

Is there a link between the public deficit and the trade deficit in the Euro area?

New evidence from panel data

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Abstract: The aim of this paper is to empirically explore the linkage between the public deficit and the trade deficit in the case of euro area member states for the period 1990-2015. The empirical studies conducted until now highlight diverging results on this relationship for both the developed and developing countries. Most of them have used time series data rather than panel data. Because it is commonly accepted that time series models may have lower statistical power than panel data models (Campbell and Perron, 1991) - as they don't add the cross-sectional dimension to the time series dimension to exploit additional information - the paper works with panel models rather than with time series models. More precisely, I apply recent panel data techniques such as the pooled mean group estimator of Pesaran, Shin and Smith (1999), which accounts for heterogeneous effects across countries and for the non-stationarity of variables. By using these methods, I assess the validity of two opposite views: the Keynesian view and Ricardian Equivalence Hypothesis. The Keynesian view states that the budget deficit affects the current account deficit, and the Ricardian Equivalence view supports that there is no relationship between the budget deficit and the current account deficit. In other words, the first view argues that there is a unidirectional causality relationship from the budget deficit towards the current account deficit, while the second one supports the idea of no linkage between the budget deficit and the trade deficit. Empirical results show for instance positive and significant effect of the trade balance on the budget balance. This study has relevant policy implications for the countries with twin and triple deficits phenomenon. Among them, favourable fiscal balances have a key role in reversing negative trends of trade balances.

Keywords: Current Account, Twin and Triple Deficits, Panel Causality Test, Euro Area

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Introduction

The global financial crisis, the Greek tumult in the euro zone, the weak economic growth, the recent referendum in the United Kingdom mark a major turning point in the most recent economic history of the world. All these events triggered the inevitable changes in the ways in which economic policy (trade and investment) will be addressed between Europe's countries and its international partners. Because the financial crisis episodes have been often associated with large, growing and eventually unsustainable current account imbalances (Roubini and Wachtel, 1997), there is an open debate about whether reducing budget deficits necessarily translates into small and less persistent current account deficits. In this regard, several southern euro area countries (such as Greece, Cyprus, Portugal, Italy) were experiencing large and growing current account imbalances since 2000 while other euro zone countries (such as Germany, Belgium, Ireland, Netherlands and Slovakia) have a surplus in their trade balances. The wide disequilibrium between the two groups may reflect huge losses in competitiveness for the deficit countries, after the introduction of the euro as well as in the aftermath of the Great Recession. Regarding the government budget balance, it has been in deficit in almost all these countries during the crisis period while now they stabilize. This paper will therefore investigate the link between the public deficit and the trade deficit for euro area economies.

The current account balance is a key measure of macroeconomic performance for euro area economies. On the one hand, a current account deficit reflects the difference between the value of exports of goods and services and the value of imports of goods and services meaning that the country is importing more goods and services than it is exporting². On the other hand, the current account deficit can be viewed as the difference between national (both public and private) savings and investment, and therefore, indicating a low level of national savings relative to investment or a high rate of investment—or both. This is why, it is not easy to discriminate between current account deficits that are the consequence of economic growth inducing capital inflows and current account deficits resulting from unsustainable imbalances between national savings and domestic investment with the accumulation of untenable debts. Furthermore, the theoretical literature (e.g., Ghosh and Ramakrishnan, 2012) shows that trade deficit can be also assessed in terms of the timing of trade, in the sense that a country may

² The current account also takes into account net income (such as interest and dividends) and transfers from abroad (such as foreign aid), which is often a small proportion of the total.

import one good and export another (intra-temporal trade), but also it may import goods of today and export goods of tomorrow (inter-temporal trade). The last approach also stresses the consumption-smoothing role of the trade deficit and surpluses. More precisely, if a country is subject to large shocks (e.g. natural disaster), it is better to temporally run a current account deficit to spread out the hurt over time. However, research shows evidence that the current account surpluses have to stand for a form of precautionary saving.

