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Another look at the determinants of current account imbalances in the European Union: An empirical assessment

Agnieszka Gehringer¹

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In a dynamic panel framework, I investigate the qualitative aspects of factors determining current account imbalances in (country groupings within) the European Union. I consider the standard determinants of current account positions discussed in the past literature, but additionally, I include a series of explanatory variables that refer to the sectoral composition of the European economies and that could have significantly contributed to the current account developments in the past decades. Independently of the econometric method used, the main finding suggests that the economic predominance of the construction sector might have played an important role in aggravating current account positions in the European economies. In parallel, some negative influence could be found for some other service sectors, but this shouldn't be of much concern due to their role played in the growth process.

JEL: F32; F34; F36

Keywords: current account determinants; construction sector; European Union

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Another look at the determinants of current account imbalances in the European Union:

An empirical assessment

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In a dynamic panel framework, I investigate the qualitative aspects of factors determining current account imbalances in (country groupings within) the European Union. I consider the standard determinants of current account positions discussed in the past literature, but additionally, I include a series of explanatory variables that refer to the sectoral composition of the European economies and that could have significantly contributed to the current account developments in the past decades. Independently of the econometric method used, the main finding suggests that the economic predominance of the construction sector might have played an important role in aggravating current account positions in the European economies. In parallel, some negative influence could be found for some other service sectors, but this shouldn't be of much concern due to their role played in the growth process.

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1. Introduction

The discussion on current account imbalances in Europe intensified significantly after the breakup of the recent economic and financial crisis. Since recently, moreover, this discussion entered into a new dimension of the European balance of payment crises, referring to the Target imbalances that, in turn, seem to be strictly connected with and possibly determined by the underlying current account imbalances (Sinn, 2012; Sinn and Wollmershäuser, 2012).

In parallel, the question of what determines current account positions and current account imbalances in Europe started to attract the attention in the recent economic literature. Based on the past theoretical and empirical analysis on current account, trying to explain and assess factors influencing current account positions, different studies brought into light some specific evidence on the European case (Rahman, 2008; Jaumotte and Sodsriwiboon, 2010; Belke and Dreger, 2011). Whereas the contributions concerning the euro area are not missing, only limited effort has been made to examine the European Union in a unified framework. This is one dimension where the paper contributes to the existing literature.

Another important innovative dimension of the present contribution concerns the current account determinants themselves. Although I do include the standard determinants of current account, as for instance suggested by Chinn and Prasad (2003), the main focus of the empirical investigation is put on new determinants that refer to the relevance of sector-level activities in the overall creation of the value added. In that way, I grasp the relative intensity and economic importance of different sectors (prevalently services, among them most importantly construction) and can assess the direction and strength of their impact on current account positions. Additionally, in investigating such sector-related impact, I disentangle the overall EU effect into regional effects, by distinguishing between four roughly homogenous country groups within the EU.

I apply different econometric methodologies that exploit the panel dimension of my dataset. In that way, the baseline dynamic model is estimated according to the pooled OLS methodology that is directly compared with the results from the fixed effects estimations. In the next step, given the risk of overestimation present in the baseline regressions, I performed the principal component analysis on the standard determinants and re-run the regression, including such principal components.

The results from almost all estimation procedures reveal a clearly negative impact of the construction sector on the current account, especially in the group composed by Greece, Ireland, Italy, Portugal and Spain (GIIPS), but also in the other country groups within the EU. Additionally, also negative impact could be found for some other service sectors (called BUSS, comprising electricity, gas and water supply; transport and storage; post and telecommunication; financial intermediation; and renting activities), again with the strongest impact observed for GIIPS. Nevertheless, considering the high growth potential intrinsic in these sectors and their role played in supporting business activities in an economic system, this effect shouldn't be viewed as negatively as in the case of the construction sector. Indeed, intensified investment in these sectors should in principle directly or indirectly, but in each case positively contribute to the future repayment of the current external debt accumulation – a condition that is essential if the intertemporal budget constraint is to be satisfied.

The paper is structured as follows. In the next section, I recall the literature on the standard determinants of the current account. Subsequently, in Section 3, I offer a conceptual framework to justify the investigation on the new set of sector-related determinants. Section 4 - referring to the conceptual picture of the previous section - shows the main facts and developments in the sectoral structure of the European economy. In Section 5, I briefly describe the data used in the subsequent empirical analysis. Section 6 is opened with the discussion of the empirical strategy, of the model, followed by the analysis of the results obtained from different estimation procedures. Finally, the last section summarizes the paper.

2. Standard determinants of the current account

Different often complementary theoretical approaches were developed in the past decades to explain current account positions. Many contributions dealing with current accounts pointed on a standard set of variables that through savings or investment decisions could possess explanatory power on the current account. This literature on standard determinants plays a crucial role in understanding the medium-to-long-term dynamics of current accounts in a rather general context. Indeed, those past examinations, among which the pioneering work by Debelle and Faruquee (1995) and Chinn and Prasad (2003), are well suitable in a broad context, including both developing and industrialized

economies, though often differing considerably in the precise country compositions. Moreover, understanding the factors relevant for current account positions is crucial in searching for valid policy strategies to properly deal with the difficult case for current account adjustment.¹

The inclusion of the standard determinants is not based on a unique theoretical elaboration, but rather derives from the consolidation of predictions stemming from different approaches. This notwithstanding, the main baseline model refers to the intertemporal approach to the current account, initially proposed by Sachs (1981) and Buiters (1981), subsequently elaborated by Obstfeld and Rogoff (1995) as well as Gandolfo (2001). According to this model that assumes the permanent income hypothesis under rational expectations, the current account is viewed as an outcome of forward-looking, perfectly smoothing consumption and investment decisions.

Based on such theoretical underpinning, the most relevant determinants of current account, referring either to savings, or investment, or both, will normally include the stock of net foreign assets (NFA), government budget – both variables expressed in relative terms to GDP - relative income, terms of trade volatility and demographic variables (young- and old-age dependency ratios).² Regarding NFA, Chinn and Prasad (2003) observe that, especially for the industrialized countries, a significantly large initial stock of NFA is associated with large current account surpluses. The theoretical explanation of the link between the government balance and current account, although with reserve depending on the degree to which consumers react in accordance with or against the Ricardian equivalence, suggests positive relationship between both variables. This is based on the hypothesis that an increase/decrease in the government balance would make available more/less national savings, with the consequent improvement/deterioration of the current account. Similarly positive relationship

¹ Debelle and Galati (2007) find out that the past episodes of current account adjustment in industrial countries were going together with significant growth deterioration and exchange rate depreciation.

