

## *Diagnostic Analysis of Greece*

CHEE HEONG QUAH\*

### **Abstract**

This paper explores Greece's level of international competitiveness and the degree of fit between the conditions in Greece and those prescribed by optimal currency areas (OCA) theory. Given that Greece now shares the same currency with Germany, the *de facto* central country of the eurozone, findings indicate that problems in Greece may have been exacerbated by loss of mercantile competitiveness *vis-à-vis* Germany and/or lack of convergence with the central economy in OCA-related dimensions.

**Key words:** European Monetary Union (EMU), debt, Greece, business cycle, monetary union, integration, euro.

**JEL Classification:** E62, F31, F32, F41, F42, O53.

### **INTRODUCTION**

Advanced economies confronting fiscal problems today share common underlying weaknesses (see, for example, Buiter and Rahbari, 2010). The first is the procyclical policy undertaken by the fiscal and monetary authorities in the boom years after the 2000 tech bubble. The second are the direct costs associated with the 2007-2008 global financial turmoil, including bailout costs. The third is the ensuing global recession that undermined revenues but augmented government expenditures. In the case of Greece, its government even concealed its actual budgetary position.

Rating agencies and the eurozone authorities should also shoulder part of the blame for the crisis in Greece. The inability of the rating agencies to recognize the inherent risks in the large sums of bonds issued by the Greek government resulted in low long-term interest rates. This helped to fuel a speculative bubble,

---

Text received March 2012; accepted October 2013.

\* Faculty of Business and Accountancy, University of Malaya, Kuala Lumpur, Malaysia, <quahch@um.edu.my>. The author thank the journal's two anonymous reviewers for their valuable comments and suggestions.

and when it burst, the European Central Bank (ECB) and the eurozone governments failed to agree over the use of downgraded Greek debt as collateral for loans to Greece.

On May 10, 2010, the ECB initiated the Securities Market Program (SMP) to effect monetary policy by purchasing government bonds. It was a deviation from the eurozone principle of not bailing out governments via monetary policy. Despite this, there were disagreements with the SMP within the ECB Governing Council. Essentially two opposing viewpoints existed within the ECB (Panico, and Purificato, 2013). The first, in support of SMP, wanted to tame speculative forces by purchasing large amounts of government securities. The second opposed this measure because it considered the crisis had been caused by structural weaknesses such as a lack of competitiveness and fiscal profligacy. The second view also asserts that the SMP would just relieve debtor countries of market discipline and spread that liability risk to all eurozone taxpayers. At the same time, the media were spreading unfounded fears about the ECB operation, making it challenging for the authorities to implement decisive solutions.

Apart from that, the origins of Greece's failures cannot be separated from its relatively high deficits in key welfare programs such as pensions and health, but the crisis and the measures to counter it have further deprived Greece of resources to provide social protection to cushion its consequences (Matsaganis, 2011).

Other thinkers, such as Milios and Sotiropoulos (2010), have linked Greece's problems to structural imbalances within the eurozone. Higher growth rates in the "peripheral" economies, coupled with rapid reduction in the cost of domestic borrowing under a single monetary policy led to significant inflows of foreign savings that helped finance current account deficits in the periphery. This external financing alleviated the pressures on consumers who otherwise would have been pressed to reduce consumption.

Yet, the alternate view put forward by de Grauwe and Ji (2012) suggests that the crisis was caused by the failure of European authorities to deal with speculative capital movements (generated by the existence of conflicts within the ECB), the unfounded fears spread by the media about the workings of the monetary union, and the increasing risks for creditor-country taxpayers related to policies different from those based on austerity.

In another respect, in a recent paper, Krugman (2012) argues that while the imbalances between the deficit and surplus in the United States (U.S.) can be

somehow balanced by the optimal currency area (OCA) dimensions of fiscal transfers (Kenen, 1969) and labor migration (Mundell, 1961), short of these two features, the imbalances between the center and periphery in the eurozone are one primary cause of the eurozone crisis. Earlier, in an OCA-related study, Barbosa and Alves (2011) found that differences in the growth of unit labor costs, dissimilarity of trade, and differences in output growth were the significant causes of the divergent competitiveness between some European Monetary Union (EMU) states. More recently, Quah (2013a; 2014) detects increased fragmentation in business cycle synchronicity within the eurozone after the global financial and economic crisis.

In light of the foregoing, this article explores Greece's levels of international competitiveness concentrating on the real exchange rate and the degree of fit between the conditions prescribed by OCA theory (other than those already presented in the literature) with the actual situation in Greece. Essentially, since Greece now shares the same currency with Germany, the *de facto* central country of the eurozone, difficulties in Greece may have been exacerbated by loss of trade competitiveness *vis-à-vis* Germany and/or lack of convergence with Germany in OCA-related dimensions. Accordingly, it is natural to employ Germany as the reference country in this analysis.

For analysis, data sampled generally range from 1992 to 2009/2011, considering the possible effects of the 1992 Maastricht Treaty, the 1999 birth of the euro, Greece's 2001 euroization, and the 2007-2008 global crisis. Since the period examined covers the time that the euro was actually implemented in Greece, one can check if there has been greater convergence with Germany after euroization.

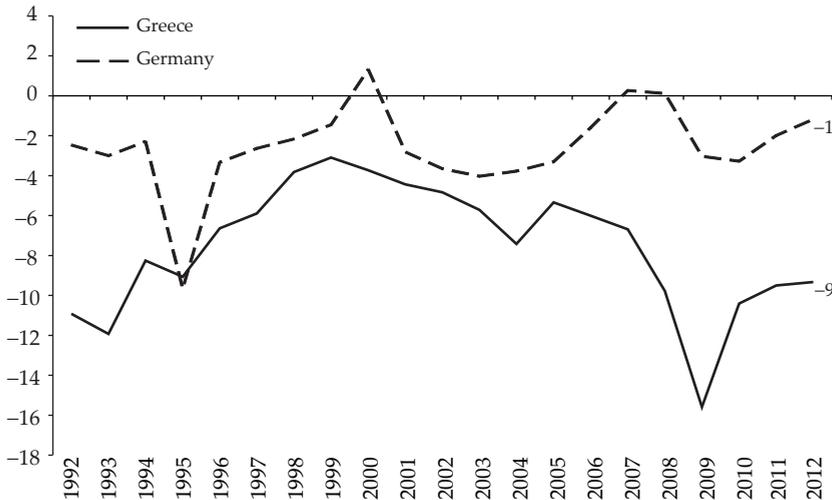
The remainder of this article is organized as follows: as background to the subsequent discussions, the second section looks at some of the Greek economy's economic performance indicators. The third section examines Greece's international competitiveness level, concentrating on the movements in real exchange rates. The fourth section introduces the OCA criteria and assesses Greece's degree of conformity with respect to these criteria. In both sections, the three- and four, assess the Greek economy's performance with respect to those of Portugal and Ireland, which, like Greece, are subject to the adjustment programs agreed upon with the European authorities. The fifth section discusses the findings and possible implications. Finally, in section six presents conclusions.

**PERFORMANCE OF GREECE VIS-À-VIS GERMANY**

Utilizing some commonly used macroeconomic indicators, this section compares the Greece’s performance to that of Germany. The items that we look at are budgetary balance, government indebtedness, current account balance, Foreign Direct Investment (FDI), private capital flows, and unemployment.

Figure 1 shows the central government budget position as a percent of Gross Domestic Product (GDP) over 1992-2012 for Greece and Germany. Obviously, budget deficits in Greece have always been greater than in Germany. Despite improvements in the run-up years toward 1999, most likely due to conformity with the Maastricht Treaty, Greece’s deficits had begun to deteriorate and diverge from Germany’s since the late 1990s. Also observable on the Greek path are an apparent dip in 2004 that coincides with the 2004 Greece Summer Olympics and a deep plunge in 2007-2009 during the global economic crisis.

**FIGURE 1**  
*Budget balance of Greece and Germany, 1992-2012*  
 (as a percentage of GDP)



Note: 2011-2012 are projected data.  
 Source: development by the author using data from *Annual Macro-Economic database (AMECO)* of the Directorate General for Economic and Financial Affairs of the European Commission.

In terms of levels, however, without comparing to Germany, the behavior of the Greek fiscal authorities had been largely reasonable until 2005, before the decay of government finances after the 2005 reform of the Stability and Growth Pact and the failure of the austerity policies to achieve the reduction of government deficits as foreseen by the adjustment program of the European Commission, the ECB, and the IMF (Arestis and Pelagidis, 2010; Papadimitriou, Nikiforos, and Zezza, 2013). Despite this, in 2010, there was a turnaround when austerity policies began to be more effective in the wake of a looming debt crisis.

The chronic deficits in Greece can be traced back to 1981 when it joined the European Community, under which protective economic barriers against foreigners were significantly removed. This brought lower government revenues, and the situation worsened when the Andreas Papandreu government implemented aggressive spending, particularly on public welfare in the early 1980s. In addition, other causes that aggravated the deficits include the earthquakes in the 1980s and 1990s and disputes with the neighboring former Yugoslav Republic of Macedonia and Turkey in the 1990s.

