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GREECE MACRO MONITOR

March 31, 2014

Greece's current account drivers and forecasts

An empirical study

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Preface

The present study employs cointegration techniques and a vector correction model (VECM) to identify and analyze the main drivers of Greece's current account in recent decades and, especially, in the years following the euro adoption. Our econometric results provide broad-based support to the key findings of a number of earlier empirical studies on the determinants of the current account. In more detail, the trend deterioration in the country's external imbalance in 1999-2008 can be traced back to a number of developments related to: a) the EU convergence process and closer integration in world goods and financial markets; b) domestic authorities' response to policy challenges arising from participation in the single currency area; and c) the structural characteristics and idiosyncrasies of the Greek economy. At the Eurozone level, the initial years following the adoption of the single currency saw most countries in the so-called euro area periphery running large current account deficits, with core member states in the richer north featuring significant external surpluses. Despite these large divergences across member states, the outbreak of the global financial crisis found the euro area running a broadly-balanced external position vis-à-vis the rest of the world. The scale and dispersion of current account imbalances across euro area countries in the initial years following the introduction of the single currency raise credible concerns as to whether such unprecedented imbalances were justified on the basis of underlying macro fundamentals. It also supports the notion that these imbalances were, to a certain extent, overlooked by euro area policy makers.

Introduction

The present study employs cointegration techniques and a vector correction model (VECM) to identify and analyze the main drivers of Greece's current account in recent decades and, especially, in the years following the euro adoption. The study constitutes an extension of an earlier paper we published in mid-2011 - see *P. Monokroussos and Thomakos D. "Can Greece be saved? Current account, fiscal imbalances and competitiveness"; London School of Economics, Hellenic Observatory, GreeSE paper No. 59* (http://eprints.lse.ac.uk/43915/1/GreeSE%20No59.pdf).

Our econometric results provide broad-based support to the key findings of a number of earlier empirical studies on the determinants of the current account. Specifically, the trend deterioration in the country's external imbalance in 1999-2008 can be traced back to a number of developments related to: *a)* the EU convergence process and closer integration in world goods and financial markets; *b)* domestic authorities' response to policy challenges arising from participation in the single currency area; and *c)* the structural characteristics and idiosyncrasies of the Greek economy.

At the Eurozone level, the initial years following the adoption of the single currency saw most countries in the so-called euro area periphery running large current account deficits, with core member states in the richer north featuring significant external surpluses. Despite these large

divergences across member states, the outbreak of the global financial crisis found the euro area running a broadly balanced overall external position. The scale and dispersion of current account imbalances across euro area countries in the initial years following the introduction of the single currency raise credible concerns as to whether such unprecedented imbalances were justified on the basis of underlying macro fundamentals. It also supports the notion that these imbalances were, to a certain extent, overlooked by euro area policy makers.

In the case of Greece, our empirical results document a number of drivers contributing to the significant deterioration in the country's current account position in the years leading to the global financial crisis, with the most important ones including:

Accumulated loss of economic competitiveness against main trade-partner economies. Among other reasons, this appears to have been the result of higher domestic inflation and unit labor costs (ULCs) growth relative to euro area trade-partners, not being fully counterbalanced by respective productivity differentials.

Pronounced fiscal policy relaxation following the *euro adoption.* In line with the "twin deficit" hypothesis, large fiscal deficits in the period leading to the sovereign debt crisis have increased disposable incomes, boosting present consumption and reducing private saving. This effect appears to have been particularly pronounced in the initial years following the euro adoption, as domestic households have probably perceived the initial rise in their disposable incomes as permanent.

Domestic financial deepening and accelerated EU converge after the euro adoption. The completion of domestic financial sector liberalization in the mid-90s, enhanced financial deepening and the accelerating catching up process with high per-capita-income countries post the euro adoption raised the level of external imbalance that can be financed by inward foreign investment. However, current account deficits may have both *good* and *bad* components, with countries featuring acute external imbalances for a prolonged period of time being susceptible to wild reversals of investor sentiment and sudden stops of external financing.

Cyclical influences i.e., faster GDP growth in Greece relative to the euro area trade-partner economies in the decade before the outbreak of the global crisis.

The economic stabilization program implemented in Greece after the outbreak of the sovereign debt crisis has already delivered tangible results, leading to a near elimination of twin deficits. In 2013, the general government primary balance recorded a surplus for the first time since 2002, while the current account reached a surplus (0.7% of GDP) for the first time on record. An out-of-sample forecasting exercise based on the present EU/IMF macro baseline scenario for Greece also points to a broadly balanced (or even positive) current account position this year and the next. From a longer term perspective, continued fiscal vigilance, prudent wage policies and the completion of the present reforms program in domestic product and services markets are necessary to prevent an excessive widening of the current account to a level that is not justified by domestic economic fundamentals.

The remainder of this paper is structured as follows: **Chapter 1** provides a brief overview of the key concepts and definitions related to a country's balance of payments; **Chapter 2** provides a short literature review on the main determinants of the current account position; **Chapter 3** takes an intertemporal view on current account developments in Greece and the euro area; **Chapter 4** presents the main results of our empirical study and discusses their policy implications; and **Chapter 5** concludes.

1. Balance of payments - Key concepts and definitions

The current account balance is the difference between domestic saving and investment, aggregated over private and public sectors. A surplus (deficit) in the current account balance implies an excess (shortage) of saving over investment. In a closed economy, saving is, by definition, equal to investment, so that the current account balance is always zero. However, in an open economy domestic investment does not need to be equal to domestic saving. Provided that international capital is mobile, a current account deficit (*i.e.*, an excess of domestic investment over saving) can be financed though borrowing from abroad. By a symmetric argument, a current account surplus can be thought as the portion of a country's saving invested abroad.

In the traditional accounting sense, the current account balance at the end of period *t*, $\mathbf{CA_t}$, equals the change in *net foreign assets*, $\mathbf{\Delta F_t}$, between the end of period *t-1* and *t*. The net foreign asset position is calculated as the difference between a country's total foreign claims and total foreign liabilities. A positive balance ($\mathbf{F_t > 0}$) means that the country is a net creditor, while a negative one ($\mathbf{F_t < 0}$) implies a debtor country at time *t*. Note also that the current account balance is a *flow* concept, while net foreign assets represent a *stock* variable. The above definition of net foreign assets does not take into account changes in asset prices. To account for that effect, the *balance of payments* identity states that the change in the net foreign asset position equals the current account plus an error term, ε_t, which captures valuation effects and net errors and omissions related to *e.g.* unrecorded debt assets held by country residents abroad (see *equation* 1 below).

$$\mathbf{\Delta F_t = CA_t + \varepsilon_t} \qquad (1)$$

The current account is one of the two main components of the balance of payments, with the other being the *capital account*. The current account represents the aggregation of the balances of: **i)** of *trade* (exports minus imports of goods); **ii)** *services* (exports minus imports of services)*;* **iii)** *factor income* (receipts minus payments for employee compensation, interest, dividends, profits and other income);and **iv)** *current transfers*. So that,

$$\mathbf{CA_t = TB_t + SB_t + FI_t + CT_t} \qquad (1i)$$

Where,

TB = trade balance; **SB** = services balance; **FI** = factor incomes balance; **CT** = current transfers balance, and ***t*** is the time subscript.

In ESA 95 accounting standards (applied to the presentation of Greek balance of payments statistics), the following identity holds for any time period ***t***:

$$\mathbf{CA_t + CT_t + FT_t + EO_t = O}$$

Where

CT = capital transfers account (for the case of Greece, it mainly reflects capital transfers from the EU); **FT** = financial account *i.e.*, the overall net balance (inflows minus outflows) of direct investment, portfolio investment, derivatives, other investment and change in reserve asserts (with a minus sign in the latter representing an increase in the country's overall reserve asset position and vice versa); **EO** = errors and omissions.

2. Theoretical overview - Determinants of the current account

In accordance with the international literature on external imbalances, empirical studies on the determinants of the current account typically focus on explanatory variables that potentially influence investment and saving decisions. Representative regressions typically include: **a)** competitiveness indicators, such as the real exchange rate (REER); **b)** catching up indicators, reflecting the state and speed of converge between countries with different income levels *e.g.* relative per capita income levels of the domestic economy and a reference foreign developed economy; **c)** demographic factors, such as population growth and the old-age dependency ratio; **d)** business-cycle indicators, such as the output gap; **e)** degree of financial market deregulation *e.g.* ratios such as private sector credit-to-GDP or M3-to-GDP may provide useful proxies for assessing the impact of banking intermediation on domestic private savings and the current account position; **f)** degree of integration with international goods, services and financial markets; in the case of Greece (and other economies in the euro area periphery), the creation of the Single European Market and, most crucially, the adoption of the common currency may have caused structural breaks in the current account time series as a result of *e.g.* the elimination of exchange rate risk as well as the collapse of domestic interest rates in the early EMU years; **g)** fiscal variables, such as the general government balance; and **h)** other important variables, such as aggregate proxies of investor and consumer uncertainty (e.g. inflation volatility) and special factors having a temporary impact on the current account *e.g.* deviation of oil prices and freight rates from their respective long-term averages. In what follows, we draw on the existing theoretical literature on external imbalances to provide some insight on the expected direction and potency of the effects of the aforementioned variables on the current account position.

i) Competitiveness indicators

The real effective exchange rate (REER) is a typical competitiveness indicator utilized in empirical studies of the current account. The expected sign in the corresponding relationship is negative. That is because an appreciation of the real exchange rate increases the purchasing power of domestic incomes in terms of imported goods. It also increases the relative value of financial, real estate and other assets held by domestic residents. These effects tend to reduce domestic saving and increase the propensity to consume. A REER appreciation of the domestic currency also tends to reduce the price competitiveness of a country's exports in international markets. The aforementioned factors have probably been amplified in the euro area following the introduction of the single currency as a result of increased competition. Recent empirical evidence suggests that the relationship between changes in the real exchange rate and the current account position may not be monotonic. Theoretical models allowing for such a non-monotonic relationship include, among others, Tornell and Lane (1998) and Mansoorian (1998). More recently, Arghyrou and Chortareas (2008) and Berger and Nitsch (2010) document that the real exchange rate has a significant (negative) effect on the current account position in most euro area economies, though this effect may be subject to nonlinearities.

ii) Convergence indicators

Convergence influences on a country's current account position can be best conceptualized within the framework of the so-called inter-temporal approach to the current account, originally proposed by Sachs (1981) and Buiter (1981) and later extended by Obstfeld and Rogoff (1995). More recently, Blanchard and Giavazzi (2002) applied a more elaborate intertemporal framework to the euro area to show that a country's *optimal* level of external borrowing is higher, the greater is its expected output growth relative to the euro area average, the lower is the wedge between the domestic and the foreign interest rate and the higher the elasticity of substitution between domestic and foreign goods (se also Giavazzi and Spaventa, 2010).

