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Can Greece be saved?
Current Account, fiscal imbalances
and competitiveness

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ABSTRACT

Drawing on the existing literature on national saving and investment we attempt to identify and empirically analyze the main drivers of Greece's current account position in recent decades and, especially, in the years following the euro adoption. Our results seem to provide broad-based support to the key findings of a number of earlier empirical studies on the determinants of Greece's current account position. More specifically, the significant deterioration in the country's current account position in recent years can be attributed to, among others: (i) accumulated loss of economic competitiveness against main trade-partner economies; (ii) pronounced fiscal policy relaxation following the euro adoption; (iii) the completion of domestic financial sector liberalization in the mid-90s and enhanced financial deepening post the country's euro area entry. To assess the capacity of the new EU-IMF economic adjustment programme to stabilize Greece's external position, we utilize our estimated econometric models to produce out-of-sample forecasts for the evolution of the current account in 2012-2016. Specifically, we examine a number of alternative scenarios encompassing varying degrees of policy-adjustment and success rates in implementing the agreed reforms. Assuming a broadly satisfactory pace of programme implementation, we forecast a steady improvement in the country's current account position in the years ahead. This is deemed to be an important prerequisite for stabilizing and gradually starting to reduce Greece's external debt, from what currently appear to be unsustainable levels.

Keywords: competitiveness, current account deficit, fiscal deficit, Greece, IMF.

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1. Introduction

The present study draws on the existing literature on national saving and investment to identify and empirically analyze the main drivers of Greece's current account position in recent decades and, especially, in the years following the euro adoption. Our results seem to provide broad-based support to the key findings of a number of earlier empirical studies on the determinants of Greece's current account position. More specifically, the significant deterioration in the country's current account position in recent years can be attributed to, among others, the following important factors:

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

- *Pronounced fiscal policy relaxation following* the *euro adoption.* In line with the "twin deficit" hypothesis, wider fiscal deficits appear to have increased disposable incomes, boosting present consumption and reducing private saving. The aforementioned effects may have been even more pronounced in the initial years following Greece's

euro area entry as domestic households probably perceived the initial rise in their disposable income as permanent.

- *Domestic financial deepening post the euro adoption.* The completion of domestic financial sector liberalization in the mid-90s and enhanced financial deepening following the euro adoption appear to have been additional contributors to the deterioration in the country's current account position. This has been the result of the ensuing relaxation of the intertemporal budget constraint facing domestic households and businesses.

In an effort to reverse the aforementioned drivers and facilitate a steady improvement in the country's external position, the new EU-IMF financing programme aims to recoup competitiveness losses accumulated since Greece's euro entry and to enhance fiscal sustainability. A third strategic pillar of the new programme is the conservation of domestic financial stability. More specifically, the new programme envisions a further significant decline in the general government deficit (and a return to primary surpluses from 2013 onwards) as a result of new austerity measures as well as the beneficial impact of a market-based restructuring of Greek public debt (PSI) and more favorable terms on the old and new EA/EFSF loans. The new EU-IMF programme for Greece also puts special emphasis on structural reforms in the domestic labor and product markets, aiming to boost medium-term growth and to help reclaim accumulated competitiveness losses via a further significant decline in domestic ULCs and the liberalization of key sectors of domestic economic activity.

In this paper we attempt to assess the capacity of the new programme of fiscal consolidation and structural reforms to stabilize the country's external position, focusing mainly on the factors described above. This is important given the ongoing heated debate about the programme's effectiveness in addressing Greece's long-standing structural economic problems. We estimate and discuss a number of alternative econometric specifications and then we use our baseline model to produce out-of-sample forecasts for the evolution of Greece's current account in 2012-2016. We examine a number of alternative scenarios encompassing varying degrees of policy-adjustment and success rates in implementing the agreed reforms. Specifically, we forecast a steady improvement in Greece's current account position in the years ahead. This is deemed to be an important prerequisite for stabilizing (and gradually starting to reduce) Greece's external debt, from what currently appear to be unsustainable levels.

The remainder of the paper is structured as follows: Section 2 provides a brief literature review on the main determinants of the current account position; Section 3 takes an inter-temporal view on current account developments in Greece and the euro area; Section 4 presents the methodology and main results of our empirical study; Section 5 cross-compares our results with earlier papers related to the Greek current account, presents our scenario and model-based projections and discusses their policy implications. Finally, Section 6 offers some concluding remarks.

2. Theoretical overview and related literature

Empirical studies on the determinants of the current account position typically focus on explanatory variables that potentially influence investment and saving decisions. Such variables usually 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) the 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. In Table 1 we summarize some the most important determinants of a country's current account position and show the expected sign of the corresponding theoretical relationship in line with the existing literature.

- **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, on a *ceteris paribus* basis, 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 even been amplified in the euro area following the introduction of the single currency as a result of strengthened 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, thought the effect may be subject to nonlinearities.

- **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 (see 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 may have 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 this has arguably led to 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 be eventually 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.

- **Financial integration**

The way in which financial integration affects a country's current account position has been already discussed within 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).

- **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 fact, 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 and 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 vice versa.

- **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).

- **Real interest rate**

 The real interest rate - *as proxied by e.g. the average deposit rate minus CPI inflation* - 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. 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.

- **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 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.

- **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).

- **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).

- **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.