² This set of variables is by no means exhaustive, but summarizes well the factors included in the empirical investigations with a separate treatment of industrialized countries, similarly as in Debelle and Faruquee (1996) and Chinn and Prasad (2003). There is also a number of studies, for instance the panel investigation by Calderón *et al.* (2002) or a pooled longitudinal estimation by Kahn and Knight (1983) regarding exclusively developing countries, in which also other variables are included.

could be expected for the volatility of terms of trade, as the more volatile they are, the more the agents in a country will be pushed to make precautionary saving, in the way to optimally smooth their unsure consumption between the current and future period. Moreover, the relative income variable refers to the stage of development assumption, according to which a less developed country normally runs current account deficits that will be repaid with the future current account surpluses, once the economy reaches a pattern of development typical for the advanced economies. Finally, the two demographic variables express relative population dependency of young and old generation, respectively. The higher is this dependency, the lower the savings and the worse performance in terms of current account balance.³

Such standard determinants should play a role with more or less strong impact not only in a global general framework, but also in influencing more specific country groupings. Indeed, following this strand of the literature, some authors undertook the effort to explain CA positions in different sub-samples of countries, with already not few works dedicated to the increasingly disputable case of the euro area.⁴ In particular, given that there are intensifying regional patterns of CA imbalances in Europe as well as in the other regions of the world, it might be worth investigating such phenomena with more caution. In this context, when dealing with more precise country groupings, it might be advantageous to extend the set of the standard variables with more specific factors driving the development of CA positions. Accordingly, Glick and Rogoff (1995) argue that considering not only global but also country-specific events is by no means irrelevant, as they might be equally important in determining productivity dynamics, with further repercussions on the current account. In this sense, they found that

³ Already a number of highly recognized studies applied such standard determinants to empirically exploit the long-run relationship between the current account and its fundamental macroeconomic determinants (in addition to already aforementioned studies, see for instance Blanchard and Giavazzi (2002) for the discussion of current account deficits in the euro area, with the emphasis on Portugal and Greece, and Gruber and Kamin (2007) who investigated the global factors determining the current account).

⁴ Jaumotte and Sodsriwiboon (2010) explain the most of the recent deterioration in current accounts in the Southern euro area countries, with specific effects related to the monetary integration and, in particular, to the adoption of the common currency.

the current account responds in a highly sensitive way even to small changes in the degree of mean reversion observable for country-level productivity development.⁵

3. Exploiting more specific determinants of the current account

An important conclusion from the past literature is that, although there might be some global factors determining the current account dynamics, country- or region-specific characteristics driving its economic performance could deliver some non negligible insights as well. This is particularly the case of the EU that since decades has been involved in an intensified process of economic and monetary integration. It has been often argued that the institution of such a supranational community and the contemporaneous elimination of economic and financial barriers on the common market could and should translate in more favourable conditions to get financed, with further consequences on the current account positions. More in details, it might be expected that the process of monetary and, more generally, economic integration could contribute to more considerable current account divergences within the integrating area. Such imbalances shouldn't be viewed negatively, as in principle they derive from the more efficient allocation of resources and, most importantly, are expected to be of a temporary nature, until the economies with the higher growth potential and, thus, current account deficits generate tradable resources, enabling to repay accumulated external debt.

In particular, the creation of the European Monetary Union and the introduction of the single currency - being the most advanced step in the process of European economic integration - considerably reduced external constraint, removed the exchange rate risk and permitted the interest rate to become insensitive to the domestic developments. Particularly the Southern euro area members saw their credit conditions improving drastically - quite overnight - and could take advantage from those developments to borrow money almost unlimitedly to finance their domestic activities of consumption and investment. Nevertheless, there is still no clear consensus to what extent the introduction of the euro contributed to specific national developments within the euro area. For instance, Kelly (2010) believes that the favourable interest rate conditions played only a marginal role

⁵ Another relevant study referring to the theoretical models linking investment and the current account is due to Nason and Rogers (2002) who investigate the current account responses to structural shocks for Canada.

in leading the Irish construction boom on the unsustainable path. On the contrary, Suarez (2010) blames the one-fits-all monetary policy for sustaining blindly the economic conditions of the three core euro area countries that experienced much less dynamic output and credit growth than it was contemporaneously the case of Spain.

But apart from or, more properly, in addition to the effects of the economic and monetary integration it is crucial to consider other factors that pertain to the actual composition and quality of economic activity of the European domestic operators. This statement strictly relates to the analysis of Giavazzi and Spaventa (2010) who examine conditions under which the intertemporal budget constraint of an open economy can be fulfilled. More precisely, they observe that as far as an economy, even if actually running current account deficits, avoids an inefficient allocation of resources in excessive consumption or in investments in non-tradable sectors, current account deficits are a natural consequence of the growth process. In other words, if the economy properly invests the excess of investment over savings in tradable sectors, it will be able to repay the successive accumulation of external net liabilities thanks to the future returns coming from the positive trade balance.

The consideration of the dichotomy tradable/non-tradable is an indisputable matter of interest in examining the conditions of the current account positions of an economy. Nevertheless, it provides scarce indication on the productivity as well as on the direct and indirect growth potential of each single sector. Indeed, both among tradable and non-tradable sectors, there are those characterized by more or less dynamic path of productivity growth. Moreover, among the service sectors, in the most past empirical contributions considered as non-tradables, there are services that play relevant role in providing an essential business environment for the activity of the other sectors in the economy. More in details, the so called knowledge-intensive business services (in short, KIBS) have been found to play a crucial complementary role in sustaining efficiency-driven economic growth, both directly as the drivers of (process) innovations and indirectly, through the crucial sustain for the rest of the economic activity. In this sense, they are sometimes argued to play a pivotal role as facilitators or even

co-producers of innovation (den Hertog, 2000).⁶ In general, they often provide non-technological components crucial in the innovative process, such as innovative service concepts, logistic infrastructure and client interface facilities. But apart from KIBS, also other less-knowledge intensive services, like transport and storage or post and telecommunication, could be crucial due to strong linkages and interactions with the rest of the economy. Without such efficiently functioning services, the activity of other sectors, be it tradable or non-tradable, would be considerably jeopardized.⁷

A similar consideration could be applied for the broad category of manufacturing sectors, conventionally considered as tradable sectors. Also here a distinction can be made between sectors with higher, medium and low technological content.⁸ Nevertheless, in my empirical investigation, I concentrate especially on the service sectors, as those typically considered as non-tradables and, thus, in principle creating most of the concerns on the current account.

As an implication for the current account, in order to make any conclusion on sustainability of intertemporal budget constraint of a country, it seems not enough to limit attention on the distinction between tradables and non-tradables. Much more insightful is to investigate, which sectors exactly dominate the economic activity within a country and generate further impact on its current account

⁶ Interest in KIBS has been increasing especially in the last decade, since the recognition of their role played in the generation of the economy-wide value added. For examples of the literature, see contributions by Acs (2002), Muller and Zenker (2009), Tether and Tajar (2007) as well as Henrekson and Johansson (2010).

⁷ For the purposes of my empirical investigation, I divide between two broad categories of services, BUSS and non-BUSS, to distinguish between sectors supporting business activities and those that are less directly important for the activity of the rest of the economic system. The first group is composed by transport and storage; post and telecommunication; financial intermediation; and renting activities. The second group includes the sector of electricity, gas and water supply; public administration and defense; education; health and social work; and other community, social and personal services. This distinction is to a certain extent arbitrary, but still based on two economic criteria: average (labour and TFP) productivity growth above 1% and the value of the indicator expressing the relative importance of a sector as supplier for all the other sectors above 0.3. For the details of the method used to classify BUSS and non-BUSS, see Appendix A.1.

