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The Effect of Fiscal Deficit on the External Imbalances in the European Union

Summary: This paper analyzes the effect of the fiscal deficit on the current account deficit in the European Union during the period 1995-2018. The purpose is to examine to what extent an increase in government spending affects the deterioration of terms of trade and contributes to increasing external imbalances. Econometric methods for heterogeneous panel data models are used to analyse the existence of a long-run relationship between the fiscal deficit and the current account. The empirical findings indicate that the twin deficits hypothesis is not confirmed for the whole European Union, but only for a certain number of member states, where a long-run relationship still exists, confirming the impact of the fiscal deficit on the current account.

Keywords: Fiscal deficit, Current account, Twin deficit hypothesis, Panel unit root tests, Panel cointegration analysis, Heterogeneous panel data models with cross-sectional dependence.

JEL: C01, C52, E62, F40.

The economic and financial crisis has actualized the issue of sustainability of the current account deficit which has become important, not only economically, but also a political issue. At the same time, a large number of countries are facing with a growing current account divergence and a balanced current account is considered more as a rarity than as a rule in economic practice.

Although the EU as a whole has had a relatively balanced current account on the aggregate level, the divergences in external positions between member states have become more pronounced after the introduction of the euro (Philip R. Lane and Gian Maria Milesi-Ferretti 2007; Helge Berger and Volker Nitsch 2010; Jorge Uxó, Jesús Paúl, and Eladio Febrero 2011; Jose Luis Diaz-Sanchez and Aristomene Varoudakis 2014). A number of member states has increase its own external imbalance, which resulted in an increase of the trade deficit and the negative mean value of the current account in 16 countries during the period 1995-2018 (Greece, Portugal, Spain, Slovakia, Hungary, Malta, Cyprus, the UK, Poland, Czech Republic, Estonia, Latvia, Lithuania, Bulgaria, Romania and Croatia). Opposite the deficit countries, there are eight surplus countries. The highest surplus is achieved in Luxembourg (8.2% of GDP), followed by the Netherlands, Sweden, Germany, Denmark, Finland, Belgium and Austria. Finally, although they suffered significant external shocks, the average

current account balance was in slight surplus in France, Slovenia, Italy and Ireland. Looking at the range of external imbalances, the largest deficits are recorded in the years preceding the outbreak of the global economic crisis, when the current account deficit was at a level above 20% of GDP in Latvia and Bulgaria. Despite that, the highest levels of the current account surplus have been obtained in the years before the introduction of the euro and after 2012, as a result of measures and political strategies that have been implemented with the aim of reducing external imbalances in a significant number of EU countries.

Also, the increasing variations, during the crisis years clearly indicate that the current account divergences between the countries are particularly pronounced in this period. In the context of individual countries, based on the values of standard deviation and range, it can be concluded that the divergent trends of the current account imbalances are primarily expressed in Greece, Poland, Hungary, Malta, Estonia, Latvia, Lithuania, Bulgaria and Croatia.

Most of the literature on current account sustainability refers to the analysis of whether the continuation of the implementation of the actual economic policy, especially monetary and fiscal policy, requires large changes or causes the outbreak of the crisis. If the answer is positive, then the current account imbalance is unsustainable (Milesi-Ferretti and Assaf Razin 1996). In other words, the current account is sustainable if the country is able to meet their long-run intertemporal budget constraint, without large changes in behavior of private sector or changes in the leading economic policy (Alan M. Taylor 2002; Mariam Camarero, Josep L. Carrion-i-Silvestre, and Cecilio Tamarit 2009).

Regarding the external imbalances in the EU, a large part of the empirical research includes the analysis of whether and to what extent the introduction of the euro and the implementation of harmonized monetary policy had an impact on the current accounts of the member states. On the trade aspect, the policy of a fixed nominal exchange rate automatically limited the use of exchange rate as a shock absorber. From financial side, the elimination of currency risk and reduction of transaction costs in financial operations resulted in increase of capital flows between countries. Different initial conditions in terms of current account balance, consumer prices, labour costs, fiscal policy and the responsibility of national governments had an impact on increasing the difference in trade capacity between countries and deepening external imbalance. However, reduced external competitiveness but increased deficit of trade flows and the level of national debt in less-developed countries, have greatly contributed to the creation of the economic dualism between the countries of the core and the periphery of Europe.

It seems that the establishment of the EMU itself assumed the existence of current account imbalances because it implied the inclusion of countries that could be at different phases of the business cycle. In other words, different economic performance of individual countries have greatly affected the ability of countries to absorb asymmetric shocks, regardless of whether they are domestic shocks or common shocks that could have an uneven effect on member states (Jesús Ferreiro et al. 2017). Hence, one part of the empirical literature agrees on the view that the circumstances that have occurred after the creation of EMU did not meet expectations and that the real

divergences and differences in external competitiveness between member countries are further increased (Berger and Nitsch 2010; Emiliano Brancaccio 2012; Jean-Baptiste Gossé and Francisco Serranito 2014).

It is known that the two most important macroeconomic policies are not uniformly defined in the monetary union. Given that monetary policy is centralized, which means a loss of monetary independence, the impact of fiscal policy on the current account can be viewed through several aspects. Firstly, the implementation of fiscal expansion and rise in government spending on that basis has an impact on the increase in demand. This further implies that a part of the increased national absorption is covered from imports, which contributes to the worsening of the current account balance. Then, in the case of permanent external imbalances, attracting foreign capital from issuing government bonds leads to interest rates increase, which further adversely affects the accumulation of external debt and rising interest payments. In fact, the cost of current government borrowing will fall to burden on future generations (Mark J. Holmes, Jesús Otero, and Theodore Panagiotidis 2010). Despite that the inflow of foreign capital facilitates the finance of the trade deficit, a rising demand for the national currency leads to its appreciation with a negative consequence on the balance of trade transactions. Regardless of whether fiscal policy has a direct or indirect impact on the external balance, twin deficit hypothesis implies that a higher budget deficit contributes to increasing the current account deficit.

Based on numerous studies which emphasize the importance of this topic, in this paper we tested the twin deficit hypothesis in order to examine whether the increase of the fiscal deficit had an impact on the deepening of the external imbalances in the European Union. Therefore, the objective of this research is to provide a deeper insight on the effect of fiscal deficit on current account balance in European countries. It is important to emphasize that the analysis of the empirical validity of the twin deficit hypothesis on a sample that includes all countries of the European Union has been tested only in a recent article of Marianna Siničáková, Veronika Šuliková, and Beáta Gavurová (2017) by applying Granger causality test and panel threshold model.

The contribution of this paper is at least twofold. First, a theoretical dimension of the impact of fiscal deficits on the current account is provided and the twin deficit hypothesis is tested on a sample of all EU countries during the period 1995-2018. Considered period is interesting because it involves significant turbulence both at EU and global level. This primarily refers to the continuous expansion of the European Union which means the entry of countries with different production and productive capacity, as well as the consequences of the introduction of the single currency and the adoption of a significant number of common sectoral policies. Also, we cannot ignore the events on the global stage, which are primarily related to the escalation of financial and economic crisis, including spillover effects on all member states. Finally, the methodological contribution of this research involves econometric methods that have not been applied earlier in the analysis of twin deficit hypothesis. This includes heterogeneous panel data models with cross-sectional dependence and estimation methods. To the best of our knowledge Pesaran common-correlated effects mean group (CCEMG) approach has not been used so far in the literature on the impact of fiscal deficit on current account balance and heterogeneous regression coefficients are not considered in this

area. On this basis, the implementation of CCEMG method enables us to test the twin deficit hypothesis for the whole EU, as well as to determine in which specific countries there is a long-term effect of fiscal deficit on the current account deficit.