These definitions are closely related to the twin deficits hypothesis meaning that an economy's fiscal and current account balances move in the same direction. In other words, the government budget deficits cause current account deficits, and therefore, the interest rates increase and crowd out funds for investments or/and attract foreign capital leading to an appreciation of the domestic currency vis-à-vis other currencies. This point of view was initially advanced in the 1980s, when both, the US current account balance and the US federal budget have faced quasi-simultaneously a significant deterioration. It also constitutes the cornerstone of the Keynesian view. At the opposite side, the Ricardian Equivalence view supports that there is no relationship between the budget deficit and the current account deficit because households adjust their savings to counterbalance anticipated future tax liabilities. Thus, interest rates are not affected and budget deficits have no adverse macroeconomic effects. Although many empirical studies tried to identify the two competing views, none of them have been able to find a strong relationship between fiscal and current account deficits, maybe because the data were used for a restricted number of countries or have focused on different time-periods or have employed diverse methods (like times series or panel models).

The classical Keynesian view has been greatly supported by a burgeoning literature like Summers (1986), Bernheim (1988), Abell (1990), Vamvoukas (1999), Andersen (1990), and Vyshnyak (2000). At the opposite side, the "Ricardian Equivalence" has been validated by works of Barro (1989), Miller and Russek (1989), Dewald and Ulan (1990), Haug (1990), and Enders and Lee (1990). Even the recent studies come to opposing conclusions: e.g., Kalou and Paleologou (2012), Bolat et alii. (2014), and Cavdar and Aydin (2015) for EU countries, found that the budget deficit causes the current account deficit, while Kim and Roubini (2004) identified an inverse relationship between the budget and current account deficits in the short run due to dominance of positive private saving-investment balance over the budget deficit, and they called it as "Twin Divergence". Furthermore, Bolat et alii. (2014) found inconclusive results for 15 EU countries for the quarterly period of 2002-2013: twin deficit relation for

some countries, triple deficit link for some countries, and none of these two theories is valid. What both camps tend to ignore is that different types of exchange rate regimes are unlikely to have the same economic effects on this relationship. This is why, the present paper will focus only on the European currency union.

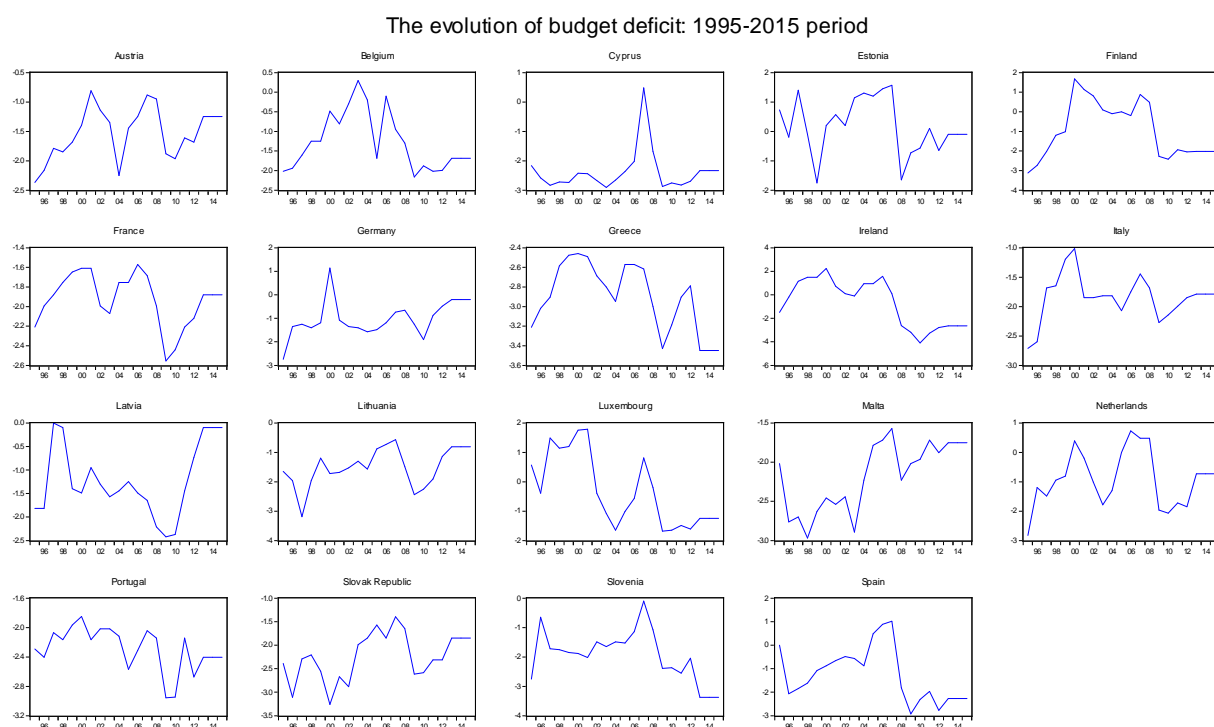
The paper has a fourfold contribution to the literature. First, the paper investigates the relationship between the fiscal budget and the current account balance for all 19 euro area countries. Previous studies focused on the EU countries or southern euro area members (e.g., Kosteletou, 2013) and almost all of them used small data spans (usually, the period after the introduction of the euro). This analysis carries on a larger period, a 21 year period (from 1995 to 2015), with a special emphasis on years corresponding to the crisis period (2008-2010). Second, the paper distinguishes between the group of southern euro area countries as the deficit group economies and the other euro area economies as the surplus group. This allows also testing the robustness of the results across different panels of countries. Third, to provide an empirical explanation for the relationship between the fiscal budget and the current account balance, the paper uses recent panel data techniques such as the pooled mean group estimator of Pesaran, Shin and Smith (1999), which accounts for heterogeneous effects across countries and for the non-stationarity of variables. Although to measure the causality relationship between the trade deficit and the trade balance for euro area members, at least, at my best knowledge. Finally, to address the exchange rate issue, but also, for robustness purposes, the paper integrates a dummy variable to highlight changes in the country's exchange rate regimes (such as the adoption of the euro). The results show that budget deficit, through its effect on national saving, is associated with negative effects on current account balance.

