



The real exchange rate of euro and Greek economic growth



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ABSTRACT

This study argues that an overvalued euro has caused the largest ever drop in Greece's GDP growth since the World War II. Sharp declines of GDP growth would have been avoided had ECB's monetary and exchange rate policy been different and more conducive to countries that suffered the most from the world economic crisis of 2007. Greece was the last to be hit, but was unfortunately 'battered' really hard. In this study, it is found that (a) the real effective exchange rate of euro was 20% overvalued and (b) this has had a negative impact on Greek economic growth. A 10% undervaluation would have increased the rate of growth of per capita GDP by almost an additional 1.25% per annum. This would have made the economic recession less severe. During the crisis years, it seems that the ECB's monetary and exchange rate policy favored particular countries in the eurozone, and Germany emerges as the big winner.

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1. Introduction

In 1981, Greece became the tenth member of the European Economic Community, the predecessor of today's European Union (EU), mainly for political reasons. Nonetheless, many thought it would be an economic success story and they have been vindicated. The adoption of the euro in 2002 was expected to lead to another such triumphant story, which indeed seemed to be happening up to the end of 2009. However, the USA economic downturn of 2007 became a European crisis in 2008–2009 and a Greek economic tragedy in 2010.

As the model of a common currency union would have predicted, countries with the structural characteristics of Greece would have had to make painful fiscal and labor market adjustments with high unemployment rates and deep losses of output. This could most probably have been avoided if the euro, introduced in 2002 as the new Greek national currency, had been devaluated. Since World War II, Greece has achieved very successful national currency devaluations, the most famous among them being the one in 1953.

However, the devaluation of the euro is not an option for the Greek policy authorities. On the contrary, since 2002 the euro has been overvalued, the extent of this appreciation being the subject of this paper. The euro value is now monitored by the European Central Bank (ECB). It is of great interest, more than fifteen years after the establishment of the euro, to see how ECB's policy has affected the individual initial members of the eurozone, particularly in the years of crisis.¹ This

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¹ The role of the ECB has been the subject of many papers, even before its official establishment. Dominguez (2006) provides an excellent overview of its role and also its impact in creating an overvalued euro. She concluded that "[I]t is less clear what role the European Central Bank would play if a European bank were to suffer a major collapse, or if one country or region within Europe were to go into financial crisis" (86–87).

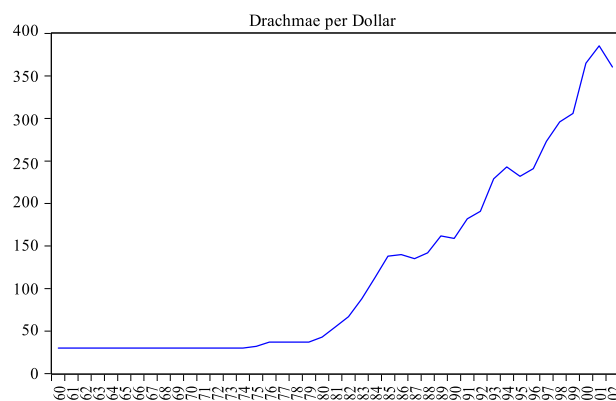


Fig. 1. Units of drachma to buy one dollar.

paper looks primarily at the impact this policy has had on Greek economic growth. I do though discuss the impact of euro's misalignment on all initial countries of the eurozone. To use the journalistic jargon, it seems that the eurozone has been divided between “butchers”² and PIIGS.³

I argue that the current protracted Greek recession is to a large extent the result of a prolonged overvalued euro. [Rodrik \(2008\)](#) has stated that overvalued currencies harm economic growth because the latter is “... associated with foreign currency shortages, *rent seeking and corruption, unsustainably large current account deficits*, balance of payments crises, and stop-and-go *macroeconomic cycles*” (italics added). As a description, it fits very well with what has been happening to Greece in the euro years, primarily after the current crisis in 2009. In this sense, Rodrik's paper can be considered a prophetic one.⁴

The rest of this paper is organized as follows. In the next section (section two), I discuss the issue of euro misalignment from Greece's perspective. Greece's foreign exchange history is split into the drachma years (up to 2001) and the euro years (after 2002). The drachma years are characterized by devaluations against the US dollar, and the euro years with strong appreciations. Section three of the paper finds that the overvalued euro has had a negative impact on Greek economic growth. Section four shows that the ECB's real effective exchange rate (REER) policy seems to favor countries like Germany which rose from the sick man of Europe to an “economic superstar”.⁵ Finally, my concluding remarks are contained in section five.