The paper is structured as follows. After the introduction, Section 1 explains the theoretical aspect of the effectiveness of fiscal policy and the mechanisms through which fiscal deficit affects the current account deficit. Section 2 provides an overview of previous literature about the twin deficit hypothesis in the EU. Section 3 deals with econometric procedure applied in the paper, followed by key results of empirical analysis presented in Section 4. Finally, Section 5 provides a summary of the obtained results and concluding remarks.

1. Fiscal Policy and Current Account

1.1 Theoretical Doubts about the Impact of Fiscal Deficits on the Current Account

Concerning the impact of fiscal deficits on the current account balance, two fundamentally opposing views about the effectiveness of fiscal policy prevail in the literature, beginning with the full justification to practical neutrality:

(1) According to Mundell-Fleming model, the twin deficit hypothesis is confirmed in the sense that the increase of fiscal deficit causes the increase of aggregate demand. This implies the rise of domestic against foreign interest rate and results in an increased inflow of foreign capital (Nikolina E. Kosteletou 2013). As expected, this leads to an appreciation of the real exchange rate with negative consequences on the deterioration of the current account balance.

The impact of the fiscal deficit on the current account is supported by the advocates of Keynesian theoretical position in the sense that the fiscal expansion, through the growth of the budget consumption, leads to the increase in the national absorption which is reflected in the encouragement of imports causing a deterioration in the current account balance (Dominick Salvatore 2006; Antonio Afonso and Christophe Rault 2009).

In contrast to the impact from the direction of fiscal deficit to the current account deficit, one part of the empirical literature supports the position that the current account deficit achieves the effect of reducing the rate of economic growth and decline of tax revenue, which is finally reflected in the increase in the budget deficit. Therefore, it is the reverse direction of the impact from the current account deficit to the fiscal deficit (Carlos F. Marinheiro 2008; Joseph E. Stiglitz 2010).

(2) Supporters of the Ricardian hypothesis is on the position that in the case of increasing the budget deficit, economic agents anticipate a tax increase in the future and make a decision to increase savings in the current period. In this way, increase in domestic savings neutralize the effects of fiscal expansion and there is no increase in domestic demand and the downturn in the current account balance. In other words, the tax reduction does not affect the domestic demand nor by increasing disposable income nor by an impact on overall consumption and investment. It appears that the decline in government saving, which is the result of the tax burden reduction, is covered by the

growth of private savings without affecting the change in the current account (Robert J. Barro 1989; George Vamvoukas and Stella N. Spilloti 2015).

1.2 Mechanisms of the Impact of Fiscal Deficits on the Current Account

Considering the relationships between the fiscal balance and current account, the subject of numerous studies is to identify the mechanisms through which budgetary imbalances cause changes in exports and imports (Roel M. W. J. Beetsma, Massimo Guiliodori, and Franc Klaassen 2008; Michael Kumhof and Douglas Laxton 2009; Ali S. M. Abbas et al. 2011; Collin Constantine 2014). In this regard, several mechanisms through which increasing fiscal deficit deepens trade divergence are identified:

(i) Since the demand of the public and private sectors are two components of national demand, the most direct impact of the fiscal deficit on the current account deficit is achieved particularly through the channel of *aggregate demand*. It means that overall demand growth is a direct result of the government spending growth which reflects negatively on the trade balance (Abbas et al. 2011).

(ii) Issuing government bonds is one of the alternative ways of financing budget deficits, regardless of whether they are the result of a lower tax burden or higher levels of government spending. With the aim of attracting the mostly foreign capital, the purchase of these bonds is offered under more favorable conditions for investors which implies a higher interest rate. It means that changes in *interest rates* are also an important mechanism of the impact of the fiscal deficit on the current account balance (Kosteletou 2013).

(iii) As already pointed out in this paper, fiscal expansion affects the growth of aggregate demand which is further manifested in the increase in imports and the deterioration of terms of trade. On the other hand, financing the current account deficit requires the inflow of foreign capital, which leads to an increase of demand for the national currency and its appreciation. So, it is obvious that the *exchange rate* is another important channel for transferring the imbalance from fiscal sector on the current account. However, the mechanism of the impact of fiscal deficits on the current account is different if there is a lack of nominal exchange rate flexibility. This implies that in a monetary union, fiscal policy affects the external imbalance through its influence on the inflation rate differentials. It also depends on the presence of rigidities in product and labor markets in the sense that less flexible markets have a higher current account deficit than others (Berger and Nitsch 2010).

Nevertheless, it is important to note that the real appreciation can occur in conditions of increased government consumption of non-tradable goods (Agustín S. Bénétrix and Lane 2013; Oscar Bayo-Rubio, Burcu Berke, and Vicente Esteve 2014). Also, as one of the possible generator of the current account imbalance is well known Balassa-Samuelson effect, which means that differences in the labor productivity between tradable and non-tradable sectors are resulted in a different price levels between countries. In other words, the growth of labour productivity and wages in the tradable goods sector in one country results in the price increase in non-tradable goods sector, leading to the appreciation of the real exchange rate (Matthias Gubler and Christoph Sax 2017).

(iv) Observing the current account in the context of the *saving-investment level*, deficit indicates a significant increase in investment compared to savings. Since the fiscal deficit affects negatively the level of net national savings, it is necessary to distinguish whether it is a result of higher investment growth due to the expected higher profits or a reflection of the lack of savings due to excessive government spending. Also, if the amount of savings is chronically less than the amount which is needed to finance domestic investment, this leads to significant accumulation of foreign debt, which includes attracting foreign capital through higher interest rates or borrowing abroad under unfavorable conditions.

2. Literature Review

Although empirical literature contains a large number of research on the topic of macroeconomic policies and their appropriate mix, most of studies have paid more attention to the monetary sphere in relation to the fiscal. Nevertheless, taking into account the negative impact of the fiscal deficit on the overall economic and development environment, this sensitive field is gaining in importance in recent years.

Dealing with the impact of the fiscal deficit on the current account deficit, the empirical results based on general dynamic equilibrium model suggest that the fiscal deficit exerts some immediate effect on the current account (Kumhof and Laxton 2009). However, it takes a long time to clearly distinguish the implications of this phenomenon in relation to other factors that characterize the economic daily life of the national economy. Precisely, authors found that the increase in the fiscal deficit for one percentage leads to a deterioration in the current account by 0.5% in the short-term, while long-term imbalance increases to 0.75 to 1%, depending on the size and openness of the economy itself.

Regarding the impact of fiscal imbalance on current transactions, the empirical findings based on panel VAR analysis indicate that the improvement of the fiscal balance by 1% affect positive change in relation of exports and imports by 0.2-0.3% (Abbas et al. 2011). Based on a sample of 176 countries during 1980-2007, the authors also emphasize that the relationship between the fiscal deficit and the current account deficit is found to be as strong in emerging economies and those with low-income level as in advanced economies, and significantly stronger in countries where output is above potential.

