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A Comparison of Greece and Germany: Lessons for the Eurozone?

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During the Great Recession and its aftermath, the economic performance of Greece and Germany diverged sharply with persistent high unemployment in Greece and low unemployment in Germany. A common explanation for this divergence is the assumption of an unsustainable level of debt in Greece in the years after the formation of the Eurozone while Germany maintained fiscal discipline. This paper reviews the experience of Greece and Germany since the creation of the Eurozone. The review points to the importance of monetary factors, especially the intensification of the recession in Greece starting in 2011 derived from the price-specie flow mechanism described by David Hume.

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A comment in a *Wall Street Journal* (3/23/15, A8) article summarized public debate over the depression in Greece. “The populist rhetoric of many Greek politicians blames the country’s economic depression on the terms of the bailout since 2010, rather than on Greece’s lack of fiscal discipline in the years up to 2009.” Especially, many Greeks blame the depression on externally forced fiscal discipline, while many Germans blame the depression on a lack of fiscal discipline before 2009. The argument made here is that both views are wrong. The depression comes from the deflation required in order to achieve depreciation in Greece’s Eurozone terms of trade. That depreciation in turn is required in order to turn a current account deficit into a current account surplus. However, understanding the problem does not provide a painless solution. Greece could mitigate the extent of the required deflation, but doing so would require structural reform of the economy.

The debate is intense because of criticism that Greece broke the rules of the Maastricht Treaty requiring fiscal discipline. For example, Jose Manuel Barroso, the former president of the European Commission, argued (European Commission 2013):

[O]ne of the reasons we have a rise of unemployment in Greece is because the Treaty was not respected by the Greek authorities and by other countries. We have a Stability and Growth Pact, we have rules and those European rules were not respected by the Greek authorities, so these unemployed people in Greece should be told that the authorities of their country did not respect the Treaties that they have signed.... [T]he biggest lesson of the crisis ... is that growth based on debt is not sustainable.

More succinctly, *The Wall Street Journal* (3/8/13) wrote:

[C]reating a rigid “Europe of Rules” is exactly the German-led strategy for managing the crisis. Berlin’s aim is to perfect the monetary union by ensuring countries adhere to rules designed to prevent future crises by addressing what are seen as the causes of the current one: government overspending and excessive risk-taking by banks.

The view of recession as a payback for prior speculative excess possesses considerable intuitive appeal. During periods of strong growth and the associated optimism about the future, households and firms take on debt. During periods of recession, they attempt to reduce their debt. The debt deleveraging of recessions is one manifestation of the pessimism about the future that causes individuals to want to increase savings. For centuries, popular commentators have turned correlation into causation based on speculative excess causing unsustainable asset bubbles and debt accumulation followed by forced debt liquidation (Hetzel 2012, Ch. 2).

There is much about the Eurozone crisis that accords with this story. After the creation of the Eurozone in 1999, Germany went through a period of painful labor-market reforms and low wage growth. It was then in a position to grow without reliance on debt and government deficits. In contrast, Greece grew strongly after the creation of the Eurozone but it was accompanied by an accumulation of debt associated with budget deficits and current account deficits.

The analysis here focuses on the different economic outcomes of Greece and Germany since the conception of the Eurozone. Germany entered the Eurozone with overly high prices for its exports (an intra-Eurozone terms of trade that overvalued its goods and services). Similarly, after the onset of the crisis in 2008, Greece suffered from overly high prices for its exports (an intra-Eurozone terms of trade that overvalued its goods and services). Like Germany, Greece has had to undergo structural adjustment. However, the Greek adjustment is far more severe than that required earlier of

Germany. The reason is that monetary factors are forcing Greece through a deflation far more severe than that required earlier of Germany.

As of early 2015, Greece was in its sixth year of recession. This paper points to the monetary contraction forced on Greece as a cause of the recession. Balance of payments equilibration within the Eurozone ultimately occurs as a consequence of the Humean price-specie flow mechanism.¹ The clearing house arrangement known as the Target2 system works as a mechanism for contracting the money stock of countries running a current account deficit not financed by inflows of capital and conversely for surplus countries. This process adjusts relative price levels among countries in a way that provides for the changes in the real terms of trade necessary to achieve balance of payment equilibrium. This adjustment forces deflation on Greece because of the near price stability for the Eurozone as a whole.²

Section 1 reviews the economics of balance of payments equilibrium within a currency union like the Eurozone. Section 2 reviews the German experience since the start of the euro and asks whether it is relevant to the case of Greece. Section 3 explains the role of the system for clearing payments among countries known as Target2. It also elaborates on the two choices for making fiscal transfers within the Eurozone, that is, either through explicit aid from governments or from the allocation of the seigniorage revenues of the ECB. Section 4 outlines the capital flight crisis in the Eurozone in 2011 and 2012. Sections 5 and 6 explore the difficulties that Greece will have to confront in achieving sustainable balance of payments equilibrium. Section 7 summarizes.

1. Balance of payments within regions of a monetary union

For ease of exposition of balance of payments equilibria within a monetary union, consider Greece as standing in for an individual country and Germany as standing in for the rest of the Eurozone. Greece's trade account is the difference between the euros earned from the export of its goods and services and the euros paid for the import of goods and services. The current account adds income earned on Greek investments abroad minus income paid to foreigners on their investments in Greece. There is also an adjustment made for net unilateral transfers like foreign aid.

The financial account is the mirror image of the current account. If Greece runs a current account deficit, then Germans are accumulating debt (IOUs) from Greeks. Equivalently, a current account deficit must be matched by a capital inflow in which the Greeks sell assets to Germans. If Greece imports more goods from Germany than it exports to Germany, it must pay the difference, that is, have a capital inflow (export IOUs). That capital inflow could be in the form of additional foreign ownership of Greek bonds, equity, or land. To summarize, a current account deficit implies a capital inflow and a current account surplus implies a capital outflow.³

¹ David Hume (1742 [1955]) described the equilibrating mechanism for the balance of payments known as the price-specie-flow mechanism in a gold standard.

² As of February 2015, year-over-year HCPI inflation for the Eurozone was -.3 percent. Hetzel (2013) argues that contractionary monetary policy pushed inflation below the ECB's target of 2%.

³ The exposition abstracts from the capital account, which is small, and includes items like debt forgiveness between governments.

If the Greek drachma and the German mark floated freely against each other, a Greek current account deficit not financed by private inflows of capital would lead to depreciation of the drachma and in time restoration of balance of payments equilibrium. Greece's term of trade would depreciate in that its goods would become less expensive relative to German goods. However, with monetary union, settlement is in the single currency, the euro. The accounting identity between the current and the financial account still holds. If, say, a Greek current account deficit exceeds the private capital inflow from Germany, then the difference is made up for by a transfer of bank reserves. Bank reserves decline in Greece and increase in Germany. In time, the associated decline in the money stock in Greece causes a decline in the Greek price level and conversely for Germany. The depreciation in the terms of trade arises from a change in relative price levels.

2. Is Germany a good model for Greece?

When the European Monetary Union (EMU or Eurozone) began operation, Germany was in the position Greece finds itself in today. Germany entered the Eurozone in 1999 with an exchange rate that overvalued its goods and services. As a consequence, after its entry into the Eurozone in 1999, Germany had to experience low inflation and high unemployment to adjust. Prior to its entry, in the context of instability in the European ERM (exchange rate mechanism), capital flows into the German mark, traditionally the strongest currency in Europe, had appreciated the mark. The other reason for the overvaluation of the mark at the creation of the Eurozone went back to German reunification.

As shown in Figure 1, Germany normally is a net capital exporter and thus runs a current account surplus. After the fall of the Berlin Wall and reunification of East and West Germany, the requirements of infrastructure investment in East Germany meant that Germany needed for a while to change from a capital exporter into a capital importer (Hetzel 2002). In order to provide the additional resources needed in Germany, Germans would have to buy more from foreigners, who would in turn have to buy less from Germans. This reversal required that prices in Germany rise more than the prices of its trading partners. Its terms of trade had to appreciate.

Germany's current account deficit became moderately negative from 1990 through 2001. Thereafter, it rose steadily and stabilized at around 7 percent of GDP. Figure 2 breaks the current account deficit into exports and imports. Germany's success as an exporter appears in the increase in its exports as a percentage of GDP, from around 27 percent in the 1980s to 50 percent at present. One reason for that success was that German labor unions were willing to hold down wage growth in order to limit the movement of manufacturing jobs to the formerly communist Eastern European countries.⁴ As a result, unit labor costs hardly moved. Also, in 2003, German Chancellor Gerhard Schröder introduced extensive labor market reforms (Hartz reforms or Agenda 2010). Germans felt that they had put into place difficult reforms.⁵

⁴ "Germany established its own new lower norm of zero nominal unit labor cost inflation resulting from a consensus between the trade unions, workers' representatives and employers that wage restraint was pivotal to preserve Germany's competitiveness, reduce unemployment and prevent further relocation of labor to Eastern Europe and other low-wage countries" (Lin and Treichel 2012, 12).

⁵ The *Financial Times* (3/8/13) cited Professor Falter, professor of politics at Mainz University, "It is like the La Fontaine fable of the ant and the grasshopper. German voters are convinced that they

At the same time, international events, especially growth in the Chinese economy, created a demand for the specialized exports of Germany, such as machine tools. In the course of the 2000s, the euro exchange rate relative to the rest of the world increasingly undervalued German goods. Along with the restructuring of the German economy in response to intra-Eurozone real terms of trade adjustment, the result was a boom in German exports to the rest of the world. An increase in the current account surplus powered growth in the German economy.⁶ Export growth came especially from the export of capital goods, which account for 9 percent of German GDP, to emerging markets.⁷

The issue addressed here is whether the German model of structural adjustment in the first half of the early 2000s should carry over to Greece. Two factors suggest a negative answer. First, until 2009, core inflation in the Eurozone remained near 2 percent. As a result, depreciation of the terms of trade for Germany could occur with low (less than 2 percent) but still positive inflation. However, the current low inflation in the Eurozone means that Greek adjustment requires deflation. In fall 2014, year-over-year CPI inflation in the Eurozone was .4 percent. Second, Greece benefits neither from a strong world economy nor from growing world demand for its exports. For example, Turkish beaches have become strong competitors of Greek beaches. Most important, as explained below, Germany never had to deal with capital flight.