2. Measuring the amount of a misvalued euro

Greece is credited with one of the most successful examples of currency devaluations in 1953. Twice as many Greek drachma (from 15 to 30 drachma) were required to buy one US dollar. Along with other fiscal and structural measures, this set in motion a process of unprecedented economic growth in the late 1950s and early 1960s.⁶

The Greek drachma was fixed to the dollar till the collapse of the Bretton Woods agreement at the beginning of the 1970s (see [Fig. 1](#)). Up to 2000, the Greek drachma was sliding against all international currencies. The adoption of the euro after 2000 reversed this trend of ongoing depreciations. From 2002 to 2008, the new Greek national currency (the euro), consistently appreciated (see [Fig. 2](#)).

In 2009 Greece was hit by what turned out to be one of the worst recessions in peace years. During the crisis, the euro value was slightly depreciating against the USA dollar. Even in 2014, five years after the beginning of the Greek recession, the euro's value was 30% higher than its 2002 value, while at some point in 2008 it reached a value of 60% higher than its 2002 value.

This section examines the over (under) valuation of Greece's national currency from 1960 to 2014. This period includes both the drachma years (1960–2001) and the euro years (2002–2014). I follow [Rodrik \(2008\)](#) in constructing an index

² As I was writing the first draft of this paper, coincidentally, the same term was used by *The Committee for Employment and Social Affairs* of the European Parliament in a vote on the role of troika in countries like Greece, Ireland and Portugal. They voted on the 13 of February 2014 on troika's role and they concluded that the troika acted ‘more like a butcher than a surgeon’.

³ Portugal, Italy, Ireland, Greece and Spain.

⁴ This is not to say that the overvalued euro is solely responsible for the current Greek economic problems. Monopolistic market structures and an inefficient public sector have had their share as well. However, these problems always existed, even before the adoption of euro and this did not prevent the growth of Greece's economy. What is different is an overvalued Greek real effective exchange rate. It should be noted here that even if these structural deficiencies have deteriorated during the euro years this might be the result of an overvalued euro. [Rodrik \(2008\)](#) mentions corruption and rent seeking behavior as one of many effects of an overvalued currency. An overvalued euro has a negative impact on the Greek tourism because there is a “menu” cost in adjusting prices when the nominal exchange rate appreciates. Greek tourism sells “all inclusive” packages which include services provided domestically at prices including in the package. Depreciation (appreciation) of the euro makes this package less (more) expensive to foreign tourists, including the ones who come from the eurozone countries.

⁵ The term is used by [Dustmann, Fitzenberger, Schönberg, and Spitz-Oener \(2014\)](#).

⁶ An early evaluation of the Greek economic development process of the 1950s is provided by [Adelman and Chenery \(1966\)](#).

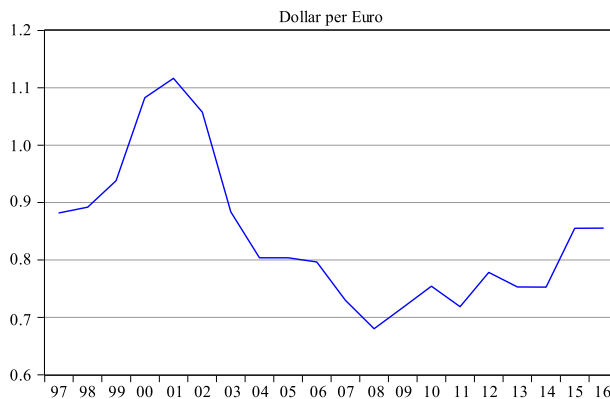


Fig. 2. Units of euro to buy one dollar.

Table 1

Balassa–Samuelson effect.

	1961–2014	1961–2001	1992–2014	1961–2014
Constant	6.21 [*] (0.236)	5.95 [*] (0.264)	1.58 ^{**} (0.615)	0.69 [*] (0.218)
ln(per capita GDP)	−0.4835 [*] (0.091)	−0.3601 [*] (0.1077)	−0.4815 ^{**} (0.213)	−0.171 ^{**} (0.084)
Adjusted R-squared	0.5752	0.3934	0.1893	0.1754

Note: Standard errors in parentheses;

^{*} at least 1% statistical significant;

^{**} at least 5% statistical significant.

of over (under) valuation of a national currency. Given that there is a currency switch from drachma to euro in 2002, I construct one time series of the Greek national currency from 1960 to 2014 based on drachma.