- **World oil prices**

Higher world oil prices exacerbate widening pressures on the current account deficit 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 pressures in its current account deficit 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 must have had a significant effect on the country's current account position.

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

Historically, Greece and other economies in the euro area have been running significant current account imbalances (see Figure 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 European Union, especially euro area countries (Blanchard and Giavazzi, 2002). The turn of the year 2008 found most countries in the so-called *euro area periphery* running large current account deficits (Greece: -17.9%; Portugal: -12.6%; Spain: -9.6% - *AMECO* database; all figures expressed 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 positions (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).

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 ca 21.1bn or 9.8%-of-projected GDP at the end of 2011 (Figure 1). 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 costs vis-à-vis main trade-partners. The real effective exchange rate (REER) constitutes a natural aggregate proxy of competitiveness and Greece's competitiveness deteriorated significantly since the country adopted the euro (Figure 2). Note that participation in the common currency area eliminates the possibility of reclaiming competitiveness losses via a depreciation of the nominal exchange rate. Effectively then, the only available root through which competitiveness can be restored is via an *internal devaluation* programme 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 programmes for Greece (initiated 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 3.8% in the period 2001-2008 vs. 2.4% in 1991-2000 and 0.7% in 1980-1990. This was the result of, among others, the domestic financial liberalization that took place by the mid-90's and the collapse in interest rates that followed 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 -0.01% in Germany (*AMECO* data).

***The sharp rise in public deficits and debts after Greece joined the single currency area*.** Using a typical 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.

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. As a result, the sharp rise in the levels and volatility of international oil prices since 2005-2006 has aggravated pressures on the current account deficit. Moreover, the strong increase in shipping revenues mid-last decade exerted a positive influence on the current account balance.

Figure 3 provides a more inter-temporal view of Greece's current account position. The graph depicts the current account balance expressed as the difference between national saving and investment. 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 saving and

investment evolved broadly in sync, with the latter mostly exceeding the former. This reflected, among other factors, increased inflows of EU cohesion funds and, more generally, the fact that in a world of increasing financial integration capital moves from the more advanced, capital-intensive countries to less developed, capital-scarce states.

However, in the period following the domestic financial liberalization in the mid-90s and, and especially, after the adoption of the euro, a significant deterioration in Greece's current account position occurred, with the corresponding shortfall reaching unprecedented levels. As depicted in Figure 3, the widening of the current account deficit in the period 2001-2008 was mostly the result of declining national (private and public) savings, especially during the second half of that period. 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.

A breakdown of the national saving and investment series in their respective public- and private-sector components in the period following the outbreak of the global financial crisis reveals some interesting trends (see Table 2). Starting with the private saving-investment (S-I) balance, what is probably the most striking development is the collapse in private investment following the eruption of the global financial crisis and, more recently, the outbreak of the Greek sovereign debt crisis (late 2009). In an effort to rescue Greece from an outright default *-given the explosion of Greek sovereign bond yield spreads to prohibitively high levels during the first months of 2010 -* its euro area partners and the IMF agreed on a

sizeable lending package (~€109bn), aiming to cover a significant part of the country's borrowing requirement until end -2012/mid-2013.

4. Empirical analysis on the determinants of Greece's current account position

4.1. Data and notation

Broadly in line with the literature review presented in the previous section, we consider 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 period, when available, is 1960-2011. Table 3 provides a summary of our data and the notation utilized in what follows.

4.2. Empirical methodology

It is not straightforward to select an appropriate methodology given the very limited time span of the available data. On the one hand, one wishes to perform an equilibrium or long-term analysis, since Greece's structural problems do not only necessitate short-run adjustment but they also require a shift towards a new equilibrium position. On the other hand, identifying the type of trend(s) in the data is difficult given the relatively short sample. This is true irrespective of the estimation method that one wishes to use. With this important caveat in mind we proceeded to formulated vector error correction models (VECM), using the standard methodology and focusing on specification testing after estimation. The VECM approach is practically useful as it offers a

coherent framework for generating short-run adjustment estimates, long-run equilibrium estimates and policy-related forecasts. The estimation, testing and specification methodology is well known and follows Johansen's contributions (1991, 1995). Preliminary results on unit root tests point to the presence of stochastic trends for all variables under study and are available upon request.

The elaborate, consider first the national accounts identity, according to which the current account, ca, is equal to the difference between national saving (S) and investment (I).

$$CA = S - I = (SP - IP) + (SG - IG) \tag{1}$$

where we have, SP and IP, to denote private saving and investment; SG and IG, denote public saving and investment; with all variables expressed as a percentage of GDP.

Expressing then SP as a function of private saving determinants, equation (1) becomes:

$$CA = f \text{ (REER, private credit -to-GDP, SG} - \text{IG, IP, rear GDP per capita, output gap, old-age dependency ratio, terms of trade, trade openness, ...)} - IP + (SG - IG) \tag{2}$$

Or, using n the notation in Table 3, we rewrite equation (2) as:

$$ca = f(rer, credit, SG-IG, IP, ypcgr, oadr, tot, open,...) - IP + (SG - IG) \tag{3}$$

Converting to a linear representation, representing a long-run relationship among these variables, we have:

$$ca_t = b_0 + b_1 rer_t + b_2 credit_t + b_3 ypcgr_t + ... + b_{n-1} IP_t + b_n ggvnt_t + \varepsilon_t \tag{4}$$

where the variable ggvnt (general government deficit as percent of GDP) is used as a proxy for the variable SG – IG in equation (3). Equation (4) is to be estimated, using various VECM specifications, as the long-run cointegrating relationship of these variables. The detailed results on cointegration testing are available on request. In the next section we present the results from the estimation and specification testing of various models, all of which include information about the presence of cointegration. In all the VECM specifications we have also used two dummy variables; one for the introduction of the euro (starting in 1999) and another for the onset of the crisis (starting in 2008).