To a certain extent, these findings may provide some rationale to what some analysts and commentators have claimed to be a "benign neglect" attitude by EU authorities towards diverging current account positions across euro area member states, especially in the period before the outbreak of the global financial crisis. The basic idea here is that, in a monetary union characterized by increased market liberalization and financial integration, capital moves "downhill" *i.e.*, from the more advanced, capital-intensive countries to less developed capital-scarce euro area states. This capital movement occurs in a quest of superior investment opportunities in poorer countries that are expected to enjoy stronger productivity and output growth in the future. Thus, the *catching up* process between low and high per-capita-income countries in an environment of increased capital mobility may have a profound effect on these countries' optimal external borrowing levels.

Naturally, the above discussion gives rise to the notion that widened imbalances within the euro area, especially in the pre-crisis period, may have had both "good" and "bad" components (Eichengreen 2010). Countries like Greece and Portugal enjoying faster productivity growth in the early EMU years capitalized on the advent of the euro and deeper financial integration to attract foreign savings in order

to finance domestic investments (Gourinchas 2002). This along with a concomitant increase in domestic consumption (*i.e.*, reduced domestic saving) as a result of positive *permanent* income effects has given rise to widening current account deficits which, to a certain extent, were the natural outcome of the real convergence progress (Ahearne, Schmitz and von Hagen 2009).

On the other hand, capital-abundant core euro area economies experienced the opposite effect. Namely, capital outflows were destined to higher growth areas in the euro area and thus, lower domestic investment, higher saving and persisting current account surpluses. Eichengreen (2010) extends the latter argument even further by claiming that core euro area countries like Germany and the Netherlands with their highly-sophisticated banks were in a position to borrow from (and run current account deficits with) the rest of the world and on-lend to Greece, Portugal and other euro periphery countries. In that respect, in the early EMU years, the core was effectively acting as a financial intermediary between the periphery and the rest of the world.

Of course, the main rationale for characterizing certain external imbalances as "good" ones is based on the premise that converging economies starting from a low income-per-capital level will eventually be able to repay accumulated foreign liabilities by increased export revenues, once they reach a higher state of development. However, with the benefit of hindsight, one can now convincingly argue that growing bilateral imbalances within the euro area were, to a large extent, overlooked by authorities, at least in the initial EMU years. Unfortunately, this "benign neglect" attitude did not prevent certain "good" imbalances from turning into "bad", driven by domestic distortions such as real estate and financial asset bubbles, fiscal profligacy and unrealistic expectations about future incomes.

A number of recent empirical studies on the determinants of the current account position use relative per capital income levels as an explanatory variable for assessing and quantifying the impact of convergence effects. Based on the earlier discussion, one would expect the coefficient of that variable to be both positive and significant.

iii) Financial integration

The way in which financial integration affects a country's current account position has been already discussed in the previous section. To recap, when countries become more closely integrated in goods and financial markets, a certain *disconnect* may arise between domestic saving and investment. This is because in a world characterized by capital mobility, capital moves "downhill" *i.e.*, from the more advanced, capital-intensive countries to less developed, capital-scarce states. In turn this suggests that poor countries with superior growth prospects may see an increase in domestic investment, a decrease in domestic saving and, by implication, a higher current account deficit. Practically, the development of the single European market and the introduction of the common currency constitute natural experiments to empirically examine whether to what extent the formation of the euro area helped to eliminate the so-called *Feldstein-Horioka Puzzle* (see Feldstein and Horioka 1980).

iv) Fiscal policy

The potential effect of changes in fiscal policy stance on private saving and the current account depends on whether domestic households react in a *Keynesian* or a *Ricardian* fashion. In a Ricardian world, higher levels of public deficits and debts are, *ceteris paribus*, associated with higher domestic savings by households. In more detail, the so-called *Ricardian equivalence* holds that an increase (decrease) in public debt must be *fully* offset by a rise (decline) in private saving. This offsetting dynamic is set in motion when, for instance, in response to a higher fiscal deficit (or lower fiscal surplus) domestic private agents decrease present consumption and increase *precautionary* saving in anticipation of reduced future disposable income. That is, as a result of higher expected taxation to repay public debt. Consequently, when the Ricardian *equivalence* holds, the impact of a fiscal policy change on the overall national saving (private + public) is zero and so is its impact on the current account position.

A departure from the Ricardian equivalence may imply that an increase in public debt may not be fully offset by an increase in private saving. In particular, the Keynesian model suggests that a higher fiscal deficit (or lower fiscal surplus) as a result of higher government spending or lower taxation increases disposable income and thus, boosts present consumption and reduces private saving. The aforementioned effect is even more pronounced if myopic households perceive the rise in disposable income to be permanent. This behavior of private agents in the Keynesian model gives rise to the so-called *twin-deficits* hypothesis, which states that higher fiscal deficits should be usually accompanied by wider current account deficits and vise versa.

v) Financial liberalization

A potentially important driver of the current account position that frequently appears in the empirical literature is financial liberalization as proxied by *e.g.* the ratio of private sector credit-to-GDP. Conceivably, financial liberalization and financial deepening are often associated with lower private saving, thanks to the relaxation of the intertemporal budget constraint facing households. Moreover, to the extent that these factors also facilitate significant price increases in domestic asset markets (e.g. housing), increased financial liberalization and bank intermediation may lead to lower private saving and higher consumption as a result of permanent income effects (Brissimis, et al 2010).

vi) Real interest rate

The real interest rate - *as proxied by e.g. the average deposit rate minus CPI* - can potentially influence private saving through two opposite channels; namely, a *substitution* effect and an *income* effect. A rise in the real interest rate can conceivably increase private savings as households postpone consumption and save more today in order to facilitate higher consumption in the future (substitution effect). A higher real interest rate also increases the opportunity cost of investments. On the contrary, if the income effect prevails over the substitution effect, then a rise in the real interest rate on deposits may induce higher consumption (and less saving) today.

vii) Demographic factors

Theoretical models and recent empirical studies document that population growth and the population age structure may have a significant effect on the behavior of private saving. The latter may be negatively affected by a high dependency rate or old population ratio. The basic intuition here follows from the life-cycle theory of consumption which implies that higher income and savings in mid-age working life offset dissaving in young and old ages. Arguably, that is because dependent and elderly people consume more than they produce and depend on the provision of goods by productive members of the economy (Higgins 1998; Lane and Milesi-Ferretti 2002). The above arguments imply that a high *contemporaneous* share of dependents relative to workers tends to have a negative effect on the current account balance. On the contrary, some empirical studies have documented a positive relationship between the current account balance and the *future* dependency ratio. That is on the basis that the latter variable constitutes a proxy of the amount of aggregate saving that domestic households need to undertake today in order to sustain desired living standards in the future (see *e.g.* Barnes, Lawson and Radziwill 2010). The potential influence of the demographic structure of an economy on domestic investment may be less straightforward. If capital and labour are complements in production, as it especially holds for business investment, a reduction in the growth of working-age population may have a negative effect on domestic investment (and vice versa). The opposite may also be true for the young and old population (Hoffmann 2002). However, in the case of public investment, a high dependency and old population ratio may raise the need for increased investment in social infrastructure.

viii) Macroeconomic uncertainty

Macroeconomic uncertainty (as proxied by *e.g.* inflation volatility) may have a significant effect on domestic saving behavior. The prevailing view in the literature is that in periods of increased macroeconomic uncertainty, domestic private-sector agents reduce present consumption and increase precautionary saving so as to smooth their consumption streams in the face of volatile future income flows. Yet, some existing empirical evidence suggest that the effect of high inflation volatility may in fact work in the opposite direction *i.e.*, reduce saving and increase current consumption at the expense of future consumption (see *e.g.* Brissimis et al 2010).

ix) Cyclical variables

Higher domestic GDP growth is often associated with lower current account balances, though this result has not proven to be very robust across countries. The basic idea here is that higher contemporaneous GDP growth rates may induce higher consumption (and lower saving) today, especially if households expect higher future income levels. Higher growth rates resulting from productivity gains may also lead to higher domestic investment (Barnes, Lawson and Radziwill 2010).

x) Trade openness

Trade openness - proxied by the ratio of the total value of external trade (exports plus imports) to GDP - is used in many empirical studies as an indicator of the existence of barriers to trade and the degree to which a country is an attractive destination for foreign capital inflows. The existing empirical literature broadly supports a positive link between trade openness and the current account balance.

xi) World oil prices

Higher world oil prices exert widening pressures on the current account balance of oil-importing countries and vice versa. Greece in particular is one of the most energy-dependent economies in the euro area and thus, one would normally expect widening current account pressures in periods of price appreciation trends in world oil markets. Transportation revenue, primarily from shipping, also constitutes an important component of the Greek services balance. As such, periods of large deviations in world oil prices and freight rates from their historical averages usually have significant effects on the country's current account position.

xii) Initial net foreign asset position

Empirical studies document a positive link between the initial net foreign asset position and the current account in the subsequent periods. This positive relation usually arises as a result of the ensuing flow of future income streams *e.g.* interest revenue or expenditure, dividend receipts or payments. For instance, in a highly indebted country, a high external debt burden today points to a future steam of sizeable interest payments that may continue to exert widening pressure on the current account deficit in the subsequent years. The *persistence* of imbalances that led to the earlier accumulation of external debts may constitute another factor strengthening the positive link between the initial net foreign asset position and the current account.