The constructed drachma values are based on the actual historical path of the Greek drachma from 1960 to 2001 and the euro after 2002. The euro values are converted into drachma using the official nominal value of 340.75 drachma for one euro. This is the nominal exchange rate of units of the Greek national currency (drachma) per US dollar. The REER (E) is the value of the nominal exchange rate multiplied by the purchasing power conversion factors of Greek drachma per US dollar⁷:

$$E = EN * (PPP^{US} / PPP^{GR}) \quad (1)$$

As in Rodrik (2008), EN is the nominal exchange rate (units of drachma per US dollar), and the PPP ratio is the conversion factors of units of Greek drachma per US dollar. Values of E greater (less) than one imply that the Greek drachma is more depreciated (more appreciated) than indicated by PPP. This measure of valuation does not take into consideration the Balassa–Samuelson effect, i.e. non-traded goods are priced lower in poorer countries. The following regression provides an estimate of this effect:

$$\ln(E) = \alpha + \beta \ln(GDPPOP) + u \quad (2)$$

$GDPPOP$ is the real Gross Domestic Product (GDP) per capita and β provides an estimate of how strong the Balassa–Samuelson effect is. The Canonical Cointegrating Regression is used for reasons explained in Montalvo (1995). Results are reported in Table 1.

I find a strong and robust impact of the Balassa–Samuelson effect. When Greek per capita income rises by 10%, the real exchange rate falls by 4.8%. Additionally, Table 1 also reports the Balassa–Samuelson effect for two more different periods: 1961–2001 and 1992–2014 which will be discussed further below in this paper. In both time periods, the effect is negative and statistically significant. Finally, the last column reports the results of the Balassa–Samuelson effect when the REER is measured as the nominal exchange rate times the ratio of USA's and Greece's Consumer Price Index (CPI). The effect is negative but not as strong as when the PPP is used. I have also estimated Eq. (2) using the two year forecasted values (2015 and 2016) provided by Eurostat. The results are almost identical (not reported in Table 1).

⁷ Purchasing power parity (PPP) is the number of national units of a country's currency required to buy the same amounts of goods and services in the national market as one US dollar would buy in the United States. Eurostat (AMECO) reports a PPP for Greece and a PPP for USA. World Bank's PPP measurement is available from 1980 and is almost identical with the Eurostat's PPP index.

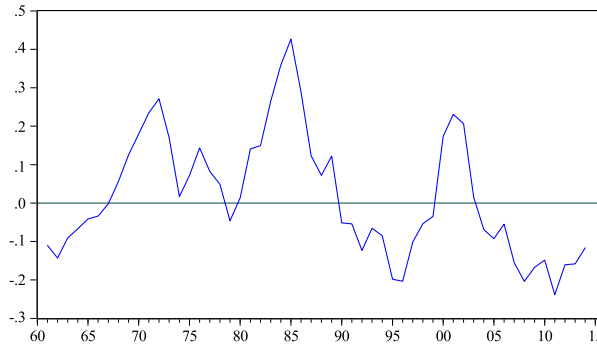


Fig. 3. The misalignment index of the Greek real exchange rate against the US dollar, 1961–2014.

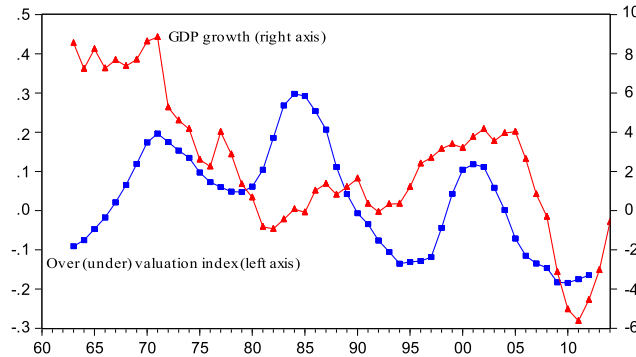


Fig. 4. Over (under) valuation and Greek economic growth, 1961–2014.