4.3. Estimation results and discussion

Table 4 provides a comprehensive summary of all estimated VECM models. The first (upper) part of the table presents the estimated coefficients (and associated *t*-statistic values in parentheses) of the cointegrating vector and also of the VECM error correction term (the speed of adjustment). The second (lower) part of the table presents all relevant specification statistics. These include: tests for cointegration, lags used, all standard diagnostics on residuals, model fit, stability analysis of the cointegrating relationship and Granger causality on the short-run dynamics. The long-run significance is measured by the significance of the speed of adjustment coefficient.

For illustration we present below the estimated equilibrium relationship for Model 1, which we use as our baseline model as it contains the most-relevant policy variables. In this model the current account is linked with the fiscal deficit, the real exchange rate and

private investment. The model produces significant estimates of the cointegrating relationship and it passes all diagnostic tests. Furthermore, there is a strong effect both on the long-term relationship (significant speed of adjustment estimate) and on the short-run dynamics (significant Granger causality test). We have:

$$ca_t = 2.53 + 0.95ggvnt_t - 0.52rer_{15,t} - 0.78pinv_t + \varepsilon_t \tag{5}$$

Note that in the above equation all estimates have the (theoretically) correct sign (see again Table 1). Specifically, the estimate of the real effective exchange rate, $rer_{15,t}$, is negative and strongly significant. Earlier we discussed the theoretical rationale for the negative sign of this important indicator for *price-competitiveness*. To recap, the idea is that 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 real effective appreciation of the domestic currency also tends to reduce the price competitiveness of a country's exports in international markets. Note at this juncture that the coefficients of the real effective exchange rate variables in all alternative VECM model specifications are all negative and statistically significant.

Next, note that the estimate on the impact of private investment is also negative and significant. Indeed, this was to be expected from the national accounting identity expressing the current account as the difference between national saving and investment - see again equation (1).

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Turning now to the estimate on the impact of the fiscal balance we see that it is positive and significant. This positive relationship provides support to the so-called *twin deficit hypothesis* and appears to be in broad agreement with the evolution of Greece's current account and fiscal positions, especially in the years following the country's euro area entry. These also point to a type of behavior by domestic agents that is broadly in line with the main predictions of the Keynesian model, which claims that a higher fiscal deficit (or lower fiscal surplus) tends to increase disposable income and thus, to boost present consumption, reduce private saving and lead to a wider current account deficit. The aforementioned effects are even more pronounced if "myopic" households perceive the rise in disposable income to be permanent. Note that in some of our VECM specifications (Models 6-10) the estimates of the fiscal balance turn negative, implying a partial *Richardian* type of behavior by domestic households. However, in most of these models the estimates of the general government balance were found to be insignificant. Finally, note that in a number of estimated specifications we cannot reject the hypothesis that the effects of the real exchange rate and the fiscal balance are of the same magnitude but opposite sign. Specifically, the test for this long-run restriction in Model 1 has a p-value of 0.64. It appears that with this model and the data at hand there is evidence about the joint, and possibly equal, importance of the real exchange rate and the fiscal balance for restoring the current account equilibrium in Greece.

In Model 1, as well as in all other estimated specifications, we utilize two dummy variables, labeled *eurodummy (d99)* and *crisisdummy (d2008)*. As indicated earlier, the former takes the value of 1 in the years 1999

onwards and zero (0) otherwise. The latter, takes the value of 1 in the years 2008 onwards and the value of 0 in all other years. The first 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. In all of the VECM specifications utilized in our study, the estimates have the *theoretically-correct* sign (negative) and are also significant. The second dummy variable 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 have noted already, a notable improvement in Greece's current account deficit is evident since 2009, mainly as a result of a sharp contraction of imports due to the domestic economic recession and the gradual reversal of the significant real effective rate overvaluation accumulated since the country's euro area entry in 2001. Again, all estimates for this variable have the *theoretically-correct* (positive) sign and they are also statistically significant.

All in all, the results of our baseline model (Model 1*)* appear consistent with both the theoretical literature and our general consideration regarding the drivers of Greece's current account position. Since the model appears to be correctly specified we will be using it for the generation of out-of-sample forecasts going up to 2016.

Turning next to the rest of the VECM specifications and the other explanatory variables in our study, we find that their estimates are

overall significant and they have the signs predicted by the theory. We discuss them below.

The estimates of our *credit* variable are all negative and strongly significant. Our private credit-to-GDP variable is used in our empirical study as a proxy for financial deepening and financial liberalization. In theory, higher levels of 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 this effect has also facilitated significant price increases in domestic asset markets (e.g. housing), increased domestic financial liberalization and bank intermediation may have led to lower private saving and higher consumption as a result of permanent income effects (see also Brissimis, et al 2010).

