$Y_{it} = \Gamma(L)Y_{it} + u_i + e_{it}, \quad (3)$$

where  $i$  ( $i = 1, \dots, n$ ) denotes the country and  $t$  ( $t = 1, \dots, T$ ) denotes the time.  $Y_{it}$  is a vector of endogenous stationary variables and  $\Gamma(L)$  is a matrix polynomial in the lag operator with  $\Gamma(L) = \Gamma_1 L^1 + \Gamma_2 L^2 + \dots + \Gamma_p L^p$ . We impose the restriction that the underlying structure is the same for each cross-sectional unit (country). Since this constraint is likely to be violated in practice, we allow for 'individual heterogeneity' in the levels of the variables by introducing country-specific (fixed) effects denoted by  $u_i$  in the model.  $e_{it}$  is a vector of idiosyncratic errors.

As is well known, in a dynamic panel the fixed-effects estimator is not consistent because fixed effects are correlated with the regressors due to lags of the dependent variables. The mean-differencing procedure commonly used to eliminate fixed effects would create biased coefficients, the so-called Hurwicz-type bias (Nickell, 1981). To avoid this problem, we use the lags of the corresponding endogenous variables as instruments, estimate the coefficients by the generalised method of moments (G.M.M.), and test the validity of instruments with the commonly used Hansen's J-statistic (Arellano & Bond, 1991; Arellano & Bover, 1995). The panel-specific fixed effects are removed using the first difference.

Once the panel V.A.R. model is estimated, we compute the impulse response functions (I.R.F.s) and the variance decompositions (V.D.C.s). Impulse response functions are the dynamic responses of each endogenous variable to a one-period standard deviation shock in other variables in the system. Variance decomposition measures the contribution of each source of shock to the (forecast error) variance of each endogenous variable and thus provides information about the relative importance of random innovations in affecting the variables in the system. Both computations are useful in assessing how shocks to the main macroeconomic factors (including external factors) affect external imbalances.

To calculate I.R.F.s and V.D.C.s we need a proper shock identification strategy, i.e., it is necessary to impose enough restrictions to decompose residuals in such a way that they become orthogonal. The commonly used procedure is the Cholesky decomposition, which implies the choice of a specific order of variables in a multivariate framework. The variable considered the most exogenous is placed first in the ordering, while the less exogenous variables appear later. In other words, the variables listed earlier in the ordering affect the

following variables contemporaneously, as well as with lags, while the more endogenous variables, that come later, affect the preceding variables with lags alone.

However, neither economic theory nor empirical studies allow us to unambiguously choose the order to retain for the variables in the Cholesky decomposition. In our specification we assumed the following ordering: (YGAP, GR, REER, BB, CAB), i.e., output gap and the growth rate are ordered before the effective exchange rate (REER) and budget balance (BB), while the current account variable is positioned last since it seems reasonable to assume that the current account balance is contemporaneously affected by the shocks from all of the endogenous variables of the model. We impose the same ordering in both groups of countries and test the robustness of our results to changes in orderings.<sup>11</sup>

## 5. Empirical results

The panel V.A.R. is estimated separately for the groups of advanced and emerging European countries, with the aim of analysing the importance of external factors in these two groups. For both groups, we estimated the coefficients of the P.V.A.R. model with five variables (YGAP, GR, REER, BB, and CAB) after the fixed effects had been removed using first differencing. Since data on the budget balance for Estonia are available from 2000, for Croatia from 2002, and for Lithuania from 2004, the panel VAR model for a group of emerging countries is unbalanced.<sup>12</sup> To account for potential crisis-driven nonlinearities, and to make a distinction between the driving forces in pre- and post-financial crisis periods, we include a crisis dummy variable<sup>13</sup> in the analysis.