⁸ For an example of a sectoral taxonomy of manufacturing sectors, based on sectoral patterns of technical change, see Pavitt (1984).

position. In particular, if intensified investment efforts are dedicated to sustain unproductive activities, with minor role in the overall growth process that, as the past European episodes relating to the construction sector witness, concerns about the long-run sustainability of the current account should rise. On the contrary, if investments are dedicated to sectors, like renting sector, with KIBS making the most part of it, it is expected that they will generate long-lasting benefits for the entire economy, even at the cost of a temporary current account deficit. In other words, deficits of the external position of an economy should not be seen as worrisome, insofar they follow from efficiency-driven investment, promising the future repayment of accumulated net liabilities.

4. Tradability, productivity, and current accounts in the EU

Before turning to the main estimation framework, it is useful and to a great extent necessary to review some features characterizing manufacturing and services sectors. In particular, it will become clear, how the quality of tradability is not much clear-cut and only in some cases corresponds to the distinction between manufacturing and services. Moreover, with the view of the quality assessment regarding the current account positions in Europe, I recall the data on productivity growth in different sectors. A third category of considerations will be dedicated to the sectoral trade balances, so that it will be possible to assess which sectors report a surplus or deficit and thus possibly positively or negatively contribute to the country's current account position. But the fact of reporting negative or positive sector-level trade balance is not sufficient in interpreting the results of the empirical analysis of the next section. Indeed, such an interpretation is based on joint evidence on tendencies occurring on the one hand in the trade balances and on the other hand in the relative importance of each sector in the generation of the value added.

It is indisputable that the division between tradable versus non tradable sectors is of central importance to the economic theory, as the example of Balassa's (1964) and Samuelson's (1964) formalization demonstrates. This notwithstanding, there has been little empirical investigation concerning this division, mostly due to the insufficient availability of data. As mentioned above, the conventional classification between tradable and non-tradable sectors was broadly corresponding in the past empirical analyses to the distinction between manufacturing sectors belonging to the first, while services to the second group. But in practice this distinction might lose its significance, given

the growing importance of services for international trade in the last few decades.⁹ Moreover, Roy Harrod stated that, in principle, all commodities (and nowadays we can add also services) are tradable within a specific area as determined by the extent of transportation costs. As a corollary, the property of tradability should be searched for separately for each country or region. As argued by De Gregorio *et al.* (1994) a natural benchmark for tradability is given by the degree to which a certain item is *actually* traded. Consequently, as the classification criterion they adopt the ratio between total exports of a sector across all fourteen OECD countries taken into analysis to the total output of that same sector, with the threshold of more than 10% to classify a sector as tradable.¹⁰ They admit that this procedure is sensitive to the arbitrary choice of the 10% threshold. Additionally, the procedure is subject to the cross-country generalization applicable to their sample, whereas differences between countries could well be found.

Following the methodology by De Gregorio *et al.* (1994), I calculate a measure of tradability separately for four groups of countries within the EU, given by the ratio between the sum of each sector's exports and imports in percentage of gross sectoral output. In general, for all country groups there are sectors (real estate, public administration and defense, education, social and other service activities) that are limitedly involved in international trade and thus can be labeled as non-tradables. The remaining sectors (with the remarkable exception of financial intermediation in non-euro countries) overcome the 10% benchmark and could in principle be treated as tradables.

TABLE 1 Tradability of sectors by country groupings in the EU

	averages over 1996-2009							
	Core		East		GIIPS		Non-euro	
Manufacture	123.2	(8.5)	125.4	(13.1)	121.2	(9.6)	102.7	(43.6)
Electricity, gas and water supply	24.8	(7.4)	22.0	(8.5)	14.3	(5.7)	22.0	(5.8)

⁹ On trade in services, see Bhagwati (1984) and Sampson and Snape (1985).

¹⁰ Alternative methods also exist. For instance, Bems (2008) defines the tradability of a sector according to the ratio of sectoral total trade to its total output. Then, as tradable he considers a sector with the ratio higher than the corresponding ratio of the wholesale and retail services – a sector usually considered in the literature to be non-tradable.

Construction	18.1	(17.1)	32.1	(21.9)	22.1	(18.9)	17.4	(1.6)
Wholesale and retail trade	14.0	(7.6)	17.5	(8.1)	13.1	(10.5)	12.2	(1.1)
Transport and storage	38.4	(17.5)	41.1	(12.5)	39.9	(29.2)	94.8	(43.3)
Post and telecommunication	19.3	(8.1)	15.6	(3.0)	10.2	(2.8)	12.8	(3.2)
Financial intermediation	14.6	(8.8)	12.7	(3.2)	20.8	(30.1)	8.5	(1.9)
Real estate	3.1	(1.4)	5.5	(2.6)	1.6	(0.7)	1.4	(0.6)
Renting activities	23.5	(11.3)	23.1	(6.7)	12.7	(2.8)	12.5	(3.9)
Public administration and defence	6.5	(3.3)	7.8	(2.7)	6.8	(4.2)	5.8	(1.4)
Education	4.4	(2.5)	4.6	(1.6)	2.9	(3.1)	2.7	(0.7)
Social	6.7	(3.5)	13.0	(3.8)	8.8	(3.9)	5.2	(1.7)
Other service activities	10.9	(7.6)	15.2	(5.3)	9.5	(5.0)	7.4	(1.7)
BUSS	23.7	(10.6)	23.1	(5.7)	28.9	(26.4)	32.2	(11.5)
Non-BUSS	11.1	(4.9)	14.8	(4.6)	13.3	(12.9)	9.2	(1.7)

Note: Standard deviation in parentheses. As BUSS, I classified electricity, gas and water supply, transport and storage, post and communication, financial intermediation and renting activities. Non-BUSS refers to the remaining service activities. The values reported for BUSS and non-BUSS express averages for the respective groups.

Source: Own calculations based on World Input Output Database (WIOD).

Two observations are due here. First, within country groups a certain degree of variability in the calculated measure of tradability can be observed, as expressed by the standard deviation. This confirms the previous intuition that it is difficult to generalize the quality of tradable or non-tradable sector, as sometimes significant differences for particular sectors might occur across countries. This is for instance the case for the construction sector that in Germany would be considered as non-tradable (2.2%), whereas it would be tradable in all the remaining countries of the core euro area. Second, only few of the service sectors that have the values of the tradability above 10% report positive sectoral current account positions. Indeed, in Figure 1, for each sector and for each of the four country groups, I calculated a measure of trade balance, expressed as the difference between the value of exports and imports relative to the sector's value added. All sectors included in the group of non-BUSS (construction; wholesale and retail trade; real estate; public administration and defense; education; social; other service activities) report negative values of sector-level current account positions, with the most considerable average deficit for construction. On the contrary, transport and storage, post and communication, financial intermediation and renting activities reveal positive trade balance. These

patterns seems to hold independently of the country group and also over time, with only few outliers, like in the case of manufacturing sectors for Eastern European countries, where the most considerable deterioration occurred in the second period under consideration.¹¹