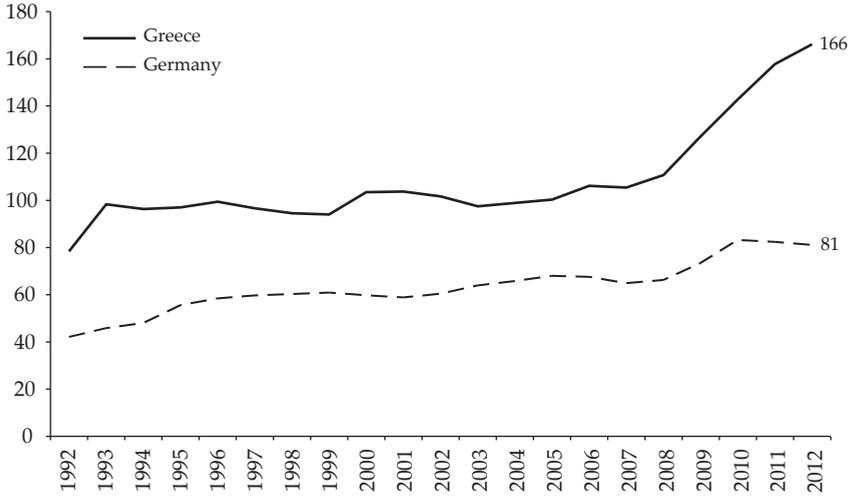
As for indebtedness, Figure 2 shows that Greek government debt has always been very high,<sup>1</sup> around 100% of GDP in the 1990s and 2000s, before skyrocketing even more since the global crisis. According to Reinhart and Rogoff (2008), the risk of a financial crisis is significantly greater when the debt ratio reaches the 100% threshold or beyond. This is despite the fact that, between 1983 and 2005, the gap between the Greek and the German ratio had decreased slightly. Also noteworthy is that, in the 1990s, despite improvements in Greece's public balances (as seen earlier), high levels of debt persisted. Quite to the contrary, Germany has always maintained debt stocks lower than its GDP.

Figure 3 charts the paths of the current account balances (as a percentage of GDP) of Greece and Germany from 1992 to 2009. It is apparent that the Greek path shows a declining long-run trend since the mid-1990s and that, in general, it is a mirror image to the German path. Interestingly, in the shorter run of 2000 to 2005, however, Greece's current account deficit did not deteriorate. This seems to be in line with Germany's hegemonic industrial exporter status *vis-à-vis* the rest of the European Union.

---

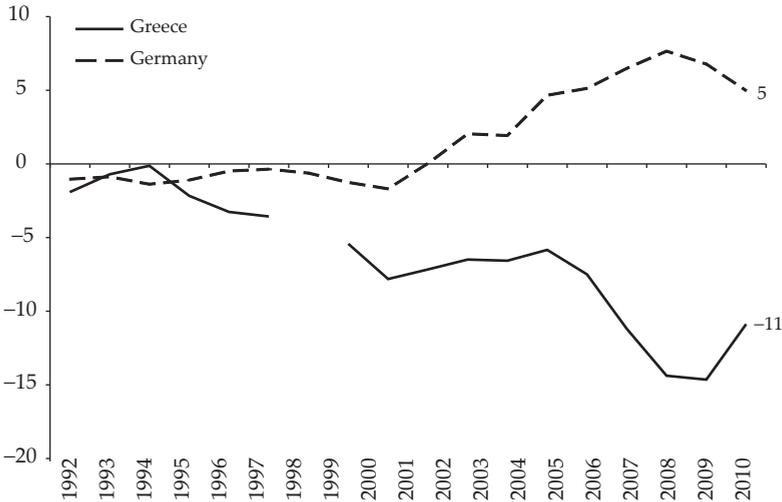
<sup>1</sup> With external borrowing becoming increasingly important where by the end of 2011, 80% of the public debt is foreign-owned.

**FIGURE 2**  
**General government gross debt of Greece and Germany, 1992-2012**  
 (as a percentage of GDP)



Source: development by the author using data from AMECO of the Directorate General for Economic and Financial Affairs of the European Commission.

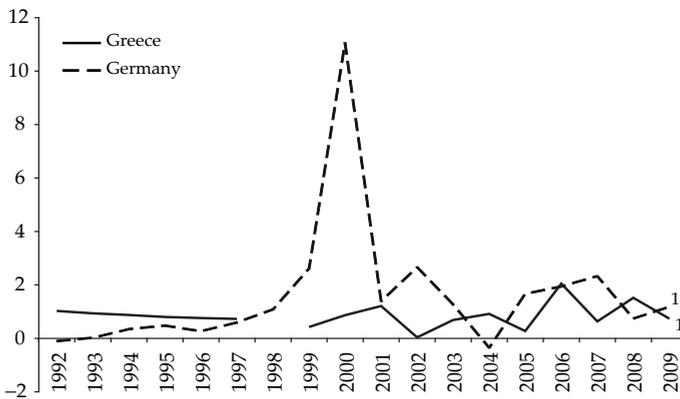
**FIGURE 3**  
**Current account balance of Greece and Germany, 1992-2009**  
 (as a percentage of GDP)



Source: computed from *World Development Indicators (wdi)* data of the World Bank.

With respect to net inflows of FDI, a component of the capital account, Figure 4 indicates that before the birth of the euro in 1999, net FDI in Greece as a percent of GDP had been by and large slightly larger than that in Germany, but since then, FDI flows to Greece have been generally lower. This is despite Greek government efforts to attract foreign investment in infrastructure projects such as highways and the Athens subway system. Also of interest is the exceptionally high FDI in Germany in the years contiguous to the 1999 euroization, implying a positive effect of euroization for Germany.<sup>2</sup>

FIGURE 4  
*Net FDI inflows to Greece and Germany, 1992-2009*  
(as a percentage of GDP)

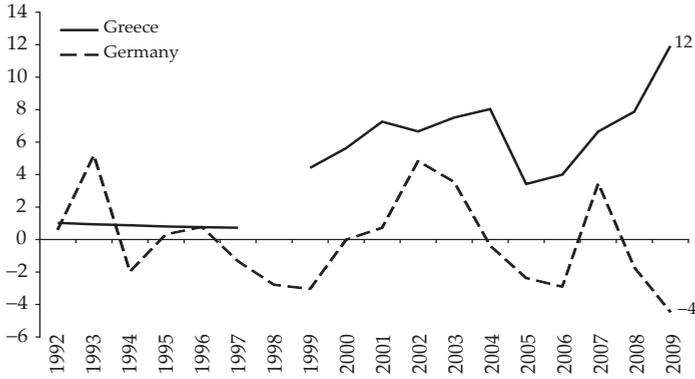


Source: computed from wdi data of the World Bank.

Meantime, Figure 5 reveals that private capital flows to Greece have significantly increased to levels higher than those to Germany since the early 2000s. Given the relatively low long-term FDI levels in Greece as shown in Figure 4, this phenomenon can be explained primarily by “hot” capital flows of short-term funds looking for higher yields in Greek assets, particularly government securities. Major sources of funds include Germany, the Netherlands, and France. Most probably this development was facilitated by the elimination of exchange risk when Greece euroized and the implicit guarantee by the eurozone authorities (see, for example, de Grauwe and Ji, 2012).

<sup>2</sup> One likely reason for the developments mentioned in current account and FDI flows could be a German loss of international competitiveness especially since Greece euroized in 2001, as we shall see in the next section, Section 3, when we look at competitiveness indicators.

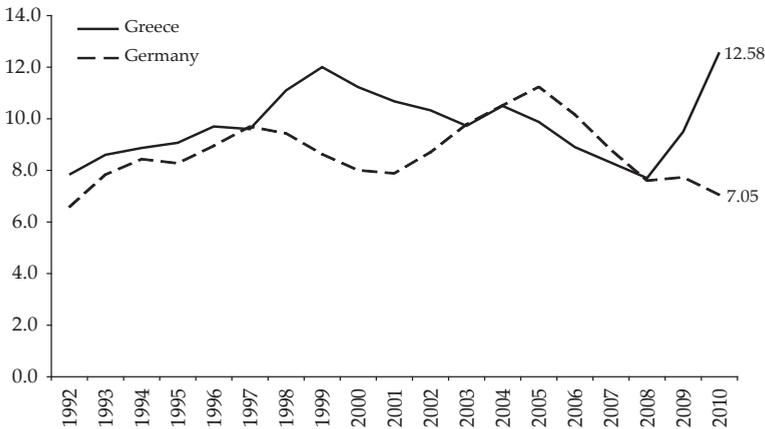
**FIGURE 5**  
***Private capital flows to Greece and to Germany, 1992-2009***  
 (as a percentage of GDP)



Source: computed from wdi data of the World Bank.

In a nutshell, based on the foregoing measures, with reference to Germany, Greece’s economic health appears to show signs of flagging, and this has been reflected in the higher unemployment rates in Greece, as shown in Figure 6. Only during the period of the asset bubble in the run-up years to the global crisis were unemployment rates lower in Greece.