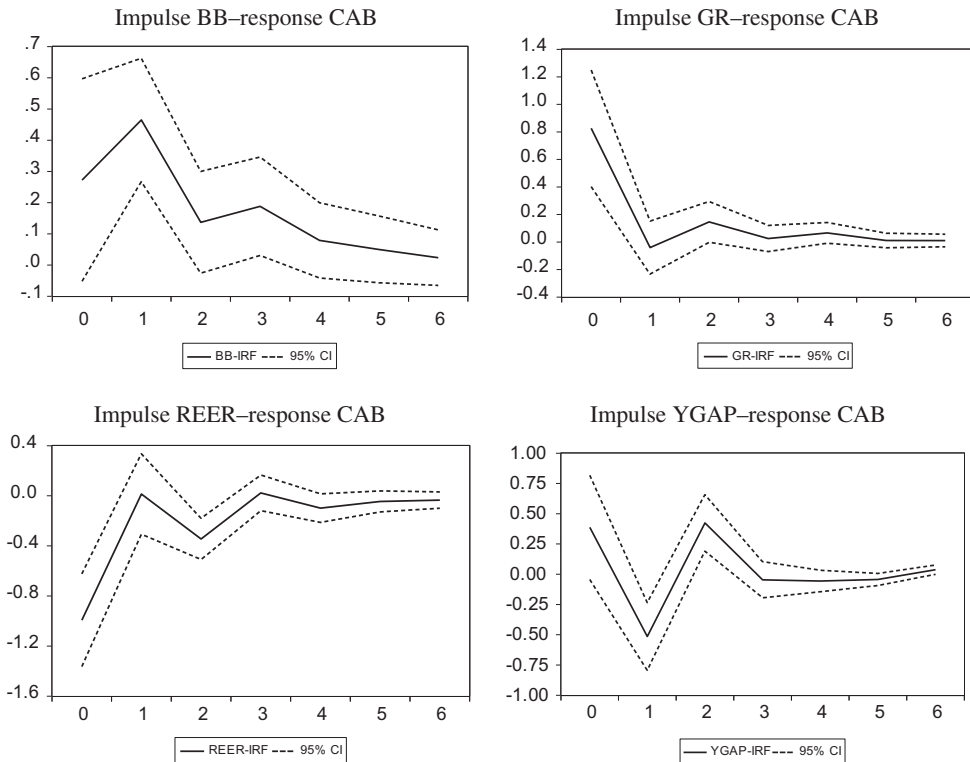
The correct lag length selection is essential for panel V.A.R.. If the number of lags is too small, the model is not able to capture the system's dynamics, leading to omitted variable bias. On the other hand, choosing too many lags causes a loss of degrees of freedom, resulting in over-parameterization. Based on model selection criteria developed by [Andrews and Lu \(2001\)](#) and the overall coefficient of determination, one lag was found to be enough to eliminate autocorrelation in the residuals for the panel V.A.R. specifications in both groups.

Figure 6 shows graphs of impulse responses for current account balance for the advanced European countries. The confidence intervals of the I.R.F.s are generated using a Gaussian approximation based on 1000 Monte Carlo draws from the estimated panel V.A.R. model, i.e., estimated coefficients and their variance–covariance matrix. Confidence intervals for the impulse responses are generated as the 5th and 95th percentiles of this distribution.

Positive effects of the variables GR and YGAP (instantaneous and in the second year) on the current accounts balance indicate the importance of export-driven growth in the economic activity of advanced countries. A moderate negative effect of shock in YGAP on the current accounts balance in the first year is probably a result of a lagged effect of higher income on domestic consumption and imports.

An appreciation of real effective exchange rate, unsurprisingly, has a negative instantaneous effect on the current account balance (negative competitiveness effect) as well as in the second year, suggesting that real appreciation worsens current account balance immediately as well as with a time lag of two years.

Finally, increases in budget balance (as a percentage of G.D.P.) have a positive effect on the current account balance, implying that in advanced countries fiscal consolidation associated with budget surplus (or budget deficit decrease) affects CAB positively.



**Figure 6.** Responses of current account balance to one standard deviation shocks for advanced European countries (in percentage of G.D.P.). (a) Impulse BB – response CAB; (b) impulse GR – response CAB; (c) impulse REER – response CAB; (d) impulse YGAP – response CAB. Source: Authors' calculations.