The estimated coefficients of our *tot* variable are positive, yet insignificant in the models that they appear (models 2, 7 & 8). In the international economics literature, "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 coefficients of our *open* variable are negative and mostly significant. The negative sign of the estimates of our trade openness variable appears to be in disagreement with what the theory predicts (see Table A1). We interpret this finding as follows: Greece's imports of goods and services have traditionally been much higher than its exports

of goods and services in value terms. (In 2011, the total value of imports was 2.4 times higher than the corresponding value of exports). Given then that our trade openness indicator is calculated as the ratio of the total value of imports and exports to nominal GDP, for *most* of the sample a rise in our *open* variable primarily indicates an increase in the total value of imports (relative to the total value of exports), which, in turn, points to a wider current account deficit, so that the negative sign can be consistent with the Greek experience.

Finally, the estimated coefficients of our *ypcgr* (logarithm of Greek output per capita GDP) and *rygrnl* (real GDP per capita of Greece relative to real GDP per capita of a reference country – here Netherlands) variables are found to be negative and significant in VECM models 2 & 5, while they are positive and insignificant in models 3 & 10. This finding is interpretable but it is not clear whether this interpretation is structural or it just relates the historical path of these variables along with the current account (the current account was worsening as the standard of living was rising). The structural explanation, however, could be consistent with the necessity of a fiscal improvement and a rise in competitiveness – at least during the short-run adjustment period.

Before closing this section we note that all estimates of the speed of adjustment have the correct sign (negative) and are all statistically significant (with the exception of Model 3). These estimates roughly measure the average correction back to equilibrium that one expects to occur within one period (i.e. within one year in our context). For example, in Model 1 the estimate is -0.44 which implies that around 44% of the current account disequilibrium is anticipated to be corrected, on

average, within one year. Therefore, our baseline model implies that it would take more than 2 years for a complete return to the estimated long-run equilibrium. From a *structural interpretability* standpoint, the magnitude of this estimate is an additional factor encouraging us to use Model 1 for generating forecasts for Greece's current account position. Note that the rest of our estimated models imply an even faster adjustment, which appears unrealistic given past experience and the current situation of the Greek economy.

5. Comparison with earlier papers, discussion of policy implications and projections for the current account deficit

Our estimation results presented in the previous section are in broad agreement with the literature related to the evolution of Greece's current account position, as presented in e.g. Arghyrou and Chortareas (2008), Bitzis et al. (2008) and Brissimis et al. (2010). The first of these papers, Arghyrou and Chortareas (2008), places special emphasis on the role of real exchange rates as determinants of the current account and explores their importance in a European and not just a Greek context. They also use a VECM approach where the current account enters the specification along the real exchange rate and domestic and foreign output levels but their sample is restricted from 1978 to 2005 and they do not consider other explanatory variables in their analysis. They also consider whether the current account adjustment can be non-linear, although the small sample available for Greece (as the authors note) makes the results rather difficult to interpret. In the second of the aforementioned papers, Bitzis et al. (2008), the authors consider only one VECM specification that includes both fiscal and competitiveness

variables but they use quarterly data from 1995 to 2006 in their analysis. They find, however, 3 cointegrating vectors in their estimation results and their estimated signs do not always coincide with our own estimates – although their empirical conclusions support the current arguments.

In the latest paper of Brissimis et al. (2010), the authors perform a long-run equilibrium analysis with emphasis on stability and consider the financial liberalization and credit expansion as a main driver of the deterioration in the current account deficit. Their methodology is different from both ours and the other two papers mentioned before, as they use a single equation approach. However, they do use, as their main specification, a model that contains the same variables as our baseline model and we have agreement in the signs and significance of the corresponding estimates. Their sample covers about the same period as the one we use here; it starts in 1960 and ends in 2007, compared to 2011 in our study. The authors perform a current account stabilization exercise, which is, however, not a direct projection on the current account path. Using their estimates and making assumptions about the path of the nominal growth rate, inflation, private investment and income per capita for Greece, they find that the current account will fall to 4.7% of GDP in 2015 – in line with our speed of adjustment estimate of a two year period gap before returning to equilibrium that we presented in the end of the previous section. In the next section we perform model and scenario-based projections that show that this number of 4.7% is among the plausible values for the future current account.

Summarizing so far, we can see that our econometric results appear to provide broad-based support to the key findings of a number of earlier empirical studies on the determinants of Greece's current account position. The trend deterioration in the country's external imbalance in 1999-2008 can be traced back to a number of developments, including among others:

- **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.** Wider fiscal deficits appear to have increased disposable incomes, boosting present consumption and reducing private saving. The aforementioned effects may have been even more pronounced in the initial years following Greece's euro area entry as domestic households probably perceived the initial rise in their disposable income as permanent.

- **Domestic financial deepening post the euro adoption.** The completion of domestic financial sector liberalization in the mid-90s and enhanced financial deepening following the euro adoption appear to have been additional contributors to the ensuing deterioration in the country's current account position. Note that according to AMECO data, domestic MFI credit to domestic households and non-MFI businesses has more than doubled since Greece's EMU entry, reaching around 114%-of-GDP at the end of

2011, from 51.5%-of-GDP in 2001. As we have explained earlier, financial liberalization and financial deepening are often associated with lower private saving, thanks to the relaxation of the intertemporal budget constraint facing domestic households and businesses.