Table A
Current account determinants and sign of theoretic relationship
Positive sign (+) indicates positive relationship / negative sign (-) indicates negative relationship

Explanatory variable	Sign of theoretical relationship
Real Effective Exchange Rate	-
GDP per capita	+
GDP growth	-
Fiscal balance *Ricardian / Keynesian agents (twin deficits)*	- / +
Financial integration due to EMU membership *Low income/High income country*	- / +
Financial deepening (credit to GDP)	-
Real interest rate	- / +
Age dependency ratio	-
Population growth	-
Macroeconomic uncertainty	+ / -
Trade openness	+
Oil price (oil importing country)	-
Freight price (country with large shipping sector)	+

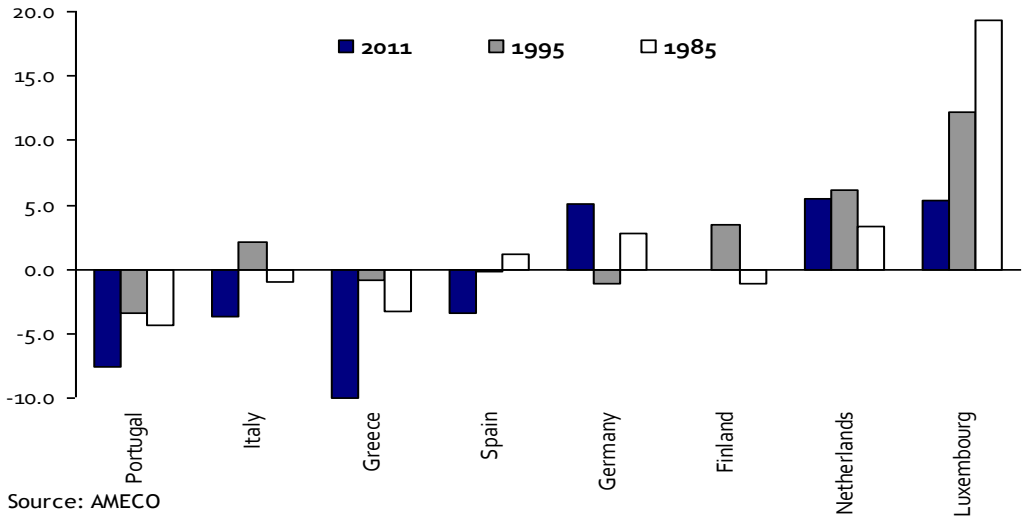
Source: Eurobank EFG Research

3. Drivers of current account developments in Greece and the euro area

3.1 Drivers of the current account

Historically, Greece and other economies in the euro area have been running significant current account imbalances (Graphs 1.1). However, the scale and persistence of such imbalances in the period following the introduction of the euro in 1999 appears to have been greater than in earlier decades (Barnes, Lawson and Radziwill 2010). In particular, for the period leading to the global financial crisis in 2008, the increase in dispersion in current account positions among OECD countries was greatest for the EU countries and especially for the euro area member states (Blanchard and Giavazzi, 2002).

Graph 1.1
Current account balances in euro area countries (ppts-of-GDP)



The turn of the year 2008 found most countries in the so-called *euro area periphery* running large current account deficits (Greece: -14.9%; Portugal: -12.6%; Spain: -9.6% ; Italy: -2.9%; all as percentage of GDP), with core member states in the richer north featuring significant external surpluses (Germany: +6.2%; the Netherlands: +4.7% ; Finland: +3.2%). Despite these large current account imbalances across member states, the overall current account position of the euro area in 2008 was close to balance (-0.7% of GDP). The scale of current account imbalances (and the ensuing net foreign asset and liability positions) across euro area countries in the period following the introduction of the single currency has raised concerns as to whether such large and unprecedented positions could be justified on the basis of underlying macro fundamentals (Arghyrou and Chortareas 2006). As we have already alluded to in the previous chapter of this paper, current account imbalances constitute an important mechanism for open economies to smooth consumption (Barnes, Lawson and Radziwill 2010). That is at least the prevailing view in the new open economy macroeconomics literature and, especially, of the intertemporal approach to the current account (Buiter 2001, Sachs 2001, Obstfeld and Rogoff 1995).

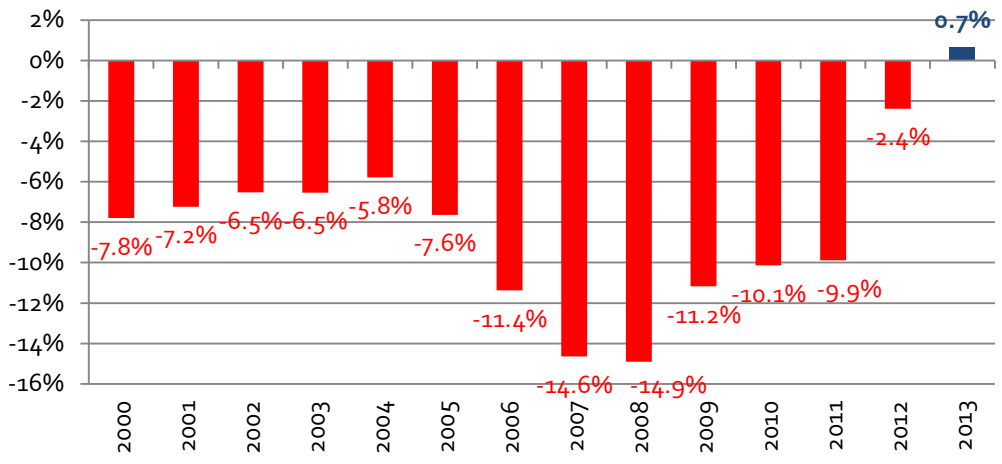
The implications of the latter view for the euro area is that diverging current account positions across member states potentially constitute the natural outcome of strengthened domestic financial deepening, the removal of exchange rate risk and the integration of goods, services and financial markets as a result of the single European market and the creation of the EMU. While the intertemporal budget constraint implies that countries cannot continue to increase their net indebtedness forever, foreign borrowing to finance productive investment and to smooth consumption may be sustainable for some time. Furthermore, for mature economies with aging populations, accumulation of foreign assets maybe an effective way to fund future consumption (Barnes, Lawson and Radziwill 2010). For Greece in particular, earlier studies have empirically documented a number of underlying factors driving the widening in the country's current account deficit, particularly in the period 1999-2008 (see *e.g.* Bitzis, Paleologos, Papazoglou 2008). To recap, some of the most important drivers of the deterioration in the current account position (and the ensuing accumulation of net foreign liabilities) include:

- **A gradual loss of competitiveness as a result of higher domestic inflation and relative unit labor cost growth vis-à-vis main trade-partners.** The real effective exchange rate (REER) constitutes an aggregate proxy of cost competitiveness and, as depicted in Graph 2.6, Greece's competitiveness deteriorated significantly in the initial years following euro adoption. Note that participation in the common currency area eliminates the potential to reclaim competitiveness losses via a depreciation of the nominal exchange rate. As a result, the only available root through which competitiveness can be restored is via an "internal devaluation" program to compress the general level of domestic wages and prices. In fact, internal devaluation constituted one of the three main strategic pillars of both the 1st and the 2nd EU-IMF bailout programs for Greece (initiated in May 2010 and March 2012, respectively), with the other two being fiscal stabilization and the safeguarding of domestic financial system stability.
- **Higher GDP growth, mainly driven by domestic demand, in the initial years following the adoption of the common currency.** Greece's real GDP growth averaged 3.6% in the period 2001-2008 vs. 2.4% in 1991-2000 and 0.7% in 1980-1990. This was partly the result of the domestic financial liberalization that took place in mid-90's and the collapse in domestic interest rates following the adoption of the single currency. Special factors, including increased fixed investment ahead of the 2004 Olympic Games, raised the import content of domestic demand, aggravating the ensuing deterioration of the country's current account position. The cyclical position of the Greek economy relative to other euro area economies over that period helped to reinforce the aforementioned trends. In the period 2001-2008, the average annual output gap of Greece was ca +0.9% compared with a corresponding average of ca 0.0% in Germany (AMECO data).
- **The sharp rise in public deficits and debts after Greece joined the single currency area**. Using a classic Keynesian argument (twin deficit hypothesis), the sharp decline in public savings in the years following the euro adoption may have aggravated the deterioration in the country's external imbalance. This hypothesis is empirically tested in the present paper.
- **Factors exogenous to developments in the Greek economy, *e.g.* developments in world oil and freight prices, may have also affected considerably the country's current account position in recent years.** Greece is a net oil importer and its economy is energy intensive. Moreover, transportation revenue from shipping has traditionally been a major source of financing for the services balance, given the country's strong share in the global commercial fleet. In that respect, the sharp rise in the level and volatility of international oil prices since 2005/2006 has aggravated pressures on the current account deficit.

3.2 Greek balance of payments developments before and after the global financial crisis

Greece's current account position underwent a sizeable deterioration in the initial years following the country's euro area entry in 2001. According to Bank of Greece's balance of payments (BoP) statistics, the current account gap widened from levels around €10.6bn (7.8%-of-GDP) in 2000 to a record €34.8bn (14.9%-of-GDP) in 2008, before embarking on a declining path, reaching a surplus of €1.2bn or 0.7%-of-GDP at the end of 2013 (Graph 2.1). In what follows, we take a closer look at the evolution of various components of Greece's current account balance.