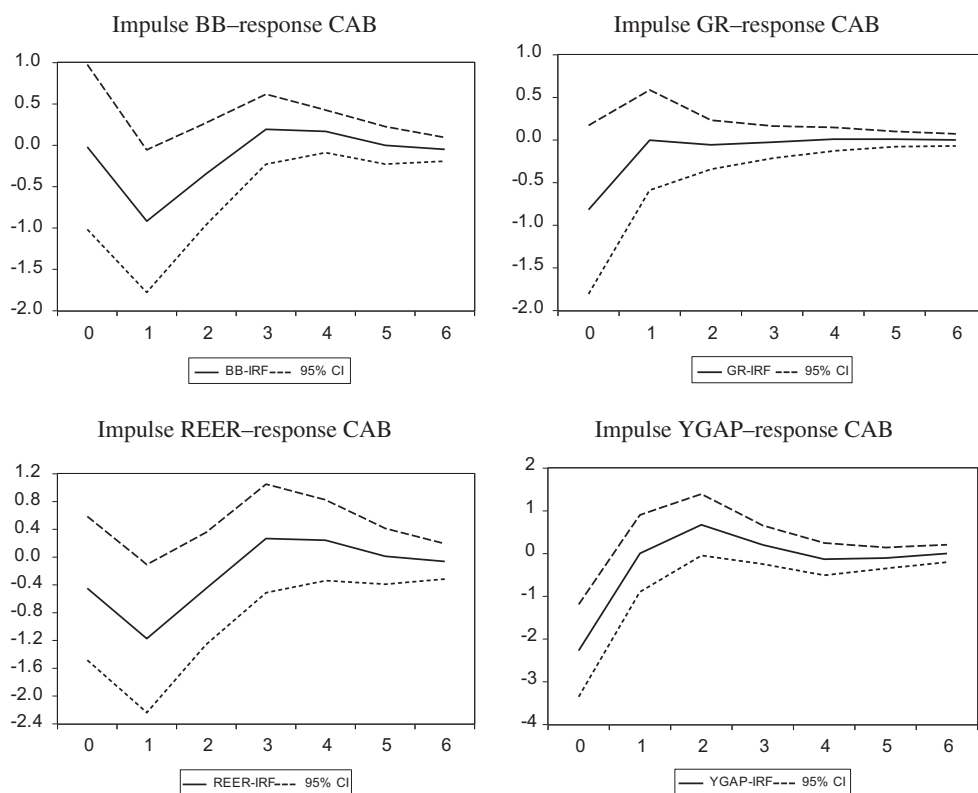
Note: impulse responses with 95% confidence intervals. The y-axis measures deviations from the baseline, while the x-axis represents years after shock.

Cumulative effects on current account balance are positive for all variables except for real effective exchange rate. A shock in real effective exchange rate has the largest (negative) cumulated effect on current account balance.

The variance decomposition for the advanced European countries (Table 2) shows that the highest portion of variation in the current accounts is explained by its own shocks. Shocks in output gap and in growth rate explain together about 25% of the current account balance total variation either in the short or long run. The exchange rate and budget balance together account for almost 30% of the CAB fluctuations. Compared to budget balance, the exchange rate shocks gain a relatively stronger weight in explaining CA fluctuations over time (almost 22%). The variance decomposition results do not seem to be very sensitive to the different time horizons considered.

The innovation analysis was also performed for emerging European Union countries. The analysis of the impulse responses (Figure 7) shows that, in the group of emerging countries, output gap has a very strong and negative instantaneous effect on the current account balance, which is more pronounced for this group of countries.

In the same way, CAB reacts to an increase in economic growth (GR). The instantaneous effect is negative but diminishes very quickly. A negative instantaneous response of the



**Figure 7.** Responses of current account balance to one standard deviation shocks for emerging European countries (in percentage of G.D.P.). (a) Impulse BB – response CAB; (b) impulse GR – response CAB; (c) impulse REER – response CAB; (d) impulse YGAP – response CAB. Source: Authors' calculations.

Note: impulse responses with 95% confidence intervals. The y-axis measures deviations from the baseline, while the x-axis represents years after shock.

**Table 2.** Forecast error V.D.C.s for advanced European countries: percentage of variation in current account balance explained by column variable.

Forecast horizon	Impulse variable				
	YGAP	GR	REER	BB	CAB
1	3.88	17.64	25.53	1.92	51.03
2	9.17	15.13	21.85	6.42	47.44
3	12.23	14.51	22.76	6.36	44.14
4	12.11	14.33	22.46	6.99	44.12
5	12.12	14.35	22.55	7.08	43.91
6	12.13	14.32	22.55	7.12	43.87

Source: Authors' calculations.

current account balance to the increases in economic growth (GR) and (YGAP) can be attributed to demand-driven growth.

The response of the current account balance to one standard deviation shock in the real effective exchange rate is negative in the first two years, with the highest impact in the first year. After the second year it gradually weakens and completely fades away after the fourth year. Since emerging countries have a fixed nominal exchange rate, the increase in the real



**Table 3.** Forecast error V.D.C.s for emerging European countries: percentage of variation in current account balance explained by column variable.