**FIGURE 6**  
***Unemployment, 1992-2010***  
 (percentages)



Source: computed from wdi data of the World Bank.

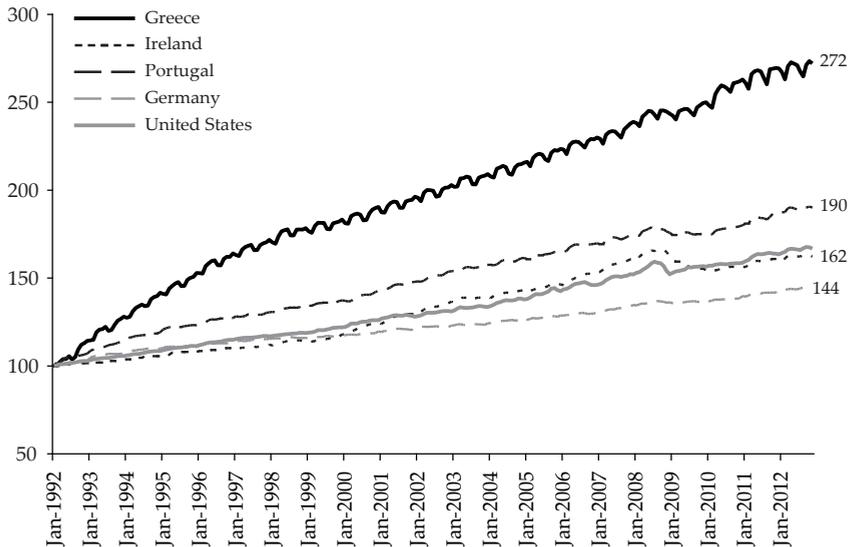
But then again, the silver lining is that Greece's growth process is demand-led rather than export-led, as in Germany. Moreover, the impacts of the global financial turmoil and the adjustment programs agreed upon with European authorities may have exacerbated Greece's problems more than what they otherwise might have been. Hence, the problems faced by Greece may not be long-term.

## EVALUATING GREECE'S INTERNATIONAL COMPETITIVENESS

### Real exchange rate as deflated by relative cpis

One important determinant of international competitiveness is the real exchange rate. Changes in the real exchange rate depend both on the relative rate of price inflation and changes in the nominal exchange rate. Consider first the underlying price inflation rate. Figure 7 plots the paths of the consumer price index (CPI) for Greece, Ireland, Portugal, Germany, and the U.S. from January 1992 to November 2012. Over this period, inflation was close to 172% in Greece, 90% in Portugal, 62% in the U.S. and Ireland, and 44% in Germany.

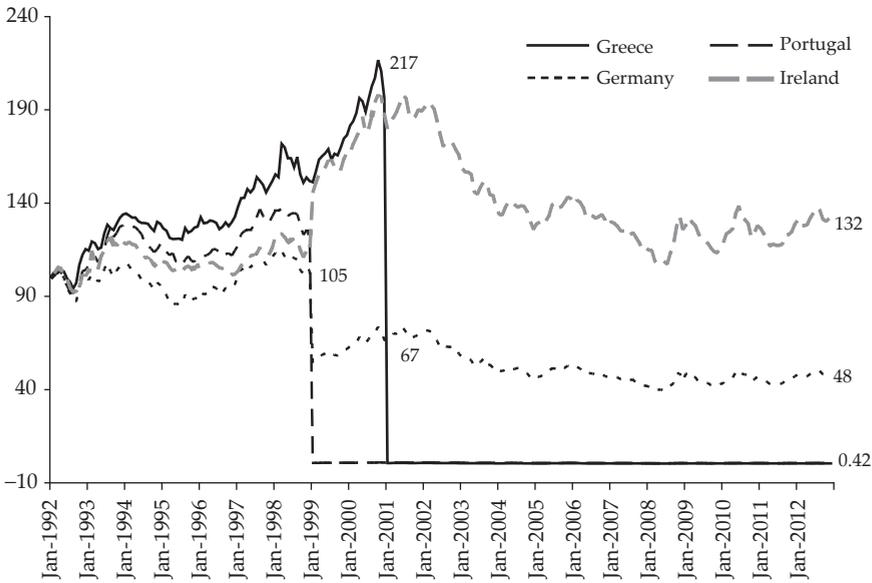
FIGURE 7  
*Consumer price index, 1992:1-2012:11*  
(1992:1 = 100)



Source: computed from Organisation for Economic Co-operation and Development (OECD) data.

Figure 8 then plots the nominal (un-deflated) dollar exchange rates for Greece, Germany, Portugal, and Ireland over the same period. Before the 1999 birth of the euro, despite a few ups and downs, the Greek drachma had visibly moved in tandem with the rest of the currencies, although the drachma had increasingly been the cheaper —indeed the cheapest— in dollar terms. Specifically, over this 1992-1999 sub-period, the drachma had depreciated close to 51% against the dollar while the German mark had roughly remained unchanged.

FIGURE 8  
*Nominal dollar rate, 1992:1-2012:12*  
 (1992:1 = 100)



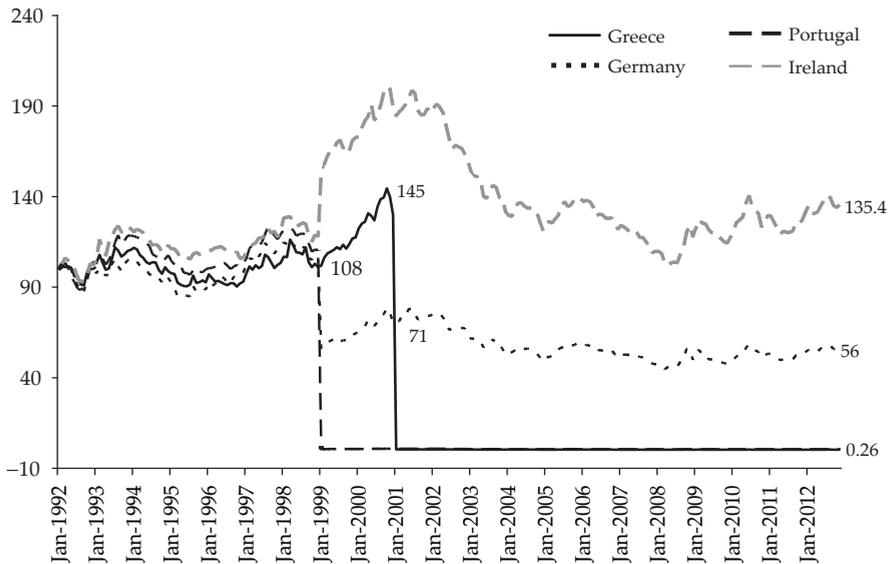
Source: computed from International Monetary Fund (IMF) data.

When we consider 1992 through 2000, the drachma actually depreciated about 117% against the dollar but the German mark, due to euroization, instead appreciated about 33% against the dollar. In short, against the dollar, the German mark had appreciated 150 percentage points more than the drachma. Therefore, before Greek euroization, Greece had been significantly more competitive than Germany (and Portugal). Nevertheless, Greece became significantly less competitive when it euroized in 2001.

Taking the sample 1992-2012 period as a whole, Greece's currency, similarly to Portugal's, effectively appreciated 100% against the dollar; Germany's appreciated close to 50%, while Irish currency depreciated about 30%. By adding the CPI inflation differential with the U.S. to the change in the nominal dollar rate, 210% is the approximate real appreciation of Greek currency against the dollar for the whole of 1992-2012. Meantime, the real appreciation of the German currency *vis-à-vis* the dollar is only about 30% over the same period.

If we double deflate the nominal dollar rates by the respective CPIs, Figure 9 shows highly synchronous paths of the European currencies prior to the 1999 birth of the euro, distanced but still parallel paths from 1999 through 2000, and a significant divergence between Greece and Germany when the drachma was replaced by the euro in 2001. The same divergence with Germany happened to Portugal and Ireland, which adopted the euro earlier, in 1999.

FIGURE 9  
Real dollar rate as deflated by CPI, 1992:1-2012:11  
(1992:1 = 100)

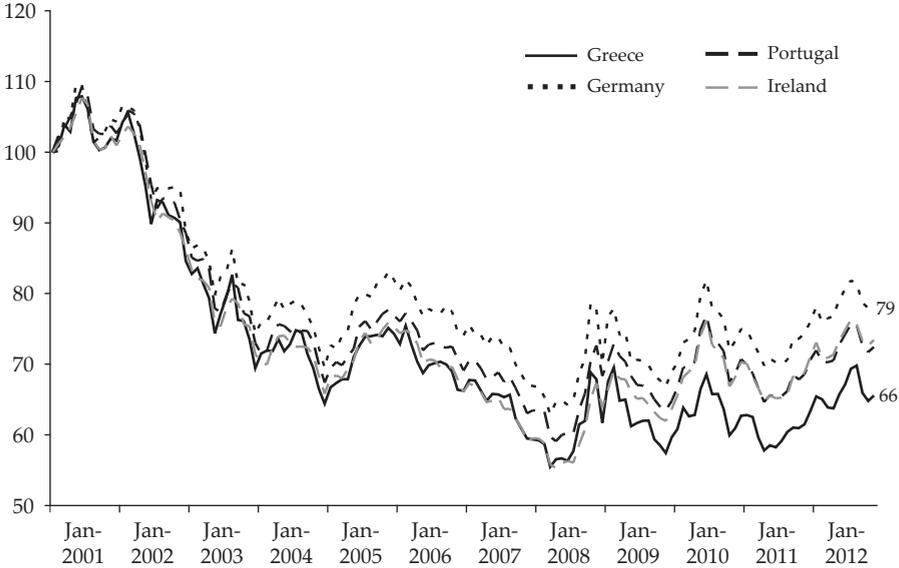


Source: computed from IMF data.