The remainder of the paper is structured as follows. The next section describes the data and the related methodology. The third section presents and discusses the empirical results. The last section concludes.

2. Data and methodology

2.1 Data

The data panel contains yearly observations from 19 euro area countries and covers the period 1990-2015. The panel included all countries for which the Eurostat database publishes variables on budget balance, current account balance and net saving all measured as ratios to GDP. There are 19 euro area countries namely Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, Spain in this study. To study the budget balance-current account balance nexus, I take into account both time-series and cross-country variation of the data set. Figure 1 shows the evolution of the budget balance during the selected period for each euro area country of the sample while the figure 2 displays their current account balance's trends. Starting with 2012, almost all budget balances tends to stabilize in all euro area countries.



The evolution of current account balances is more contrasted. It can be distinguish to groups of countries: countries that experienced large and growing current account imbalances until 2010 (such as Greece, Portugal, Italy, Slovakia, Belgium, France, Luxembourg) and countries that have surplus in their trade balances particularly after the introduction of the euro such as Germany, Austria, Ireland, Netherlands or Malta.

The evolution of the current account balance in the euro area countries: 1995-2015 period

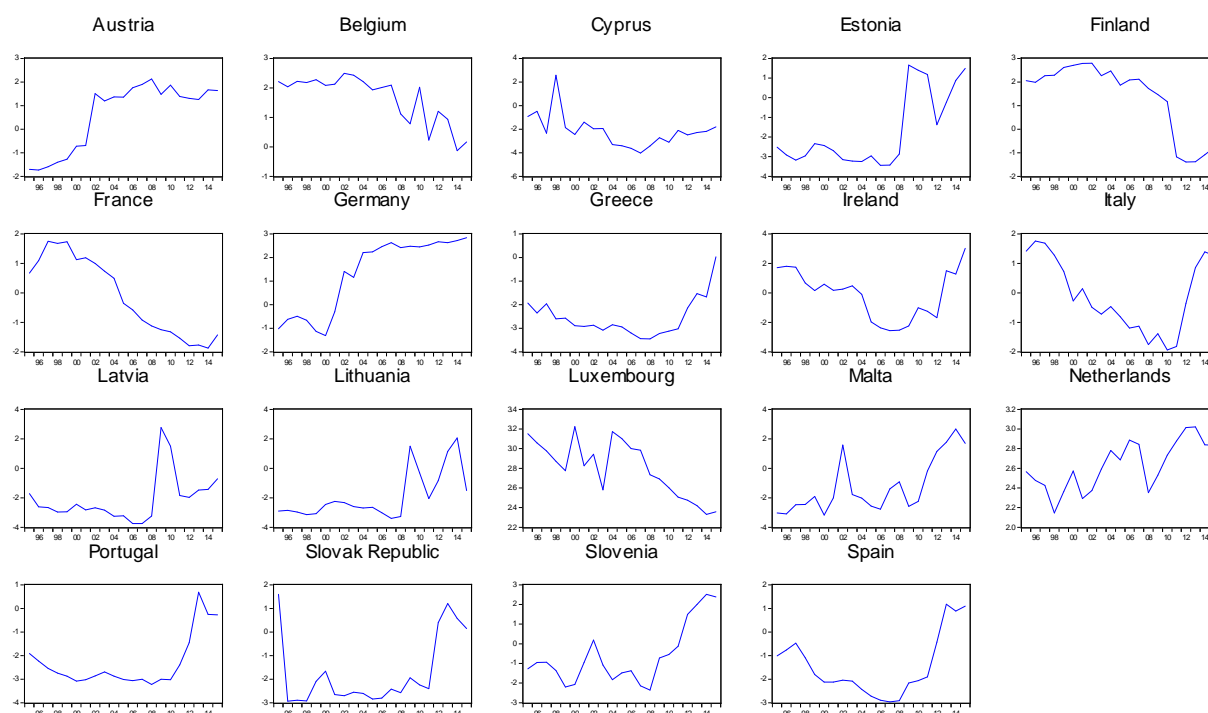


Table 2 displays the correlation matrix between the budget balance, current account balance and net saving all measured as ratios to GDP. Results show small positive correlation between the selected variables. However, the correlation coefficient between net national savings and the other two variables (the budget balance and trade balance) is higher but, lesser than 0.50.

Table 2: Matrix correlation

	BB	TB	NS
BB	1		
TB	0.256	1	
NS	0.402	0.462	1