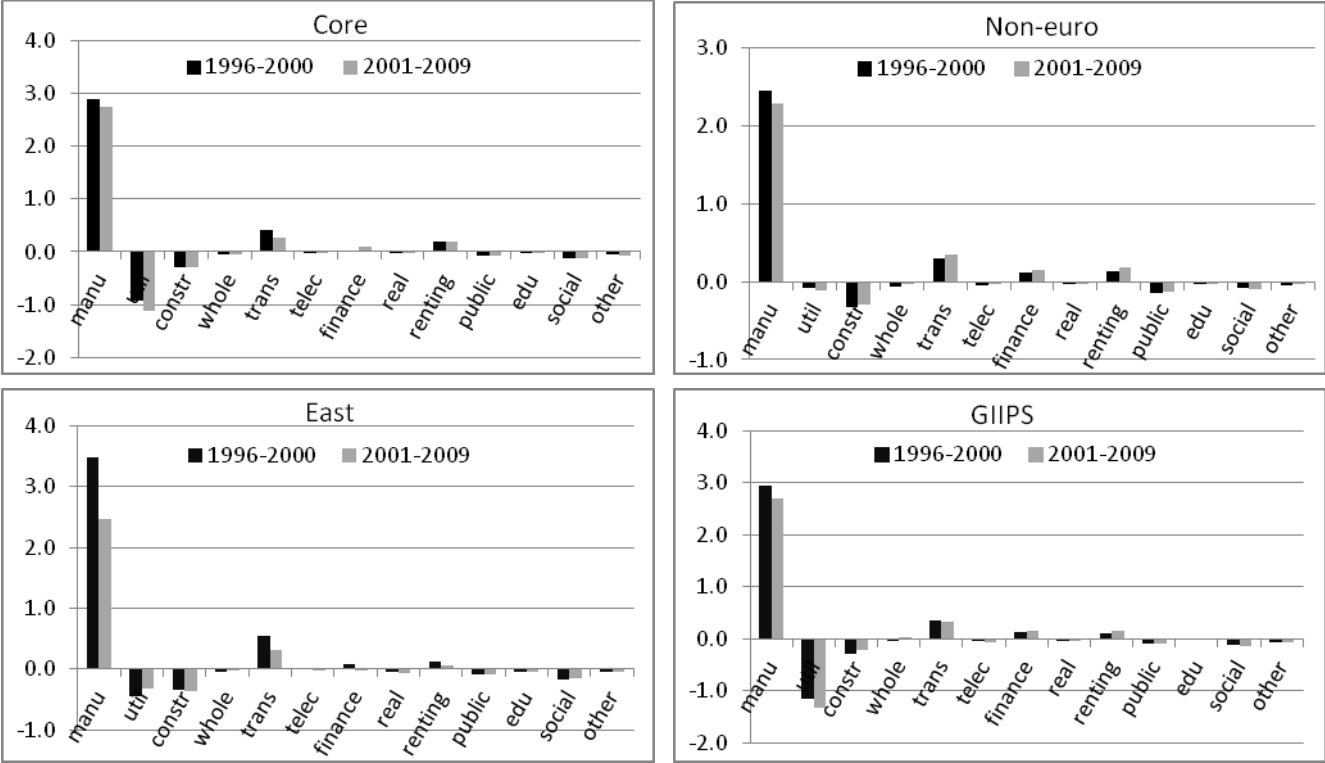


FIGURE 1 Sectoral trade balances in the country groupings within the EU.

Source: Own elaborations based on WIOD.

Although from the above analysis some clear patterns emerge with potentially important consequences on current account imbalances in the EU, little can be said about the quality and extent of the sectoral impact on the current account. This is mainly because the measure of tradability merely says whether a sector is involved in the international trade, whereas the sectoral trade balances, although it provides an indication on the direction of influence on the current account, it does not permit to make any qualitative insight of such influence. More precisely, as stated already in the

¹¹ I divided the entire period 1996-2009 into two subsamples, 1996-2000 and 2001-2009, based on the observation of the development of the country-level current accounts in the EU, for which after 2001 rapidly growing imbalances could be observed. For the development of current account positions of the four country groups, see Appendix A.2.

previous section, even if a sector experiences negative trade balance, its economic importance for the economic system, deriving particularly from its growth potential, should mitigate the worries about its negative impact on the national current account. To fill this conceptual gap, two further indicators might bring some more light on the issue. The first one refers to the average growth rate of productivity at the single sector level, considered again separately for each of the four country groups. The second one analyses the sectoral impact in the generation of the total value added of the national economy.

Regarding the productivity growth rates, they are reported in Table 2. I distinguish between total factor productivity (TFP) and labour productivity. Although there are clear differences between those measures, it is indisputable that especially construction sector experienced on average very low - if not negative – productivity growth rates. On the contrary, manufacturing sectors, but also business services and electricity, gas and water supply, which make out the major part of the BUSS category, were manifesting positive total factor and labour productivity growth rates. Thus, especially for the construction sector and for BUSS these findings are of particular importance in the context of the analysis of current account determinants and their imbalances. Indeed, whereas construction, with its low growth potential and negative sectoral trade balance, would have irreversibly negative impact on current account positions, the same cannot be said for BUSS, which directly or indirectly – through their accompanying role for the economic activity of the other sectors – play an important role for the entire growth dynamics. Consequently, the current investment in BUSS, even though contributing to deterioration in the current account position, might be crucial to create the necessary business environment, with long-lasting positive return generated by sectors profiting from BUSS and, thus, the potential for the future repayment of actual net liabilities would be assured.

TABLE 2 Average productivity growth rates by sectors of activity in the EU country groupings.

	averages over 1996-2009*							
	Core		East		GIIPS		Non-euro	
	TFP	labour	TFP	labour	TFP	labour	TFP	labour
Manufacture	3.4	2.9	6.4	7.3	0.9	2.3	4.1	3.1
Electricity, gas and water supply	3.2	3.3	4.8	2.8	0.1	2.5	0.7	1.3
Construction	-0.3	0.1	-1.9	1.0	-0.1	-0.1	-0.7	-0.3
Wholesale and retail trade	1.5	0.9	2.9	4.2	0.3	1.1	2.1	1.6

Business services	1.6	1.5	3.5	4.0	0.9	2.1	2.3	2.0
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*due to the data availability regarding TFP growth, for East averages are calculated over 1999-2008, for Non-euro TFP growth over 1997-2007 and for GIIPS over 2001-2009. Data on the productivity growth in the other service sectors, especially in the community services, were not available.

Source: Own calculations based on OECD STAN Database for Structural Analysis.

But, additionally, the validity of this conclusion depends on the relative size of the investment made in a particular sector. More precisely, in sectors like (especially) construction, with low productivity growth combined with negative sectoral trade balance, intensified and in some extent excessive investment activities might have contributed to deteriorating current account positions in some European economies.¹² This can be seen from the analysis of data reported in Figure 2, where I calculated the sector-level contribution in the growth of value added.