Regarding the first two of these factors (i.e., economic competitiveness and fiscal sustainability), it is important to note that their permanent improvement is envisioned in two of the three main strategic pillars of the new EU-IMF bailout programme for Greece that was endorsed by the February 21, 2012 Eurogroup (the third one being the conservation of domestic financial stability). Specifically, the new programme envisions a further significant decline in the general government deficit (and a return to primary surpluses from 2013 onwards) as a result of new austerity measures (mainly from the expenditure side) as well as the beneficial impact of a market-based restructuring of Greek public debt (PSI) and more favorable terms on old and new EA/EFSF loans.

The new EU-IMF programme for Greece also puts special emphasis on structural reforms in the domestic labor and product markets, aiming to boost medium-term growth and help reclaim accumulated competitiveness losses via a further significant decline in domestic ULCs and the liberalization of key sectors of domestic economic activity. The applied package of aggressive fiscal consolidation and structural reforms under the first EU-IMF bailout programme (incepted in May 2010) as well as deteriorated consumer and investor sentiment propagated a sharp contraction in the domestic economic activity, with real output having already declined by as much as 15 percentage points since Q4

2008. The new official funding programme is also expected to have an initial recessionary impact on the domestic economy. Specifically, new EU-IMF baseline scenario forecasts Greek real GDP growth to contract by a further 4.8% in 2012, following a near 7% decline in the prior year. Domestic economic activity is broadly expected to stabilize in 2013, with a return to positive and sustainable growth now expected no earlier than in 2014. By implication, the current recession (and more competitiveness gains down the road) is expected to further reduce the current account deficit in the quarters and years ahead.

To assess the ability of the new EU-IMF programme to stabilize Greece's current account, we utilize our baseline estimates of the baseline VECM Model 1 to produce out-of-sample forecasts for the evolution of Greece's current account position in 2012-2016 under the following two scenarios:

➢ **Scenario A (full adjustment)** broadly incorporates the underlying macro & fiscal forecasts of the new IMF baseline scenario for Greece (IMF County Report No. 12/57, March 2012); and

➢ **Scenario B (partial adjustment)** incorporates a less favorable projected trajectory relative to that envisaged in *scenario A*. Specifically *Scenario B* assumes realized adjustments in our real effective exchange rate (r*er15*) and fiscal balance (*ggvnt*) variables that are half the size the respective adjustment assumed in the first scenario.

Figure 4 shows the forecasted path of Greece's current account position in *Scenario A (full adjustment)* and *Scenario B (partial adjustment)* based

on the assumed evolution of government deficit, real exchange rate and private investment under these scenarios. The derivation of these forecasts has been generated by our estimated baseline Model 1, given the assumed evolution of the relevant explanatory variables. However, due to the obvious uncertainty that is embedded both in model specification and the forecasts themselves, we augment our *scenario-based* forecasting framework with two additional elements. Specifically, we compute fully-dynamic forecasts involving model feedback on the explanatory variables of the current account. In other words, the forecasts for real exchange rate, government spending and private investment are *model-generated* and not *scenario-generated*. As a final step, we compute *average* forecasts of our scenario-based and dynamic projections.

Under all these four cases we actually find a projected improvement in Greece's current account position, see Table 5 for a comprehensive summary of these forecasts and their standard errors. Specifically, our out-of-sample forecasts imply an average current account balance (deficit) in 2012-2016 that ranges between -6.64%-of-GDP and -3.96%-of-GDP *i.e.,* an average improvement of at least 3% ppts-of-GDP and at most 6% ppts-of-GDP, relative to the -9.9%-of-GDP current account realization in 2011. The margin of error in these projections is on average 3% over the entire *out-of-sample* projection horizon. This, in turn, points to an average range of current account projections ranging between -1%-of-GDP and -7%-of-GDP under our "full adjustment" scenario and between -9.7%-of-GDP and -3.7%-of-GDP under our "dynamic adjustment" scenario.

Overall, our estimation results and the projections based on our models support the necessity of a vigorous implementation of the reforms programme agreed with official lenders, so as to enhance fiscal sustainability and improve the country's current account position. The latter, in particular, is a prerequisite for stabilizing (and gradually starting to reduce) Greece's external debt, from what currently appear to be unsustainable levels.

6. Concluding remarks

In this paper, we take a close look at Greece's current account position, placing additional emphasis on the main factors that led to its sharp deterioration in the post Eurozone entry period. Our study makes three main contributions. First, it presents a comprehensive picture about the historical evolution of the country's current account, relating it to the existing literature and expanding the findings of previous empirical studies. Second, it presents estimation results from several well specified models that use most of the underlying determinants highlighted in the literature. We find that widened fiscal deficits, accumulating competitiveness loses and reduced private saving have been among the main drivers of the deterioration in Greece's current account position in the initial EMU years. Other important variables – such as openness and terms of trade – also appear to have been having an impact, though their direct effect cannot be discerned since they do not constitute direct policy variables. Third, we present scenario and model-based projections that incorporate the main variables of interest and find that they are broadly consistent with a gradual improvement in

Greece's current account, under all different scenarios for their evolution examined in this study. However, such an improvement is tied to both fiscal consolidation and to a further boost in the country's competitiveness. Such preconditions are in broad agreement with the new reforms programme agreed with the EC/ECB/IMF *troika* of official lenders.

Can Greece be saved? Well, it appears that it can, at least according to the theory and if one believes the projections presented in this study. In Greece's case, the onus of proof lies mainly with policy makers and social partners. In time we will find out whether the necessary reforms to stabilize the country's external position were truly and correctly implemented.