Graph 2.1-Greece's current account deficit (ppts-of-GDP)

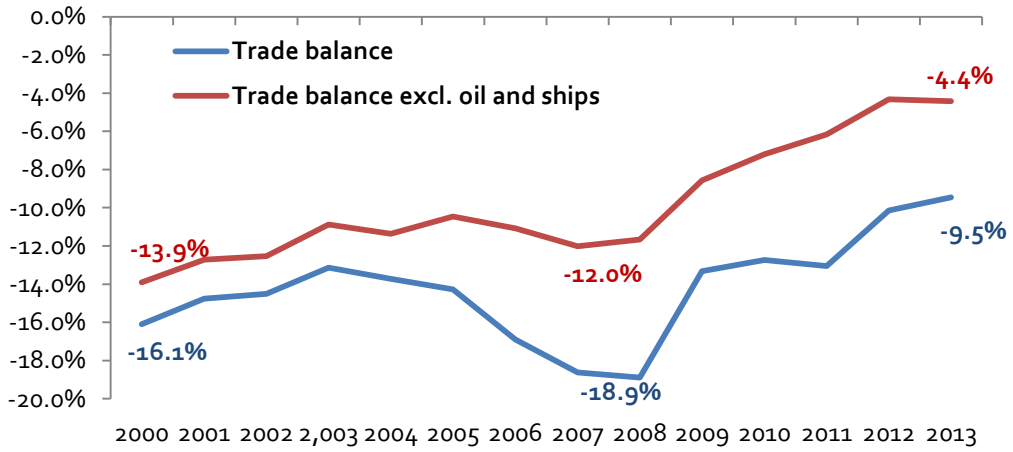


Source: BoG, Eurobank Global Markets Research

Trade balance

A brief look at the evolution of the main components of the current account position since 2000 reveals some interesting trends. From a starting position of €21.9bn (16.1%-of-GDP) in 2000, the trade deficit hit a record of €44bn (18.9%-of-GDP) in 2008, before declining significantly in the following years to reach ca €17.2bn or 9.5%-of-GDP at the end of 2013. From its peak in 2008, the trade deficit has declined by around 61%, with the improvement having been even more pronounced in the trade balance excluding oil and ships (down by ca 70% in the period end-2008 to end-2013). According to the latest available BoG data, the cumulative deficit of the trade balance excluding oil and ships in January-December 2013 amounted to 4.4%-of-GDP (Graph 2.2). The net balance (purchases minus sales) of ships has started from a broadly flat (balanced) position in 2000, it reached a decade-high shortfall of ca 2.5%-of-GDP in 2007 and stood at a deficit of 0.8%-of- GDP at the end of 2013. To the extent that the purchase of ships can translate into increased transportation revenue in the future, the aforementioned development should be viewed as a net positive with respect to future BoP developments.

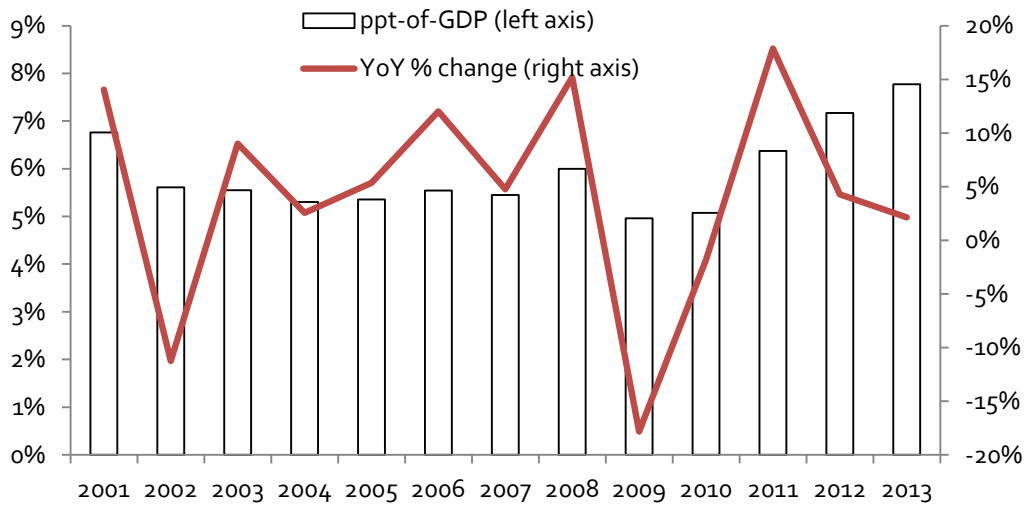
Graph 2.2- Greece's trade balances (ppts-of-GDP)



Source: BoG, Eurobank Global Markets Research

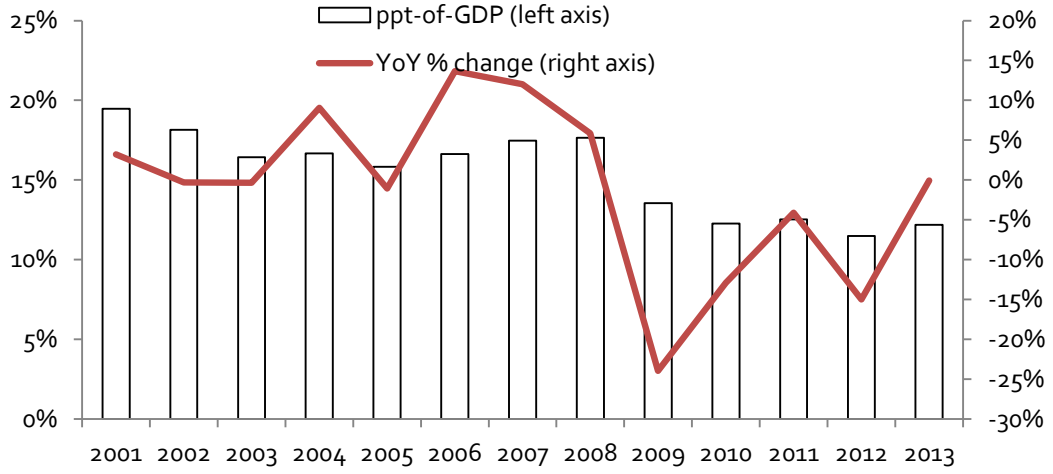
As regards merchandise exports, BoG's latest balance of payments statistics show a rise in the total value of exports of goods excluding oil and ships in the period 2011-2013, following respective declines of 1.8 % and 17.8% in the years 2010 and 2009 (Graph 2.3). As a percentage of GDP, Greece's goods exports excluding oil and ships amounted to 7.8% in 2013, the highest ratio in more than a decade, though this is partly attributed to the sharp decline in nominal GDP over the past six years. On the other hand, merchandise imports excluding oil and ships have declined over the past three years (Graph 2.4). As percent of GDP the respective ratio stood at ca 12.2% at the end of 2013, compared to 17.7% at the end of 2008.

Graph 2.3
Greece's merchandise exports excluding oil and ships



Source: BoG, Eurobank Global Markets Research

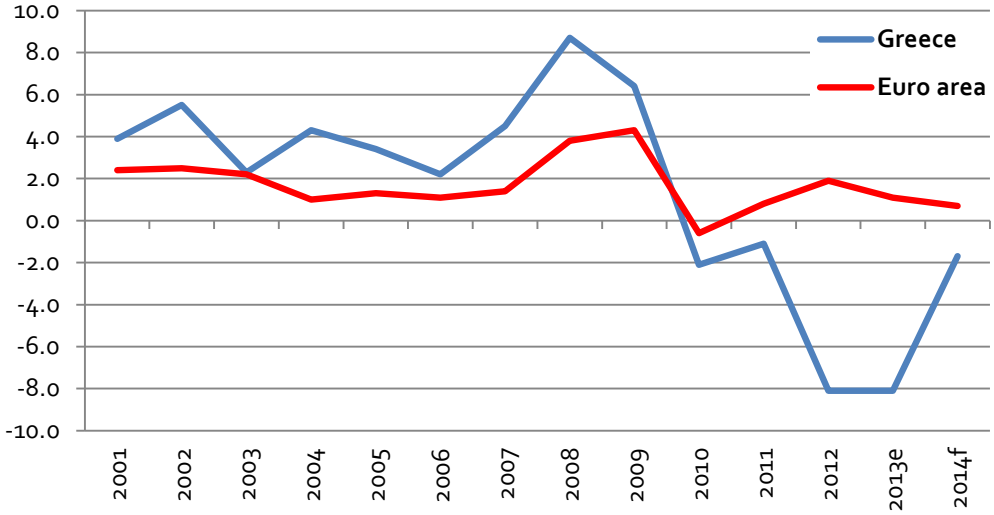
Graph 2.4
Greece's merchandise imports excluding oil and ships



Source: BoG, Eurobank Global Markets Research

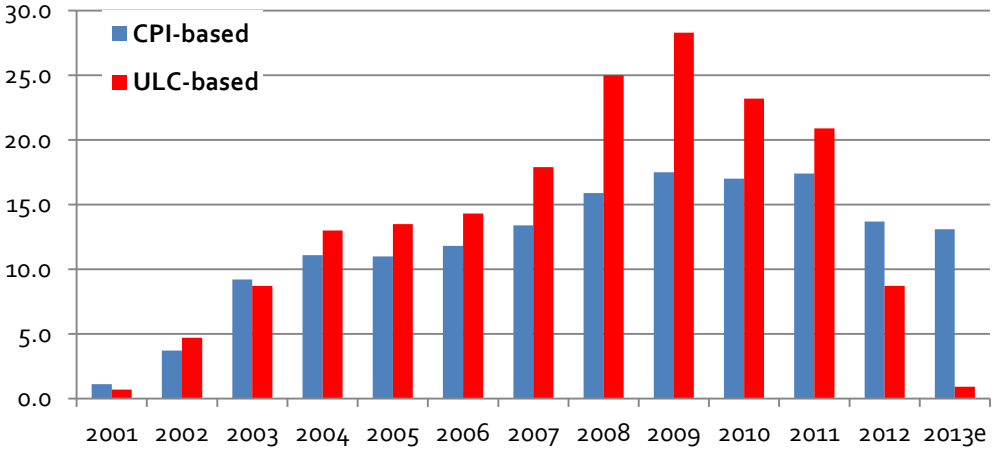
Taking into account the aforementioned developments, one can safely conclude that the significant improvement in the trade balance in the past five years can be mainly attributed to a concomitant decline of merchandise imports as a result of the global financial crisis and the pronounced domestic recession following the eruption of the Greek sovereign debt crisis in late 2009. That is, especially given that the total value of merchandise imports continues to exceed the total value of merchandise exports by a significant margin (in the 12-months to December 2013, the total value of goods imports was around 1.8 times the total value of merchandise exports)**.** Another important factor contributing to the observed improvement in the overall trade balance is the recent rebound in Greece's merchandise exports as a result of: a) the recovery of main trade-partner economies (e.g. core euro area member states) since the second half of 2009; the ongoing decline in Greece's ULCs growth due to the economic recession, the applied fiscal austerity program and, more recently, the implementation of structural reforms aiming to induce more flexibility in the domestic labor market (Graphs 2.5 & 2.6).