Note: BB – budget balance; TB – trade balance; NS – net national savings

2.2 Methodology

This section presents briefly the empirical framework to explore the relationship between the current account balance and the budget balance. As my data covers 19 countries (N = 19 countries) relative to the selected time period (T = 21 years), the most appropriate method is the Pooled Mean Group (PMG) estimator for dynamic heterogeneous panels by Pesaran, Shin and Smith (1999). The method is likely to provide more consistent results than traditional dynamic panel models as GMM-difference estimator by Arrelano and Bond (1991) or the

GMM-system estimator of Arrelano and Bover (1995) for, at least, several main reasons: (i) small N can induce unreliable autocorrelation test, (ii) a larger time span of data means increasing number of instruments which may affect the validity of the Sargan test of over-identification restriction, and thus, the null hypothesis of exogeneity of instruments (see Roodman, 2006), (iii) the GMM captures only the short-run dynamics of data.

Pooled mean group (PMG) model

The PMG method uses the autoregressive distributed lag (ARDL) model for time periods $t = 1, 2, \dots, T$ and groups $i = 1, 2, \dots, N$ that can be expressed as follows:

$$\ln TB_{it} = \mu_i + \sum_{j=1}^p \lambda_{ij} \ln TB_{i,t-j} + \sum_{j=0}^q \gamma_{ij} \ln X_{i,t-j} + \varepsilon_{it} \quad (1)$$

where $\ln TB_{it}$ is the logarithm of trade balance dependent variable, X_{it} is the $k \times 1$ vector of explanatory variables for group i (including budget balance BB_{it} and net savings NS_{it}), μ_i denotes the fixed effects, λ_{ij} 's are scalar coefficients of the lagged dependent variables, γ_{ij} 's are $k \times 1$ coefficient vectors. When I re-parameterized the eq. (1), I obtain the form:

$$\Delta \ln TB_{it} = \varphi_i [\ln TB_{i,t-1} - \theta_i \ln X_{i,t-1}] + \sum_{j=1}^{p-1} \lambda'_{ij} \Delta \ln TB_{i,t-j} + \sum_{j=0}^{q-1} \gamma'_{ij} \Delta \ln X_{i,t-j} + u_{it} \quad (2)$$

where u_{it} are independently distributed across i and t , with zero means and variances $\sigma_i^2 > 0$.