Appendix A: List of Tables

Table 1

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

Table 2

Greece: Saving-Investment Balance, 2008-11
(in percent of GDP)

	2008	2009	2010	2011 est.
Private S-I balance	**-10.4**	**2.3**	**-0.9**	**-1.9**
Investment	20.7	15.4	13.9	12.6
Saving	10.4	17.7	13.0	10.8
Public S-I balance	**-4.6**	**-13.5**	**-9.2**	**-7.9**
Investment	2.9	2.9	2.3	2.1
Saving	-1.6	-10.5	-6.9	-5.8
Current account balance	**-14.9**	**-11.1**	**-10.1**	**-9.8**
Gross investment	23.7	18.3	16.2	14.7
Gross domestic saving	8.7	7.2	6.1	4.9

Source: IMF staff calculations (March 2012)

Table 3
Data and notation

Variable description	Country	Source	Units	Notation	Data availability - Initial year of respective time series
Current account - "Balance on current transactions with the rest of the world" (National accounts)	Greece	AMECO	% GDP	*ca*	1960
Real GDP per capita (2005 market prices)	Greece	AMECO	EUR thousands (variable expressed as natural logarithm of respective value)	*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
Real effective exchange rates, based on unit labour costs (total economy) :- Performance relative to the rest of 23 industrial countries (EU-15, TR, CH, NR, US, JP, AU, MX, NZ) : double export weights (XUNRQ)	Greece	AMECO	Index (FY2000=100) (variable expressed as natural logarithm of respective value)	*rer23*	1970
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 (FY2000=100) (variable expressed as natural logarithm of respective value)	*rer15*	1960
Old-age dependency ratio (% of working population)	Greece	AMECO	%	*oadr*	1961
Young-age dependency ratio (% of working population)	Greece	AMECO	%	*yadr*	1961
Total credit to domestic non-MFIs by domestic MFIs (outstanding balances e.o.p)	Greece	BoG	% GDP	*credit*	1980
Terms of Trade (goods & services)	Greece	AMECO	Index (FY2000=100) (variable expressed as natural logarithm of respective value)	*tot*	1960
Trade openess	Greece	AMECO	%	*open*	1960
crude oil price		Bloomberg	$/br (variable expressed as natural logarithm of respective value)	*oil*	1960
Private Investment (% of GDP) - Gross fixed capital formation to GDP ratio private sector	Greece	Ameco	% GDP	*pinv*	1960

Table 4

Estimation results on the determinants of Greece's current account balance

Variable name	Model 1 Baseline	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
ypcgr					-0.01 (4.56)					0.09 (0.62)
rygrnl		-0.46 (5.88)	0.03 (0.31)							
ggvnt	0.96 (4.67)	1.26 (7.59)	1.31 (6.27)	0.52 (2.67)		-0.24 (1.58)	-0.38 (2.29)	-0.40 (2.42)	-0.10 (0.69)	-0.28 (1.69)
rer23				-0.43 (7.08)						
rer15	-0.52 (8.08)	-0.42 (6.21)	-0.48 (7.30)		-0.21 (5.47)					
oadr										
yard										
credit						-0.13 (4.82)	-0.19 (5.56)	-0.19 (5.50)	-0.12 (4.90)	-0.18 (2.23)
tot		0.26 (1.85)					0.07 (0.63)	0.09 (0.84)		
open			-0.22 (1.61)						-0.15 (1.81)	
pinv	-0.78 (3.96)			-0.36 (1.90)	-0.13 (1.07)	-0.16 (1.01)	-0.09 (0.47)			
eurodummy (d99)	-0.03 (3.34)	-0.07 (3.42)	-0.03 (2.25)	-0.03 (4.01)	-0.03 (5.00)	-0.04 (4.11)	-0.03 (3.02)	-0.03 (3.30)	-0.04 (4.16)	-0.03 (3.63)
crisisdummy(d2008)	0.04 (2.93)	0.06 (3.35)	0.06 (3.42)	0.04 (2.91)	0.03 (3.07)	0.04 (3.58)	0.06 (5.67)	0.06 (6.11)	0.04 (4.42)	0.04 (3.26)
Number of lags in VECM	2	2	1	2	2	1	1	1	1	1
Adjustment coefficient	-0.44 (2.62)	-0.55 (2.96)	-0.11 (0.78)	-0.54 (3.52)	-0.55 (4.74)	-0.79 (5.16)	-0.87 (5.96)	-0.83 (6.20)	-0.90 (5.25)	-0.81 (5.67)
Adj. R-squared	46%	64%	37%	55%	58%	60%	66%	67%	62%	63%
Test on long-run restrictions	0.64	0.82	n.a.	0.62	0.58	0.85	0.96	n.a.	0.97	0.69
Trace test	*1*	*2*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*
Max test	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
No residual autocorrelation	0.44	0.19	0.63	0.34	0.58	0.07	0.03	0.26	0.02	0.10
No residual heteroscedasticity	0.54	0.39	0.81	0.38	0.33	0.88	0.64	0.67	0.33	0.11
Residual normality	0.48	0.94	0.24	0.36	0.06	0.16	0.01	0.01	0.84	0.67
Stability of cointegration	0.99	0.74	0.86	0.95	0.30	0.16	0.92	0.96	0.32	0.64
Joint causality of explanatory variables on curent account	0.02	0.00	0.1	0.01	0.00	0.07	0.00	0.00	0.12	0.02

Source: Eurobank EFG Research and authors' estimation.