3. The sudden stop of capital inflows, the Target2 payments system, and seigniorage

Greek membership in the Eurozone made it an attractive place to invest. From its start in 1998 through 2008, cross-border financial holdings in the Eurozone increased from about 200 percent of GDP to 600 percent (Pisani-Ferry et al 2013, Figure 20). Moreover, the purchase of debt rather than equity dominated the capital flows. Capital inflows into Greece required an appreciation in Greece's terms of trade. That appreciation had to occur through an increase in the price level and nominal wages in Greece. However, in fall 2008, private capital inflows ceased because of the financial crisis. Banks that had held Greek government debt began to restrict lending to domestic borrowers. Moreover, in fall 2009, concerns rose over the sustainability of the Greek budget deficit and the solvency of Greek banks. The cessation of capital inflows turned into capital outflows.

In the absence of official foreign aid, an end to private capital inflows would have forced an abrupt end to Greece's current account deficit. Capital outflows would have necessarily required turning a current account deficit into a surplus. With a fixed exchange rate, a current account deficit not financed by capital inflows results in a loss of reserves by Greek banks. The money stock

have tightened their belts as a result of Agenda 2010.... And like the ant in the La Fontaine fable, they do not see why they should pay again to bail out the spendthrift grasshoppers.”

⁶ While Germany's trade balance with other Eurozone countries fell in 2007Q4 from 37 billion euros to 18 billion euros in 2014Q4, it rose with non-Eurozone countries from 4 billion euros to 27 billion euros. As a percent of GDP, Germany's exports rose from 28% in 2000Q1 to 48% in 2014Q4. (Haver Analytics)

⁷ Without Germany, Eurozone growth was negligible. Moreover, as reported in the Deutsche Bank Weekender newsletter (10/17/14), all of the 3.5 percent growth in the Eurozone since the 2009 cyclical trough through mid-2014 came from net exports with two-thirds of the increase in the goods trade balance coming from emerging markets.

declines. In a world without monetary frictions, a deflation would occur that brings about balance of payments equilibria through depreciation in the Greek terms of trade. However, in reality, the required deflation takes time. Figure 3 shows the relationship between growth in money (M1) and in nominal GDP.⁸ In accord with the empirical generalizations of Milton Friedman (1989), only with a long lag does the relationship between money and nominal GDP appear in prices rather than in real GDP. As a result, when capital inflows precipitately become capital outflows and money contracts (“sudden stops”), the required balance between imports and exports occurs through recession that restricts the demand for imports.

In order to understand the short-run buffers in the Eurozone working to buffer such reversals, it is necessary to understand the Target2 system.⁹ It is a payments clearing system that records net flows of bank reserves among Eurozone member countries. What allows it to serve as a buffer is the ability of the banks in the countries losing reserves to replace the lost reserves by borrowing for extended periods from the European Central Bank (ECB). In the Eurozone, the banks of countries that lose reserves borrow from the ECB through their national central banks. That is, the national central banks create new reserves to make up for the lost reserves.¹⁰

In the context of the Greek balance of payments deficit relative to the Eurozone, the ECB creates the reserves to pay for the excess of imports by Greece. On the ECB’s balance sheet, this reserve creation appears as loans to Greek banks. For the Greek central bank, it appears as a liability to the Target2 system. At the same time, banks feel regulatory and market pressure to contract their balance sheets in order to repay the loans and as a consequence to contract deposits. Greek nationals lose deposits while others in the Eurozone gain deposits. Over time, this redistribution of deposits causes the changes in relative national price levels that eliminate the Greek current account deficit and turn it into a surplus. Greek banks can then repay the loans from the ECB made via the Target2 system.

Although the accumulation of Target2 liabilities has been necessary for Greece in order to buffer the sudden stop in capital inflows, it has been controversial because it constitutes unlegislated fiscal policy. The Eurozone has two broad mechanisms for making the fiscal transfers required in order to lessen the harsh adjustments imposed by the sudden reversal of capital inflows to capital outflows. The first is direct aid and the second is the use of the seigniorage power of the central bank. Direct aid relies on governments to guarantee the extension of debt to the peripheral countries.¹¹ Direct aid has included the Eurozone’s European Financial Stability Facility (EFSF), which was replaced by the European Stability Mechanism (ESM).

The allocation of seigniorage revenues entails using the balance sheet of the ECB in order to acquire the debt of the governments of the peripheral countries or the debt of their banks. Central banks earn revenue from money creation because their assets earn interest in excess of their

⁸ In the absence of data on currency, M1 is sight deposits at Greek banks.

⁹ TARGET2 is the abbreviation for the Trans-European Automated Real-time Gross settlement Express Transfer system 2. It is the large-value cross-border payments and settlement system for the Eurosystem.

¹⁰ In the United States, banks cannot borrow except for short periods.

¹¹ The peripheral countries are Portugal, Italy, Ireland, Greece, and Spain. The core countries are Germany, France, the Netherlands, and Austria.

liabilities, such as currency. The ECB distributes the excess of its revenues over expenses to its member countries based on their capital contributions. The ECB can effectively allocate some of its seigniorage revenue to particular countries or their banks by lending to them at rates below which they could borrow in the market. Loans to banks occur through the MRO (main refinancing operations), LTRO (long-term refinancing operations), and ELA (emergency liquidity assistance) facilities. In addition, in spring 2010 and summer 2011, the ECB bought the debt of countries directly through the SMP (securities markets program). The possibility also exists of purchases of peripheral sovereign debt as part of the OMT (outright monetary transactions) program, which replaced the SMP program.

In March 2010, the European Commission, the ECB, and the IMF formed the Troika in order to coordinate lending to Greece based on strong oversight (“conditionality”).¹² Starting with bilateral loans to Greece in April 2010 from member countries of the Eurozone, the Eurozone has provided considerable direct aid to the peripheral countries. The Eurozone created the EFSF to finance European government aid to them. The successor to the EFSF, the ESM began in October 2012 with €500bn in lending capacity beyond the commitments made by the EFSF. The German government has advocated increased fiscal sharing only in the framework of enforceable rules. It fears that fiscal transfers made without strict conditionality ensuring fiscal discipline will allow the peripheral countries to put off hard choices to achieve fiscal balance.

The ECB has contributed significantly to the fiscal transfers required to maintain the Eurozone. That fact appears in the increase in the size of the ECB’s balance sheet. Measured relative to Eurozone GDP, in fall 2008, it went from about 15 percent to 20 percent. In spring 2011, it began to increase again, reaching somewhat more than 30 percent by early 2013. The expansion in the ECB’s balance sheet appeared in the diminution of the importance attached to its traditional means of supplying reserves to banks through the short-term auction of funds, the main refinancing operations (MROs). In their place, the ECB began supplying reserves through long-term refinancing operations (LTROs), which redirected lending toward banks in the periphery. It also supplied reserves through the mechanism of the Target2 system.

4. Greek balance of payments adjustment and the capital flight crisis

The Eurozone experienced two recessions with the second peak in the business cycle occurring in 2011Q1.¹³ When recovery from the first recession collapsed, financial markets became concerned about the survival of the euro. From mid-summer 2011 to mid-summer 2012, investors fled the sovereign debt markets of the peripheral countries. The main problem was with Italy and Spain because they were too big to fail and too big to bail out. The fear was of a negative, self-reinforcing cycle initiated by high interest rates on sovereign debt.

¹² The European Commission acts on behalf of the member states whose governments must approve the disbursement of funds.

¹³ Hetzel (2013) argues that contractionary monetary policy caused the recessions. Both in 2008 and again in 2010, a commodity-price inflation shock pushed headline inflation far above core inflation, which remained near 2 percent. In each case, the ECB raised interest rates and maintained them at a level that caused aggregate nominal demand to fall. Real demand and output had to fall in order to keep headline inflation at or below 2 percent.

Consider Italy whose debt/GDP ratio was 120 percent. In summer 2011, the fear was of a negative feedback loop setting in between a sovereign debt crisis and a banking crisis. Italian banks hold large amounts of Italian government debt. If the sovereign debt burden became unsustainable in the eyes of financial markets, the value of Italian bonds would fall. The possibility of sovereign default meant that Italian banks could become insolvent. Depositors then would flee. For small countries like Ireland, Portugal, and Greece, the Troika (European Commission, ECB, and the IMF) coordinated aid. However, Italy is the third-largest country in the Eurozone. The willingness of the core countries, especially Germany, to backstop the issuance of Eurobonds to bail out a country as large as Italy was uncertain.

Target2 imbalances then became an important means of financing capital flight. Cecchetti, McCauley, and McGuire (2012) examined the reasons for the emergence of Target2 imbalances. From 2002 to mid-2007, private capital inflows completely financed current account deficits. From mid-2007 through 2009, private capital flows finance three-fifths of the current account imbalances. From 2010 through 2011, Target2 imbalances financed all of current account imbalances. However, in 2012Q1 and 2012Q2, the growth of Target2 imbalances far outpaced current account imbalances. As Cecchetti et al noted, their growth corresponded to the transfer of deposits from the banks of peripheral countries to those of core countries, especially, to German banks. In this way, the banks making the transfer protected themselves against “redenomination risk,” that is, the risk that a country would leave the Eurozone and redenominate its bank deposits in a new national currency.