Forecast horizon	Impulse variable				
	YGAP	GR	REER	BB	CAB
1	26.18	3.39	1.03	0	69.4
2	23.51	3.05	7.21	3.84	62.4
3	24.62	2.95	7.82	4.21	60.4
4	24.63	2.93	8.08	4.34	60.03
5	24.59	2.91	8.29	4.44	59.77
6	24.62	2.91	8.29	4.44	59.74

Source: Authors' calculation.

exchange rate (real appreciation) is related to the increase in domestic demand financed by capital inflow from advanced countries. The cumulated negative effect of REER on CAB in emerging countries indicates a lower propensity to export. It is well known that pre-crisis current account developments in emerging countries were driven by huge capital flows and deterioration in competitiveness, as captured by REER.

An increase in the budget balance results in a decrease of the current account balance in the first two years, with the highest effect in the first year, after which it becomes almost insignificant.

In contrast to the group of advanced countries, all cumulative effects on current account balance for emerging countries are negative. The effects of output gap and REER are most pronounced. Negative cumulated effect on CAB as a result of shock in fiscal balancer indicates to the negative net effect of fiscal consolidation in emerging countries. From the well-known paradox of saving, an increase in willingness to save can lead to a decrease in overall saving and thus deteriorate the current account balance if investments are unchanged or decrease less than saving.

The results of variance decomposition for variable CAB for emerging countries (Table 3) reveal that the highest portion of variation in the current accounts is again mainly explained by its own shocks. G.D.P. growth rate and output gap together explain about 30% of CAB fluctuations, whereas REER explains about 8% of the variance. The real effective exchange rate and budget balance, together explaining about 12% of variation in current accounts, play a minor role in current account balance dynamics in emerging countries compared to the group of advanced countries.

Comparing the results of impulse response functions and variance decompositions reveals different roles for the analysed variables in explaining current account fluctuations in advanced and emerging countries. The positive effects of GR and YGAP on CAB in advanced countries are related with export-driven growth, which improves current account growth, while positive effects of BB can be explained with the twin deficit hypothesis. On the other hand, the negative effects of GR and YGAP in emerging markets are related with demand-driven growth, while strong negative effects of BB indicate that a budget deficit decrease (or surplus increase) is related with deterioration of current accounts. In the pre-crisis period demand growth enabled higher economic activity, which is related to a budget deficit decrease, but also to increased imports and worsened current accounts. In times of crisis demand declined and growth decreased, as well as tax revenues and imports, which deteriorated the budget balance but improved current accounts. REER has negative effects in both groups of countries but these are more pronounced in the emerging group.

This probably reflects the higher importance of price factors in comparison with non-price factors in emerging markets.

The results of variance decomposition show that economic growth plays a more important role for current account development in advanced markets than in emerging markets. Contrary to the advanced markets, the real effective exchange rate plays a less important role in emerging markets.

## 6. Conclusions

In this paper we establish the key factors that determine the current account balance for selected advanced and emerging European Union countries. Our sample includes the so-called core eurozone and emerging European Union economies with fixed and stable exchange rate regimes. Panel vector autoregression models are estimated separately for each group of countries with endogenous variables budget balance, current account balance (both expressed as a percentage of G.D.P.), growth rate of G.D.P., output gap (defined as a deviation of income from potential G.D.P.), and the real effective exchange rate.

Empirical results are somewhat different for country groups. The analysis of impulse response functions suggests that the real effective exchange rate has a negative effect on the current account balance in both groups, which is more pronounced in emerging than in advanced countries. Other variables (budget balance, growth rate of G.D.P., and output gap) affect current account balance positively in advanced countries and negatively in emerging countries. Growth rate and output gap effects on current accounts reflect sources of growth that are in emerging countries compared to advanced countries, which are mainly driven by domestic demand. The budget balance effect can be attributed to the twin deficit hypothesis in advanced countries and to demand-driven growth in emerging countries.

External balance fluctuations are mainly explained by their own shocks (44% in advanced countries and about 60% in emerging countries). Among other variables, economic activity captured by output gap explains the highest portion of current account balance variations in emerging countries. In advanced countries, in addition to economic activity (captured by growth and output gap), the real exchange rate also plays a prominent role in current account imbalances. However, these findings are consistent with the view that strong G.D.P. growth has been the key driver of current account deficits in emerging countries (until the recent crises).