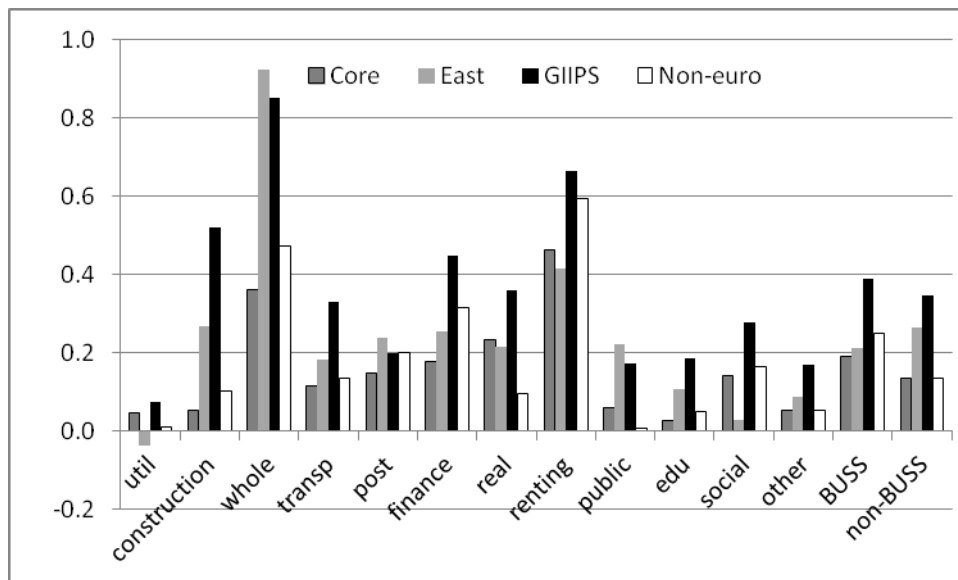


FIGURE 2 Sectoral contribution (in %) to the value added growth, average over 1996-2009.

Source: Own calculations based on OECD STAN Database for Structural Analysis.

The evidence for construction and for the wholesale and retail trade sector is particularly striking, as it shows the great importance of these sectors in the value added growth, especially for

¹² As discussed below, the case of construction is particularly evident in the European case. Instead, regarding the sector of electricity, gas and water supply, despite of its negative trade balance, the sector was not exhibiting particularly dynamic increase in activity across Europe, so that its impact on the national current account position should remain moderate.

GIIPS and for the Eastern European countries. This growth, extensively based on a construction boom, was made possible for the GIIPS countries thanks to more favorable financing conditions after the euro adoption. For Eastern European countries, one can expect that the prospect of the EU accession and successful institutional convergence to the EU norms led to intensified investment flows from abroad that were increasingly allocated in housing and other private services (like wholesale and retail trade), often tightly linked to the construction sector. Nevertheless, as mentioned before, the case of construction is comparably more serious than for the other services, like wholesale and retail trade sector, with almost balanced sectoral trade position and positive productivity dynamics.

5. Data

The database constructed for the empirical exercises constitutes a strongly balanced panel referring to 20 EU member states in the period 1995-2009.¹³ In the estimation framework presented in the next section, I apply annual observations and use the bulk of information deriving from the panel structure of my database.¹⁴ With the purpose to disentangle effects that might be specific for roughly homogenous clusters of EU members, I distinguish between four country groups that, nevertheless, do

¹³ Countries taken under consideration are Austria, Belgium, Finland, France, Germany, Netherlands (forming the core euro area), Greece, Ireland, Italy, Portugal, Spain (labeled GIIPS), Czech Republic, Estonia, Hungary, Poland, Slovakia, Slovenia (labeled East), Denmark, Sweden and UK (forming non-euro group). Due to the data unavailability for Lithuania, Latvia, Malta and Cyprus, I had to exclude them from my investigation, although especially the two Baltic economies would be of a great interest for the present study, due to the construction boom observed in the recent years.

¹⁴ In separate estimations not reported here, I estimated the main specifications on cross-sectional data. The standard determinants remained significant, whereas the variables of interest in my analysis (referring to sectoral level contribution in the generation of value added) were almost always insignificant. This is most probably due to the fact that their influence on the current account is more of a short-term nature and is thus averaged out when implementing a cross-section analysis. This conclusion also applies to the transformation of annual data into 5-year non-overlapping averages, like in Chinn and Prasad (2003) or Calderón *et al.* (2002). Moreover, the focus of my investigation is on the sharp and dynamic developments observed before and after 2001, so that a cross-section analysis and estimations based on 5-year averages don't make much sense here.

not enter the estimations with simple dummy variables, yet by means of different interaction terms with respective explanatory variables. This strategy should provide much more meaningful conclusions regarding specific country-groups effects.

The dependent variable in my analysis is given by each country's current account position as percentage of GDP, with the data taken from Eurostat. From this same source, I retrieved data necessary to obtain a variable expressing net foreign assets in percentage of GDP (*NFA*) as well as both dependency ratios (*old_age* and *young_age*). In particular, old-age dependency ratio expresses the share of the old age population (65+) over the young population (15 - 64). Instead, young-age dependency ratio will be usually expressed in terms of the population growth rate. Relative income (relative to the U.S.) and GDP growth ($d(GDP)$) are based on data taken from the World Economic Outlook database, whereas terms of trade indicator, used to obtain its time-averaged standard deviation, comes from the World Development Indicators. Finally, the variables measuring the sectoral influence have been calculated for each sector as a share of this sector's value added in total value added. The data necessary to obtain them are taken from OECD STAN Database for Structural Analysis.

6. Estimation strategy

Following the past empirical contributions, I first apply the pooled OLS methodology for a series of specifications and compare the results with an alternative fixed effect specification, often used in this framework (Calderón *et al.*, 2002; Chinn and Prasad, 2003) in order to soak up country-specific factors.¹⁵ Nevertheless, given that the specifications of the major interest for my analysis

¹⁵ I am also aware of possible endogeneity problems of my specifications, especially where the government budget or GDP growth rate are included directly in the analysis. In this context, I consider the PCA instrument as one of the methods to overcome the problem, as in that way I exclude potentially endogenous variables from the direct structure of the estimating equation and consider their influence through principal components. Additionally, I run two stages least square instrumental variable regressions that broadly confirmed the results (not reported here) obtained in the basic estimation procedure. Finally, another suitable method to deal with endogeneity concerns would be through generalized methods of moments (GMM) methodology that, however,

contain a great number of explanatory variables, the risk of overestimation brought me to apply the principal component analysis (PCA) that permitted to reduce the number of covariates, still taking into account their joint influence.

6.1. The model

The baseline specification for all estimations is a dynamic model, in which the dependent variable is given by annual values of current account position in percentage of GDP. The model is dynamic, as it includes the lagged observation of the dependent variable, as in equation 1.

$$ca_{kt} = \beta_1 ca_{k(t-1)} + \beta_2' \mathbf{X}_{kt} + \beta_3' \mathbf{Z}_{kt} + \tau_t + \varepsilon_{kt} \quad (1)$$

where ca_{kt} is current account in percentage of GDP in country k at time t , whereas $ca_{k(t-1)}$ is its lagged value. Vector \mathbf{X}_{kt} includes the standard determinants of current account, as discussed earlier in the paper. Moreover, vector \mathbf{Z}_{kt} contains a set of explanatory variables referring to the sectoral importance in the generation of value added (from *manufacture* to *non-BUSS*), to interaction terms of these variables with the country groups' dummies (from *constr*core* to *d(GDP)*Non-euro*) as well as to the two euro-country-groups interaction terms (*euro*core* and *euro*GIIPS*).¹⁶ Finally, τ_t and ε_{kt} refer to time dummies and to idiosyncratic error term, respectively.