Using current account and Target2 data, Vihriälä (2013) noted:

Between the April 2010 and August 2012, net private capital outflows totaled 167bn in Greece, 118bn in Ireland and 99bn in Portugal. In terms of pre-crisis GDP, these figures amount to about 75%, 62% and 59% respectively. Starting in summer 2011, private investors started to leave also Italy and Spain, which between May 2011 and August 2012 recorded outflows of 303bn (19% of pre-crisis GDP) and 364bn (35% of pre-crisis GDP).... Before the announcement [ECB President Mario Draghi’s pledge to do “whatever it takes” to preserve the monetary union] a larger and larger share of Greek, Irish, Italian and Spanish bonds had been off-loaded by foreign investors and acquired by domestic banks....

Figure 4 shows the Greek current account balance. Figure 5 shows a breakdown of how Greece has financed its current account deficit. The cumulative current account deficit measures the amount of debt that Greece owes the rest of the world as a consequence of the trade deficits. That debt can be held by private investors who voluntarily invest in Greece, by the ECB in the form of Target2 credits, and by foreign official institutions (the Troika). The cumulative current account deficit must be financed through some combination of debt held privately by foreigners, Target2 credits, and Troika loans.

As shown in Figure 4, Greece ran a current account deficit from 2000 through 2012 when it went to zero. That is, the solid line showing the cumulative current account declined until the end of 2012. With no official aid from the Eurozone and with minimal Target2 liabilities (shown by the small-dashed line) in the pre-2008 period, it follows that private capital inflows financed the current account deficit. From mid-2008 through 2011, Greek Target2 liabilities mounted. Starting in May 2010, Greece began to receive regular disbursements from external, official sources. For the period from mid-2008 through 2011, Greece financed its foreign debt through the combined aid of the Target2 system and official institutions. Thereafter and continuing through 2014, Greece repaid

much of its Target2 liabilities with Troika aid. Official aid relieved foreign private investors of their Greek debt.

For Greece, the capital flight started in 2008 (Figure 5) with the recession (Figure 6). As shown in Figure 7, however, the yield on Greek 10-year bonds did not increase until November 2009. The initial capital flight thus likely reflected the general increase in bank home bias produced by the financial crisis (Arslanap and Tsuda 2012, 32). In October 2009 elections, PASOK replaced New Democracy as the governing party. A restatement of government finances revealed a large government deficit, now estimated at 10 percent of GDP (Bruegel Annex, 3/1/15). In 2010 and 2011, private capital flight reflected a sovereign debt crisis. In 2010Q2, foreign investors began selling Greek government debt. “Between mid-2010 and end-2011, foreign investors cumulatively reduced their exposure to high-spread euro area sovereign debt by about US\$ 400 billion” (Arslanap and Tsuda 2012, 26).

Initially, the ECB became the residual lender financing the Greek payments imbalance (current account deficit plus capital outflows). In the first instance, when Greeks import more than they export or capital flows out of the country, Greek banks lose reserves. There are three main ways they can borrow from the ECB via the Bank of Greece in order to replace the lost reserves. Using the Main Refinancing Operations (MRO) facility with which the central bank offers repurchase agreements, Greek banks can borrow short term using high-quality collateral. The Long-Term-Refinancing-Operations (LTRO) program offered multi-years loans. Finally, the Emergency Liquidity Assistance (ELA) facility offers loans at a higher rate than the MRO but with inferior quality collateral.

From a negligible amount prior to mid-2008 to summer 2011, the share of Greek banks in total MRO and LTRO financing from the ECB rose to 20 percent (Pisani-Ferry et al 2013, Figure 2). In summer 2011, Greek banks turned to the ELA facility (Milligan 2012). ELA borrowing from the Bank of Greece rose to €120 billion by summer 2012 (Pisani-Ferry et al 2013, Figure 3). By early 2012, the Bank of Greece funded 35 percent of the liabilities of Greek banks (European Central Bank, “Greece, Share of central bank funding in credit institutions liabilities,” 4/7/2015).

Capital flight from the peripheral countries intensified in line with talk of debt restructuring (write-down). In October 2010, in Deauville, France, German Chancellor Angela Merkel and French President Nicolas Sarkozy agreed that in the future debt securities would include collective actions clauses, which would facilitate restructuring. The principle of debt write-downs became known as private sector involvement (PSI). “[I]n July 2011, debt restructuring was officially endorsed [by the European Union Council] as an option for Greece. ... But agreement on a deep PSI had to wait until October 2011, and negotiations were only completed in February 2012” prior to the Second Economic Adjustment Program announced in March 2012 (Pisani-Ferry et al 2013, 42 and 68).¹⁴ By that time, holders of Greek debt, chiefly French and German banks, had allowed the debt to run off. As a consequence of replacing the outflow of bank reserves from Greece, 80 percent of Greek debt passed into the hands of foreign official institutions with much of the remainder held by Greek banks (Slok 2015).

¹⁴ Gulati et al (2012, Abstract) put the aggregate haircut on Greek debt at 55-65 percent depending upon the valuation of the old bonds and estimated the debt relief received by Greece to be in the order of 48 percent of GDP.

Fear of a Greek exit from the Eurozone reached its peak intensity in the first half of 2012. Considerable doubt existed as to whether Greece would implement the terms of the February 2012 Second Economic Adjustment Program. The June 17, 2012, Parliamentary elections resulted in a coalition government formed by Prime Minister Antonis Samaras, who made clear that Greece would accept the Troika adjustment program. In November 2012, the Greek Parliament approved the austerity package.

The uncertainty created by the replacement of the New Democracy government with Syriza in January 2015 again produced capital flight and runs on banks. ELA borrowing by Greek banks has risen while Target2 liabilities have again turned negative. ECB funding of Greek banks (MRO, LTRO, and ELA lending) peaked at about €135 billion in summer 2012; fell to about €40 billion in late 2014; and then rose again to somewhat above €100 billion in February 2015 (Deutsche Bank 2015, 6). Greek banks have assets and liabilities of about €500 billion.¹⁵

5. The Greek transfer problem¹⁶

The real resource counterpart to the repayment of the euro debt incurred by Greece to external creditors (the IMF, the ECB, the EFSF, and, chiefly, hedge funds) requires Greece to run a balance of trade surplus. There is a flow and a stock aspect to the establishment of a sustainable international payments balance. The flow aspect means that the terms of trade must be such that the current account is in balance given private net capital flows. In the absence of private capital flows, say, in the form of foreign direct investment, the current account must still balance. At present, current account balance has been achieved only due to a reduction in the demand for imports consequent upon a massive contraction in domestic demand. The Greek terms of trade must depreciate further (the Greek price level must fall further relative to the price level of other Eurozone partners) in order to achieve current account balance at full employment.

The stock aspect entails running a current account surplus sufficient to transfer the resources required in order to pay down the existing debt. That transfer will require an additional depreciation in the Greek terms of trade. Although transitory, it will extend over a very long period of time because Greece's external official creditors have lengthened the maturity of the debt considerably. Even with Greece's present elevated debt-to-GDP ratio, Greece need transfer about 2 percent of its GDP annually (Wolff 2015). Equivalently, it need run only a current account surplus of that magnitude apart from private capital inflows.

In a world in which price levels adjusted without friction, the Greek terms of trade would depreciate through a reduction in its domestic price level. In the classical Humean price-specie flow world, how would this occur? Consider the annual payment for an extended period of, say, €1 billion to external creditors. The Greek government would first run a budget surplus of €1 billion, which would increase its account with the Bank of Greece by that amount and reduce the deposits of Greek nationals by the same amount. It would then write a check, say, to the EFSF, which would pay down

¹⁵ The ECB limits the ability of the four largest Greek banks to add to their net holdings of Greek Treasury bills. In doing so, it prevents the Greek government from financing deficits by issuing Treasury bills to the banks, which then use them as collateral to borrow from the ELA facility.

¹⁶ The term "transfer problem" came from a debate in the late 1920s between John Maynard Keynes and Bertil Ohlin over the feasibility of effecting the resource transfers implied by the reparations imposed upon Germany after World War I.

its debt, held almost exclusively by non-Greek nationals, by that amount. In paying down its debt, the EFSF writes checks, which when cashed, drain the reserves of the Greek banking system.

Assuming that Greek banks cannot borrow in order to make up the loss, they sell assets in order to obtain reserves. As a result, Greek nationals experience a reduction in their euro deposits. (That reduction would not occur if the Greek government had used the surplus to make domestic purchases.) In order to bring their money holdings back to the desired level, Greek nationals reduce their expenditures. Greece needs to run an annual trade surplus (excess of exports over imports) of €1 billion in order to import the euros required to replenish the depleted cash balances of its nationals. Equilibrium returns when the Greek price level has fallen sufficiently (the Greek terms of trade has depreciated sufficiently) in order to generate the required current account surplus.

The problem is that the price level does not adjust in a frictionless manner. There is the inherent disruption to production in forcing a price-level reduction, which disturbs all the relative prices set in euros. Those relative prices convey the information required to allocate resources. In a country like Greece where markets are highly cartelized, deflation is all the more disruptive and occurs only with high levels of unemployment. In addition, deflation increases the real value of euro-denominated debt. In a world of frictionless renegotiation of debt contracts, some combination of personal bankruptcy and restructuring would occur and economic activity would continue. However, in any country and especially in Greece with a poorly functioning judicial system, debt default is disruptive. Households and firms do not receive the credit they need in order to deal with disruptions to their cash flow and make productive investments.