Notes:

1. *t* -statistics in parentheses below point estimates; significance increased when restrictions are valid (unrestricted estimates shown).

2. Test on long-run restrictions indicates the p-value on the null hypothesis of linear combinations of coefficients (where applicable); a value greater than 5% implies that the hypothesis cannot be rejected.

3. Trace test and Max test indicate the number of cointegrating relationships present, based on the trace test and maximum eigenvalue test respectively.

4. 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.

5. Stability of cointegration indicates whether the cointegrating relationship is valid through the whole sample; a value greater than 5% indicates rejection of stability.

6. Joint causality indicates whether the dynamic terms of the explanatory variables affect the evolution of the current account; a value greater than 5% indicates non-causality.

Table 6

Projected current account path (%-of-GDP) under different adjustment scenarios

YEAR	Scenario A (full adjustment)	Standard error (SE)	Scenario B (partial adjustment)	Standard error (SE)	Dynamic	Standard error (SE)	Average	Standard error (SE)
2012	-8.15%	1.63%	-8.75%	1.63%	-9.51%	1.62%	-8.80%	1.63%
2013	-6.40%	2.07%	-7.60%	2.07%	-9.12%	2.55%	-7.71%	2.23%
2014	-4.82%	2.31%	-5.82%	2.31%	-6.60%	3.12%	-5.75%	2.58%
2015	-0.97%	2.36%	-3.10%	2.36%	-4.43%	3.57%	-2.83%	2.76%
2016	2.28%	2.36%	-0.96%	2.36%	-3.12%	3.83%	-0.60%	2.85%
Average	-3.96%	2.15%	-5.47%	2.15%	-6.64%	2.94%	-5.36%	2.41%