6.2. Results from dynamic panel estimations

Based on equation (1), I estimated different specifications according to the pooled OLS method with time dummies. The results are reported in Table 3, starting with the specification considering only standard determinants of the current account (column 1) and subsequently adding to this specification a variable set of other determinants related to the sectoral variables (columns 2 to 6).

According to the results of Table 3, the coefficient on the lagged dependent variable is positive and below one, suggesting a certain, even though moderate degree of current account persistency. This means that current account surpluses/deficits tend to re-occur the next year too. Moreover, this also requires a sufficient number of groups, surpassing the number of instruments – a condition that is difficult to satisfy in my case.

¹⁶ Interaction terms are obtained as products between two respective variables, for instance *constr* and *euro*.

means that it is reasonable choice to include such a lagged verification of the dependent variable among the regressors.

TABLE 3 Pooled OLS estimation with time dummies.

	dependent variable <i>CA/GDP</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>ca_{t-1}</i>	0.808 (0.053)***	0.775 (0.064)***	0.747 (0.069)***	0.783 (0.061)***	0.758 (0.068)***	0.735 (0.060)***
<i>gov balance</i>	0.267 (0.124)**	0.264 (0.134)*	0.254 (0.139)*	0.286 (0.152)*	0.274 (0.114)*	0.228 (0.116)*
<i>NFA</i>	-0.003 (0.006)	-0.002 (0.007)	-0.003 (0.007)	-0.007 (0.008)	-0.002 (0.007)	0.006 (0.006)
<i>relative income</i>	3.323 (1.394)*	3.067 (1.824)*	2.907 (1.956)	4.295 (2.344)*	2.451 (1.899)	-0.390 2.194
<i>old-age dep.</i>	-0.135 (0.042)**	-0.142 (0.048)**	-0.098 (0.057)*	-0.062 (0.060)*	-0.129 (0.049)**	-0.129 (0.052)*
<i>young-age dep</i>	-2.867 (1.117)*	-1.516 (1.046)	-0.341 (1.180)	-1.155 (1.513)	-0.817 (1.073)	-0.808 (1.197)
<i>terms of trade var</i>	-0.031 (0.104)*	0.011 (0.110)	0.016 (0.117)	-0.035 (0.135)	0.008 (0.124)	0.022 (0.102)
<i>d(GDP)</i>	-0.513 (0.114)***	-0.501 (0.108)***	-0.495 (0.107)***	-0.508 (0.107)***	-0.495 (0.111)***	
<i>manufacture</i>		9.330 (17.574)	-5.644 (18.326)	-3.767 (18.545)		-10.626 (17.521)
<i>construction</i>		-30.379 (17.808)*	-28.518 (18.454)*		-32.143 (23.109)*	-30.227 (16.186)*
<i>BUSS</i>		-14.135 (26.261)	-15.620 (26.412)	-4.847 (25.870)	-14.086 (24.203)	-29.580 (25.399)
<i>Non-BUSS</i>		-22.240 (37.775)	-17.028 (38.299)	-5.460 (38.777)	-18.262 (33.761)	-35.818 (35.057)
<i>constr*core</i>				-10.715 (9.025)		
<i>constr*GIIPS</i>				-20.939 (9.567)**		
<i>constr*East</i>				-0.715 (14.272)		
<i>constr*non-euro</i>				-21.580 (13.202)		
<i>manu*core</i>					0.076 (11.184)	
<i>manu*GIIPS</i>					-13.816 (9.669)	
<i>manu*East</i>					-8.116 (15.523)	
<i>manu*non-euro</i>					-9.875 (16.561)	
<i>d(GDP)*core</i>						0.206 (0.148)
<i>d(GDP)*GIIPS</i>						-0.367 (0.151)*
<i>d(GDP)*East</i>						-0.558 (0.098)***
<i>d(GDP)*Non-euro</i>						0.037 (0.133)
<i>euro*core</i>			0.303 (0.448)			
<i>euro*GIIPS</i>			-0.916 (0.535)*			
<i>N° observations</i>	268	259	259	259	261	259
<i>R²</i>	0.875	0.876	0.878	0.877	0.876	0.894

Note: Robust standard errors are reported. ***, ** and * refer to 1, 5 and 10% significance level. Time dummies are included.

Among the standard determinants of the current account, government balance signs significantly positive influence, giving support to the twin deficit hypothesis.¹⁷ Also the coefficients on the relative income variable and the old-dependency ratio are significant in the majority of cases and report the expected signs, but the stability of these relations is rather weak, as will become clear from the estimations that follow. This weak significance might be due to the very nature of those determinants which are expected to exercise impact on the current account in medium-to-long run. Consequently, a rather short time horizon of my analysis might be insufficient to confirm underlying relationship.

Instead, the result that deserves attention relates to the relative importance of the construction sector in the generation of the overall value added. Its impact on the current account is negative in all specifications. Moreover, when decomposing the effect between country groupings, it seems that the entire evidence is driven by the Eastern European countries. Nevertheless, as it will be clear from the analysis of both the fixed effect model and the estimations based on the principal components, this evidence might be weakened by the presence of other country-specific effects that still play a role here. Finally, regarding the other variables, also the growth of real GDP exercised a strong impact on current accounts, meaning that higher growth rates of GDP were associated with deteriorating current account positions. This effect seem to be the strongest for GIIPS and East – a result that goes hand in hand with relatively high output growth in those two groups in the period under examination.¹⁸ This last result is important as it permits to argue against the common trend effect between the dependent variable and the growth rate of GDP. In particular, if this were the case, the expectation would be of a significant effect for all and not only some country groups. This result has been confirmed also in the fixed effect and principal component estimations. Finally, neither BUSS nor non-BUSS reported significant influence on current account positions in the EU, but the same reservation like in the case of construction, regarding country-specific effects, could be valid here.

¹⁷ This result is in line with the findings by Chinn and Prasad (2003) regarding the sample of industrialized countries. Nevertheless, in more general framework of analysis, the literature is still inconclusive on the validity of the hypothesis see, for instance, Kim and Roubini (2008).

¹⁸ This growth in the period preceding the crisis was higher than the growth in the core euro area on average by 1.2 and 2.1 percentage points for GIIPS and East, respectively.

As an alternative specification to the pooled OLS method, I run the same set of specifications seen in Table 3 with fixed effects method. An advantage of the fixed effect model is that it permits to get rid of some country-specific effects and concentrate on the influence deriving from factors typically important for all countries. This is also compatible with the fact that the emphasis of my investigation is on differences in the impact of specific variables due to country-grouping effects. Indeed, by separating country-specific effects and simultaneously by introducing country groups variables, I can better assess their impact on current account positions.