The debt-deflation trap that Irving Fisher talked about applies to Greece. As just described, in order to generate the current account surpluses required to pay off external debt, Greece must deflate. However, deflation causes recession. The recession could permanently lower the productive capability of the economy.¹⁷ As output falls, tax revenue falls and the government deficit increases. If households and firms default on their loans from banks, banks need recapitalization. In order to render tolerable the suffering of the Greek people and prevent complete economic collapse, the “institutions” (the Troika) extend additional loans to Greece. In order to achieve repayment, the addition to the debt burden requires more deflation.

The combination of increased real debt and weakening ability to pay produced by recession undermines the ability of the banking system to allocate resources efficiently (IMF 2014, 15):

The payment culture has been weakened, including through repeated moratoria on auctioning foreclosed assets. And the insolvency framework has been unable to deal with either the rehabilitation of viable entities or the liquidation of non-viable entities.... [R]esources remain trapped in unproductive or inefficient activities.... Greece has one of the highest levels of NPLs [nonperforming loans] globally....

¹⁷ “The trauma of recession has been so harsh as to force people and companies, particularly skilled people and good, profitable companies, to leave Greece and set up operation elsewhere” (Congdon 2013, 5).

As a matter of arithmetic, the debt-to-GDP ratio (D_t) equals the product of the prior period's ratio (D_{t-1}) times one plus the difference in the interest rate on the debt (i_t) and the growth rate of nominal GDP (y_t) minus the primary balance (PB).

$$(1) \quad D_t = D_{t-1}(1 + (i_t - y_t)) - PB$$

Debt sustainability is a requirement of an IMF assistance program. That is, given its program, the IMF must forecast a declining value of D in (1). It did so based in part on a forecast of positive future nominal GDP (y) growth. Specifically, it forecast a return to positive real GDP growth in 2012 combined with continued positive inflation, apart from price stability in 2011 (IMF 2013, p. 13, "Real GDP Growth" and "Average CPI Inflation"). In fact, the growth rate of nominal GDP became negative in 2008Q2 and remained negative through 2013. At the same time, the IMF based its 2010 standby arrangement program of assistance to Greece on the assumption of "an estimated 20-30 percent competitiveness gap" (IMF 2013, Executive Summary). The IMF underestimated the required deflation and the associated negative impact on real output of such a large terms of trade adjustment.

6. How much deflation?

Official forecasts have regularly fallen short in their estimation of the time that would be required for Greece to emerge from recession and exit the bailout program. One reason for the unwarranted optimism was the limited experience of the IMF, which regularly deals with crises, in dealing with crises in a monetary union. Pisani-Ferry et al (2013, 10-11) noted that the majority of past IMF programs "were accompanied by a sharp currency depreciation." Among countries with fixed exchange rates that received IMF bailouts, almost all had capital controls. In contrast, the Eurozone countries like Greece had "irrevocably fixed exchange rates and a regime of unfettered capital flows." That is, the terms of trade adjustment had to occur through deflation rather than depreciation of the currency.

Using measures of the real effective exchange rate (REER) for countries in the Asian and Latin American crises, Pisani-Ferry et al (2013, 10-11) calculated the currency depreciation that occurred during the crises.¹⁸ For the Latin American countries, the depreciation amounted to about 40 percent. For the Asian countries, the initial depreciation was about 40 percent but then settled down at 30 percent. Comparison with the Asian and Latin American experiences suggests that Greece could need an even larger depreciation in its terms of trade. These countries went into the crisis with current account deficits not far from 5%. Greece went into the crisis with a current account deficit of 15 percent.

A number of factors exacerbate the deflation required to achieve the depreciation in the real terms of trade needed to eliminate in a sustainable way the current account deficit of Greece. First,

¹⁸ The REER is calculated as a trade weighted-average of the exchange rates of the country with its trading partners adjusted by the CPIs of the country and its trading partners. The Asian crisis countries with crisis dates in parentheses are Indonesia (1997), Korea (1997), Thailand (1997), and the Philippines (1998). The Latin American countries were Brazil (1998), Argentina (2000), and Uruguay (2002).

after the crisis, the Greek terms of trade appreciated. Figure 8 shows German and Greek inflation. Greek inflation actually increased after the crisis. The increase in excise taxes and the VAT required by the terms of the 2010 bailout in order to reduce the government's fiscal deficit pushed up prices with the effect of increasing the ultimate required deflation. Moreover, as shown in Figure 8, the disinflation in the Eurozone, which appears in declining German inflation, implies that in order to depreciate its terms of trade Greece must deflate.

Second, the adjustment is more severe if the country starts with significant external debt. Payment of the interest and principal on the debt then necessitates running current account surpluses beyond simply eliminating the deficit. Toward the end of 2013, the ratio of external debt to GDP was about 100 percent in Greece (Goldman Sachs, 1/17/13, 3). Third, deflation increases the real value of euro-denominated debt. Fourth, the smaller the tradeable goods sector relative to the nontradeable goods sector, the more difficult it is to expand exports. In Greece, the tradeable goods and services sector is just above 30 percent. In Ireland, in contrast, it is near 50 percent (Goldman Sachs 1/17/13, 6).

Although by the end of 2012, Greece had come close to current account balance, the improvement came from the effects of severe recession in depressing imports. That fact means that the deflation required in order to achieve a sustained surplus in the current account has only just begun. Figure 9 shows Greece's real GDP and current account deficit. The common decline in the two series after 2008 suggests that Greece has achieved current account balance through a decline in imports produced by a fall in domestic demand. In 2014, real GDP was at its 2000 level. Because imports will increase as the economy recovers, it follows that Greece is still a long way from having achieved an internal Eurozone terms of trade consistent with full employment.

How much deflation must Greece endure in order to depreciate its terms of trade sufficiently in order to create a terms of trade surplus with full employment? Between 2000Q1 and 2014Q3, the Greek CPI rose 45 percent and the German CPI rose 25 percent (Figure 10). That is, the Greek terms of trade appreciated relative to Germany's terms of trade by 20 percentage points. Since 2012, with Greek deflation, the Greek terms of trade have depreciated but only a little. If the appreciation in the Greek terms of trade that occurred in the first decade of the Eurozone was due solely to a capital inflow that will not return, Greek deflation will have to undo the prior inflation difference. Based solely on the difference between the cumulative change in the Greek and German price levels, the Greek price level may have to decline by an additional 20 percent. If since the 2008 crisis other peripheral countries like Spain and Ireland have become more competitive, then it is possible that Greece will have to undergo an even more prolonged deflation in order to restore external trade balance.

Figure 11 tells a similar story in terms of the divergence in unit labor costs. The Greek/German difference widened through 2009 and has narrowed subsequently. Still, the gap remains large. Reducing the Greek unemployment rate of 26 percent (youth unemployment rate of 49 percent) will draw additional workers into the labor force with lower productivity and will likely increase unit labor costs. Also, in order to channel domestic production into exports, Greek workers have to become poorer. That is, real wages must fall through a greater decline in nominal wages than in prices. The elevated level of the unemployment rate demonstrates how costly it is to reduce unit labor costs through wage deflation. Creation of a current account surplus could in principle occur through a dramatic increase in the competitiveness of the Greek trade sector reflected in a decline in unit labor costs. However, structural reforms are difficult politically and require time to yield results. It is likely that Greece will need to undergo many years of deflation.

Finally, the deflation required in order to depreciate Greece's internal Eurozone terms of trade will increase an already high debt-to-GDP ratio. In 2005, Greece's debt-to-GDP ratio was 98.6 percent, which rose modestly to 105.4 percent in 2008. However, during the recession it increased sharply to an estimated 174.9 percent in 2014. The need to balance the budget in order to assure investors that Greece will remain part of the Eurozone will then limit the ability of Greece to make investment in education and infrastructure. In the May 2010 assistance program for Greece, the Troika estimated the "need of a real exchange-rate depreciation ... of the order of 20-30 percent" (Pisani-Ferry et al 2013, 67). In retrospect, that estimate appears conservative.

7. Are there practicable and painless solutions?

For a country like Argentina, which suffered deflation under its currency board, the option existed of abandoning the currency board and depreciating the peso.¹⁹ The assumption here is that the euro is so thoroughly embedded in Greek society that the reintroduction of the drachma combined with a floating exchange rate would not eliminate the need for continued Greek deflation. The reason is that the Greeks would continue to use the euro rather than the drachma for money.

Money serves three functions. It is a medium of exchange, a store of value, and a unit of account. Reintroduction of the drachma even with its required use for the payment of taxes and in government transactions would not necessarily entail its replacement of the euro for these functions. The reintroduction of the drachma would most surely be accompanied by the expectation that it would depreciate—an expectation likely to be self-fulfilling. Greeks would continue to rely on the euro for money. Capital controls are not a viable alternative because they cripple the financial system and break down over time.

In principle, the Greek government could reintroduce the drachma with the commitment to maintain internal price stability. With the passage of years, perseverance could make the commitment credible, and Greek citizens would again use the drachma for all three functions of money. In the interval, the euro would continue as the medium of exchange for high-value transactions, as store of value, and as the unit of account. The depreciation of the terms of trade required for external stability would require the same deflation in the euro prices that Greeks assign to their goods as is currently required with the euro as the national currency.

There are no practicable schemes to eliminate deflation and recession in Greece within a short time frame. One could imagine an omniscient central planner who would lower all euro prices by, say, 20 percent and reduce all euro debt contracts subject to jurisdiction in Greek courts by 20 percent. One could imagine Greek firms having to get permission from a price board if they failed to lower their euro prices by less than, say, 3 percent a year. One could imagine a subsidy on all Greek exports financed by a tax on all imports. One could imagine the elimination of the possibility of runs on Greek banks through the sale of the four large Greek banks to large European banks that benefit from the financial safety net offered by their countries. The operative word here is "imagine."