Concerning testing different theories about the effects of fiscal policy and budget deficit on the current account, it is argued that the growth of government spending and savings reduction increase the imports due to the growth of total demand. The results obtained by using finite-horizon open-economy macroeconomic models also indicate that bond-financed increase in government expenditures has a stronger negative impact on the current account compared to tax-financed alternative (Hassan Mohammadi 2004). Namely, the increase of the tax burden, with the aim of financing budget deficits, affects the deterioration of the current account from 0.16 to 0.29%, while the issuance of bonds increases the deficit by 0.45 to 0.72%.

Focusing on causality between fiscal and current account deficit, the empirical results based on structural VAR model suggest that the increase in government spending by 1% does not affect current deterioration of the current account balance, but with

a time lag (0.5% increase of deficit comes after three years; Tommaso Monacelli and Roberto Perotti 2007). Also, empirical literature confirms more common impact of fiscal changes to the current account in the long-run in economies with higher share of international exchange in GDP (Giancarlo Corsetti and Gernot J. Müller 2006).

Analyzing the relationship between fiscal deficit and the current account in small open economies, John Bluedorn and Daniel Leigh (2011) confirm the twin deficit hypothesis for 17 OECD countries over the period 1978-2009. According to their results, a 1% of GDP fiscal consolidation raises the current account balance-to-GDP ratio by about 0.6 percentage points within two years. In other words, reducing the external imbalances by 1% of GDP would require a fiscal consolidation of about 1.7% of GDP.

Using a two-sector dependent open economy model, Santanu Chatterjee and Azer Mursagulov (2012) investigated the mechanism through which government spending affects the real exchange rate and trade flows. The authors suggest that the sectoral composition of spending, financing policies, investment in certain manufacturing areas and the relative productivity of public infrastructure, basically determine the final effect of higher public expenditure on the appreciation or depreciation of the currency and, consequently, to the movement of imports and exports. Dealing with similar issues about the impact of government spending on the real exchange rate changes, the results of panel VAR model for eleven EMU countries indicate that fiscal shocks have more influence on the non-tradable sector compared to tradable goods (Bénétrix and Lane 2009). However, the authors found that shocks in government absorption lead to the real exchange rate appreciation, while shocks in public investment have a larger and more persistent impact on the real exchange rate than shocks in government consumption. In that circumstances, the most important effects are the increase in imports and exports reduction, with negative implications on the current account.

Twin deficits hypothesis is confirmed in case of selected EU countries (Spain, Greece, Portugal, Italy, France, Cyprus and Slovenia) during the period 1991-2010 (Kosteletou 2013). Namely, it is shown that an expansive fiscal policy worsens trade balance, as well as the implemented fiscal policy option in surplus countries (particularly Germany) has an impact on current accounts in the observed EU countries. In fact, it is emphasized that fiscal coordination between European countries is extremely important to reduce the trade imbalance. Also, using the Granger causality testing and panel threshold model on a sample that covers all EU member states during the period 2000-2014, the twin deficit hypothesis is accepted in at least half of the EU countries (Siničáková, Šuliková, and Gavurová 2017). Traditional view that fiscal deficit causes the current account deficit is confirmed in the case of the Netherlands, Greece, Italy, Portugal, Cyprus, Czech Republic, and Croatia. Opposite causality or current account targeting is confirmed in six countries (Belgium, Finland, France, Ireland, Malta, and Romania) while bi-directional causality is found in Spain and Hungary. The authors argue that bi-directional causality is the most complicated situation in practise, because policy makers have to reduce both imbalances at the same time, in order to solve this problem. Besides this conclusions, empirical findings show that countries with public debt-to-GDP lower than 30.7% do not record twin deficit, while countries with public

debt-to-GDP between 30.7and 98.1% have a greater risk of twin deficit. On the other hand, the results emphasize that countries with public debt-to-GDP in long-run over 98.1% suffer from high and persistent twin imbalances.

According to the dynamic panel threshold model, empirical results on a sample of 22 industrial countries during the period 1981-2005, suggest that an increase in the fiscal deficit leads to a higher current account deficit in low debt and medium debt countries (up to a debt level of 44% of GDP). In a medium-to high debt countries (debt ratio is between 44% and 90% of GDP) the relationship is still positive but considerably smaller, while for the countries with debt ratios of above 90% of GDP the relationship is negative and insignificant. This means that increase in budget deficit does not result in a rise in the current account deficit (Christiane Nickel and Isabel Vansteenkiste 2008). Repeating the estimation for 11 euro area countries, the authors find similar findings in the sense that relationship between fiscal balance and current account is positive when government debt to GDP remains below 80%. Thereafter the relationship is negative and insignificant.

On the other hand, Aleksander Aristovnik and Sandra Djurić (2010) reject the validity of the twin deficit hypothesis for all EU member states during the 1995-2008. The results indicate the presence of high level of substitutability between private and public savings and suggest a relatively low correlation between fiscal deficit and current account deficit.

The results of the comparative analysis of the key determinants of the current account show that the fiscal deficit effect is larger in developing economies than in developed countries (Leandro Medina, Prat Jordi, and Thomas Alun 2010). Similar findings were obtained in studies of foreign trade relations in transition countries, where the results suggest a significant impact of the fiscal deficit, foreign direct investment and exchange rate on the current account balance (Paolo Zanghieri 2004). Testing results of the influence of various factors on the movement of the current account in the transition countries show that the increase in the fiscal deficit by 1% affects the increase of the current account deficit by 0.3-0.4% (Aristovnik 2006).

One part of previous studies proved the twin deficits hypothesis, implying positive and statistically significant relationship between the budget balance and the current account (Menzie D. Chinn and Enswar S. Prasad 2003; Matthieu Bussière, Marcel Fratzscher, and Gernot J. Müller 2004; Sabine Herrmann and Axel Jochem 2005; Sebastian Barnes, Jeremy Lawson, and Artur Radziwill 2010; Erica Clower and Hiro Ito 2012; Anna Ivanova 2012; Tatiana Cesaroni and Roberta de Santis 2015; Vamvoukas and Spilloti 2015).

Contrary to previous findings which mainly investigate the impact from fiscal deficit to external imbalances, the empirical results for the Eurozone countries indicate that the differences in export performance of individual economies may not result in balanced trade relations and that the impact is achieved from the direction of the trade deficit to fiscal imbalances. This implies that the current account balance is not the result of irresponsible fiscal policy, but of the exchange of goods and services between countries. In other words, fiscal austerity has no ability to solve the problem of structural current account deficit (Constantine 2014).

3. Methodology Framework

In this section, the econometric panel data techniques, used in empirical analysis, are briefly described. Since the empirical analysis in this paper is based on panel sample of 28 EU countries in the period of 24 years (1995-2018), one of the first steps in econometric procedure should be testing for nonstationarity in panels. Bearing in mind that the results of the cross-section dependence tests determine the choice of further testing and estimation procedure, the Pesaran CD test is initially applied (M. Hashem Pesaran 2004, 2007). Thus, if the cross-section dependence exists in the panel data, second generation unit root tests should be used for testing the level of integration, such as Pesaran CADF and CIPS tests. After preliminary econometric analysis, panel data cointegration analysisis conducted in order to check the long-run relationship between fiscal balance and current account. For this purpose the error-correction based Westerlund cointegration test for panel data is applied.