In greater detail, Figure 10 reveals that, from 2001 to 2012, though the movements of the rates were parallel (a result of the unification of nominal exchange

rates), the Greek path is consistently the lowest among those of all the currencies. This implies that, in real terms, it is increasingly expensive in U.S. dollars to purchase from Greece compared to Germany, Portugal, or Ireland. This is observed when January 2001 is used as the base of reference. The gaps are even greater if 1992 is used as the base year, as Figure 9 shows.

FIGURE 10  
*Real dollar rate as deflated by CPI, 2001:1-2012:11*  
 (2001:1 = 100)



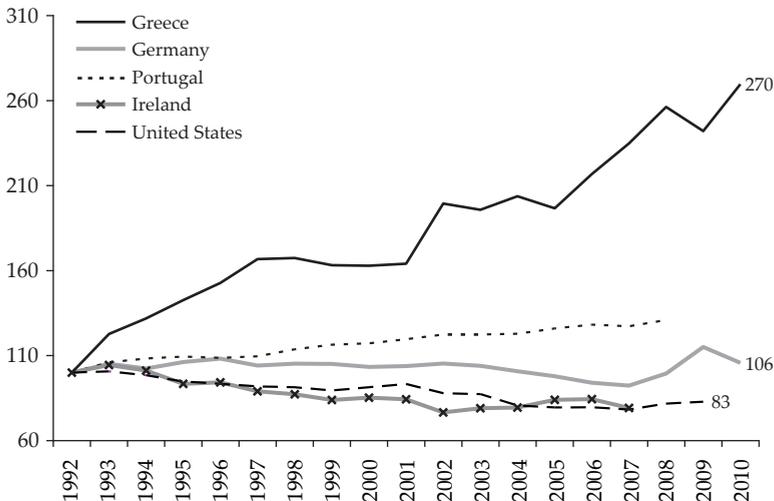
Source: computed from IMF data.

To summarize, the real exchange rate relationship between the countries can be divided into three phases. In the first phase (1992-1998), their paths are virtually unified and synchronous. In the second phase (1999-2000), Greece is less competitive than Ireland, but more competitive than Germany and Portugal due to significant nominal appreciation of the German and Portuguese currencies against the dollar in 1999. In the third phase (2001-2012), Greece is more expensive than Germany, Portugal, and Ireland due to the exceptionally high nominal appreciation of the Greek currency against the dollar when Greece euroized in 2001 and a higher inflation rate in Greece.

## Real exchange rates as deflated by relative unit labor costs

To check on the foregoing calculations of “real” exchange rates as deflated with broadly based CPIS, consider the OECD’s estimated unit labor costs more narrowly in manufacturing. Annual data are used as they are available for all the countries concerned. Figure 11 reveals that the Greek unit labor costs rose by 170%; those in Germany rose by just 6%, while those in the U.S., similarly to Ireland, actually fell by 17%. Portugal’s is slightly higher than Germany’s, but much lower than Greece’s. Thus, manufacturing unit labor costs in Greece rose relative to those in the U.S. by 187% and, relative to those in Germany, by 164 percent.

**FIGURE 11**  
*Manufacturing unit labor costs, 1992-2010*  
(1992 = 100)

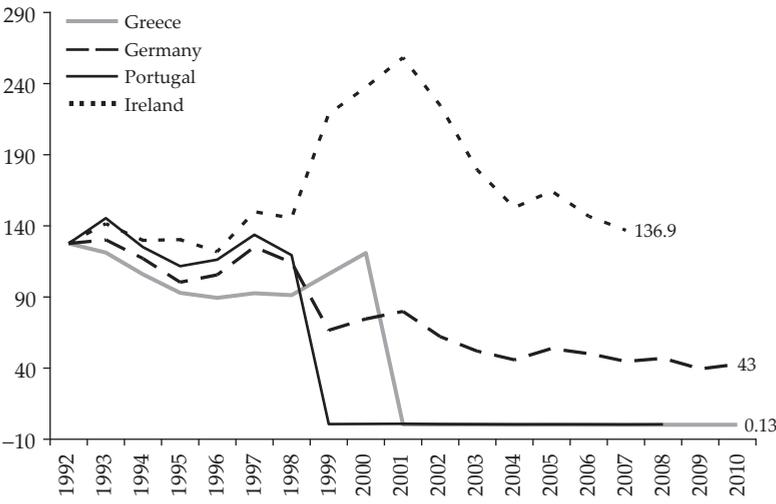


Source: computed from OECD data.

If we double deflate the nominal dollar rates with manufacturing unit labor costs, Figure 12 indicates roughly three phases of the real rate paths. In the first phase (1992-1998), prior to the launch of the euro, a dollar could purchase more labor units in Ireland, Portugal, and Germany than in Greece. During the second phase (1999-2000), before the drachma was replaced by the euro, labor costs in dollars were cheaper in Greece than in Portugal and Germany, but not

as cheap as in Ireland. In the third phase (2001-2009), Ireland and Germany's labor costs were significantly lower than Greece's and Portugal's (using 1992 as the benchmark year).

**FIGURE 12**  
*Real dollar rates as deflated by relative unit labor costs, 1992-2010*  
 (1992 = 100)



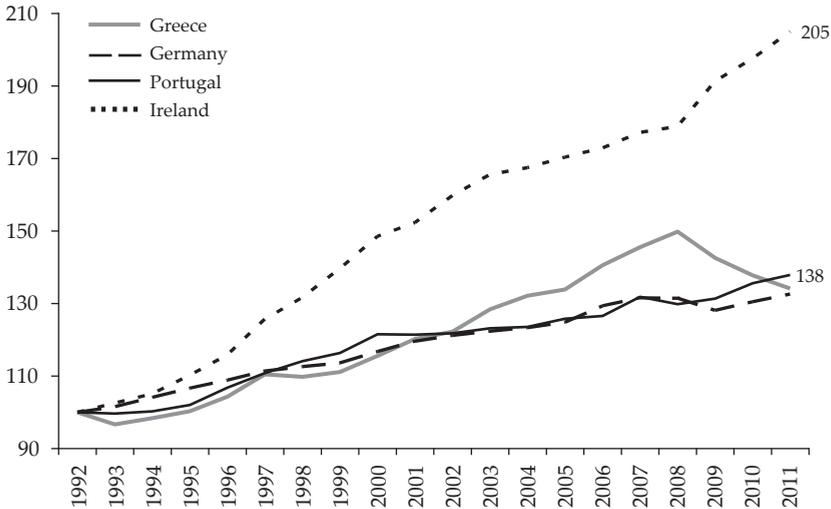
Source: computed from OECD data.

On the whole, over the 1992-2010 period, Greece's labor costs in dollars appreciated by 43 percentage points more than Germany's and 137 percentage points more than Ireland's.

Can we explain Germany's relatively greater competitiveness *vis-à-vis* Greece by superior productivity growth in Germany? Not really. Figure 13 displays the movements of labor productivity for Greece and Germany. It is clear that, since 2003, Greece has overtaken Germany in productivity growth. The relative competitiveness of Ireland *vis-à-vis* Greece, however, can be explained by greater productivity.

Putting it all together, the evidence discussed in this section seems to indicate that Greece's loss of competitiveness *vis-à-vis* Germany is largely due to excessive appreciation of the Greek nominal dollar rate when Greece unified its money with Germany's and not to greater productivity growth in Germany.

FIGURE 13  
*Labor productivity, 1992-2011*  
 (1992 = 100)



Source: Computed from OECD data.

Short of offsetting adjustments in domestic prices, the euro would continue to be substantively overvalued for Greece.

Also, the loss of the exchange-rate instrument in the Greek case and the simultaneous presence of a higher inflation rate suggest the creation of a European mechanism compensating for the consequent loss of competitiveness. As a matter of fact, Greece's higher inflation rate may be the result of the oligopolistic structure of its productive organization.

### CONFORMITY TO OPTIMUM CURRENCY AREAS CRITERIA

This section evaluates Greece according to the convergence criteria suggested by OCA theory. As before, comparisons are made with Portugal and Ireland. As an introduction, I will first review what OCA theory is all about.