Greek voters put Syriza in power as a protest against "austerity." Austerity possesses two components: a primary fiscal surplus (a surplus before interest payments on debt) and structural

¹⁹ From 1991 until 2002, Argentina converted dollars and pesos at a one-for-one ratio while allowing the change in pesos to pass directly through to the peso monetary base.

reform. Greece has no choice but to run a primary surplus. Otherwise, investors would question whether the government would ever raise the revenue to repay its debt. At 1.2 percent of GDP in 2014, the primary balance (excluding one-time adjustments) offers a minimal margin for increasing government expenditure (Darvas 2015, Annex).

A strong economic revival in the Eurozone would increase the demand for Greek exports. A return to 2 percent inflation engineered by sustained quantitative easing would limit the amount of deflation that Greece must endure. Those events now seem possible. Nevertheless, structural reform is the only way in which Greece can significantly lessen the amount of the required deflation and the associated recession. Structural reform would do so by increasing the real terms of trade without deflation. That could occur in two ways. Greece would become attractive to foreign investors. It could also deregulate the economy in order to make the Greek export industry more innovative and competitive.

The following offers some comments on the limited degree of structural reform to date. All an economist can do is to make the case for free-market reforms and to point out that such reforms will only produce significant foreign direct investment if they are perceived as permanent. For that to happen, the Greek populace must accept them.

8. The difficulty of structural reform

George Bitros (2013, 26), professor emeritus at Athens University of Economics and Business, argued that “the public budget became the spoils of politicians, tightly organized minorities and interlocking groups of business interests” and that the movement away from a free-market economy to an economy organized around monopolies and government regulation occurred “mainly because of the sharp partisan competition that emerged in the political arena” after the ousting of the military government in 1974. The impression left by Bitros is that given the weakness of Greek institutions politicians found it costly to form the coalitions required to hold power. Given the weakness of the state in raising tax revenues, political parties thus found it expedient to encourage the formation of cartels. These cartels, which were protected from competition, received rents (monopoly returns) in return for support of their political patrons.

Hayashi et al (2015, 1) summarized the stylized facts surrounding the innovation that leads to new industries. “As new industries evolve from birth to maturity, it is typically observed that price falls, output rises, and firm numbers initially rise and later fall.” Researchers term the decline in firm numbers “shakeout.” The lesson is that the innovation spurred by competition requires free entry *and* free exit. The highly regulated Greek economy discourages both.

Slok (2012) reported the World Bank ranking of countries according to ease of doing business. In 2013, Greece ranked 78 overall but ranked even lower in key categories. For example, in the category “starting a business,” which measures factors such as days required in order to receive a license, Greece ranked 146. In registering property, it ranked 150, and in enforcing contracts it ranked 87. As a condition for assistance, Greece passed laws liberalizing entry into markets and professions but then delayed their implementation (International Monetary Fund 2013b, 18). In Greece, there are more than 500 regulated professions accounting for about one-third of employment (International Monetary Fund 2013a, 15). Similarly, Greece moved only slowly to eliminate employment protection laws. The International Monetary Fund (2014, 23) noted with respect to the law that limits collective dismissals, “[N]o such dismissal has been approved for thirty years....”

Heavy government regulation along with the arbitrary application of laws encourages corruption (Cambanis 2015).

In order to free the resources required for an excess of exports over imports at full employment, Greece must achieve an internal as well as an external terms-of-trade devaluation. That is, the price of nontradeable goods must decline relative to the price of tradeable goods. According to the International Monetary Fund (2013b, 37), Greece has not progressed in this respect: “Despite reform attempts, professions like pharmacology and law, as well as the transport and energy sectors, remained closed to new entrants. Continuing protection caused prices of nontradeables to remain elevated relative to the prices of tradeables....”

9. Concluding comment

The Eurozone economy has started to recover. The ECB’s policy of quantitative easing will encourage recovery and, if sustained, return inflation to the 2 percent target. Those events will encourage the demand for Greek exports and lessen the need for deflation. However, the Greek economy is effectively “euroized.” It is likely that it will have to continue deflation for many years. Only a national commitment to free markets that facilitates entry and exit will promote the investment from abroad and the internal competitiveness capable of lessening the need for terms-of-trade devaluation achieved through deflation. Spain and Ireland have opened up their economies to a significant degree and they are experiencing strong export growth and strong economic recoveries. It is possible that their example will encourage a similar national consensus for reform in Greece.

References

- Arslanap, Serkan and Takahiro Tsuda. "Tracking Global Demand for Advanced Economy Sovereign Debt." IMF Working Paper, WP/12/284, December 2012.
- Bitros, George C. "From Riches to Rags or What Went Wrong in Greece." Athens, December 31, 2013. (<http://ssrn.com/abstract=2196347>).
- Cambanis, Thanassis. "Why Can't Greece Shake Its Corruption Problem?" *Boston Globe*, August 22, 2014.
- Cecchetti, Stephen G.; Robert N. McCauley, and Patrick M. McGuire. "Interpreting Target2 balances." BIS Working Paper No. 393, December 2012.
- Congdon, Tim. "An Update on the Greek Situation." International Monetary Research Limited, April 26, 2013.
- Darvas, Zsolt. Bruegel. "Should other Eurozone programme countries worry about a reduced Greek primary surplus target?" February 25, 2015.
- Deutsche Bank. "db140weekender." October 17, 2014.
- European Central Bank. *Statistical Data Warehouse*, April 7, 2015.
- European Commission. Memo. "Austerity and growth debate: What President Barroso actually said at the Brussels Think Tank Dialogue." Brussels, 23 April 2013.
- Financial Times*. "Ecade-old Refors still Divide Social Democrats." March 8, 2013, 2.
- Friedman, Milton. "The Quantity Theory of Money." in John Eatwell, Murray Milgate, and Peter Newman, eds., *The New Palgrave Money*. New York: W. W. Norton, 1989, 1-40.
- Goldman Sachs. *European Economics Analyst*. Issue No. 13/03, January 17, 2013.
- Gulati, Mitu; Christoph Trebesch, and Jeromin Zettlmeyer. "The Greek Debt Exchange: An Autopsy." September 11, 2012.
- Hayashi, Fumiko; Bin Grace Li; and Zhu Wang. "Innovation, Deregulation, and the Life Cycle of a Financial Service Industry." February 2015.
- Hetzel, Robert L. "German Monetary History in the Second Half of the Twentieth Century: From the Deutsche Mark to the Euro." Federal Reserve Bank of Richmond *Economic Quarterly* 88 (Spring 2002), 29-64.
- _____. *The Great Recession: Market Failure or Policy Failure?* Cambridge: Cambridge University Press, 2012.
- _____. "A Monetarist Critique of ECB Monetary Policy (Revised February 2015)." Federal Reserve Bank of Richmond Working Paper, 13-07R, 2013.
- Hume, David. "Of the Balance of Trade (1742)" in *Writings on Economics*, ed., Eugene Rotwein, Freeport: Books for Libraries Press, 1955.
- International Monetary Fund. "Greece: First and Second Reviews." January 2013.
- _____. "Greece: Ex Post Evaluation of Exceptional Access under the 2010 Stand-by Arrangement." May 20, 2013b

_____. “Greece: Fifth Review.” June 2014.

Lin, Justin Yifu and Volker Treichel. “The Crisis in the Euro Zone.” World Bank Policy Research Working Paper 6127, July 2012.

Milligan, Tessa. “Tracking the ELA.” *Cumberland Advisors – Market Commentary*, September 6, 2012.

Pisani-Ferry, Jean; Andre Sapier; and Guntram Wolff. “EU-IMF Assistance to Euro-area Countries: an Early Assessment.” Bruegel Blueprint Series, vol. XIX, 2013.

Vihriälä, Erkki. “(Slowly) back to normal in the Eurozone.” Bruegel *Improving Economic Policy*, January 31, 2013.

Slok, Torsten. Deutsche Bank. “Cross-country Differences in Structural Policies.” October 2012.

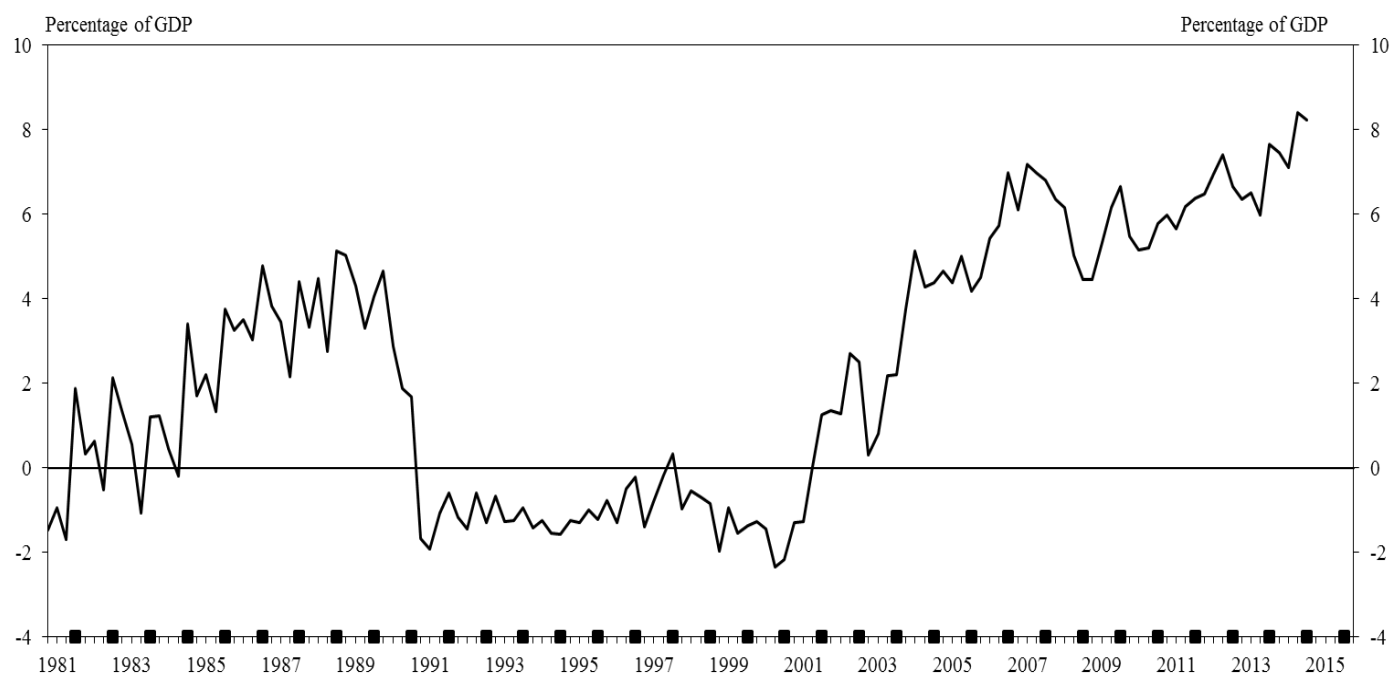
_____. “Who Owns European Government Debt?” Deutsche Bank Research, January 22, 2015.