Graph 2.5
ULC YoY % growth (Greece vs. Eurozone)



Source: BoG, Eurobank Global Markets Research

Graph 2.6
Greece's REER cumulative growth (vs. 28 major trade partners)

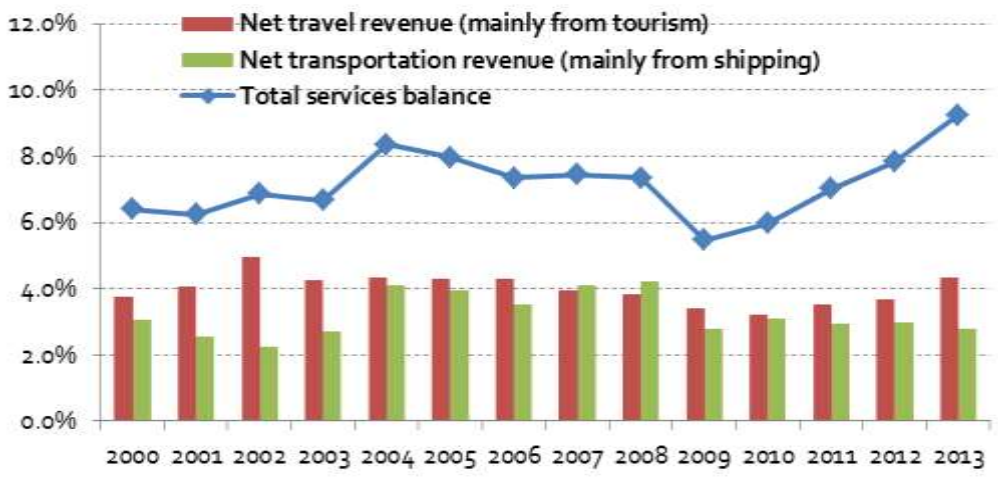


Source: BoG, Eurobank Global Markets Research

Services balance

The overall services balance increased by 11.1%YoY in January-December 2013, reaching 9.2%-of-GDP. Greece's services balance has traditionally been in a surplus position, providing an important source of balance-of-payments financing. This has primarily been on the back of the strong performance of the tourism and shipping sectors, two of the most important industries of the Greek economy (Graph 2.7). In particular, 2013 was a record year for the Greek tourism sector, with travel revenue rising by 14.9%YoY, following broadly stagnant growth in the prior year. On the other hand, gross revenue from transportation (mainly shipping) dropped by 9%YoY last year.

Graph 2.7
Greece's services balance and main components (ppts-of-GDP)

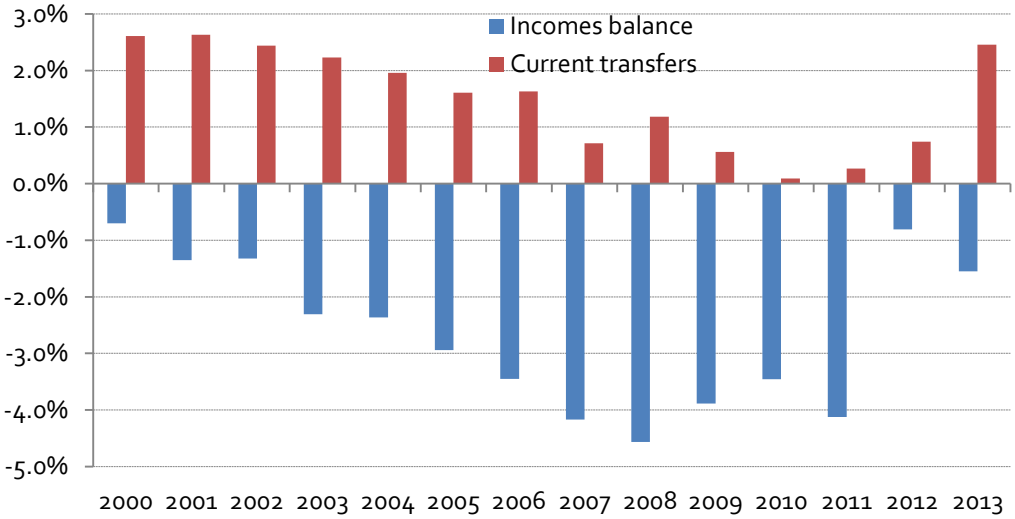


Source: BoG, Eurobank Global Markets Research

Income balance

The incomes balance has traditionally been in deficit, mainly reflecting net payments for interest, dividends and profits on foreign investments in Greece (Graph 2.8). The incomes deficit followed a broadly increasing trend since Greece's EMU entry, rising from levels around 0.7%-of-GDP in 2001 to a multi-year high of 4.6%-of-GDP in 2008. At the end of 2013, the corresponding shortfall stood at 1.5%-of-GDP. We expect Greece's incomes balance to derive significant support in the years ahead from: a) lower coupon payments on market debt thanks to a market-based debt restructuring (PSI) implemented in March 2012; and b) reduced interest outlays on official loans due to the debt-relief package for Greece announced at the November 2012 Eurogroup.

Graph 2.8
Income and current transfers balances (ppts-of-GDP)



Source: BoG, Eurobank Global Markets Research

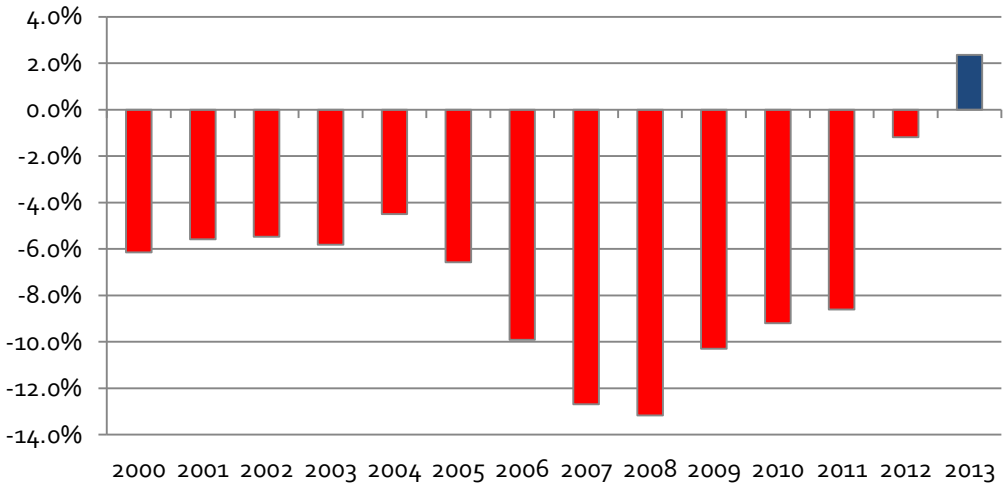
Current and capital transfers

In recent years, the balances of current and capital transfers have been in surplus, mainly reflecting higher net EU payments to the general government (Graphs 2.9). A faster absorption of EU structural funds has lead to higher capital inflows in 2012-2013, benefiting the overall balance of current transfers.

Financial account

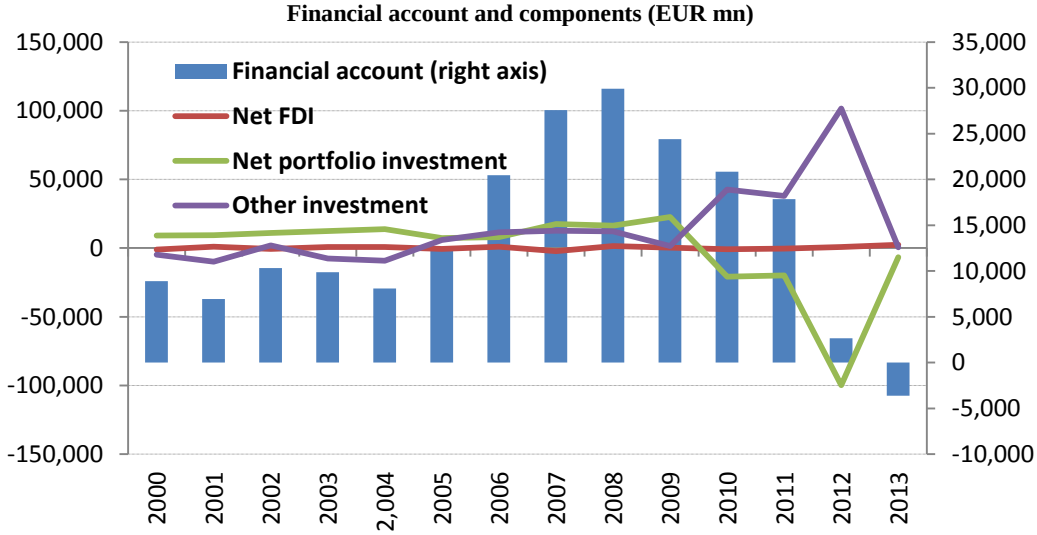
Despite significant portfolio outflows in 2010-2012, the overall balance of the financial account remained in surplus over that period, mainly thanks to substantial EU-IMF funding to Greece under the 1st and 2nd bailout programs singed in May 2010 and March 2012, respectively (Graph 2.10). Further down the road, a significant pick up in foreign direct investment (from their broadly depressed levels in the prior decade) a further stabilization/reversal of bank deposits and a resumption of net portfolio inflows are required to stabilize the financial account and provide adequate financing to the country's balance-of-payments.