$$\varphi_i = - (1 - \sum_{j=1}^p \lambda_{ij}); \theta_i = \frac{\sum_{j=0}^q \gamma_{ij}}{1 - \sum_{k=1}^p \lambda_{ik}}; \lambda'_{ij} = - \sum_{m=j+1}^p \lambda_{i,m}; j= 1, 2, \dots, p-1; \text{ and}$$

$$\gamma'_{ij} = - \sum_{m=j+1}^q \gamma_{i,m} \text{ with } j= 1, 2, \dots, q-1.$$

Two forms of causalities among variables are provided by PMG model: a short-run causality by testing the significance of coefficients related to the lagged differences of economic variables (λ'_{ij} and γ'_{ij} in eq. (2)), and a long-run causality measured by the speed of adjustment coefficient (the error correction term - φ_i) whose sign has to be a negative for that variables show a long-run equilibrium. It is known that a larger value of φ_i means a stronger response of the variable to the deviation from long-run equilibrium and a low value indicates that any deviation from long-run equilibrium of economic activity need much longer time to force variables back to long-run equilibrium. If the error correction term is significant in both equations, bidirectional causality between variables takes place.

Properties of the series

Before applying the PMG model, the cross-section dependence hypothesis and different other properties of the series is analyzed by using panel unit root, and panel cointegration tests. The cross-section dependence hypothesis is studied with the Pesaran (2004) test and the Baltagi, Feng, and Kao (2012) bias-corrected scaled LM test. The existence of interdependencies between euro area countries can be justified by the common shocks with heterogeneous effects across countries (e.g., sovereign debt crisis, migration crisis, British Referendum etc) and other unobserved components due to the economic and financial integration process experienced in the last decade by these economies. The results reported in table 3 strongly reject the null hypothesis of no cross-sectional dependence at the 1% level of significance for all variables indicating a potentially similar common dynamics to the countries.

Table 3: Cross section dependence results of Pesaran (CD) and Baltagi, Feng and Kao (LM)

H0: no cross-section dependence in residuals		PANEL: VARIABLES IN LOG		
<i>Whole period</i>	CD	p-value	Biais corrected scaled LM	p-value
EA – 19				
<i>Ln TB</i>	4.606 ^a	0.00	45.245 ^a	0.00
<i>Ln BB</i>	16.883 ^a	0.00	21.845 ^a	0.00
<i>Ln NS</i>	15.712 ^a	0.00	44.830 ^a	0.00
<i>Model</i>	19.707 ^a	0.00		

Notes: *a* means significant at the 1% level.

Panel unit root investigation

We check now for the stationarity of the selected variables (i.e., the order of integration of series) by applying the second generation test of Pesaran (2007). Under the null hypothesis, the test assumes nonstationarity and allows for cross-section dependence. The results (upon request) show evidence in favor of the non-stationarity in level of our variables and stationarity in first differences (at 1% level of significance).

Panel cointegration analysis

The previous section indicated that the assumption of strong interdependencies between cross-sectional units was validated by the Pesaran (2004) test. Accordingly, we can apply second-generation cointegration tests allowing for cross-section dependences in cointegrating vectors

such as the Westerlund test (2007). Under the null hypothesis, this test assumes the absence of cointegration and the existence of an error correction term for individual panel members (with a group mean statistic – G_t and G_a) and/or for the entire panel (with panel statistic – P_t and P_a) without any common restriction. The test accounts for a large degree of heterogeneity, both in the long-run cointegrating relation and in the short-run dynamic, and for the dependence within, as well across, the cross-sectional units (Westerlund, 2007). Results of table 4 show evidence in favor of cointegration for at least one of the countries in the panel.

Table 4: The Westerlund (2007) test results: budget balance – current account balance link

Statistics with constant and trend	Value	Z-value	P-value
G_t	-11.75 ^a	-46.18 ^a	0.000
G_a	-3.841	2.558	0.995
P_t	-7.493 ^c	-1.395 ^c	0.082
P_a	-2.855 ^a	1.349	0.911

Note: i) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; ii) the p-values are based on the normal distribution; iii) lag selection is based on the AIC criterion, iv) the models are only with constant (without trend).

3. Results and discussion

Table 5 displays the results of PMG when the dependent variable is the budget balance and the current account balance, respectively. I also integrate in the model a dummy variable that captures the quality of euro area member. The first 8 columns show the results for all 19 euro area countries while the last two columns display the results for the euro area countries that are characterized by high current account balances on the whole period. These countries are: Cyprus, France, Greece, Ireland, Lithuania, Latvia, Portugal, Slovakia, Slovenia and Spain.