The above estimates can be used to measure the over (under) valuation of the Greek currency unit per US dollar (E_{OU}).⁸ The measure is the difference between the actual value of the REER (E) and the value predicted by the above estimation (E_p):

$$\ln(E_{OU}) = \ln(E) - \ln(E_p) \quad (3)$$

If the difference in Eq. (3) is less (greater) than zero, the currency is overvalued (undervalued). Fig. 3 shows the log of REER over (under) valuation index of Greek currency units per dollar for the 1960–2014. From mid 1980s, the Greek euro was undervalued against the USA dollar. Since the 1980s, the Greek currency unit has been overvalued. With the exception of the first euro year (2002), the Greek REER has been overvalued throughout the euro years. The over- or undervaluation measure ranges from -0.24 to 0.21 , and averages around an overvaluation number of -0.1 with a standard deviation of 0.11 .

Quoting Easterly, Rodrik (2008, p. 366) argues that "... large overvaluations have an adverse effect on growth". According to Fig. 3, the overvaluation in the euro years exceeded 20%. This overvaluation was unprecedented for the post war period of Greece, primarily its duration. Unprecedented for peace years was the collapse in the Greek economic growth rates. The impact of an overvalued Greek REER of euro on economic growth is examined in the next section.

3. The impact on economic growth

Fig. 4 depicts the rate of growth of per capita GDP and the over (under) valuation index. I follow Rodrik (2008) in using a five year centered moving average of both variables. Not only is overvaluation related to years of economic stagnation but also undervaluation is related to periods of economic growth. The effect is symmetric. The correlation seems to be much stronger after 1992.

The impact depicted in Fig. 4 can be directly estimated using a GDP growth (GDPGR) equation which is related to an initial real per capita GDP (the convergence term) and the over (under) valuation measure:

$$\text{GDPGR} = \alpha + \beta \ln(\text{GDPGR})_{-1} + \delta \ln(E_{OU}) + u \quad (4)$$

⁸ According to Rodrik (2008) this measure is preferred because has the advantage of making comparisons over time. However, other indices are used and reported below in this paper. The estimates are robust to any index specification and to different time periods.

Table 2
The real exchange rate and Greek economic growth.

	(a)	(b)	(c)	(d)	(e)	(f)
Constant	0.21** (0.040)	0.259 [†] (0.041)	0.334 [†] (0.028)	0.325 [†] (0.034)	0.417 [†] (0.085)	0.317 [†] (0.040)
ln(initial per capita income)	−0.072 [†] (0.015)	−0.095 [†] (0.016)	−0.126 [†] (0.011)	−0.121 [†] (0.014)	−0.156 [†] (0.030)	−0.119 [†] (0.016)
ln(over (under) valuation index)	0.054*** (0.032)	0.052*** (0.028)	1.029 [†] (0.316)	1.225 [†] (0.373)	0.820** (0.36)	1.079 [†] (0.414)
The Olympic effect		0.053 [†] (0.009)	0.067 [†] (0.009)	0.052 [†] (0.010)	0.071 [†] (0.011)	0.064 [†] (0.010)
ln(initial per capita income) × ln(over (under) valuation index)			−0.371 [†] (0.118)	−0.458 [†] (0.142)	−0.302** (0.133)	−0.386** (0.152)
Adjusted R-squared	0.3844	0.5515	0.6222	0.5698	0.4963	0.5659
Time period	1961–2014	1961–2014	1961–2014	1961–2001	1971–2014	1961–2014

Note: Standard errors in parentheses;
[†] at least 1% statistical significant;
^{**} at least 5% statistical significant;
^{***} at least 10% statistically significant.

Table 2 gives the estimates of the coefficients of Eq. (4).⁹ Column (a) of Table 2 reports the parameter estimates of the simple model. I find a positive economic growth impact of over (under) valuation of the real Greek foreign exchange rate value for the 1961–2014 period. The average growth in per capita GDP of the period is 2.5%. A 10% undervaluation would have increased the rate of growth of per capita GDP by almost 54% or by an additional 1.25% per annum.

In the euro years, the overvaluation of the Greek real foreign exchange rate was 20%, especially in the post-2008 period when the Greek per capita GDP was sharply declining. If the overvaluation of euro had been corrected, the growth rate would have still been negative but the recession would have been much milder. Extending this argument even further, if Greek authorities could undervalue their national currency, as they did many times in the past with great success and at higher rates than 10%, they would have been able to overcome the recession altogether. The question is whether the euro exchange rate could be affected given the institutional framework of the eurozone.¹⁰ This issue is discussed in the next section.