Graph 2.9
Current account and capital transfers balance (ppts-of-GDP)



Source: BoG, Eurobank Global Markets Research

Graph 2.10
Financial account and components (EUR mn)

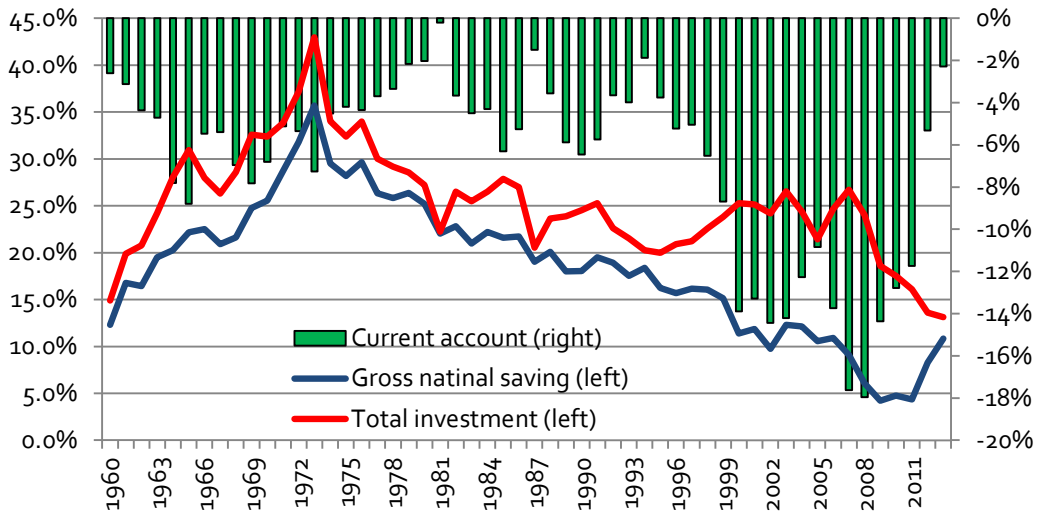


Source: BoG, Eurobank Global Markets Research

3.3 Greece's current account viewed from a saving-investment balance perspective

Graph 2.11 below provides a more intertemporal view of Greece's current account position (AMECO database). The graph depicts the current account balance (green bars) expressed as the difference between national saving and investment (blue and red lines, respectively). In the period before Greece's euro area entry (2001), the country's current account position recorded mostly small-to-medium sized deficits (between 2% to 5%-of-GDP). Over that period, national savings and investment evolved broadly in sync, with the latter mostly exceeding the former. However, in the period following the domestic financial liberalization in the mid-90s and, especially, after the adoption of the euro, a significant deterioration in Greece's current account position took place. As depicted in graph 2.11, the widening of the current account deficit in the period 2001-2008 was mostly the result of declining national savings, especially during the second half of that period (2004-08). On its part, total investment (as percent of GDP) hit a multi-year high near 25% in 2003 (the year before the 2004 Olympic Games) to only decline steadily thereafter, with the descent taking accelerating proportions after the eruption of the global financial crisis in 2007/08.

Graph 2.11
Greece's current account as a savings-investment imbalance (ppts-of-GDP)



Source: AMECO, Eurobank Global Markets Research

3.4 Concluding remarks to this section

After recording a post EMU-entry high of 14.9%-of-GDP in 2008, Greece's current account balance deficit improved considerably to reach a surplus of ca 0.7%-of-GDP at the end of 2013 (first positive balance on record). This improvement reflects mainly a shrinking shortfall in the trade balance of goods excluding oil and ships as well as a higher services surplus due to stronger revenue from tourism. The current account is likely to reflect another small positive balance this year, reflecting lower demand for imports as a result of the ongoing weakness of domestic demand and higher exports growth due to improved competitiveness. Further down the road, a sustained increase in exports and higher direct investment are required to provide medium-term support to the country's balance of payments dynamics.

4. Empirical study – Determinants of Greece's current account position

4.1 Data and notation

Our empirical study utilizes annual data on Greece's current account, expressed as percent of GDP, as well as a range of potential explanatory variables. The primary source of our data is the European Commission's AMECO database and the estimation time horizon, when available, is 1960-2013. Table 1.1 below provides a summary of our data and the notation utilized in our study.

Table 1.1 - Data and notation

Variable description	Country	Source	Units	Notation	Data availability - Initial year of respective time series
Current account balance (estimated as the difference between gross national savings and gross capital formation)	Greece	AMECO	% GDP	*ca*	1960
Real GDP per capita (2005 market prices)	Greece	AMECO	EUR thousands (variable expressed as natural logarithm of respective values)	*ypcgr*	1960
Real GDP per capita of Greece relative to real GDP per capita of reference country	Greece vs. Netherlands	AMECO	%	*rygrnl*	1960
Net lending (+) or net borrowing (-): general government - ESA 1995 (Including one-off proceeds related to the allocation of mobile phone licences)	Greece	AMECO	%GDP	*ggvnt*	1980
Output gap (gap between actual GDP and trend GDP expressed as % of trend GDP)	Greece	AMECO	% trend GDP	*ygapgr*	1965
Real effective exchange rates, based on unit labour costs (total economy) :- Performance relative to the rest of 24 industrial countries (EU-15, TR, CH, NR, US, CA, JP, AU, MX, NZ) : double export weights (XUNRQ)	Greece	AMECO	Index (FY2005=100) (variable expressed as natural logarithm of respective values)	*rer24*	1995
Real effective exchange rates, based on unit labour costs (total economy) :- Performance relative to the rest of the former EU-15: double export weights (XUNRQ)	Greece	AMECO	Index (FY2005=100) (variable expressed as natural logarithm of respective values)	*rer15*	1960
Old-age dependency ratio (% of working population)	Greece	AMECO	%	*oadr*	1961
Young-age dependency ratio (% of working population)	Greece	AMECO	%	*yadr*	1961
Terms of Trade (goods & services)	Greece	AMECO	Index (FY2005=100) (variable expressed as natural logarithm of respective value)	*tot*	1960
Trade openess (total value of exports and imports as % of GDP)	Greece	AMECO	%	*open*	1960
crude oil price index		*Bloomberg*	Variable expressed as natural logarithm of respective values	*oil*	1960
Private Investment (% of GDP) - Gross fixed capital formation to GDP ratio private sector	Greece	Ameco	% GDP	*pinv*	1960

4.2 Unit root tests

We find all variables in our study to be unit root (i.e., I(1)) processes. For expositional purposes we report below the test results for our current account-to-GDP variable, ***ca***, in levels (Table 1.2). The estimated value of our *Augmented Dickey-Fuller* (ADF) test statistic presented in the table below is -2.246211 and the corresponding one-sided p-value is 0.1931. Moreover, the associated 1% 5% and 10% critical values are all lower than ADF t-statistic, suggesting that the test cannot reject the null hypothesis of a unit root at conventional test sizes. In our unit root test we utilized the Schwarz Information Criterion (SIC) for selecting the maximum number of lag terms in the ADF test equation.

Table 1.2

Unit root test results for our current account-to-GDP, *"CA"*, variable (in levels)

Null Hypothesis: CA has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.246211	0.1931
Test critical values:	1% level	-3.562669	
	5% level	-2.918778	
	10% level	-2.597285	

*MacKinnon (1996) one-sided p-values.

Table 1.3 shows the results of performing the ADF test in the first differenced series of the current account variable. For this series, the ADF test rejects the null hypothesis of a unit root (against the alternative hypothesis of stationarity) at the 10%, 5% and 1% confidence level.

Table 1.3

Unit root test results for the first differenced series of our "*CA*" variable

Null Hypothesis: D(CA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.558655	0.0000
Test critical values:	1% level	-3.562669	
	5% level	-2.918778	
	10% level	-2.597285	

*MacKinnon (1996) one-sided p-values.

As a final note to this section, Table 1.4 below presents the results of the ADF unit root tests for all variables utilized in our study, both in levels and in first differences. Again, our unit root test values broadly confirm that existence of a unit root in all variables under examination.

Table 1.4
ADF unit root test results for variables in levels and first differences

	In levels		In first differences	
Variable	**t-Statistic**	**Prob.**	**t-Statistic**	**Prob.**
ca	-2.246	0.19	-5.559	0.00***
ypcgr	-1.446	0.84	-4.878	0.00***
rygrnl	-2.040	0.27	-5.790	0.00***
ggvnt	-2.365	0.16	-5.795	0.00***
rer24	-1.761	0.39	-2.390	0.02**
rer15	-3.100	0.12	-6.593	0.00***
oadr	-2.164	0.50	-5.887	0.00***
yadr	-2.701	0.24	-3.935	0.02**
tot	-1.896	0.33	-7.403	0.00***
open	-1.250	0.65	-6.494	0.00***
oil	-0.840	0.80	-6.963	0.00***
pinv	-1.208	0.66	-4.869	0.01***

Note: ***, ** and * denote rejection of the null of a unit root at 1%, 5% and 10% confidence levels, respectively.

4.3 Cointegration

It is a well-known result in econometric analysis that when two or more *trending* or *non-stationary* time series are regressed on each other the *spurious* regression problem arises. In case of trending time series, the spurious relationship may be due to a common trend governing both series rather than to pure economic reasons. In case of *nonstationarity* (say, of I(1) type), time series even without drifts may exhibit local trends that tend to move along for relatively long periods. The problem of spurious regressions stimulated the development of the theory on non-stationary time series analysis. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary time series may be stationary. If such a stationary linear combination exists, then the series are said to be *cointegrated.* Moreover, the linear combination – called the *cointregrating equation* – may be interpreted as a long-run equilibrium relationship among the variables. Since all variables utilized in our study have been found to be integrated of order one (i.e., I(1) processes) we proceeded next to test for cointegration among the variables using the relevant methodology developed by Johansen (1991, 1995). The presence of cointegration in our variables forms the basis for a number of alternative Vector Error Correction Model (VECM) specifications estimated in our study. In this paper, we test for cointegration between our left-hand side variable, *ca*, and alternative sets of (potential) explanatory variables.

In our study, we examine a number of alternative specifications for explaining the evolution of Greece's current account position. For illustration purposes, **Table 2.1** (Annex section) presents the cointegration test results for the following variables:

- ***ca,*** current account balance (as percent of GDP);
- $\boldsymbol{rer_{15}}$**,** natural logarithm of the ULC-based real effective exchange rate of Greece vs. 15 Eurozone trading partners;
- ***ggvnt,*** general government balance (as percent of GDP); and
- ***pinv,*** private investment (as percent of GDP).

As implied by Table 2.1 (Annex), both the *Trace* and *Maximum Eigenvalue* tests point to the existence of one cointegration relationship among the above variables.