Our findings suggest that with a growing financial integration and easy finance in the European Union a process for preventing imbalances is needed. Responsibilities for the imbalances can be attributed to both groups of countries as emerging (debtor) countries accumulated large debts and the advanced (creditor) countries provided large amounts of credit. Better credit market regulations and coordination of fiscal policies are needed to rebalance the fiscal stance across European Union countries. The European Union Commission's Macroeconomic Imbalance Procedure could be more effective by placing a symmetric emphasis on the restoration of external balances in deficit countries and by reducing the excessive surpluses in other countries.

The obtained results open up new questions. Is current account development mainly caused by changes in export or import? Does the relationship between budget balance and current accounts mainly depend on revenue or expenditure changes? Similar questions can also be put to the real effective exchange rate, whose effects can be viewed through changes

of nominal effective exchange rate and domestic and foreign prices. All of these questions should be an issue for future researchers.

The main limitation of this research is the fact that we did not take into account the role of financial integration in current account imbalances. We did not quantify the impact of financial integration in determining current account developments. It could be very fruitful for further research to examine, in a systematic manner, the impact of capital openness, not only in the eurozone, but also in emerging countries.

## Notes

1. Some non-European Union countries such as Switzerland, Norway, and Iceland are also advanced countries. In empirical analysis we focus on 'core' eurozone countries (France, Belgium, Netherlands, Germany, Austria, and Finland). Our sample includes emerging European Union countries with a fixed (or stable) exchange rate regime (Croatia, Bulgaria, Latvia, Lithuania and Estonia).
2. Determinants of intra-euro area current account imbalances are difficult to identify 'robustly', ex ante as well as ex post (Eichengreen, 2010).
3. Convergence only takes place as long as the sole relevant difference between core and periphery is the difference in capital stocks. If there are additional differences in human capital, economic policies, or institutions, convergence cannot be taken for granted.
4. Instead, some countries remained in the euro area and continued to run current account deficits, despite rapidly falling private capital inflows, which was possible because public capital replaced private capital. As private capital flows to periphery countries declined, foreign capital was replaced by the growing liabilities of their central banks to the European Central Bank and the central banks of individual euro area countries, a network known as the Eurosystem. This development took place within the Eurosystem's unified interbank payment network for cross-border transfers, known as TARGET2. In terms of balance of payments accounting, this can be seen as an accumulation of negative balances on the official foreign reserves account of periphery countries.
5. A similar argument also applies to highly euroized countries such as Croatia where negative balance sheet effect could exceed positive competitiveness effect and deteriorate economic activity.
6. Felipe and Kumar (2014) confirm (for the Southern euro area) that competitiveness problems come rather from a typology of their product instead of unit labour costs or productivity. Blanchard (2007) discusses the difficulties of achieving price competitiveness (through labour cost decreases or productivity increases) or increasing high technology exports for Portugal.
7. Since price level increases moderately in advanced countries, there is a possibility of a weak association between YGAP and REER as well as CAB. However, a positive relationship between YGAP and CAB is also possible if an increase in variable YGAP is associated with higher exports and an improvement in CAB.
8. Higher government expenditure or lower taxes decrease public savings but increase income and money demand, causing higher interest rates. Higher income or interest rates will increase private savings. If an increase in private savings growth exceeds the public savings decrease, overall savings will be higher. Investments positively depend on income and negatively on the interest rate, so the effect of a decrease in public savings on investment is unclear.
9. The group of emerging European Union countries is restricted to those having fixed or stable exchange rate regimes, like Croatia. Maintaining a broadly stable exchange rate of the kuna against the euro has been a key element of Croatia's economic policy strategy. The exchange rate serves as a key anchor for price stability given the country's high import dependency. Some of these countries have introduced the euro in recent years (Estonia in 2011, Latvia in 2014, and Lithuania in 2015).

10. Also, some companies in emerging European Union countries became more export-oriented, which also enhanced current account balances. Recently, the role of domestic demand on export competitiveness is tested by researchers such as Esteves and Rua (2015).
11. The ordering is partially based on the results of panel causality tests that are available upon request.
12. For both groups, stationarity of the variables is tested by Fisher-type panel unit roots tests (Choi, 2001). Tests reject the null hypothesis that all panels contain unit roots for all variables.
13. The crisis dummy variable is equal to one in 2009 to 2014 and zero for other years.

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No potential conflict of interest was reported by the authors.

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