Compared to the first generation cointegration tests, the main advantage of the Westerlund test is that it accounts for the presence of cross-section dependence in panel data by using the bootstrap approach. This implies calculating the bootstrapped *p*-values that are robust in the presence of common factors. Also, in contrast to the most of residual-based cointegration tests, there is no problem of common-factor restriction, which further increases the power of the Westerlund test (Joakim Westerlund 2007; Westerlund and David Edgerton 2007; Aynur Pala 2016).

Westerlund (2007a) defined four tests to test cointegration in panel. The null hypothesis assumes that there is no cointegration, while there are differences regarding the definition of alternative hypotheses. The first two tests are based on the group mean approach and statistics, G_τ and G_α, are used to test the null hypothesis: $H_0: \alpha_i = 0$ for all i (cointegration does not exist) against the alternative: $H_1: \alpha_i < 0$ for at least one i (cointegration exists in some of the panels). The other two tests are based on the pooling of the all units of panel and using the statistics P_τ and P_α for testing the defined hypothesis: $H_0: \alpha_i = 0$ for all i (cointegration does not exist) against: $H_1: \alpha_i = \alpha < 0$ for all i (variables are cointegarted in all panels).

Testing the null hypothesis is based on checking if the error-correction term in panel error-correction model is equal to zero. In that case, error-correction model is specified as follows (Damiaan Persyn and Westerlund 2008):

$$\Delta y_{it} = \delta_i' d_t + \alpha_i (y_{it-1} - \beta_i' x_{it-1}) + \sum_{j=1}^{p_i} \alpha_{ij} \Delta y_{it-j} + \sum_{j=0}^{p_i} \gamma_{ij} \Delta x_{it-j} + u_{it}, \quad (1)$$

where d_t denotes deterministic component, for which there are three cases: (i) $d_t = 0$, model without deterministic component; (ii) $d_t = 1$, model with a constant; (iii) $d_t = (1, t)'$, model with a constant and a trend. Long-run relationship exists if the component $y_{it-1} - \beta_i' x_{it-1}$ is stationary and if the residuals are stationary. In other words, if $\alpha_i < 0$ then there is error correction, which means that x_{it} and y_{it} are cointegrated. On the other hand, if $\alpha_i = 0$ there is no error correction and no cointegration between x_{it} and y_{it} (Westerlund 2007).

Rejection of the null hypothesis of no cointegration implies examination of long-run relationship by the estimation of the error correction model (Westerlund

2007). Since the long-run relationship can be homogeneous or heterogeneous, both mean group estimator (MG) and pooled mean group estimator (PMG) are applied. MG method refers to the mean of estimated *N* individual regression coefficients, while the PMG method includes pooling and averaging the coefficients of the model (Pesaran and Ronald Smith 1995; Pesaran, Yongcheol Shin, and Smith 1999). Also, PMG method assumes homogeneous long-run slope coefficients (common across all panels), but heterogeneous short-run dynamics, while MG method assumes heterogeneity for both long-run and short-run coefficients.

The choice between the MG and PMG estimators depends on Hausman test result, which under the null hypothesis assumes that both estimators are consistent, but MG estimator is inefficient. However, if the null hypothesis is rejected (true model is heterogeneous) then MG estimator remains consistent, whereas the PMG estimator is inconsistent.

Under cross-sectional dependence, Pesaran common-correlated effects mean group (CCEMG) method can be applied instead of MG and PMG methods. This method implies heterogeneous both regression coefficients and factor loadings as a consequence of unobserved common factor, which can capture cross-section dependence. In contrast to the methods that obtain coefficients estimates with common factors (MG and PMG), the specificity of CCEMG estimator is reflected in the elimination of the influence of uneven various shocks from the model and then estimating the regression which is expanded with the averages of cross section data (Pesaran 2006). In other words, an important feature of this method is its invariance to the number of unobserved common factors. Similar to the MG method, the estimates obtained by applying CCEMG methods are based on the average of individual slope coefficients.

In fact, Pesaran (2006) starts from the following regression:

$$y_{it} = \alpha_i' d_t + \beta_i' x_{it} + u_{it}\,,\; u_{it} = \gamma_i' f_t + \varepsilon_{it}\,, \tag{2}$$

and d_t is a $n \times 1$ vector of observed common factors which is divided as $d_t = (d_{1t}', d_{2t}', d_{3t}')'$, where d_{1t} is a vector of deterministic components, d_{2t} is a vector of unit root stochastic observed common factors, and d_{3t} denotes the vector of stationary stochastic observed common factors. Also, x_{it} is $m \times 1$ vector of observed individual-specific regressors on i^{th} cross section unit at time t, u_{it} error term with multifactor structure, f_t is a $k \times 1$ vector of unobserved common effects with heterogeneous factor loadings γ_i and ε_{it} idiosyncratic errors independent of d_t and x_{it} (Pesaran 2006; George Kapetanios, Pesaran, and Takashi Yamagata 2011).

For obtaining estimations using CCEMG method, Pesaran (2006) suggests the use of the average of the estimated slope coefficients:

$$\hat{\beta}_{CCEMG} = N^{-1} \sum_{i=1}^{N} \hat{\beta}_i, \tag{3}$$

where $\hat{\beta}_i = (X_i' \bar{M}_\omega X_i)^{-1} X_i' \bar{M}_\omega y_i$, $X_i = (x_{i1}, x_{i2}, \ldots, x_{iT},)'$ and $y_i = (y_{i1}, y_{i2}, \ldots, y_{iT},)$. $\bar{M}_\omega$ is defined as: $\bar{M}_\omega = I_T - \bar{H}_\omega (\bar{H}_\omega' \bar{H}_\omega)^{-1} \bar{H}_\omega'$ and $\bar{H}_\omega = (D, \bar{Z}_\omega)$, while D and $\bar{Z}_\omega$ denote the $T \times n$ and $T \times (k+1)$ matrices of observations d_t and $\bar{z}_{\omega t}$.

The investigation of long-run relationship between fiscal deficit and current account in this paper is conducted by using not only MG and PMG, but also CCEMG method. The reason for that is the fact that the EU countries are strongly associated

from the trade and financial aspect, implying they are often exposed to common shocks. Taking into account the presence of the cross-section dependence which arises due to unobserved common factors and heterogeneous factor loadings, the final conclusions are formed on the basis of CCEMG estimation results.

4. Empirical Results

In this section, we present the results of the econometric analysis of the impact of the fiscal deficit on the current account deficit in all member states of the European Union over the period 1995-2018. The source of data is World Economic Outlook Database - International Monetary Fund. Both variables, current account and fiscal balance are expressed as a percentage of GDP.

The first part of the empirical findings includes the descriptive analysis of variables in order to gain an initial insight about the the fiscal balance and current account dynamics in the EU.

Table 1 Summary Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Current account	672	-0.9648	5.5618	-23.7150	15.3110
Fiscal balance	672	-2.6486	3.2964	-32.1780	6.7360

Source: Authors' estimations.

As resulting from Table 1, the mean value of the current account in the EU was negative (-0.9648) with a high variations across individual member states (from -23.7150 to 15.3110). Similarly, the mean value of the fiscal balance was also negative (-2.6486), while the spread of fiscal imbalance suggests that countries differ significantly in terms of the level of government spending. The values of the current account and fiscal balance by individual countries are presented in the Appendix (Tables A1 and A2).