The foundations of the OCA theory were laid out by Mundell (1961) and McKinnon (1963), and then refined by Kenen (1969) and Krugman (1990). In essence, OCA theory outlines the criteria under which a country or economic zone can reap large benefits and/or substantially reduce the cost of joining a currency area. As summarized by Boreiko (2003: 315):

The OCA theory concerns certain benefits and costs associated with adopting a single currency which depend on the degree of convergence of the economies. The benefits are associated with economizing on exchange costs and importing the credibility of the union's central bank, thus reducing the inflationary expectations and level of inflation. As for the associated costs, they are essentially the opposite of the benefits of having an independent monetary policy and exchange rate, which are useful as a means of coping with shocks that are asymmetric between the potential monetary union partners.

Following the recent works of Quah (2012a; 2012b; 2013b), Quah and Crowley (2010; 2012a; 2012b), and Quah and Ismail (2012), the OCA criteria investigated here are bilateral trade intensity, business cycle symmetry, real interest rate synchronization, inflation convergence, and labor market flexibility. The efficacy of these criteria in the context of the eurozone was evidenced by Artis and Zhang (2002) when Portugal, Italy, Greece, and Spain were selected as the group that possesses the least similar OCA features *vis-à-vis* Germany.

The first four criteria are measured against a reference country and, to reiterate, it is natural to pick Germany, the *de facto* central banker of the eurozone. At the same time, it is appealing to compare Greece's relations with Germany to those with the United States, a dominant economy in the Northern Atlantic.

### **Bilateral trade intensity**

Mundell (1961) stresses trade as a precondition for evaluating the benefits and well-being of stable exchange rates. McKinnon (1963) echoed that countries that trade a great deal with each other are good candidates for monetary integration, as the benefits in terms of transaction-cost savings and exchange-rate certainty can be maximized. Empirically, Bayoumi and Eichengreen (1997) detected that European countries that achieve the highest levels of bilateral trade are characterized by the greatest rise in readiness for monetary union.

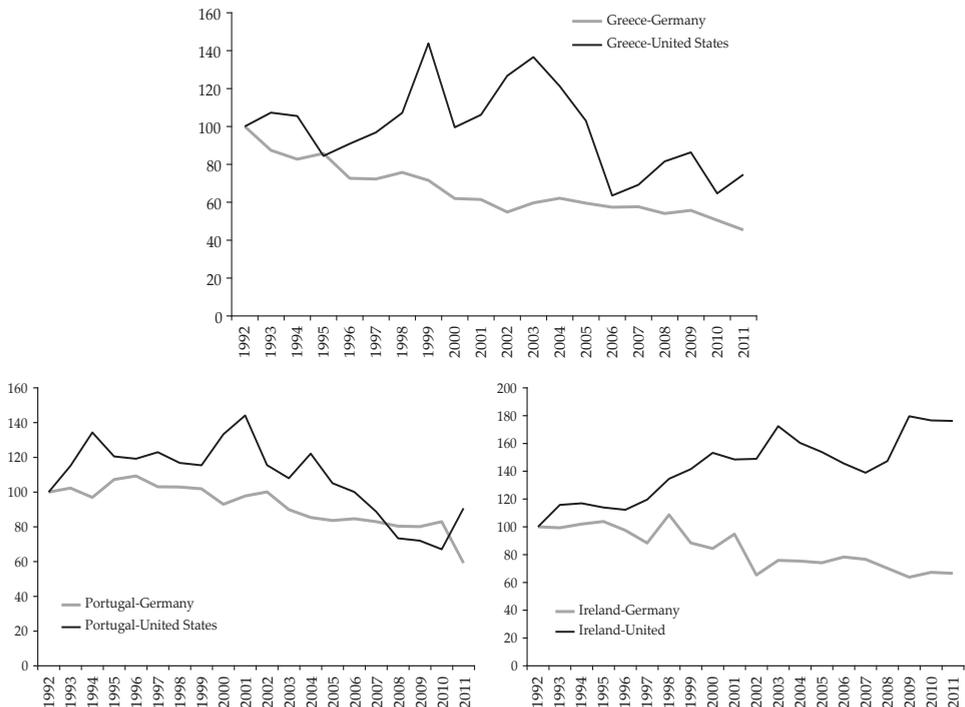
Along these lines, it is persuasive to use this facet as one criterion to assess whether adoption of Germany's policies in Greece has been appropriate or not. For this purpose, trade openness is measured by bilateral trade intensity, or  $(x_{i,r} + m_{i,r}) / (x_i + m_i)$ , where  $x_i$  and  $m_i$  are Greece's exports and imports of goods, respectively, and the subscript  $r$  indicates destination to or source from Germany or the U.S. The value for every year over 1992-2011 is shown in Figure 14.

The chart indicates that, despite a few ups and downs, Greece's trade openness with the U.S. is consistently higher than with Germany. In fact, Germany's

importance as a trade partner declined over the period. In another sphere, if we look at the long-run pattern of trade with the U.S., it seems to drift upward through the 1990s and downward in the 2000s, in line with Greece's rising competitiveness against the U.S. in the former period but its falling competitiveness when it adopted the euro in the latter period. If we use the percentage of German trade in total Greek trade, as compared with the U.S., between 2000 and 2006, Greece's trade openness with the U.S. can be related to the trend of U.S. GDP also.

A similar observation can be made about Portugal and Ireland, whose trade openness with the U.S. has been larger than that with Germany. While Portugal's greater openness with the U.S. has been declining in recent years, Ireland's has actually been rising quite remarkably.

FIGURE 14  
*Greece's trade openness with the U.S. and Germany, 1992-2011*  
(1992 = 100)



Source: computed from *Direction of Trade Statistics (DOTS)* data of FMI.

## Business cycle symmetry

When business cycles are substantially synchronous across currency areas, the role of flexible exchange rates as shock absorbers against asymmetric demand or supply pressures across the areas becomes largely irrelevant. Hence, for the case of Greece, the greater the business cycle synchronicity with Germany (or the U.S.), the stronger the case for currency unification with Germany (or the U.S.). In terms of measurement, it has become popular to implement this criterion according to the synchronicity of business cycles by evaluating the correlations of the cyclical components of output. To extract the cycles, the method of Gerlach (1988) and Baxter and Stockman (1989) is adopted where cyclical components of quarterly real GDP series are detrended using the Hodrick-Prescott (H-P) filter.

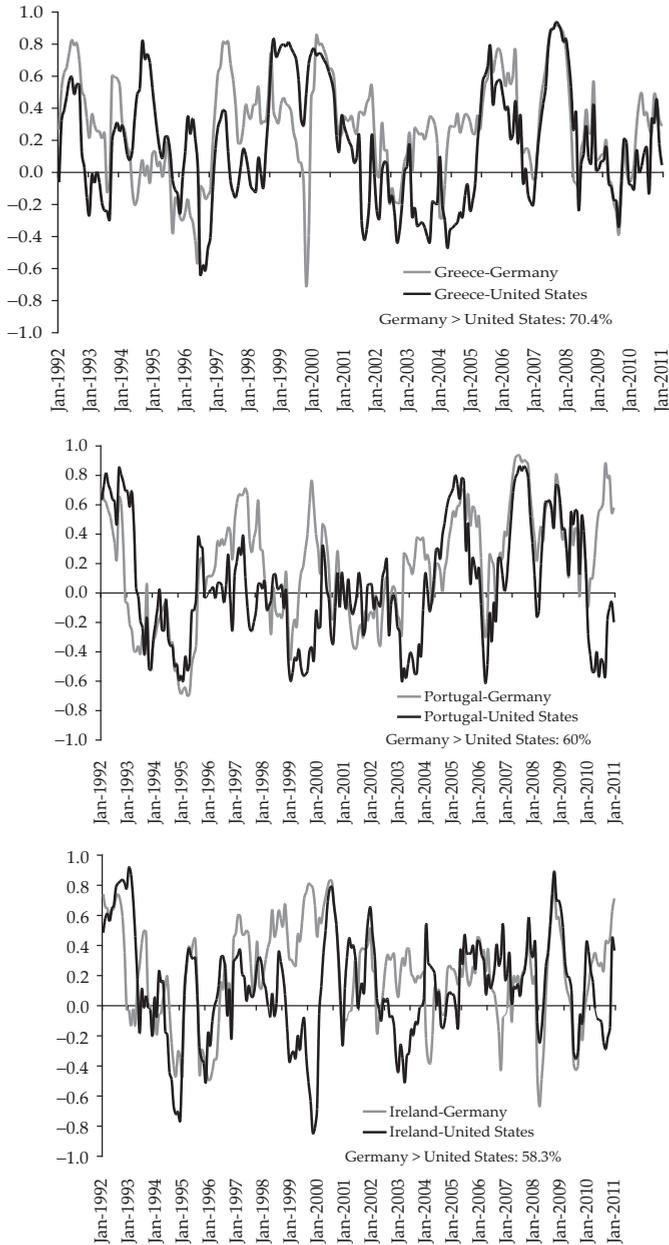
Figure 15 plots the 12-month-forward-rolling-correlations of Greece's business cycles with Germany's and with the U.S.'s for January 1992 to January 2011. The monthly industrial production index (IPI) is used to extract the output variations. Those for Portugal and Ireland are also shown. The number of times that correlations with Germany are larger than those with the U.S., expressed in percent, is also given.