The results reported in Table 4 generally confirm the findings on the standard determinants from the pooled OLS regressions, with the difference that government budget variable reported an even stronger evidence, whereas the other standard determinants lost their explanatory power. Instead, regarding the sectoral variables, construction appeared with much stronger evidence, and also the country groupings effects became clearer. In particular, not only GIIPS, but also East and core euro area experienced a negative impact of construction on current account. This result is in line with the persistency of the trade deficits of the construction sector connected with its growing relative importance in the generation of the value added. Moreover, relatively strong and negative evidence could be found for the manufacturing sectors, with the group of Eastern European countries prevailing in this effect. Indeed, as it has been demonstrated in the previous section, current account deterioration in this group of countries in the years after 2001 went hand in hand with the strong deterioration of the sectoral trade balance of the overall manufacturing activities.

Dynamic panel estimations based on principal component analysis

The risk of overestimation in the above analysis derives from a high number of explanatory variables included on the right-hand side of equation 1. In this regard, one possible solution, not implemented before in this framework, could be to apply the principal component analysis. This is a multivariate, non-parametric method constituting a useful tool to investigate a common pattern of the

underlying data and, consequently, to compress the data, by reducing the number of dimensions, without at the same time losing much of the valuable information contained in the original variables.¹⁹

TABLE 4 Fixed effect estimation with time dummies.

	dependent variable <i>CA/GDP</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>ca_{t-1}</i>	0.688 (0.060)***	0.602 (0.062)***	0.582 (0.065)***	0.564 (0.064)***	0.629 (0.065)***	0.611 (0.058)***
<i>gov balance</i>	0.315 (0.083)***	0.310 (0.089)**	0.307 (0.090)**	0.324 (0.091)***	0.297 (0.090)**	0.247 (0.085)*
<i>NFA</i>	-0.008 (0.007)	-0.007 (0.008)	-0.009 (0.008)	-0.002 (0.008)	-0.005 (0.008)	0.001 (0.008)
<i>relative income</i>	-0.042 (5.694)	5.604 (6.011)	4.524 (6.429)	9.523 (6.802)	0.424 (6.458)	0.582 (5.861)
<i>old-age dep.</i>	-0.166 (0.175)	-0.099 (0.185)	-0.046 (0.204)	-0.214 (0.204)	-0.031 (0.192)	-0.211 (0.176)
<i>young-age dep</i>	-2.372 (1.331)*	0.112 (1.453)	0.260 (1.463)	-0.273 (1.523)	0.713 (1.455)	0.022 (1.369)
<i>terms of trade var</i>	--	--	--	--	--	--
<i>d(GDP)</i>	-0.530 (0.081)***	-0.506 (0.085)***	-0.494 (0.087)***	-0.518 (0.085)***	-0.533 (0.087)***	
<i>manufacture</i>		-101.912 (30.182)**	-102.245 (31.264)**	-92.007 (30.049)**		-90.664 (30.074)**
<i>construction</i>		-125.168 (25.254)***	-118.883 (27.015)***		-28.688 (18.960)	-112.252 (23.767)***
<i>BUSS</i>		-13.281 (36.633)	-14.870 (37.134)	-12.605 (36.389)	-18.604 (36.835)	-30.414 (37.567)
<i>Non-BUSS</i>		-181.507 (79.330)*	-163.742 (83.625)*	-167.447 (78.986)*	-129.021 (84.900)	-138.600 (74.913)*
<i>constr*core</i>				-294.632 (62.539)**		
<i>constr*GIIPS</i>				-104.791 (33.494)**		
<i>constr*East</i>				-113.205 (35.148)**		
<i>constr*non-euro</i>				-63.041 (104.298)		
<i>manu*core</i>					-52.454 (62.962)	
<i>manu*GIIPS</i>					-37.377 (53.677)	
<i>manu*East</i>					-160.545 (44.768)***	
<i>manu*non-euro</i>					-108.532 (85.721)	
<i>d(GDP)*core</i>						0.198 (0.152)
<i>d(GDP)*GIIPS</i>						-0.276 (0.179)
<i>d(GDP)*East</i>						-0.556 (0.080)***
<i>d(GDP)*Non-euro</i>						0.122

¹⁹ In the literature, PCA is applied in a number of economic and non-economic fields. But the scope of the method is the same – to arrive at a composite indicator compressing the information from multiple variables into a reduced number of components. For examples of the application of PCA in the economic literature, see Dreher (2006) and König and Ohr (2012).

						(0.197)
<i>euro*core</i>			0.560			
			(0.851)			
<i>euro*GIIPS</i>			-0.703			
			(1.051)			
<i>N° observations</i>	268	259	259	259	261	259
<i>R² overall</i>	0.861	0.795	0.797	0.300	0.714	0.843

Note: Results refer to the fixed effects method. Random effects estimations have been also performed, with only few changes in the results. However, in the majority of cases, the Hausman test rejects the null of efficiency of the random effect estimator. ***, ** and * refer to 1, 5 and 10% significance level. Time dummies are included. Standard errors in are parenthesis. Terms of trade variable has been dropped due to no time variation.

My strategy consisted in performing PCA for the standard determinants of the current account and to replace them in the original model with the two principal components that appeared to have the highest loading factors, the first with the value of 2.8 and the second 1.4. The two components together manage to explain over 60% of variability of the original variables, whereas the first factor contributed already with 40%.²⁰

Confronting the results from this new method (Tab. 5) with the results previously discussed, they appear to be comparable. More precisely, the two principal components (*pc1* and *pc2*) that express the compressed impact from the standard determinants are significant and positive, probably due to the effect reported previously by the lagged dependent variable and the fiscal balance variable. But also the results for construction are confirmed here. Moreover, given that BUSS sectors revealed significantly negative impact in the present estimation framework, in column 4, I replaced the country-specific variables relative to manufacturing sector with the respective country-specific interaction terms for BUSS variable. Here the results are the strongest for GIIPS, for which the growing importance played by the sector in the value added growth could be documented.²¹ Finally, a

²⁰ Figure A.2 in Appendix A.3 plots the eigenvalues obtained after PCA. The figure reveals a flat decrease of eigenvalues after the second component, confirming that the choice of the first two components is reasonable. Although the third factor still lies above the horizontal line with value 1, its inclusion would only marginally improve the cumulative explanatory power. This notwithstanding, I redone all the estimations including four components (as their cumulative explanatory power achieved almost 88%), but the second and the third components remained always insignificant. I validated the PCA with the Kaiser-Meyer-Olkin's measure of sampling adequacy that supported the overall suitability of the data set with a value of 0.6.

²¹ This contribution rose from 0.48% in the period 1995-2000 to 0.52% in the years thereafter.

remarkable result concerns the influence of the euro introduction on GIIPS (*euro*GIIPS*) seen also in the pooled OLS framework. This seems to confirm that the euro adoption might have contributed negatively to the increasing current account deficits in this country group.