It is known that after the introduction of a single currency and a common monetary policy, the achievement of macroeconomic stability at the national level is limited by the capacity of fiscal policy. Fiscal coordination between the EU countries refers to the fact that countries must adhere to the criteria defined by the Stability and Growth Pact[1]. Actually, these criteria are set to enable member states to achieve sustainable public finances. However, the experience of European countries indicate that the amount of the budget deficit and public debt exceeded the quantitative restrictions in a number of countries over the last decade.

Taking into account that the period of analysis is heterogeneous in terms of enlargement of the EU, the establishment of EMU and adverse changes in the global level, EU member states can be divided into several groups based on the evolution of the current account and fiscal deficit over time (Figure A1, Appendix).

The first group includes countries that have managed to achieve the highest levels of the current account surplus in the EU (Germany, Netherlands, Luxemborg,

[1] The budget deficit of each Member State must not exceed 3% of GDP while public debt must not exceed 60% of GDP.

Austria, Denmark and Sweden). This group also contains France, Belgium and Finland, bearing in mind that the mean value of current account in these countries was positive, but the trade balance is still moved from surplus to phase of a slight deficit after the outbreak of the global economic and debt crisis.

The second group involves countries with significant external imbalances, which are considered as the most vulnerable countries of the European Union (Portugal, Ireland, Italy, Greece, Spain and United Kingdom). Also, with the exception of Spain in 2005, 2006 and 2007 and Ireland in the years before the outbreak of the global crisis, it is evident that external imbalances were accompanied by a chronic public finances imbalances.

Third group is the most heterogeneous group in terms of the current account balance. On one side, there are countries where the terms of trade improved after 2009/2010 years. Nevertheless, these countries recorded a current account deficit by the end of analysed period (Cyprus, Poland, Slovakia, Estonia, Latvia and Lithuania). On the other side, there are countries that had a current account deficit during the first fifteen years, but they still managed to achieve a current account surplus in recent years (Czech Republic, Hungary, Slovenia and Malta).

The last group contains countries that joined the European Union during the last two enlargements, in 2007 and 2013. Bulgaria had the most serious external imbalance during the crisis years in relation to all other member states (Table A1). Adverse terms of trade were also achieved in Romania and Croatia. The current account balance has improved after 2009 in all three countries, while Croatia and Bulgaria even managed to move into the phase of the current account surplus in recent years.

According to the dynamics over the period 1995-2018, we can notice some degree of coordinated movements between current account and fiscal balance in the sense that periods of increase in government spending are accompanied by a deterioration of the current account. This is particularly evident in countries with strong external imbalance, which during the period of escalation of the global economic crisis and subsequent debt crisis had the highest levels of budget deficit and public debt in relation to other member states (Portugal, Greece, Czech Republic, Poland, Romania, Croatia).

Relying on above observed relation and bearing in mind that the twin deficit hypothesis implies the estimation of long-run relationship between the fiscal deficit and the current account, testing for cointegration in panel data is conducted. Before cointegration testing, we initially used panel unit roots tests to check the level of integration of each variable. To choose between the first and second generation panel unit roots tests, cross-section dependence (CD) test is applied. Since N dimension is larger than T, we used Pesaran CD test[2].

Knowing that the first generation panel unit root tests are based on the assumption of cross-section independence, Pesaran CD test results lead us to choose the second generation unit root tests. Therefore, Pesaran panel unit root test in the presence of cross-section dependence is used. This test implies under the null hypothesis that all panels contain unit root, while the alternative hypothesis assumes stationarity (Pesaran 2007). Testing for stationarity is based on the model with constant because the

[2] Results of the Pesaran CD test are not reported, but they are available from the authors upon request.

graphical representations of the movement of the fiscal balance and the current account cannot clearly detect the existence of the deterministic trend, but also since the inclusion of the deterministic trends results in lower power of the test (John Elder and Peter E. Kennedy 2001; Pesaran 2007).

Table 2 Pesaran Unit Root Test

Variable	Level			First difference	
	CADF $\bar{t}$- statistic	CIPS $Z(\bar{t})$ -statistic	*p*-value	CIPS $Z(\bar{t})$ -statistic	*p*-value
Current account	-1.262	2.633	0.996	-3.885	0.000
Fiscal balance	-1.459	1.571	0.942	-3.740	0.000

Notes: The maximum number of lags for both variables is four and is determined by using the Akaike information criterion.

Source: Authors' estimations.

Presented results in Table 2 suggest that both current account and fiscal balance have a unit root, while their first differences are stationary.

Relying on the conclusions about the cross-section dependence and the level of integration, further econometric analysis relates to testing the cointegration between fiscal deficit and the current account. For this purpose second generation Westerlund cointegration test is applied (Westerlund 2007; Westerlund and Edgerton 2007). The weak exogeneity of regressors is requirement for this cointegration test. This assumption determines the power of cointegration test as well as the relevance of the conclusions based on the estimated error correction model (Westerlund 2007). Additionally, to check the causality between the fiscal balance and current account, we used the Granger causality test for the whole panel, which is applied on the first differences of variables, and Dumitrescu&Hurlin causality test which examines the presence of heterogeneous causality in the panel (Jochen Hartwig 2009; Luciano Lopez and Sylvain Weber 2017).

Table 3 Causality Tests (Granger and Dumitrescu&Hurlin)

Hypothesis	Fiscal deficit → current account deficit
Granger causality test	
H_0: causality does not exist H_1: causality exist	*F*-statistic: 6.92 *p*-value: 0.0087
Dumitrescu&Hurlin causality test	
H_0: causality does not exist H_1: causality exist for at least one *i*	*W*-statistic: 3.590 $\bar{Z}$-statistic: 7.7560 *p*-value: 0.0000

Source: Authors' estimations.

The results of the Granger test indicate that the null hypothesis of no causality can be rejected at the 5% level of significance (p-value = 0.0087), thus confirming the causality direction from fiscal deficit to current account deficit (Table 3). Also, in accordance with expectations, Dumitrescu&Hurlin test results indicate the existence of heterogeneous causality, which confirms the adequacy of the use of Westerlund cointegration test in heterogeneous panels.

Table 4 Westerlund Cointegration Test

Statistic	Value	*Z*-value	*p*-value	*p*-value (bootstrap)
G_t	-0.758	1.113	0.867	0.378
G_a	-2.279	1.772	0.262	0.081
P_t	-4.308	-1.376	0.084	0.042
P_a	-5.951	-1.689	0.048	0.027
AIC, lags: 1				
AIC, leads: 1				

Notes: Robust *p*-values were obtained by a bootstrap procedure with 400 replications.

Source: Authors' estimation.

Based on the realized values test statistics (except for G_t) and the corresponding robust p-values, we can conclude that the null hypothesis of no cointegration can be rejected: in case of G_a test at 10% significance level, while for P_t and P_a tests at 5% significance level (Table 4). Therefore, we have evidence of cointegration between the fiscal deficit and the current account for at least one panel and at the level of the whole panel.

Bearing in mind that short-term dynamics of cointegrated variables is primarily influenced by the deviations from the equilibrium level, in order to assess the speed of adjustment to long-run equilibrium, the next step is to estimate error correction model. Knowing that a long-run relationship between the variables can be homogeneous and heterogeneous, we implemented both MG and PMG method.

Table 5 Error Correction Model (MG and PMG Method)

	Error correction		Hausman test
	Coefficient	*p*-value	
MG	-0.2269	0.000	Test statistic: 0.01
PMG	-0.1376	0.000	*p*-value: 0.9093

Source: Author's estimations.