The Wall Street Journal. “ECB Chief Plays Down Italy Fears.” March 8, 2013, A6.

_____. “Greeks Investigate Statistics Chief over Deficit Figure.” March 23, 2015, A8.

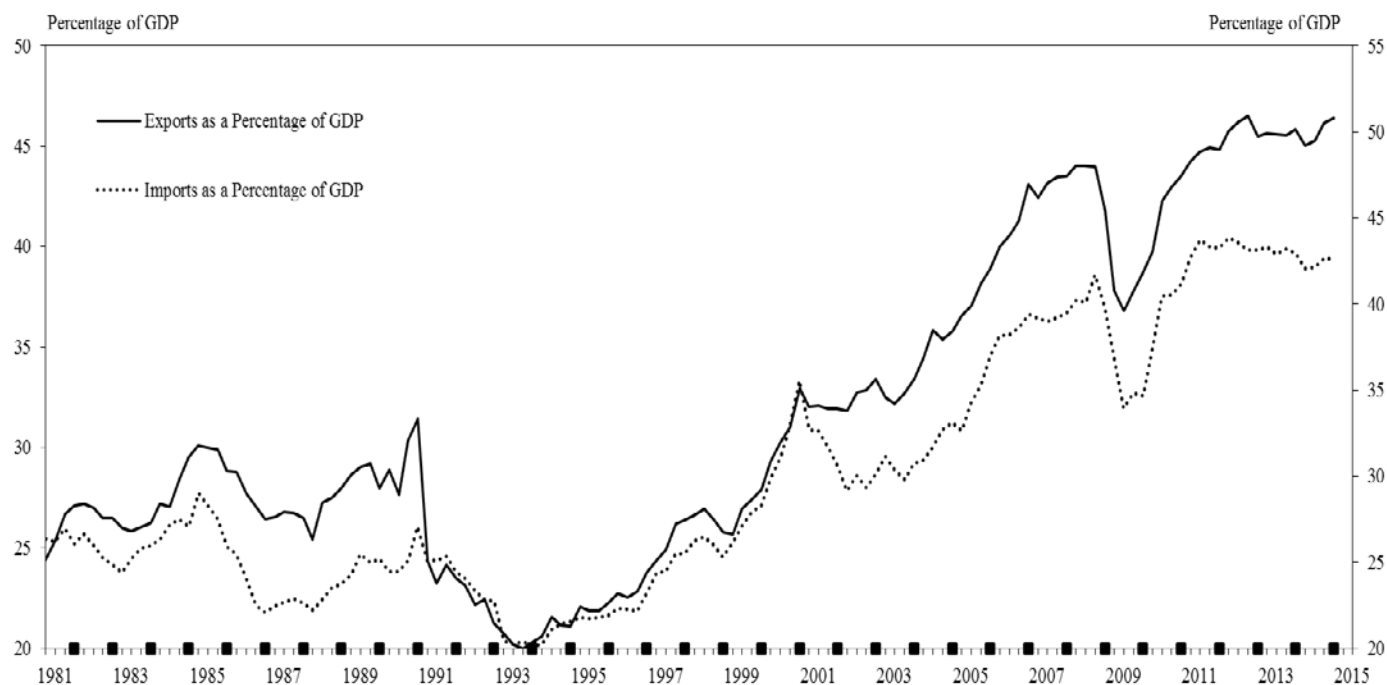
Wolff, Guntram B. Bruegel “A New Start for Greece.” February 11, 2015.

Figure 1
Germany: Current Account Balance



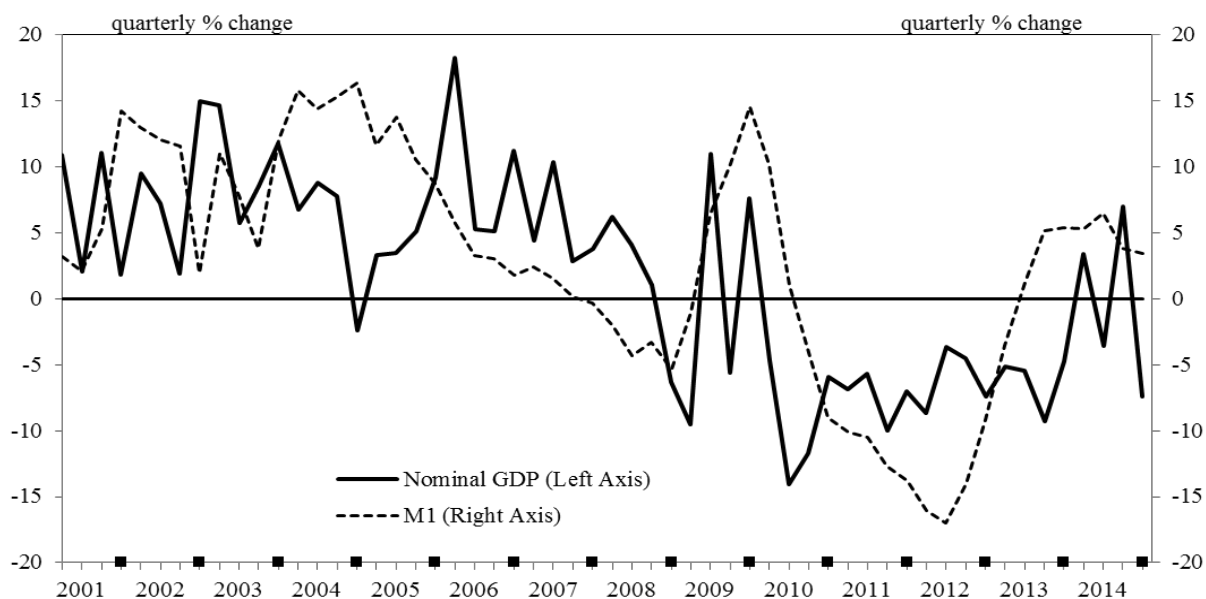
Notes: Current account expressed as a percentage of Nominal GDP. Data prior to 1991 are for West Germany. Heavy tick marks indicate fourth quarter of the year. Source: Deutsche Bundesbank & Haver Analytics.

Figure 2
Germany: International Trade



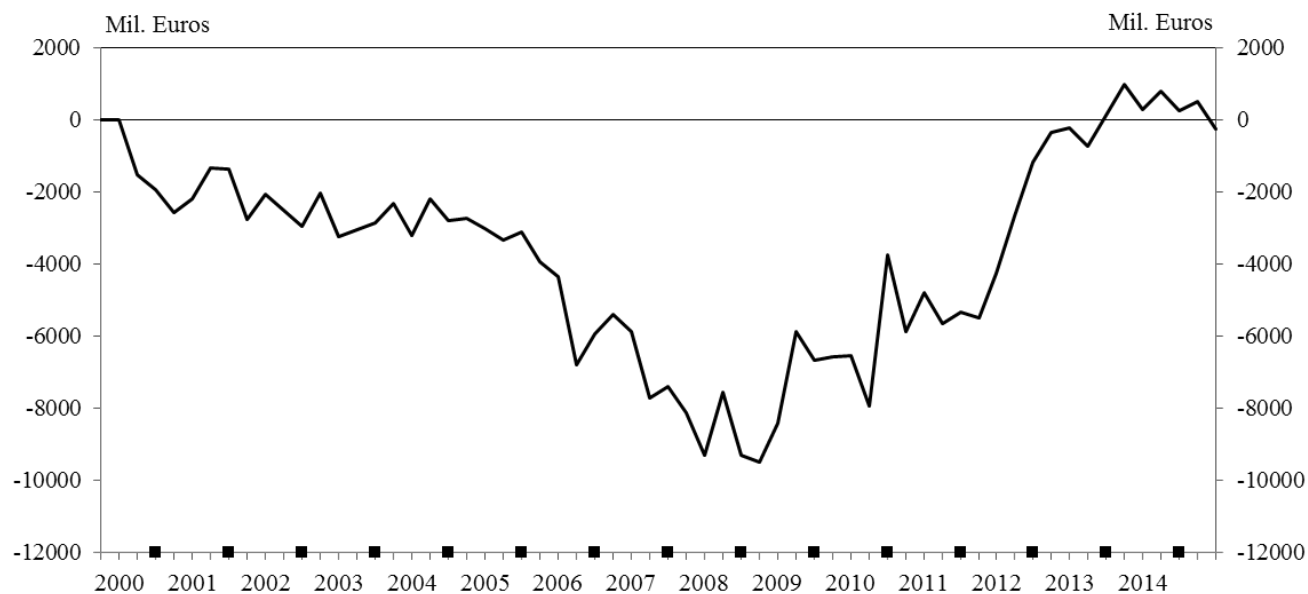
Notes: German Exports and Imports expressed as a percentage of Nominal GDP. Heavy tick marks indicate fourth quarter of year. Source: Eurostat & Haver Analytics.