As the chart and the percentages show, Greece is virtually more synchronous with Germany than with the U.S. over the period, with 70.4% of the time; correlations with Germany are greater. As for Portugal and Ireland, similar observations can be made, but with lower percentages, namely, 60% and 58.3% respectively. Based on this evidence, Greece's business cycle symmetry with Germany *vis-à-vis* that with the U.S. is higher than Portugal's and Ireland's.

## Real interest rate cycle symmetry

Though not listed as one of the criteria based on traditional OCA theory, according to Artis and Zhang (2002), this factor is indicated by a "revealed preference" argument. If the monetary policy of a country has historically differed little from that of a reference country, the cost of relinquishing monetary independence would be low, so that synchronization in real interest rates may be interpreted as an indicator of coordination in monetary policy. Following Quah and Crowley (2010), real interest rate series are detrended by applying the H-P filter to extract the cycles where synchronicity is indicated by correlation between the cycles.

FIGURE 15  
*Business cycle correlations with Germany and with the U.S., 1992:1-2011:1*



Source: computed from OECD data.

To compute real interest rates, short-term money market and CPI inflation rates are used. The 12-month-forward-rolling correlation coefficients with Germany and with the U.S. over 2001:1-2012:1 are plotted in Figure 16. The number of times when correlations with Germany are greater than those with the U.S., in percent, is also given. The time period is constrained by data availability over the countries.

As the chart shows, the relative dominance between Germany and U.S. differs depending on the sub-period. Specifically, for Greece, in the first years after the 1999 euroization, the symmetry with Germany had been greater, but in the run-up years through the late 2000s U.S. sub-prime crisis, the degree of symmetry with the U.S. was higher. In 2010-2011, during the euro debt panic, there was a remarkable relative convergence with Germany *vis-à-vis* the U.S. The relative monetary policy coordination of Greece with the U.S. in the period leading to the sub-prime crisis may have helped to fuel speculative bubbles in Greece. Hence, not surprisingly, the percent value of greater synchronicity with Germany *vis-à-vis* the U.S. is only a slight lead of 51.9%. This indicates almost equal dominance of U.S. monetary policy in relation to Germany's over Greece. To clarify, though Greece and Germany actually share the same nominal interest rates after euroization, their "real" interest rate cycles could still diverge due to inflation rate differentials.

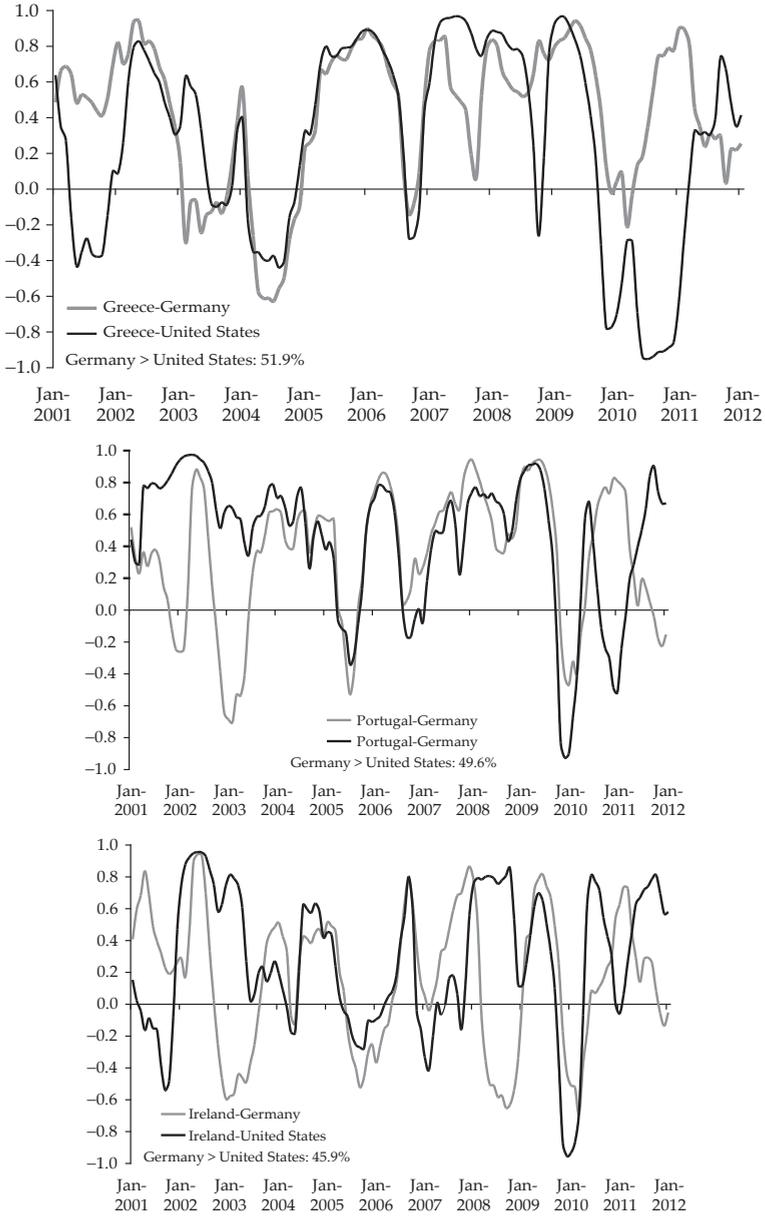
As for Portugal and Ireland, by the same measures, the degree of synchronicity with the U.S. has in fact been slightly greater than that with Germany.

### **Inflation convergence**

As put by Artis and Zhang (2002), the traditional OCA literature originated during the era of "fixed-price" economics, so introducing inflation convergence as a criterion could be regarded simply as an appropriate normalization. From another perspective, since similar inflation rates result from similarities in monetary and fiscal policies and economic structure, the cost of joining a currency area is presumably low when inflation rates are similar across members (Nguyen, 2007). Convergence in inflation also reflects similarity in labor costs and trade union aggressiveness among countries, which implies less need for nominal exchange rate flexibility in adjusting current account imbalances (Fleming, 1971).

This criterion is quantified by the absolute CPI inflation differential  $|x_i - x_r|$ , where  $x_i$  and  $x_r$  are the respective rates of inflation in Greece, Portugal, or Ireland,

FIGURE 16  
*Real interest rate cycle correlations with Germany  
 and with the U.S., 2001:1-2012:1*



Source: computed from OECD data.

and Germany or the U.S. The absolute value is used because the magnitude is of concern here. Lower differentials indicate greater convergence in inflation and *vice versa*.

Figure 17 charts the differentials from January 1992 to December 2012. Obviously, inflation in Greece has been converging toward that in Germany and the U.S. through the years, particularly since the advent of the euro in 1999. Specifically, inflation in Greece has by and large paralleled that of the U.S. more than Germany's throughout, especially in the recent decade, despite implementation of the Maastricht price stability criterion. Similar findings can be seen for Portugal and Ireland, where, for a significant portion of the period, inflation convergence with the U.S. was greater than with Germany.

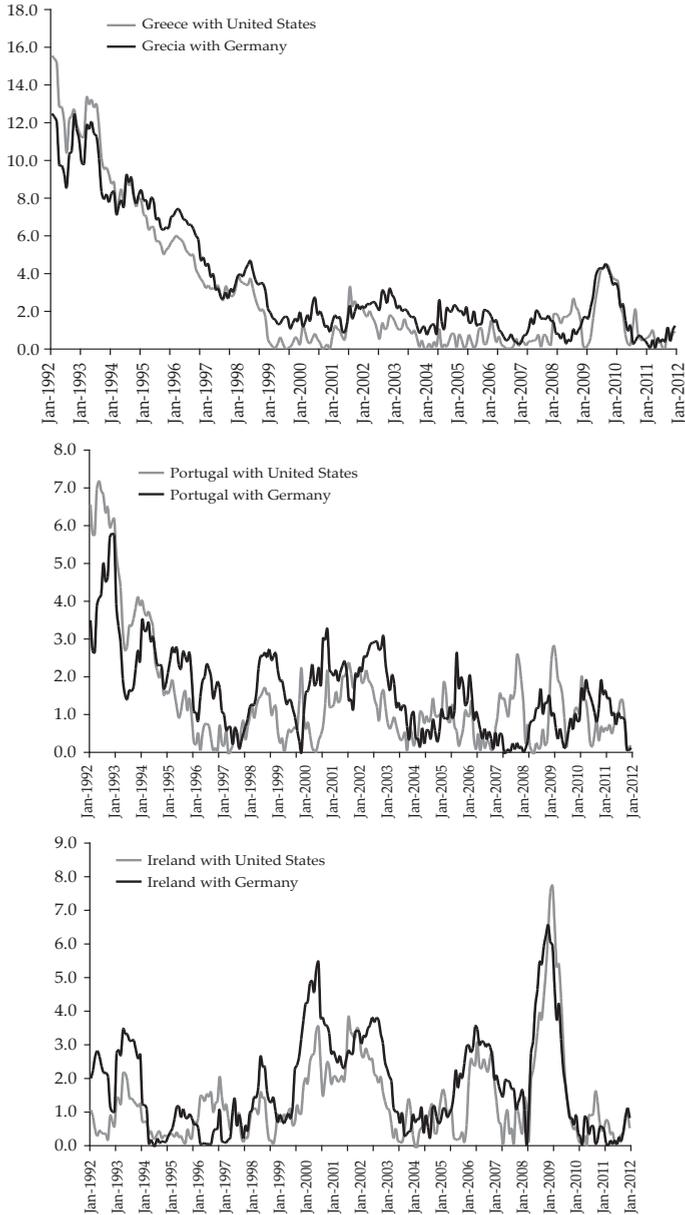
### **Labor market flexibility**

Ingram (1962) and Kenen (1969) proposed that flexibility in domestic labor markets is equally important to mobility of labor across nations—popularized by Mundell (1961), and inspected recently by Krugman (2012) in the light of the eurozone crisis—in balancing distorted labor markets. It is hypothesized that the higher the flexibility of the labor markets, the greater the ability for employment to recover following adverse shocks; hence, the greater the desirability of fixing the exchange rates. Following Artis and Zhang (2002), an OECD index measuring strictness of employment protection is used, which stipulates that the smaller the index, the greater the flexibility.