4.4 VECM model

Based on the results of our cointegration tests we next proceed to estimate a number of alternative Vector Error Correction Model (VEMC) specifications (*for demonstration, Table 1.3 at the Annex section depicts the full estimation output for one of the models under examination*). **Table 2.2** below provides a summary of VECM model estimates. The first (upper) part of Table 2.2 shows the estimated coefficients (and the associated t-statistics in parentheses) of the VECM's cointegrating equation, which can be interpreted as the long-term equilibrium relationship linking the current account variable, *ca*, with the list of explanatory variables utilized in the corresponding specification. For instance, the equation below depicts the estimated equilibrium relationship of *Model 1* that corresponds to the first column of Table 2.2.

$$\boldsymbol{ca} = 4.95 - 0.33*\boldsymbol{rygrnl} + 0.27*\boldsymbol{ggvnt} - 0.35*\boldsymbol{rer_{15}} - 0.69*\boldsymbol{tot}$$

All coefficients in the equation above are significant and with the exception of the coefficient of the ***tot*** variable they all have the theoretically correct sign (see also Table A in Chapter 3).

In more detail, the coefficient of the real effective exchange rate, $\boldsymbol{rer_{15}}$, is found to be negative and significant in *Model 1* as well in the rest of VECM specification estimated in our study. Chapter 3 of this paper provides the theoretical rationale for the sign of this *price competitiveness* indicator in typical empirical studies of the determinants of the current account. To recap, the expected sign of the aforementioned relationship is negative. Other things being equal, an appreciation of the real exchange rate increases the purchasing power of domestic incomes in terms of imported goods. It also increases the relative value of financial, real estate and other assets held by domestic residents. These effects tend to reduce domestic saving and to increase the propensity to consume. A real effective appreciation of the domestic currency also tends to reduce the price competitiveness of a country's exports in international markets. The aforementioned factors have probably been amplified in the euro area following the introduction of the single currency as a result of strengthened competition.

The estimated coefficient of the general government fiscal balance, ***ggvnt***, in *Model 1* is both positive and significant, providing support to the so-called *twin deficit hypothesis* and appearing to be in broad agreement with the evolution of Greece's current account and fiscal balance in the years following the country's euro area entry. This result also points to a type of domestic agent behavior that is broadly in line with the main predictions of the Keynesian model, which claims that a higher fiscal deficit (or lower fiscal surplus) leads to a deterioration in the current account balance as the ensuing increase in disposable income boosts present consumption and reduces private savings. In a number of model specifications estimated in our study, the coefficient of the *ggvnt* variable is found to be negative (yet, mostly insignificant), implying a (partial) *Richardian* type of behavior by domestic households (for further discussion on this topic see Chapter 3).

The estimated coefficients of the *convergence variable* ***rygrnl***, which in our study denotes the ratio of per capita income in Greece over the per capita income of a reference country (Netherlands), is also found in *Model 1* to be significant to have the theoretically correct (negative) sign. In fact, the coefficient of *rygrnl* is negative and strongly significant in all relevant model specifications estimated herein, with the sole exception of Model 2. The basic rationale for a negative relationship between the current account balance and *rygrnl* is as follows: in a monetary union characterized by increased market liberalization and financial integration, capital moves from the more advanced, capital abundant countries to the less developed, capital-scarce economies. This process is set in motion in a quest of superior investment opportunities in poorer countries that are expected to enjoy stronger productivity and output growth in the future. In other words, the catching up process between low and high per-capita-income countries in an environment of increased capital mobility appears to have profound implications for their optimal external borrowing levels, with countries receiving increased amounts of inward investment sustaining higher current account deficits for longer. Of course, as explained in Chapter 3, these current account deficits may have both *good* and *bad* components, with countries featuring acute external imbalances for a prolonged period of time being susceptible to sudden reversals of investor sentiment and thus, sudden stops of external financing.

In line with other empirical studies in international literature, the estimated coefficient of our *cyclical* variable ***ygapgr*** (output gap) is also negative and strongly significant in all VECM model specifications presented in Table 2.2. The basic idea here is that above-potential GDP growth stimulates higher consumption and lower savings today (and vice versa), especially if households expect higher future income levels. Higher growth rates resulting from productivity gains may also lead to higher domestic investment (Barnes, Lawson and Radziwill 2010).

The estimated coefficient of our ***tot*** (terms of trade) variable is found to be negative and strongly significant in models 1, 8 and 10 and positive and insignificant in Model 9 of Table 2.2. As explained in Section 3 of this document, the theoretically correct sign between *tot* and the current account is positive. Terms of trade is defined as the ratio of price exports to price imports. It effectively measures what quantity of imports can be purchased through the sale of a fixed quantity of exports. A terms-of-trade improvement is usually considered to be good for a country in the sense that it can buy more imports for any given level of exports.

The estimated coefficient of our ***open*** (trade openness) variable is both positive and strongly significant, a result that is broadly consistent with what the theory predicts. Trade openness - herein, proxied by the ratio of the total value of external trade (exports plus imports) to GDP - is used in many empirical studies as an indicator of the existence of barriers to trade and the degree to which a country is an attractive destination for foreign capital inflows. The existing empirical literature broadly supports a positive link between trade openness and the current account balance.

The estimated coefficient of our *demographic* variable, ***oadr*** (old age dependency ratio), which in our study is defined as the ratio of the number of elderly over the working population, is found to have the theoretically correct sign (negative) though it is statistically insignificant (models 11 & 12 – Table 2.2). The basic idea supporting a negative sign in the aforementioned relationship is based on the life-cycle theory of consumption, which implies that higher income and savings in mid-age working life offset dissaving in young and old ages. Arguably, this is because dependent and elderly people consume more than they produce and depend on the provision of goods by productive members of the economy (Higgins 1998; Lane and Milesi-Ferretti 2002). The above arguments imply that a high *contemporaneous* share of dependents relative to workers tends to have a negative effect on the current account balance.

As to the ***adjustment coefficient*** in Model 1, this is found to be both significant and to have the theoretically correct sign (negative). Furthermore, its estimated value (-0.66) implies that more than half of a current account balance diversion from its long-term equilibrium is anticipated to be corrected, on average, within one period (i.e., one year). The adjustment coefficient values are also negative and significant in all other VECM specifications estimated in our study.

In the majority of estimated model specifications, we utilize two dummy variables, *eurodummy(d1999)* and *crisisdummy(d2009*). The former takes the value of 1 in the year 1999 onwards and zero (0) otherwise. The latter, takes the value of 1 in the year 2009 onwards and the value of 0 in all other years. In addition to these dummy variables, the oil price index also enters our VECM model specifications as a strictly exogenous variable (i.e., outside the cointegrating relationhionship).

Our ***eurodummy(d1999)*** dummy aims to empirically document whether and to what extent domestic financial deepening and increased financial integration with world goods and capital markets as a result of euro area entry have led to a trend deterioration of Greece's current account position in the initial years following the adoption of the single currency. As explained in Chapter 3, when countries become more closely integrated in goods and financial markets, a certain disconnect may arise between domestic saving and investment. That is because in a world characterized by capital mobility, capital moves "downhill" *i.e.*, from the more advanced, capital-intensive countries to less developed, capital-scarce economies. In turn, this suggests that poor countries with superior growth prospects may see an increase in domestic investment, a decrease in domestic saving and, by implication, a higher current account deficit. In all of the VECM specifications utilized in our study, the estimated *eurodummy(d1999)* variable has the theoretically-correct sign (negative), though it is not always significant.

Separately, our *crisisdummy(d2009)* aims to capture the impact of the 2008/09 global financial crisis and, primarily, the effects of the ensuing Greek sovereign debt crisis on the country's current account position. As we explained already, a notable improvement in Greece's current account deficit is evident after 2009, mainly as a result of a sharp contraction of imports due to the domestic economic recession and the reversal of the significant real effective rate overvaluation accumulated since the country's euro area entry in 2001. Again, all estimated coefficients of our *crisisdummy(d2009)* variable have the theoretically-correct sign (positive), though they are not always statistically significant.

Table 2.2 – Determinants of Greece's current account balance: alternative VECM specification

	Model Secifications						
Variable	**Model1**	**Model2**	**Model3**	**Model4**	**Model5**	**Model6**	**Model7**
ygapgr							
ypcrg					-0.23 (3.33)	-0.34 (3.56)	-0.13 (3.37)
rygrnl	-0.33 (2.56)	0.49 (2.18)	-0.69 (5.56)	-0.45 (3.53)			
ggvnt	0.27 (-2.15)	0.47 (-2.00)	-0.19 (1.33)		-0.10 (0.52)	-0.07 (0.39)	
rer24							
rer15	-0.35 (3.36)	-0.53 (2.72)		-0.18 (2.35)	-0.07 (0.70)		-0.21 (2.28)
oadr							
tot	-0.69 (5.83)						
open							
pinv			-0.77 (7.00)	-0.52 (4.74)		-0.19 (-1.44)	-0.04 (0.29)
oil	0.01 (0.34)	-0.02 (-1.60)	0.01 (1.38)	0.01 (1.33)	0.01 (0.86)	0.02 (2.27)	0.01 (0.98)
eurodummy(d1999)	-0.04 (2.37)	-0.03 (-1.79)	-0.02 (-1.39)	-0.02 (-1.56)	-0.02 (-1.62)	-0.02 (-1.78)	-0.02 (-1.77)
crisisdummy(d2009)	0.04 (1.17)	0.06 (2.60)	0.03 (1.17)	0.01 (0.36)	0.01 (0.39)	0.01 (0.17)	0.01 (0.57)
Number of lags in VECM	**2**	**1**	**1**	**1**	**1**	**1**	**1**
Adjustment coefficient	-0.66 (-2.81)	-0.43 (-2.43)	-0.86 (3.86)	-0.23 (-2.05)	-0.86 (-3.99)	-48 (2.55)	-0.28 (2.56)
Adj. R-squared	64%	50%	54%	34%	65%	60%	38%
Trace test	2	1	1	1	1	1	1
Max test	2	1	1	1	0	1	1
No residual autocorrelation	0.51	0.48	0.65	0.6	0.72	0.89	0.22
No residual heteroscedasticity	0.41	0.22	0.11	0.15	0.82	0.38	0.12
Residual normality	0.91	0.91	0.21	0.23	0.80	0.50	0.15

Source: Eurobank Global Markets Research & authors' estimates

Notes

1. t-statistics in parentheses below point estimates.
2. Trace test and Max test indicate number of cointegrating relationships present, based on the trace test and the maximum eigenvalue test, respectively.
3. Residual autocorrelation, residual heteroscedasticity and residual normality indicate the p-value of the respective null hypotheses; a value greater than 5% implies that the hypothesis cannot be rejected.