Figure 3
Greece: M1 and Nominal GDP



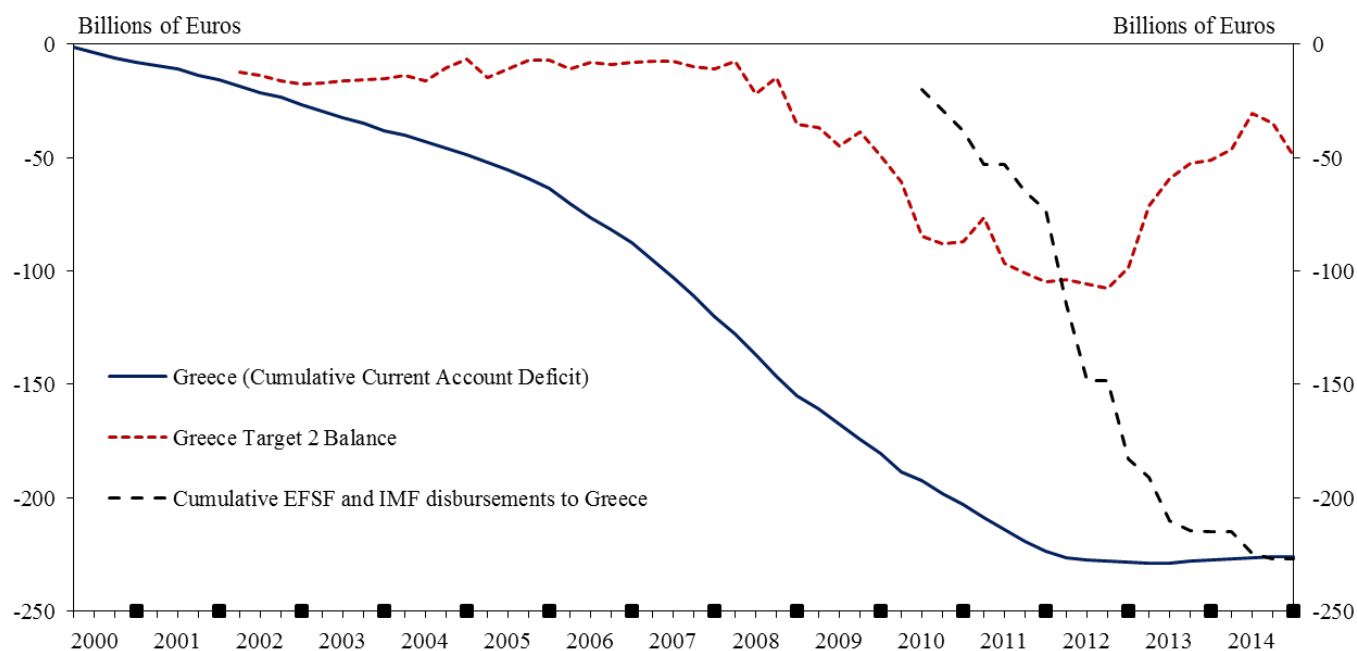
Notes: Quarterly percentage changes in M1 and nominal GDP. Source: Hellenic Statistical Authority (ELSTAT)/Haver Analytics. Heavy tick marks indicate the fourth quarter of each year.

Figure 4
Greece: Current Account Balance



Notes: Series is quarterly seasonally adjusted. Heavy tick marks indicate fourth quarter of the year. Source: Haver Analytics.

Figure 5
Greece: Sources of Financing the Current Account Deficit



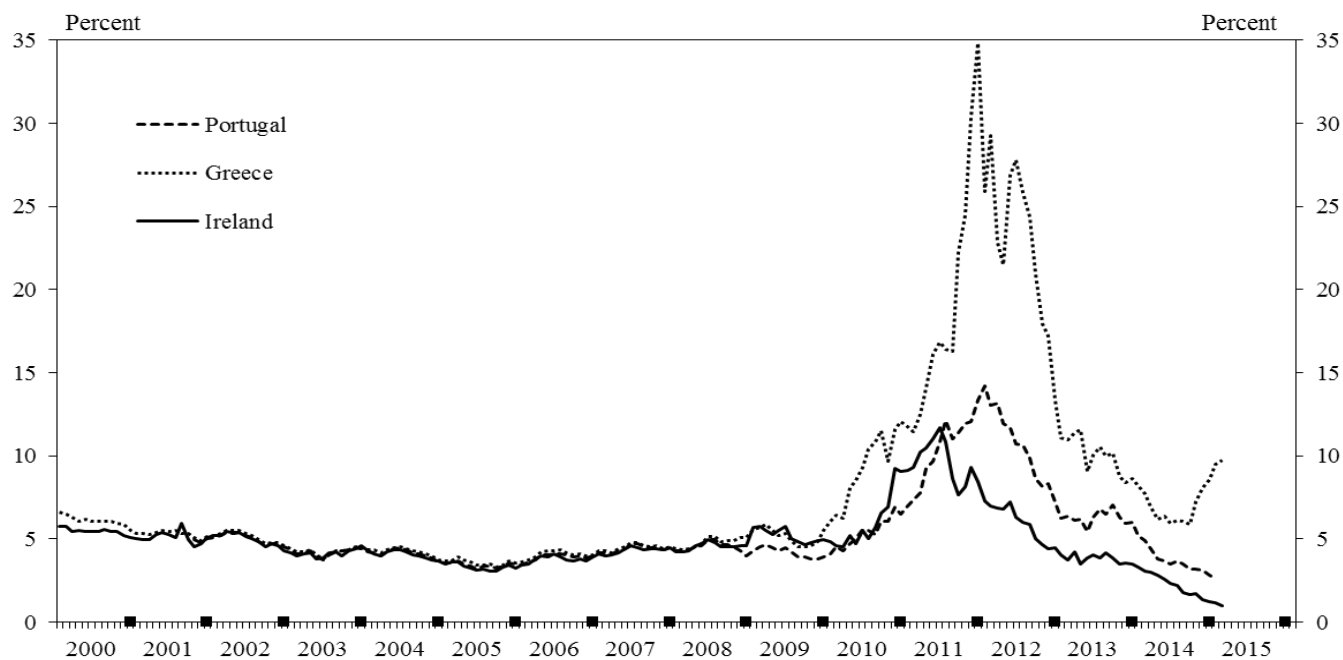
Notes: Heavy tick marks indicate fourth quarter of year. Source: EuroStat & Haver Analytics.

Figure 6
Real Final Sales to Domestic Purchasers



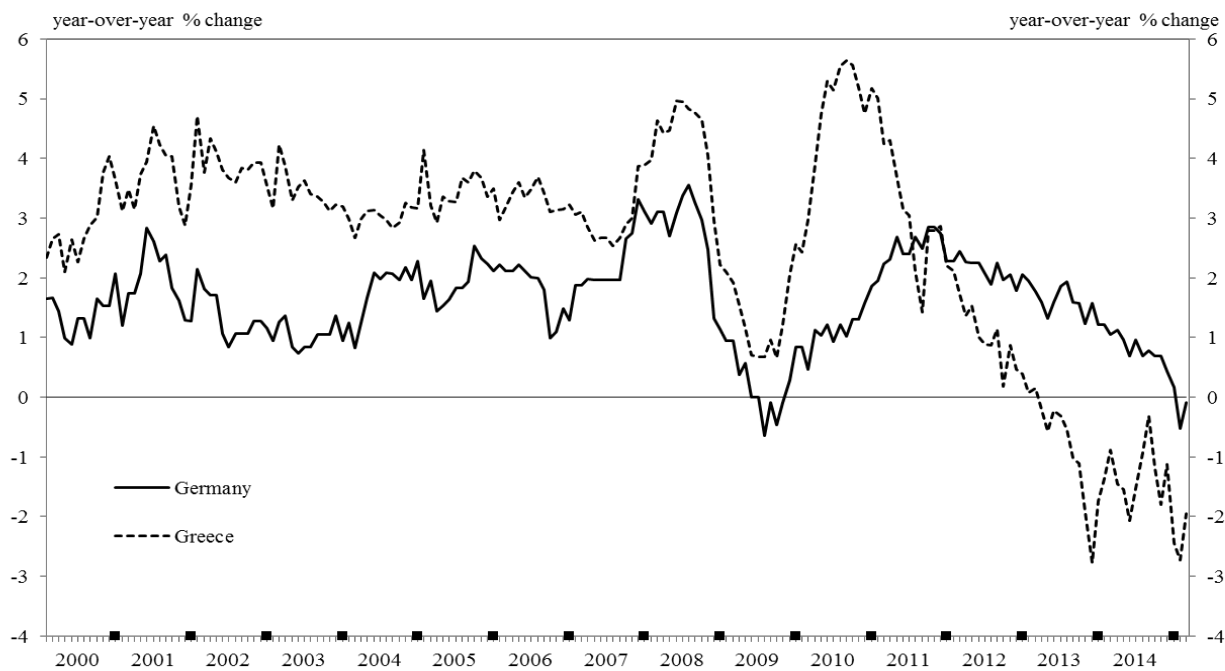
Notes: Real final sales to domestic purchasers expressed as 4-quarter percentage change. Heavy tick marks indicate fourth quarter of the year. Source: Haver Analytics.