Figure 18 shows that Greece's labor market is less elastic than Germany's despite increased flexibility in Greece since the early 2000s. Nonetheless, Greece is still more flexible than Portugal and Ireland in the 2000s. It seems persuasive to associate the lower rigidity in Greece with its 2001 euroization, and, though employment protection in Germany has still been lower, the gap between Germany and Greece narrowed significantly in the 2000s.

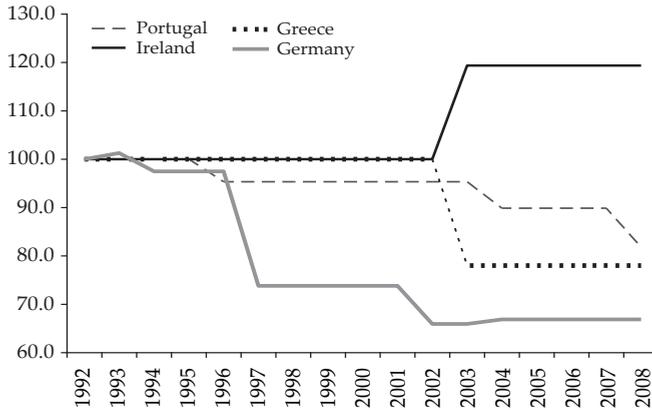
Incidentally, although lower protection and greater flexibility in the labor markets in Greece in the 2000s are technically consistent with a rigid exchange regime, it is nonetheless socially abhorred by the working class. Therefore, coupled with spending cuts by the government in the wake of the 2010 debt crisis, it is not surprising to find a tremendous public outcry by the Greek people.

FIGURE 17  
*Inflation convergence with Germany and with the U.S., 1992:1-2012:12*  
 (percentages)



Source: computed from oecd data.

FIGURE 18  
*Strictness of employment protection*  
 (1992 = 100)



Source: computed from OECD data.

**DISCUSSION**

It may be too late for Greece, an “entrenched” euro participant, to quit the euro, as withdrawal from the union and the corresponding restoration of the drachma would most certainly instigate sell-offs, runs on the drachma, and sharp depreciations of the resurrected currency. Eventually, these could lead to ever deeper debt problems, as the bulk of the debts owed are euro-denominated. Even though devaluation could be favorable for exporters, steep depreciation would bring about an abrupt loss of purchasing power of the new drachma, increased inflation pressures, and capital flight.

Despite this, prospective accession countries such as Hungary, Latvia, Lithuania, Denmark, and other participants in the second exchange rate mechanism (ERM II), as well as the central eurozone authorities, could still benefit from Greece’s experiences in the aspects highlighted in this article.

To summarize, Table 1 puts together the key observations discussed. The first few items highlight the problems faced by Greece. It may also be worth mentioning that Greece seems to have been more competitive than Germany before unification but less competitive thereafter.

In terms of the OCA criteria, it is somewhat apparent that Greece has maintained declining degrees of bilateral trade intensity and inflation convergence

with Germany even after years of euroization. Convergence in inflation is a dimension stressed by Robert Mundell (see, for example, Mundell, 2000) as the most important dimension for monetary convergence as it reflects convergence in a myriad of economic variables in the long run. As regards interest-rate-cycle symmetry, convergence with Germany is only marginally higher than with the U.S. Meanwhile, there is also a sign of increased convergence in labor market flexibility with Germany.

To sum up, aside from the problems highlighted in Section 2, and the loss of competitiveness pointed out in Section 3, Greece, similarly to Portugal and Ireland, also lacks conformity with OCA criteria, particularly in the dimensions of trade and inflation convergence. While decreased competitiveness, widening trade deficits, and lower FDI can be linked to over-appreciation of the Greek currency when it euroized, there are reasons to believe that the budgetary problems are associated with a lack of agreement with the OCA prescriptions.

In the absence of a flexible exchange rate and independent monetary policies that could serve as shock absorbers to external disruptions, augmented fiscal expansion (as observed, for example, by Buiter and Rahbari, 2010, and Matsaganis, 2011) in Greece might have been driven up by attempts by the authorities either deliberately or inadvertently ameliorating adverse impacts resulting from asymmetric macroeconomic shocks (due to lack of business cycle synchronicity and declining trade openness with Germany) between Greece and Germany.

The foregoing observation complements Krugman (2012), who postulates that fiscal transfers (for example, in the form of welfare transfers) from surplus to deficit states would have prevented the economic imbalances and hence the debt crisis. Short of automatic stabilizing mechanisms of a federal government, the Greek government had to borrow from the richer states, primarily Germany and the Netherlands, and this could be one of the reasons behind Greece's debt crisis. Of course, moral hazard, the belief that there was an implicit back-up by the EMU authorities, was not the key element in the story.

Yes, higher growth rates and rapid reduction of borrowing costs in Greece, as pointed out by Milios and Sotiropoulos (2010), were the drivers of hot capital flows into Greece, but they were just the manifestations of a lack of conformity in the OCA dimensions, such as business cycle symmetry and bilateral trade intensity—if trade openness with Germany were increasing, prices in Germany and Greece would have been more convergent, and this could have eliminated part of the “above-average” returns from investing in Greece.

One can conjecture that, in the presence of rigid prices and wages, particularly in the short run, subscribing to Germany's monetary policy during the run-up years to euroization might not have been suitable for Greece, which suffered from relatively high unemployment (see Figure 6). As the respective figures indicate (14 and 15), business cycle symmetry and trade openness with Germany were not substantially high at that time. Though in the medium to long term, monetary policy and expected inflation may be unrelated to unemployment rates, in the short run, there could be a certain degree of inverse correlation where tighter money (to curb inflation) leads to lower employment. To offset this, the Greek government may have increased spending precipitately. Accordingly, increased borrowing through increased issuance of bonds led to a speculative bubble and inflows of hot capital. When the bubble burst and flows of funds reversed, short of additional borrowing and revenues to service existing debts, a debt crisis ensued.

TABLE 1  
*Summary of observations*

<i>General performance measures (in percentage of GDP)</i>	<i>Summary</i>
1 Central government budgetary balance	Greece's fiscal deficit has always been greater than Germany's. Greece shows improvement in the run-up period toward euroization but deterioration thereafter.
2 Government indebtedness	Greece's debt stocks at over 100% of GDP are significantly greater than Germany's.
3 Current account balance	On the whole, Greece's deficit increases while Germany's surplus rises.
4 Foreign direct investment	Before the 1999 introduction of the euro, flows to Greece were slightly greater than to Germany but after that, on average, FDI to Greece was somewhat smaller.
5 Net private capital flows	Private capital flows to Greece have significantly increased to levels larger than those to Germany since the early 2000s.
<i>On Competitiveness</i>	
1 Nominal exchange rate	Before Greece's adoption of the euro, it was significantly more competitive than Germany, Portugal, and Ireland.

TABLE 1, continuation...

2 Real exchange rate as deflated by relative CPI	Prior to its euroization, Greece was more competitive than Germany and Portugal (in 1999-2000). Similarly to Portugal, Greece was less competitive than Germany and Ireland after euroization.
3 Real exchange rate as deflated by relative unit labor cost	Similarly to Portugal, Greece became less competitive than Germany and Ireland after euroization.
<i>Conformity to OCA criteria</i>	
1 Bilateral trade intensity	Greece's trade openness with the U.S. is consistently greater than with Germany. In fact, openness with Germany exhibits a falling trend. Similarly for Portugal and Ireland.
2 Business cycle synchronicity	Greece is more convergent with Germany than with the U.S. Similarly for Portugal and Ireland.
3 Real interest rate cycle symmetry	Greece is slightly more convergent with Germany. Portugal and Ireland are slightly more convergent with the U.S.
4 Convergence in inflation	Convergence with Germany and with the U.S. has risen significantly. Virtually slightly more parallel with U.S.
5 Flexibility in labor market	Greece's level has been less flexible than Germany's, but is converging toward Germany's. In recent years, Greece has been more flexible than Portugal and Ireland.