Table 2.2 (Continued) - Determinants of Greece's current account balance: alternative VECM specification

	Model Secifications						
Variable	**Model8**	**Model9**	**Model10**	**Model11**	**Model12**	**Model13**	**Model14**
ygapgr							-0.42 (2.02)
ypcrg	-0.15 (0.61)			-.017 (2.24)		-0.14 (4.00)	
rygrnl		-0.72 (6.04)			-0.90 (2.17)		
ggvnt	-0.39 (1.67)	-0.15 (1.01)		-0.79 (3.10)	-0.36 (0.62)		
rer24							
rer15	-0.52 (2.69)		-0.14 (2.05)	-0.31 (2.19)		-0.33 (3.89)	-0.08 (3.53)
oadr						-0.04 (0.49)	-0.08 (0.24)
tot	-0.96 (4.37)	0.02 (-0.18)	-0.22 (1.97)				
open				0.78 (5.02)	2.29 (-6.07)		
pinv		-0.80 (5.67)	-0.10 (0.83)				
oil	-0.01 (-0.27)	0.01 (1.67)	-0.01 (-0.77)	-0.01 (-0.73)	-0.01 (-0.23)		
eurodummy(d1999)	-0.01 (-0.26)	-0.02 (-1.68)	-0.03 (-3.62)	-0.03 (-1.57)	-0.04 (-1.51)	-0.03 (-2.37)	-0.04 (-3.05)
crisisdummy(d2009)	0.02 (1.11)	-0.03 (-1.33)	0.04 (2.57)	0.02 (0.71)	0.04 (1.43)	0.01 (0.70)	0.04 (2.57)
Number of lags in VECM	**1**	**1**	**1**	**1**	**1**	**2**	**2**
Adjustment coefficient	-0.34 (-2.64)	-0.95 (-4.00)	-0.50 (-4.94)	-0.41 (-2.44)	-0.12 (-2.02)	-0.40 (-2.64)	-0.24)-2.79)
Adj. R-squared	53%	56%	53%	63%	36%	55%	51%
Trace test	1	1	2	1	1	1	2
Max test	1	2	2	1	1	1	0
No residual autocorrelation	0.78	0.19	0.8	0.57	0.36	0.85	0.68
No residual heteroscedasticity	0.64	0.16	0.1	0.51	0.28	0.63	0.78
Residual normality	0.90	0.23	0.20	0.85	0.89	0.02	0.03

Notes

4. t-statistics in parentheses below point estimates.
5. Trace test and Max test indicate number of cointegrating relationships present, based on the trace test and the maximum eigenvalue test, respectively.
6. Residual autocorrelation, residual heteroscedasticity and residual normality indicate the p-value of the respective null hypotheses; a value greater than 5% implies that the hypothesis cannot be rejected.

4. Policy Implications and concluding remarks

The present study employs cointegration techniques and a vector correction model (VECM) to identify and analyze the main drivers of Greece's current account in recent decades and, especially, in the years following the euro adoption. Our econometric results provide broad-based support to the key findings of a number of earlier empirical studies on the determinants of the current account. Specifically, the trend deterioration in the country's external imbalance in 1999-2008 can be traced back to a number of developments related to: a) the EU convergence progress and closer integration in world goods and financial markets; b) domestic authorities' response to the policy challenges arising from participation in the single currency area; and c) the structural characteristics and idiosyncrasies of the Greek economy.

At the Eurozone level, the initial years following the adoption of the single currency saw most countries in the so-called euro area periphery running large current account deficits, with core member states in the richer north featuring significant external surpluses. Despite these large divergences across member states, the outbreak of the global financial crisis found the euro area running a broadly balanced overall external position. The scale and dispersion of current account imbalances across euro area countries in the initial years following the introduction of the single currency raise credible concerns as to whether such unprecedented imbalances positions were justified on the basis of underlying macro fundamentals. It also supports the notion that these imbalances were, to a certain extent, overlooked by euro area policy makers.

In the case of Greece, our empirical results document a number of drivers contributing to the significant deterioration in the country's current account position in the years leading to the global financial crisis, with the most important ones including:

Accumulated loss of economic competitiveness against main trade-partner economies. Among other reasons, this appears to have been the result of faster domestic inflation and unit labor costs (ULCs) growth not being fully counterbalanced by respective productivity differentials.

Pronounced fiscal policy relaxation following the euro adoption. In line with the "twin deficit" hypothesis, large fiscal deficits in the period leading to the sovereign debt crisis have increased disposable incomes, boosting present consumption and reducing private saving. This effect appears to have been particularly pronounced in the initial years following the euro adoption, as domestic households have probably perceived the initial rise in their disposable incomes as permanent.

Domestic financial deepening and accelerated EU converge after the euro adoption. The completion of domestic financial sector liberalization in the mid-90s, enhanced financial deepening and the accelerating catching up process with high per-capita-income countries post the euro adoption raised the level external imbalance that can be financed by inward foreign investment. However, current account deficits may have both good and bad components, with countries featuring acute external imbalances for a prolonged period of time being susceptible to wild reversals of investor sentiment and sudden stops of external financing.

Cyclical influences i.e., faster GDP growth in Greece relative to the euro area trade-partner economies in the decade before the outbreak of the global crisis.

The economic stabilization program implemented in Greece after the outbreak of the sovereign debt crisis has already delivered tangible results, leading to a near elimination of twin deficits. In 2013, the general government primary balance recorded a surplus for the first time since 2002, while the current account reached a surplus (0.7% of GDP) for the first time on record. An out-of-sample forecasting exercise based on the present EU/IMF macro baseline scenario for Greece also points to a broadly balanced (over even positive) current account position this year and the next. From a longer term perspective, continued fiscal vigilance, prudent wage policies and the completion of the present reforms program in domestic product and services markets are necessary to prevent an excessive widening of the current account that is not justified by domestic economic fundamentals.

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Annex

Table 2.1 – Cointegration tests

Sample (adjusted): 1983 2013
Included observations: 31 after adjustments
Trend assumption: Linear deterministic trend (restricted)
Series: CA PINV RER15 GGVNT
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.711476	79.10189	63.87610	0.0016
At most 1	0.507389	40.56961	42.91525	0.0842
At most 2	0.342006	18.62053	25.87211	0.3037
At most 3	0.166484	5.645191	12.51798	0.5066

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.711476	38.53227	32.11832	0.0072
At most 1	0.507389	21.94908	25.82321	0.1498
At most 2	0.342006	12.97534	19.38704	0.3300
At most 3	0.166484	5.645191	12.51798	0.5066

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Lag selection based on the Akaike (AIC), Schwarz (SC) and Hannan-Quinn (HQ) Information criteria

Source: Eurobank Global Markets Research

Table1.3 – Vector Error Correction Model 2 estimation output

Vector Error Correction Estimates
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
CA(-1)	1.000000
YPCGRNL(-1)	-0.494674
	(0.22722)
	[-2.17707]
GGVNT(-1)	-0.471733
	(0.23865)
	[-1.97664]
RER15(-1)	0.531679
	(0.19541)
	[2.72080]
C	-2.133672

Error Correction:	D(CA)	D(YPCGRNL)	D(GGVNT)	D(RER15)
CointEq1	-0.428102	-0.019818	0.296763	-0.452486
	(0.17642)	(0.08433)	(0.17295)	(0.27804)
	[-2.42662]	[-0.23502]	[1.71590]	[-1.62743]
D(CA(-1))	-0.006292	0.167485	-0.015451	0.375903
	(0.19014)	(0.09088)	(0.18640)	(0.29965)
	[-0.03309]	[1.84284]	[-0.08290]	[1.25446]
D(YPCGRNL(-1))	-0.545438	-0.042619	0.192872	0.675278
	(0.39295)	(0.18783)	(0.38522)	(0.61929)
	[-1.38805]	[-0.22690]	[0.50068]	[1.09040]
D(GGVNT(-1))	-0.108789	0.002555	-0.185550	0.213458
	(0.17133)	(0.08189)	(0.16795)	(0.27001)
	[-0.63498]	[0.03119]	[-1.10476]	[0.79056]
D(RER15(-1))	-0.172430	0.033710	-0.067301	0.232773
	(0.13004)	(0.06216)	(0.12748)	(0.20494)
	[-1.32596]	[0.54231]	[-0.52792]	[1.13579]
C	0.022361	-0.001597	-0.008027	0.035292
	(0.01311)	(0.00626)	(0.01285)	(0.02065)
	[1.70632]	[-0.25491]	[-0.62477]	[1.70878]
D_EURO	-0.028349	0.019547	0.015458	-0.040417
	(0.01581)	(0.00756)	(0.01550)	(0.02492)
	[-1.79271]	[2.58598]	[0.99713]	[-1.62177]
D_CRISIS	0.056331	-0.030825	0.045288	0.007230
	(0.02166)	(0.01035)	(0.02124)	(0.03414)
	[2.60035]	[-2.97692]	[2.13256]	[0.21177]

Table1.3 (continued) – Vector Error Correction Model 1 estimation output

OILINDEX	-0.015041	-0.006601	-0.001960	-0.013806
	(0.00938)	(0.00448)	(0.00919)	(0.01478)
	[-1.60407]	[-1.47281]	[-0.21324]	[-0.93421]
R-squared	0.502267	0.656701	0.479509	0.329829
Adj. R-squared	0.329142	0.537292	0.298468	0.096726
Sum sq. resids	0.009397	0.002147	0.009031	0.023340
S.E. equation	0.020213	0.009662	0.019815	0.031855
F-statistic	2.901188	5.499619	2.648629	1.414948
Log likelihood	84.72390	108.3447	85.35963	70.16745
Akaike AIC	-4.732744	-6.209046	-4.772477	-3.822965
Schwarz SC	-4.320505	-5.796808	-4.360239	-3.410727
Mean dependent	-0.000656	-0.005000	0.001719	-0.005156
S.D. dependent	0.024678	0.014204	0.023658	0.033518
Determinant resid covariance (dof adj.)		1.05E-14		
Determinant resid covariance		2.79E-15		
Log likelihood		354.5683		
Akaike information criterion		-19.66052		
Schwarz criterion		-17.82835		

Source: Eurobank Global Markets Research

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