Figure 7
Yields on 10-Year Government Bonds



Notes: Heavy tick marks indicate December. Source: ECB and Haver Analytics.

Figure 8
Headline Inflation



Notes: Headline inflation is the harmonized CPI. Monthly observations of 12-month percentage changes. Heavy tick marks indicate December. Source: Haver Analytics.

Figure 9
Greece: Real GDP and External Current Account

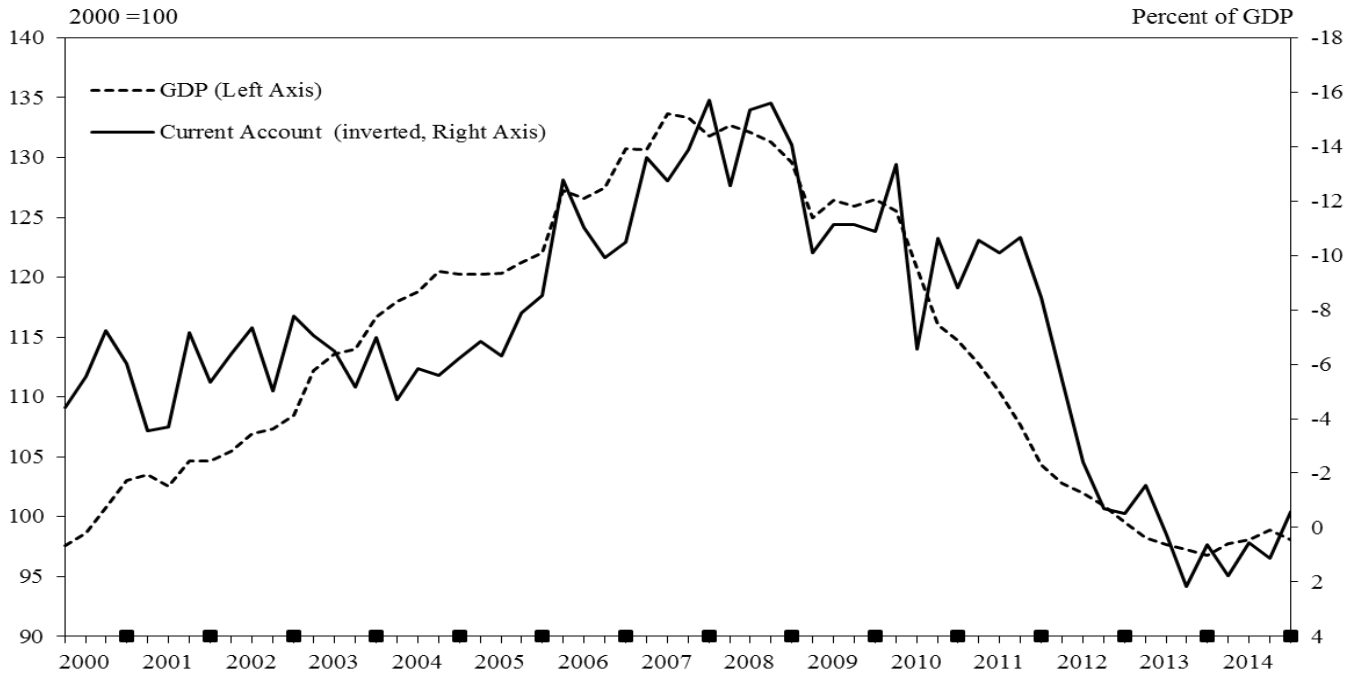


Figure 10
Inflation Divergence

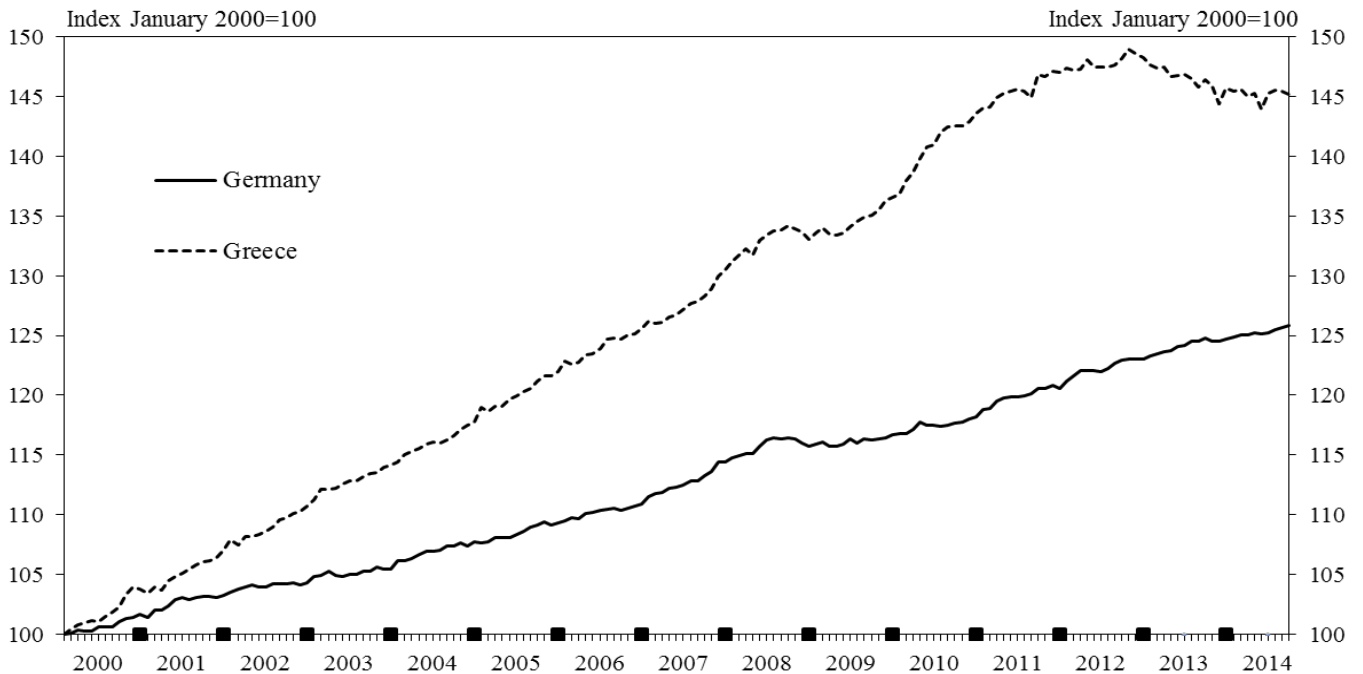
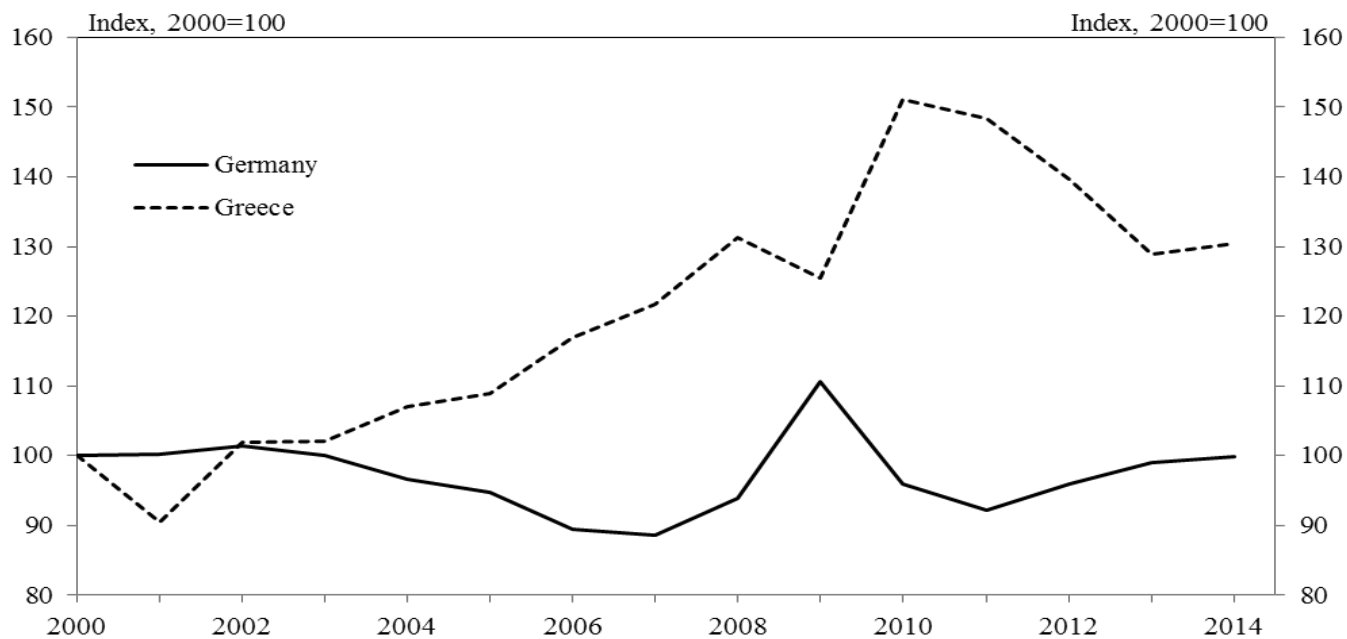


Figure 11
Nominal Unit Labor Costs



Notes: Unit labour costs based on hours worked from the manufacturing sector. Each series is normalized to 100 in 2000. Annual data. Source: European Central Bank.