## CONCLUSION

To recap, in section two, we looked at how distressing the state of the economy has been in Greece, and, more importantly, its worrying budget position, using some of the most commonly used macroeconomic indicators. In section three, we examined Greece's international competitiveness, focusing on measures of real exchange rates, and observed that the euro had been overvalued for Greece. Section four in turn explored the real convergence dimensions related to the OCA framework and detected that Greece has notably less compliance in aspects of trade intensity and inflation convergence.

In conclusion, though it is logically consistent that problems in Greece could have been aggravated by a lack of competitiveness and a lack of conformity to the OCA criteria as pointed out in this article, the evidence shown is still far from sufficient to prove a causal relationship between the variables. Nonetheless, short

of an infallible methodology, the inferences posed should be substantive enough from a theoretical point of view to spur further research on the topic.

Another limitation is that this study is just one of the many alternative positions raised in the literature. Readers should be aware of alternative factors such as excessive deficit spending, total debt in excess of the country's GDP, near-zero economic growth, and a downgrade of Greece's debt rating (see, for example, Abboushi, 2011). These weaknesses are the result of poor governance of both the "euro area" and of Greece (Featherstone, 2011). At the same time, successive governments in Athens have failed to overcome endemic problems of low competitiveness, trade and investment imbalances, and fiscal mismanagement. There is also blame to be placed on the conflicts within the ECB and the media for spreading fear among eurozone taxpayers.

Germany has gained competitiveness because it has been able to squeeze its workers harder, leading to persistent current-account surpluses that were turned into foreign direct investment and bank lending to its periphery (Lapavitsas *et al.*, 2010)

The foregoing views are in general in line with and complement the conclusion of this article. While speculative capital flows were a dominant factor in the Greek debt crisis, this could just be one of the symptoms of fundamental weakness in Greece. If we remember the 1997-1998 Asian financial crisis, fundamental weaknesses in the political economy were the sources of runs against the Thai baht and the Indonesian rupiah.

## REFERENCES

- Abboushi, S., 2011. Analysis and Outlook of the Greek Financial Crisis. *Journal of Global Business Management*, 7(1), pp. 1-8.
- Arestis, P., and Pelagidis, T., 2010. Absurd Austerity Policies in Europe. *Challenge*, 53(6), pp. 54-61.
- Artis, M., and Zhang, W., 2002. Membership of EMU: A fuzzy clustering analysis of alternative criteria. *Journal of Economic Integration*, 17(1), pp. 54-79.
- Barbosa, J.R., and Alves, R.H., 2011. Divergent Competitiveness in the Eurozone and the Optimum Currency Area Theory [FEP Working Papers no. 436]. *Faculdade de Economia, Universidade do Porto*, Portugal.
- Baxter, M., and Stockman, A., 1989. Business Cycles and the Exchange-rate Regime. *Journal of Monetary Economics*, 27(1), pp. 377-400.

- Bayoumi, T., and Eichengreen, B., 1997. Ever Closer to Heaven? An Optimum-currency-area Index for European Countries. *European Economic Review*, 41, pp. 761-70.
- Boreiko, D., 2003. EMU and Accession Countries: Fuzzy Cluster Analysis of Membership. *International Journal of Finance and Economics*, 8, pp. 309-25.
- Buiter, W.H., and Rahbari, E., 2010. Greece and the Fiscal Crisis in the Eurozone [CEPR Policy Insight no. 51]. *Centre for Economic Policy Research (CEPR)*, London.
- De Grauwe, P., and Ji, Y., 2012. Self-fulfilling Crises in the Eurozone: An empirical test. *Journal of International Money and Finance*, 34, pp. 15-36.
- International Monetary Fund, 2012. *World Economic Outlook* [Chapter 3]. Washington, DC: IMF.
- Featherstone, K., 2011. The JCMS Annual Lecture: The Greek sovereign debt crisis and EMU. A Failing State in a Skewed Regime. *JCMS: Journal of Common Market Studies*, 49(2), pp. 193-217.
- Fleming, J.M., 1971. On Exchange Rate Unification. *Economic Journal*, 81, pp. 467-88.
- Gerlach, S., 1988. World Business Cycles under Fixed and Flexible Exchange Rates. *Journal of Money, Credit and Banking*, 20, pp. 621-32.
- Ingram, J., 1962. *Regional Payments Mechanisms: The Case of Puerto Rico*. Chapel Hill: University of North Carolina Press.
- Kenen, P., 1969. A Theory of Optimum Currency Areas: An eclectic view. In: Mundell, R.A., and Swoboda, A.K. (eds.). *Monetary Problems of the International Economy*. Chicago: University of Chicago Press.
- Krugman, P., 1990. Policy Problems of a Monetary Union. In: De Grauwe, P., and Papademos, L. (eds.). *The European Monetary System in the 1990s*. Harlow: Longman.
- Krugman, P., 2012. Revenge of the Optimum Currency Area. In: Acemoglu, D., Parker, J., and Woodford, M. (eds.). *NBER Macroeconomics Annual 2012* [Vol. 27; pp. 439-48]. Cambridge, MA: National Bureau of Economic Research (NBER).
- Lapavistas, C.; Kaltenbrunner, A.; Lindo, D.; Michell, J.; Paineira, J.P.; Pires, E., and Teles, N., 2010. Eurozone Crisis: Beggar thyself and thy neighbour. *Journal of Balkan and Near Eastern Studies*, 12(4), pp. 321-73.
- Matsaganis, M., 2011. The Welfare State and the Crisis: The case of Greece. *Journal of European Social Policy*, 21(5), pp. 501-12.
- McKinnon, R., 1963. Optimum Currency Areas. *American Economic Review*, 53, pp. 717-25.
- Milios, J., and Sotiropoulos, D.P., 2010. Crisis of Greece or Crisis of the Euro? A view from the European “periphery”. *Journal of Balkan and Near Eastern Studies*, 12(3), pp. 223-40.
- Mundell, R., 1961. A Theory of Optimum Currency Areas. *American Economic Review*, 51, pp. 657-64.
- Mundell, R., 2000. Currency Areas, Volatility, and Intervention. *Journal of Policy Modeling*, 22, pp. 281-99.

- Nguyen, T., 2007. East Asian Currency Area: A fuzzy clustering analysis of homogeneity [DPRC Working Paper no. 10]. *Development and Policies Research Center* (DPRC), Vietnam.
- Panico, C., and Purificato, F., 2013. The Debt Crisis and the European Central Bank's Role of Lender of Last Resort. [online] Political Economy Research Institute, University of Massachusetts Amherst. Available at: <[http://www.peri.umass.edu/fileadmin/pdf/working\\_papers/working\\_papers\\_301-350/WP306.pdf](http://www.peri.umass.edu/fileadmin/pdf/working_papers/working_papers_301-350/WP306.pdf)>.
- Papadimitriou, D.B., Nikiforos, M., and Zezza, G., 2013. *The Greek Economic Crisis and the Experience of Austerity: A Strategic Analysis*. Annandale-on-Hudson, New York: Levy Economics Institute of Board College.
- Quah, C.H., 2012a. Is East Asia as Prepared as Eurozone for Monetary Union? *Journal of Business, Economics, and Management*, 13(3), pp. 471-88.
- Quah, C.H., 2012b. Can Japan or China Replace the US as the Monetary Anchor for Hong Kong and Macau? *Asia Pacific Business Review*, 18(3), pp. 335-54.
- Quah, C.H., 2013a. Clustering Eurozone Cycles. *Quality & Quantity. International Journal of Methodology*, pp. 1-16. [online] Available at: <<http://link.springer.com/article/10.1007/s11135-013-9966-6/fulltext.html>>.
- Quah, C.H., 2013b. Potential Currency Areas in East Asia using United States, Japan, or China as the Monetary Anchor. *Economia Mexicana, Nueva Época*, 3(1), pp. 247-79.
- Quah, C.H., 2014. Revisiting Business Cycles In Eurozone. *Acta Oeconomica* (forthcoming).
- Quah, C.H., and Crowley, P.M., 2010. Monetary Integration in East Asia: A hierarchical clustering approach. *International Finance*, 13(2), pp. 283-309.
- Quah, C.H., and Crowley, P.M., 2012a. Which Country should be the Monetary Anchor for East Asia: The US, Japan or China? *Journal of the Asia Pacific Economy*, 17(1), pp. 94-112.
- Quah, C.H., and Crowley, P.M., 2012b. China and the Dollar: An optimum currency area view. *Prague Economic Papers*, 4, pp. 391-411.
- Quah, C.H., and Ismail, N., 2012. Monetary Integration in East Asia: A critical review. *Actual Problems of Economics*, 4, abril.
- Reinhart, C.M., and Rogoff, K.S., 2008. This Time is Different: A Panoramic View of Eight Centuries of Financial Crises [NBER Working Papers no. 13882]. NBER, Cambridge, MA.