The results in Table 5 show that the estimated coefficients of error correction model satisfy initial criteria that they are negative, less than one and significant at the 1% of significance level. In comparing the PMG and MG estimators, the MG estimator is based on assumption that all coefficients are heterogeneous both in the short and in the long-run analysis, while PMG estimator involves the restriction for long-run coefficients to be the same across group and relax this restrictions for the short-term, where coefficients and intercepts are allowed to vary (Guiseppe Caivano and Nicola D. Coniglio 2016). The assumption of a long-run homogeneity increases the efficiency of the estimates because it reduces the standard errors of the long-run coefficients (Pesaran, Shin, and Smith 1999). Result of Hausman test indicates that the null hypothesis cannot be rejected, so that we conclude that PMG estimator as the efficient estimator under the null hypothesis, is preferred (Edward F. Blackburne and Mark W. Frank 2007). The negative and statistically significant coefficient means that about 13.76% deviation from the equilibrium level is corrected in the next period (Table 5).

Apart from MG and PMG methods, the twin deficit hypothesis in the EU is also tested through the analysis of long-run relationship between the fiscal deficit and the

current account based on CCEMG method. This method is applied in order to cover the both issues, parameter heterogeneity and cross-section dependence. Estimation results of observed long-run relationship using MG, PMG and CCEMG methods are presented in Table 6.

Table 6 Long-Run Relationship between Fiscal Deficit and Current Account Deficit

Dependent variable: current account	PMG	MG	CCEMG
Fiscal deficit	0.7996	0.5037	0.1462
p-value	(0.000)	(0.813)	(0.267)
CSD test			-0.367
p-value			(0.717)
Pesaran (CIPS) test			-9.356
p-value			(0.000)

Notes: *p*-values are presented in parentheses.

Source: Authors' estimations.

The empirical findings based on PMG indicates the existence of long-run relationship between the fiscal deficit and the current account at 1% significance levels. Contrary to this result, MG and CCEMG estimation results indicate that long-run relationship is not statistically significant. Based on properties of estimators discussed in methodological part of the paper, definitive attitude about the twin deficits hypothesis is relied on the results of CCEMG estimation procedure.

Accordingly, bearing in mind that the CCEMG method takes into account the cross-section dependence in panel (which was confirmed according to the results of the Pesaran CD test), our final conclusion is that the twin deficit cannot be confirmed for the European Union as a whole during 1995-2018. Pesaran CD test results suggest that null hypothesis of cross section independence in CCEMG framework cannot be rejected, meaning that CCEMG method adequately captures it. Furthermore, based on Pesaran CIPS test, results show that CCEMG residuals are stationary, which also confirms the validity of the use of CCEMG method for performing the final conclusions.

Despite the fact that the validity of the twin deficit hypothesis is not confirmed at the level of the EU, the following analysis examines whether long-term relationship between the fiscal deficit and the current account deficit can be approved in some member states.

Based on the results by the individual EU economies, it is evident that in some countries long-run relationship between the fiscal balance and current account is statistically significant. First, looking at the older EU member states (Germany, France, Belgium, Netherlands, Luxembourg, Denmark, United Kingdom, Austria, Finland and Sweden), long-run relationship is confirmed at 1% level of statistical significance in Germany, for France, Belgium and Finland twin deficit hypothesis is accepted at 5% significance level, and in Denmark at 10% level.

On the other hand, when we look at the PIIGS countries (Portugal, Italy, Ireland, Greece and Spain) the long-run relationship between fiscal deficit and current account deficit is found only in Italy at 10% level of statistical significance. Looking at the third group of countries (EU10), the twin deficit hypothesis is accepted in Slovakia,

Hungary, Cyprus, Estonia and Latvia. For the last group of countries, the double deficit is confirmed only in Bulgaria.

Table 7 Long-Run Relationship between the Fiscal Deficit and the Current Account by Individual Countries - CCEMG Estimation Results

Country	Coefficient	*p*-value
Austria	0.7538	0.119
Belgium	1.0527	**0.052**
Bulgaria	1.0272	**0.024**
Croatia	-0.2556	0.115
Cyprus	-0.9229	**0.001**
Czech Republic	0.2484	0.285
Denmark	0.6804	**0.064**
Estonia	-1.0551	**0.001**
Finland	0.5721	**0.036**
France	1.7188	**0.024**
Germany	0.9514	**0.000**
Greece	-0.3291	0.459
Hungary	0.6903	**0.008**
Ireland	0.0938	0.368
Italy	-0.7409	**0.089**
Latvia	-1.2238	**0.001**
Lithuania	0.2464	0.339
Luxembourg	0.3260	0.268
Malta	0.0317	0.906
Netherlands	-0.4519	0.274
Poland	-0.5119	0.405
Portugal	0.5849	0.150
Romania	-0.0416	0.921
Slovakia	0.4196	**0.025**
Slovenia	-0-1323	0.512
Spain	-0.1371	0.609
Sweden	0.3188	0.304
United Kingdom	0.3792	0.141

Source: Authors' estimations.

Taking into account the heterogeneity of countries in terms of external imbalances and the individual macroeconomic performance, the conclusions derived from this research have different implications. Despite the fact that the average value of the current account was positive during the period of analysis in Germany, France, Belgium, Finland and Denmark, it is evident that the periods of increasing fiscal imbalances are accompanied by a deterioration of the current account (Figure A1, Tables A1 and A2). On the other hand, given that the twin deficit hypothesis is confirmed only in Italy, it is clear that the increase in the fiscal deficit was not the primary cause of the increased external imbalances in PIIGS countries. The current account deficit in these countries was mainly generated by the expansion of domestic demand that exceeded income growth. However, the growth of aggregate demand is, in a large extent, financed by capital inflows from developed countries of the European Union. This

policy led to an unsustainable increase in the level of national debt in the PIIGS countries. As expected, the increase in aggregate demand in this way proved to be extremely problematic and resulted in a debt crisis.

In terms of the twin deficit hypothesis, which is confirmed in Slovakia, Hungary, Cyprus, Estonia, Latvia and Bulgaria, the results indicate that the long-run relationship between the fiscal balance and the current account was negative in countries that had current account deficits above 5% of GDP (Cyprus, Estonia and Latvia), while in other countries was positive (Slovakia, Hungary and Bulgaria) (Table A1).

Finally, although the twin deficits hypothesis is not accepted for the whole EU during the period 1995-2018, obtained empirical findings support the fact that the increase in budget spending had a significant impact on the external imbalances in a certain number of member states.

In addition, we divided our sample into two sub-periods in order to determine whether the fiscal deficit had a more influence on the external imbalances after the outbreak of the global economic crisis. So, taking into account the adverse effects of the great recession on almost all European economies, the first sub-period covers the period before the crisis, and the second sub-period includes the years after 2008. The results are presented in Appendix (Tables A3, A4, A5, and A6) and indicate that the fiscal deficit actually had a greater impact on increasing the current account deficit in the years after the outbreak of the crisis. In fact, based on the CCEMG method results, the twin deficit hypothesis is confirmed only at 10% significance level in the EU member states during the period 2009-2018.