Source: Eurobank EFG Reasearch

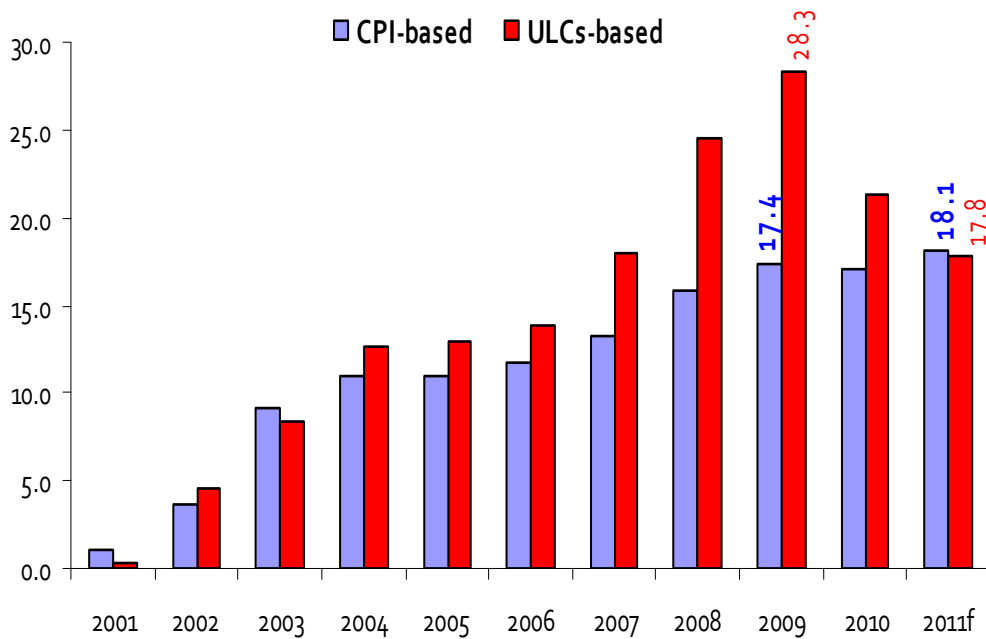# Appendix B: List of Figures

Figure 1
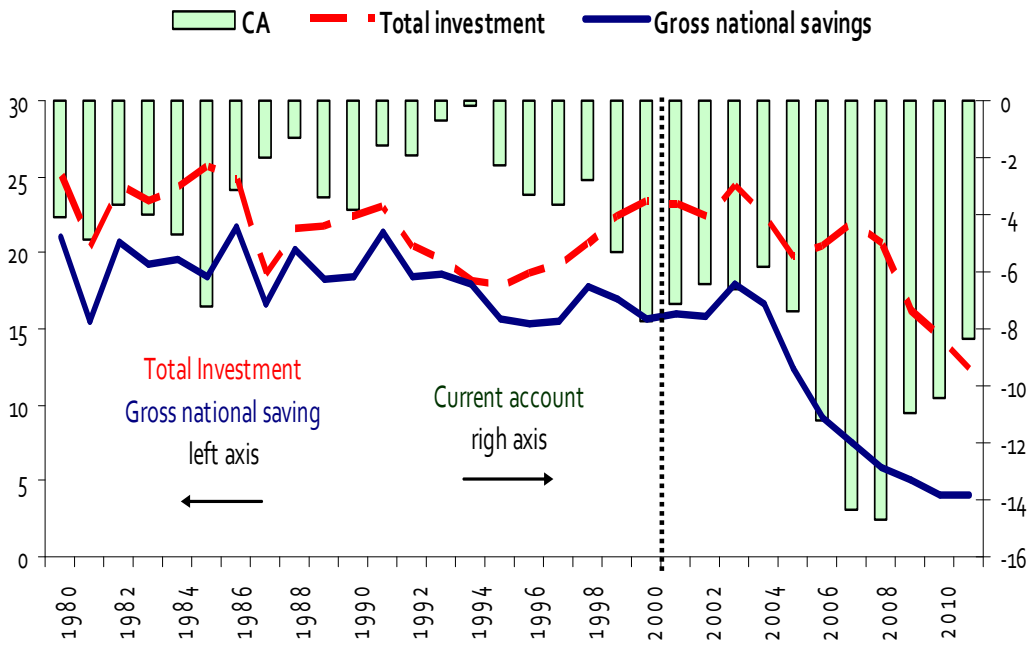Greece's current account balance (ppts-of-GDP)
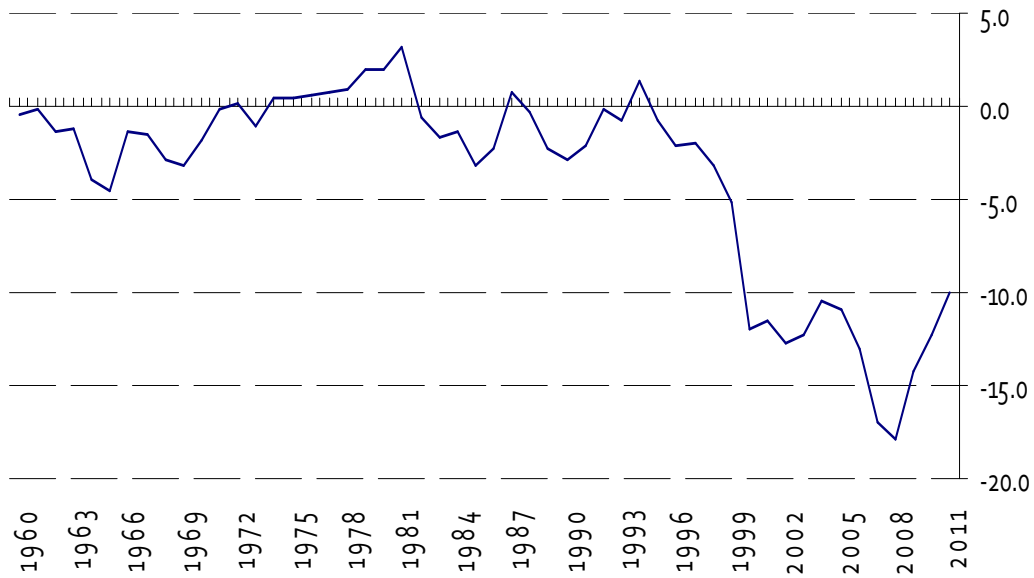
Source: AMECO

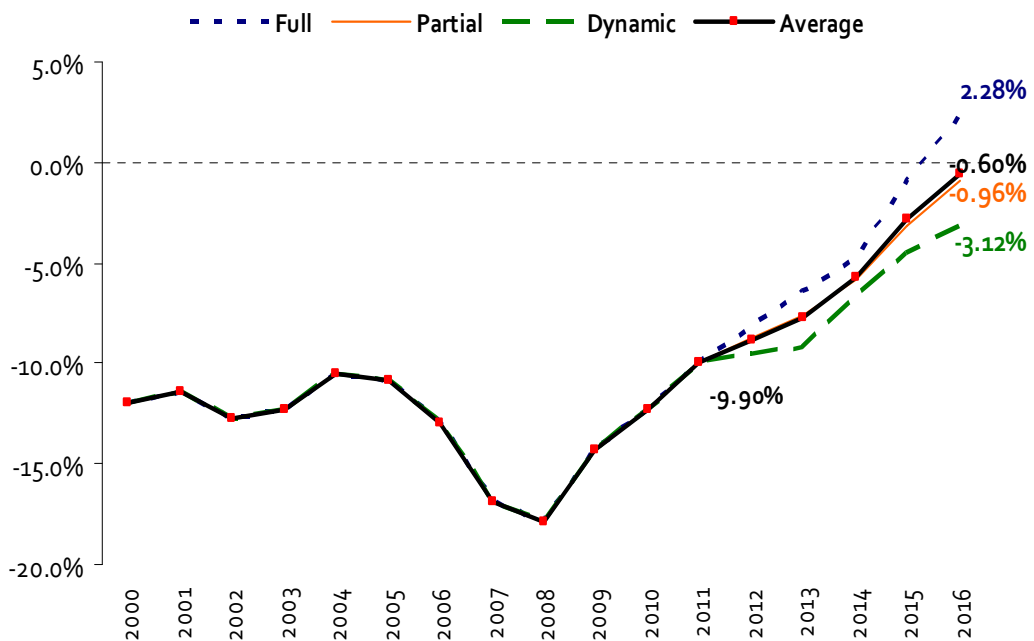**Figure 2**
Greece's REER - Cumulative growth

Source: BoG, Eurobank EFG Research

Figure 3

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

Source: AMECO, BoG, Eurobank EFG Research

Figure 4

Projected current account path (%-of-GDP) under different adjustment scenarios

Source: Eurobank EFG Research; AMECO

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