The EA 19 results show that our variables of interest – the budget balance and the current account balance, respectively – have significant effects on each other only in the long-run. More precisely, the current account balance influences positively and significantly the budget balance (Keynesian view) while the budget deficit has a negative impact on the current account balance in the long run. In the short-run, the impacts are unclear. It seems that current account balance influences negatively the budget deficit while budget balance affects it positively or insignificantly. Results also indicate a bidirectional causality in the long-run between these two variables since the error correction term is negative and significant in both cases. Also, the long-run impact of current account balance on budget balance is smaller than vice-versa. The effect of the quality of euro area membership is almost positive in the long run, but unclear in the short-run. These results are greater in magnitude for the current account deficit countriesetc.

Table 5. The PMG estimation results: 1995-2015 period

Variable	Budget Balance for EA-19		Current Account Balance for EA-19		Budget Balance for EA-19		Current Account Balance for EA-19		Budget Balance for EA-11		Current Account budget for EA-11	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
<i>Long-run coefficients</i>												
Budget Balance	-	-	-0.921***	0.239	-	-	-0.974***	0.227	-	-	-0.036**	0.147
Current Account Balance	0.070***	0.028	-	-	-0.025	0.028	-	-	0.340***	0.061	-	-
Net Savings	-	-	-	-	0.070**	0.029	0.079	0.188	-	-	-	-
Euro area membership	-0.104	0.090	3.089***	0.334	-0.127	0.117	3.101***	0.337	-1.086***	0.330	3.239***	0.174
Crisis*CA Balance	-	-	-	-	-	-	-	-	0.132	0.289	-1.042	0.924
Crisis	-	-	-	-	-	-	-	-	-3.142***	0.427	-5.637**	2.293
<i>Error-corection term</i>												
	-0.455***	0.069	-0.229***	0.049	-0.437***	0.047	-0.222***	0.044	-0.176***	0.056	-0.233**	0.104
<i>Short-run coefficients</i>												
Δ Budget Balance (t-1)	0.181***	0.058	0.129**	0.064	-	-	0.060	0.067	-	-	0.043	0.077
Δ Current Account Bal.	-0.235***	0.091	-	-	-0.325*	0.172	-	-	-0.063	0.069	-	-
Δ Net Savings	-	-	-	-	0.792**	0.339	0.437	0.243	-	-	0.437	0.243
Δ Euro area membership	0.370***	0.395	-0.532**	0.212	0.425	0.272	-0.410*	0.239	0.128	0.297	-0.707	0.443
Crisis*CA Balance	-	-	-	-	-	-	-	-	-0.464	0.348	-2.944	2.338
Crisis	-	-	-	-	-	-	-	-	-0.923***	0.238	-5.827	5.249
<i>Intercept</i>												
	-0.581***	0.156	-0.818	0.195	-0.647***	0.119	-0.820	0.191	-	-	-0.709	0.338
<i>Trend</i>												
	-	-	-	-	-	-	-	-	-	-	-	-
No. of countries	19		19		19		19		11		11	
Observation	361		380		380		380		220		220	

Note: The selected model is an ARDL (1,1,1,1,1) for PMG with Eviews . ii) * p<0.10, ** p<0.05, *** p<0.01; iii) the number of max lags were set of 1 as shown by the AIC criterion; iv) numbers in parentheses are standard errors; estimations are made with Eviews for PMG. The PMG results are qualitatively similar between the two models. EMU membership – dummy variable for the quality of euro area member, Crisis – debt crisis and 2008 global financial crisis.

4. Conclusion

The paper investigates the relationship between trade deficit and budget deficit for 19 euro area countries. The analysis is performed over the period 1995-2015 and uses dynamic panel estimation models, including the Pooled Mean Group estimator of Pesaran, Shin and Smith, (1999). The findings, when imposing a linear relationship, suggest that budget deficit, through its effect on national savings, is associated with negative effects on current account balance. The findings provide some support for the twin deficit hypothesis only in the long-run. In terms of policy implications, this outcome should suggest that expanding budget deficit *per se* may negatively affect the current account and ultimately, the economic growth particularly in the long-run.

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