However, due to the economic heterogeneity among the EU countries, the dilemma remains whether the combination of centralized monetary and decentralized fiscal policy is adequate political combination. In other words, the question is whether such defined policies have sufficient capacity to help the most vulnerable countries to reduce their current account deficit to acceptable limits. Since it is still determined by the decisions of national governments, the impression is that the policymakers pay more attention to potential opportunities of fiscal policies. In this regard, although the impact of structural and cyclical determinants of the current account has already been evaluated in the empirical literature (Chinn and Prasad 2003; Barnes, Lawson, and Radziwill 2010; Calista Cheung, Davide Furceri, and Elena Rusticelli 2013), it would be interesting to examine how these two categories of the fiscal deficit had an impact on the external imbalance and twin deficit hypothesis. This is important because the cyclical budget deficit does not necessarily cause an increase of the external imbalance, while the structural budget deficit requires greater discipline and more painful measures defined by national governments to prevent its impact on the further distortion of the current account balance.

5. Concluding Remarks

Although the aggregate level of the current account in the EU has been close to balance over the years, numerous intra-European external trade divergences have become obvious after the introduction of the euro. Increasing differences in external competitiveness between countries can be interpreted through various aspects: (i) In accordance with the catching-up process and convergence approach, capital can flow freely from

more-developed countries to less-developed countries which have a lack of capital but a high rate of return at the same time. So, starting from the optimistic expectations regarding future growth rates and improvement of permanent income in less-developed countries, increased investments exceeded savings and contributed to the deepening of external imbalances (Olivier J. Blanchard and Francesco Giavazzi 2002; Ansgar Belke and Christian Dreger 2013); (ii) The expansion of domestic demand in less-developed countries has exceeded the growth of the real income and is mainly financed by capital inflows from more-developed countries. As expected, increased national absorption resulted in the further growth of prices and labor costs, which had an impact on the loss of external competitiveness in deficit countries. In other words, deficit countries managed to delay the structural reforms that were necessary to reduce current account imbalances between member countries (Ruo Chen, Milesi-Ferretti, and Thierry Tressel 2012). In fact, the level of national debt and real divergences were further increased; (iii) It is difficult to ignore the presence of significant macroeconomic heterogeneity in the Eurozone which largely determines their individual capacity to absorb a variety of internal and external shocks. However, the application of the two most important macroeconomic policy is different which means the loss of monetary independence after the introduction of the euro, while fiscal policy is determined by the decisions of national governments. Actually, a number of national governments has been rather irresponsible which resulted in the deterioration of the fiscal position and increased public debt, especially in high deficit countries. It turns out that divergent fiscal policy paths have been closely associated with the deepening of external imbalances in some member states (Gunther Schnabl and Timo Wollmershäuser 2013; Carlos A. Carrasco and Patricia Peinado 2015).

After the outbreak of the great recession and the subsequent debt crisis, a number of Eurozone countries have been confronted with a severe fiscal imbalances and differences in fiscal positions between countries have become increasingly apparent. In order to reduce the large and persistent external imbalances, a number of countries are faced with the challenge of reducing the budget deficit. Due to the fact that fiscal imbalances can be a serious destabilizing factor in the process of reduction external imbalance, this article investigates the validity of twin deficit hypothesis in the European Union during the period from 1995 to 2018. For this purpose, the econometric methods of heterogeneous panel data models are applied.

The empirical findings based on the application of CCEMG estimation procedure indicate that twin deficit hypothesis is not accepted for the whole EU. However, the results suggest that the long-run relationship between fiscal balance and current account can be confirmed for the following countries: Germany, France, Belgium, Denmark, Finland, Italy, Slovakia, Hungary, Cyprus, Estonia, Latvia and Bulgaria. Although these countries differ significantly in terms of external imbalances, we can derive a conclusion that the increase in government spending had an impact on the deterioration of the current account balance.

With the exception of countries that had an average surplus in the current account balance during the period of analysis (Germany, France, Belgium, Denmark and Finland), it is evident that in Italy, Slovakia, Hungary, Cyprus, Estonia, Latvia and Bulgaria the irresponsible coordination of fiscal policy generated unsustainable current

account deficits. It is obvious, therefore, that in these countries there is a need to change the leading form of fiscal policy which includes a commitment for better planning the budget spending without creating excessive deficits and public debt.

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Appendix

Table A1 Current Account by Individual Member States of the EU

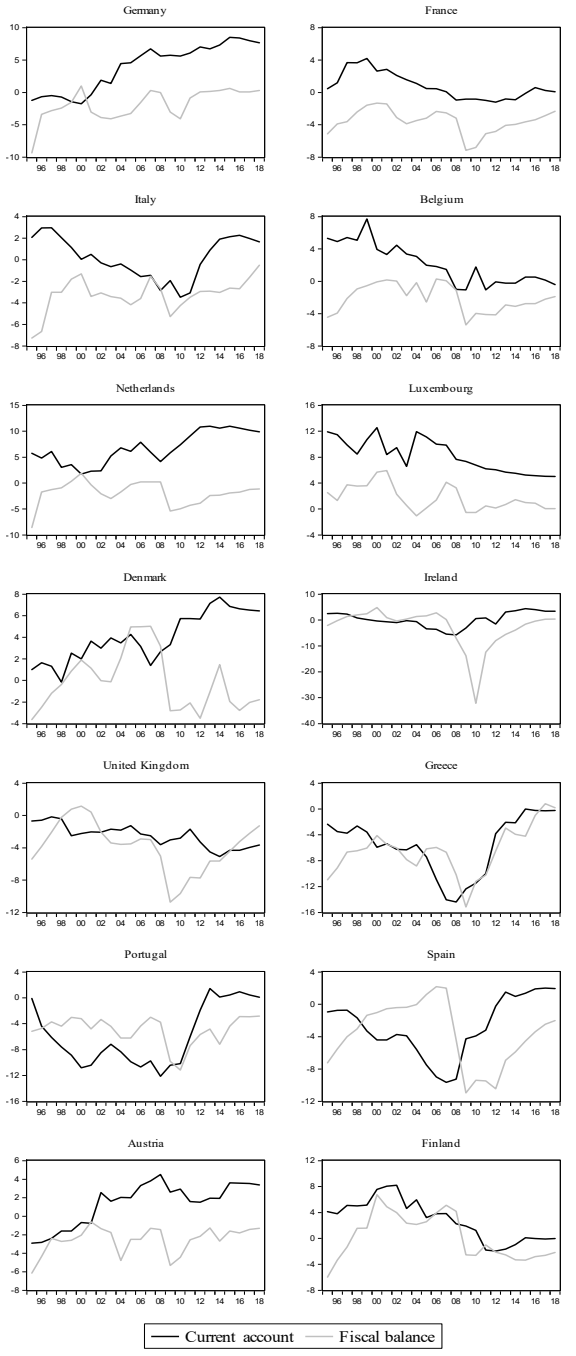
Country	Mean	Std. dev.	Min	Max
Austria	1.397	2.299	-2.913	4.500
Belgium	2.118	2.486	-1.076	7.703
Bulgaria	-2.893	8.273	-23.715	15.322
Croatia	-3.397	4.168	-12.295	4.387
Cyprus	-5.131	3.531	-15.542	2.854
Czech Republic	-2.502	2.229	-6.257	0.906
Denmark	3.986	2.250	-1.490	7.718
Estonia	-5.200	5.859	-14.981	2.541
Finland	2.810	3.129	-1.934	8.194
France	0.785	1.641	-1.194	4.203
Germany	3.950	3.6391	-1.750	8.494
Greece	-5.599	4.453	-14.380	-0.004
Hungary	-2.655	5.102	-8.501	5.386
Ireland	0.271	2.946	-5.726	4.451
Italy	0.227	1.943	-3.476	2.961
Latvia	-5.809	6.550	-20.918	8.078
Lithuania	-5.632	4.932	-15.053	3.577
Luxembourg	8.246	2.538	5.015	12.537
Malta	-1.350	4.791	-9.359	9.851
Netherlands	6.752	3.058	1.754	10.979
Poland	-3.542	2.035	-7.442	0.614
Portugal	-5.819	4.692	-12.126	1.455
Romania	-5.049	3.412	-13.813	-0.457
Slovakia	-2.133	3.648	-9.703	2.697
Slovenia	0.856	3.912	-5.316	7.624
Spain	-2.778	3.644	-9.648	1.998
Sweden	5.603	1.541	3.191	8.862
United Kingdom	-2.524	1.376	-5.088	-1.680
Total	-0.965	4.168	-23.715	4.387