TABLE 5 Pooled OLS with principal components

	dependent variable <i>CA/GDP</i>				
	(1)	(2)	(3)	(4)	(5)
<i>pc1</i>	2.899 (0.139)***	2.815 (0.239)***	2.942 (0.306)***	2.981 (0.305)***	2.435 (0.244)***
<i>pc2</i>	1.267 (0.169)***	0.983 (0.246)***	1.086 (0.243)***	1.113 (0.257)***	1.968 (0.241)***
<i>manufacture</i>	22.039 (19.140)	28.540 (24.923)	32.752 (24.788)	56.298 (22.911)*	20.544 (19.551)
<i>construction</i>	-93.411 (13.936)***	-62.645 (17.653)***		-58.198 (15.441)***	-72.229 (17.289)***
<i>BUSS</i>	-109.024 (24.770)***	-80.905 (30.746)**	-84.367 (35.637)*		-127.402 (24.629)***
<i>Non-BUSS</i>	-85.829 (35.553)**	-56.104 (49.768)	-44.212 (50.798)	21.118 (39.706)	-56.767 (46.099)
<i>constr*core</i>			-25.660 (11.877)*		
<i>constr*GIIPS</i>			-66.447 (10.931)***		
<i>constr*East</i>			-33.302 (18.663)*		
<i>constr*non-euro</i>			-40.834 (12.092)**		
<i>BUSS*core</i>				-4.228 (8.954)	
<i>BUSS*GIIPS</i>				-40.555 (10.962)***	
<i>BUSS*East</i>				2.389 (18.877)	
<i>BUSS*non-euro</i>				-17.697 (8.243)*	
<i>d(GDP)*core</i>					-0.016 (0.171)
<i>d(GDP)*GIIPS</i>					-0.938 (0.163)***
<i>d(GDP)*East</i>					-0.730 (0.136)***
<i>d(GDP)*Non-euro</i>					-0.359 (0.183)
<i>euro*core</i>		0.792 (0.548)			
<i>euro*GIIPS</i>		-2.538 (0.488)***			
<i>N° observations</i>	259	259	259	259	259
<i>R² overall</i>	0.778	0.780	0.790	0.784	0.838

Note: Robust standard errors are in parentheses. ***, ** and * refer to 1, 5 and 10% of significance level, respectively.

7. Conclusions

The aim of this investigation was to provide some new insights to the factors determining the current account in the European Union. I found a broad sustain to the standard set of determinants,

with the fiscal balance variable reporting the strongest evidence. This notwithstanding, the focus of the analysis is on new sector- and to a certain extent country-group-specific effects, coming principally from the sectoral composition and development of economic activities.

The results based on the implementation of such a new set of sector-specific explanatory variables suggest that the deterioration in the current account positions in the EU could be to a large extent explained by the construction sector. In particular, this result is the strongest for the GIIPS countries, where the construction boom and the subsequently bursting bubble provoked the most disruptive consequences. Consequently, this finding points to some ill-conditioned developments of the current account positions, with aggravating consequences on the intertemporal budget constraint conditions. In particular, this offers a formal and empirically documented support for the decision taken by the European Commission to include, in particular, House Price Index, but also private credit flows, as indicators in the Macroeconomic Imbalance Procedure. This should permit to better monitor and timely prevent potentially disruptive developments in the construction and other related sectors.

Finally, also some negative evidence could be confirmed for BUSS services, as well as for the manufacturing sectors. Nevertheless, on the contrary to the construction sector, BUSS services and manufacturing sectors both reveal positive sectoral trade balances and both are characterized by positive productivity growth rates, so that their qualitative impact on the current account shouldn't create much concerns.

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Appendix A.1. Classification of service sectors between BUSS and non-BUSS

For the purpose of the empirical investigation, I distinguish all service sectors in two groups according to two criteria: productivity growth criterion and supplier’s role criterion. The first is measured by the average (labour and TFP) productivity growth for each sector higher/lower than 1%. Complementary to this, the supplier’s role criterion consists in distinguishing between sectors for which the average ratio of intermediate inputs delivered to the other sectors over the total output produced by that sector is higher/lower than 0.2. In particular, based on input output tables for each country and for each year between 1996 and 2009, I calculated such shares and took the time averages for the four country groups and separately for each of the service sector included in my analysis. Finally, to classify the services in BUSS and non-BUSS, the sector had to satisfy contemporaneously both criteria, i.e. productivity > 1% and supplier’s share >0.3 to be a BUSS and the opposite for non-BUSS.

Appendix A.2. Current account development in the EU

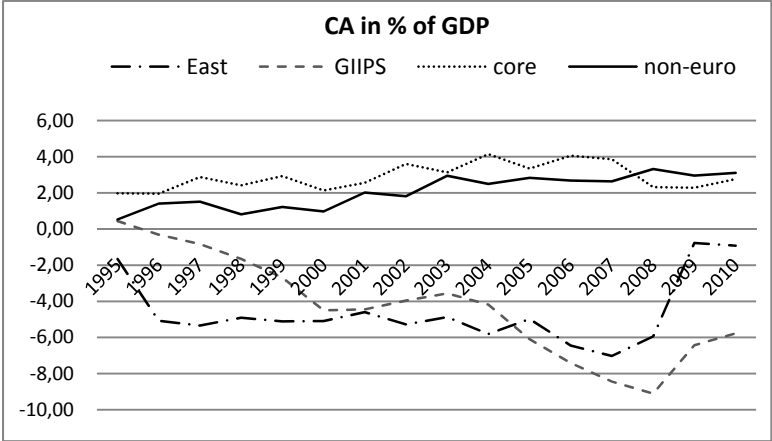


FIGURE A.1 Current account positions in the country groups within the EU

Appendix A.3. Principal component analysis and eigenvalues

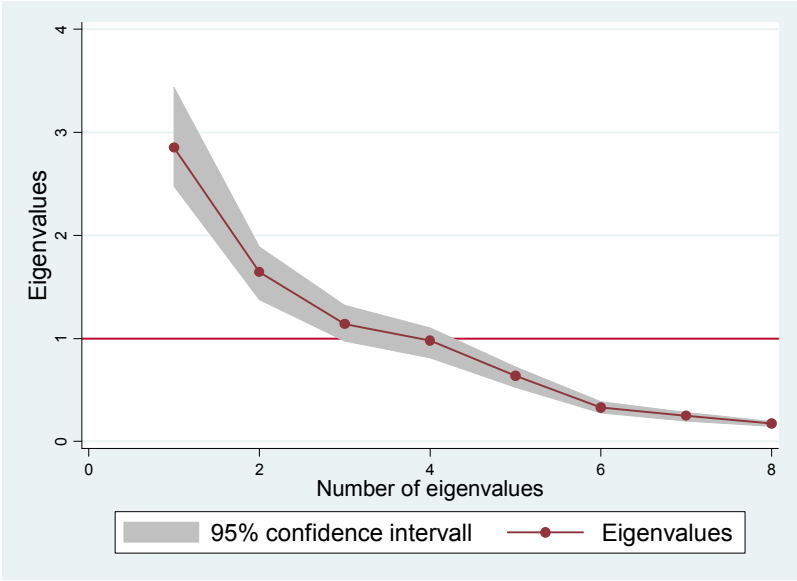


FIGURE A.2 Scree plot of eigenvalues after principal component analysis.