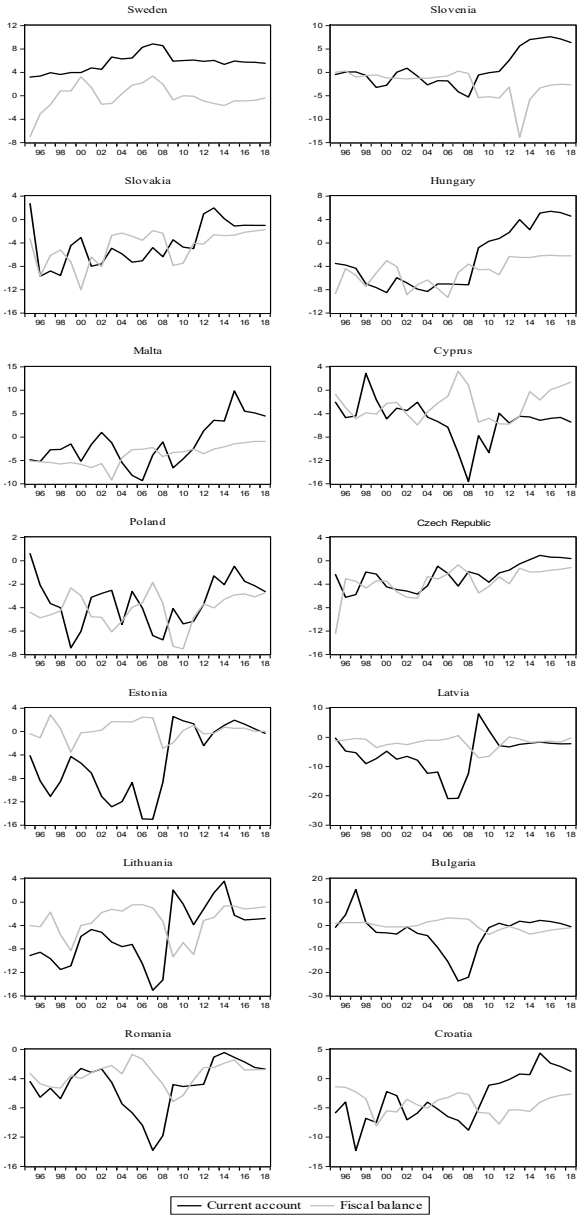
Source: Authors' estimations.

Table A2 Fiscal Balance by Individual Member States of the EU

Country	Mean	Std. dev.	Min	Max
Austria	-2.547	1.435	-6.148	-0.616
Belgium	-2.097	1.708	-5.386	0.294
Bulgaria	-0.165	1.989	-3.826	3.228
Croatia	-4.231	1.795	-8.074	-1.409
Cyprus	-2.490	2.578	-5.946	3.255
Czech Republic	-3.559	2.481	-12.427	-0.694
Denmark	-0.126	2.713	-3.620	5.019
Estonia	0.229	1.552	-3.548	2.857
Finland	0.139	3.497	-5.970	6.736
France	-3.549	1.478	-7.162	-1.318
Germany	-1.832	2.374	-9.339	0.980
Greece	-6.446	3.722	-15.152	0.800
Hungary	-4.884	2.339	-9.330	-2.124
Ireland	-2.868	7.789	-32.178	4.790
Italy	-3.242	1.535	-7.253	-0.502
Latvia	-1.819	1.837	-7.012	0.598
Lithuania	-3.188	2.766	-9.329	-0.447
Luxembourg	1.698	1.949	-1.064	5.949
Malta	-3.845	2.057	-9.143	-0.935
Netherlands	-1.931	2.268	-8.584	1.880
Poland	-4.154	1.419	-7.527	-1.851
Portugal	-4.975	2.155	-11.171	-2.842
Romania	-3.394	1.563	-7.132	-0.682
Slovakia	-4.647	2.833	-12.024	-1.746
Slovenia	-2.522	3.059	-13.891	0.283
Spain	-3.668	3.901	-10.958	2.197
Sweden	-0.259	2.172	-7.001	3.338
United Kingdom	-3.786	3.067	-10.717	1.166
Total	-2.649	3.296	-32.178	6.736

Source: Authors' estimations.


Germany
France
Italy
Belgium
Netherlands
Luxembourg
Denmark
Ireland
United Kingdom
Greece
Portugal
Spain
Austria
Finland
Current account
Fiscal balance



Source: Authors' estimation.

Figure A1 Fiscal Balance and Current Account in EU

Table A3 Westerlund Cointegration Test (1995-2008)

Statistic	Value	Z-value	*p*-value	*p*-value (bootstrap)
G_t	-1.245	-1.791	0.736	0.176
G_a	-2.492	1.683	0.491	0.062
P_t	-4.739	-1.926	0.064	0.056
P_a	-3.745	-1.486	0.263	0.048
AIC, lags: 1				
AIC, leads: 1				

Notes: Robust *p*-values were obtained by a bootstrap procedure with 400 replications.

Source: Authors' estimation.

Table A4 Long-Run Relationship between Fiscal Deficit and Current Account Deficit (1995-2008)

Dependent variable: current account	PMG	MG	CCEMG
Fiscal deficit *p*-value	-0.1298 (0.159)	-1.4888 (0.433)	-0.1288 (0.327)
CSD test *p*-value			0.517 (0.605)
Pesaran (CIPS) test *p*-value			-5.459 (0.000)

Notes: *p*-values are presented in parentheses.

Source: Authors' estimations.

Table A5 Westerlund Cointegration Test (2009-2018)

Statistic	Value	Z-value	*p*-value	*p*-value (bootstrap)
G_t	-1.348	-1.893	0.029	0.088
G_a	-2.872	1.082	0.860	0.050
P_t	-5.513	-2.100	0.018	0.017
P_a	-1.338	-0.570	0.284	0.053
AIC, lags: 1				
AIC, leads: 1				

Notes: Robust *p*-values were obtained by a bootstrap procedure with 400 replications.

Source: Authors' estimation.

Table A6 Long-Run Relationship between Fiscal Deficit and Current Account Deficit (2009-2018)

Dependent variable: current account	PMG	MG	CCEMG
Fiscal deficit *p*-value	0.2099 (0.000)***	0.3972 (0.250)	0.2403 (0.071)*
CSD test *p*-value			-0.694 (0.488)
Pesaran (CIPS) test *p*-value			-7.241 (0.000)

Notes: *p*-values are presented in parentheses.

Source: Authors' estimations.