In the remainder of this section, I discuss the robustness of this impact. Eq. (4) is extended to include: (a) the institutional impact of euro introduction in 2002, (b) the 2004 Olympic Games effect (1998–2007), (c) the effect of dictatorship (1967–1974), and (d) the effect of elections. Only the Olympic effect was statistically significant. The estimate is reported in column (b) of Table 2. This finding supports Rose and Spiegel (2011) empirical evidence that the Olympics increase exports and thus lead to an export-led economic growth.

Column (c) of Table 2 extends the regression model to include an interaction term between initial income and the over (under) valuation index. Its estimated coefficient is negative and statistically significant. This shows that the impact depends on the level of development. As the Greek economy grows, the impact of over (under) valuation diminishes.

The impact can be split into different time periods. The most important sub-periods are the drachma and the euro years. Column (d) of Table 2 reports the estimates of the drachma years (1961–2001). The results are very similar to the ones obtained for the entire sample period. However, as expected the over (under) valuation impact is greater.

The index of overvaluation is based on the drachma–dollar exchange rate. Eurostat (AMECO) reports a real effective exchange rate which is equivalent to EN of Eq. (1) above. This index is available since 1970. Eq. (2) is estimated using the Eurostat measure of REER. The parameter estimate is −0.5355 and its *t*-value 5.88. The new estimates are applied to construct a new over (under) valuation index as specified by Eq. (3). The new index is used to estimate Eq. (4). The parameter estimators are reported in column (e) of Table 2. The impact is not as strong but all coefficients are statistically significant. A possible explanation is that Eurostat uses a PPP based on a distinction of traded and non-traded goods. Traded goods are used to estimate REER. However, in the case of Greece, tourism plays an important role and domestic prices of the so-called non-traded goods have a strong impact on tourism exports. This strong impact is not captured by the Eurostat's measurement of real effective exchange rates.

Finally, as mentioned in Table 1, another index of REER can be constructed using the nominal exchange rate of Greek drachma per US dollar multiplied by the ratio of CPI of USA and Greece. The growth equation was re-estimated using the new REER and the results are reported in column (f) of Table 2. The results are pretty much the same as with those in column (d).

Since 2002, the foreign exchange value of the national currency of Greece, the euro, cannot be devalued by the Greek monetary authorities as was done the pre-euro period. The above analysis suggests that from Greece's point of view the

⁹ The three variables of the equation are integrated of zero order using the ADF and KPSS test. The OLS can be used to estimate unbiased and efficient coefficients.

¹⁰ This paper by no means recommends a Grexit. This issue is not discussed in this paper. What it does recommend is a less restrictive monetary policy similar to the one announced on the 9th of March 2015 ECB quantitative easing. This is expected to depreciate euro's value especially against the US dollar and *ceteris paribus* would devalue the Greek REER.



Fig. 5. The eurozone inflation rate based on the harmonized CPI index (%).

euro has been overvalued resulting in lower economic growth. It is of interest to see whether this was the case for the other eurozone countries as well. In other words, was euro overvalued for the rest of the eurozone? If not, which countries faced an overvalued euro and which an undervalued one? These questions are discussed in the next section.

4. The over (under) valuation of euro

The European Central Bank (ECB) has followed a restrictive monetary policy targeting the eurozone inflation rate. Based on the harmonized index of consumer prices, ECB's target is an inflation rate below but close to 2%. Fig. 5 shows the inflation rate in the eurozone since 1999 for the 18 eurozone countries.

What is of interest is that the inflation rate was slightly above the 2% target from 2000 to 2007,¹¹ being a really high achievement of price stability. Inflation jumped to 3.33% in 2008, crumbled to 0.3% in 2009 and to 1.6% in 2010. It also exceeded the 2% threshold in 2011 and 2012 (2.7% and 2.5%) but it is expected to be below 1.5% in the next four years (2013–2016).

This is contrary to what one would expect from a central authority aiming at combating economic recession and the huge levels of official unemployment of the periphery of the eurozone. For example Schmitt-Grohé and Uribe (2013, p. 210) have found "... that a policy of four percent inflation for five years would go a long way towards bringing unemployment down to pre-crisis levels" in the eurozone.¹² This would have put a downward pressure on an overvalued euro as is demonstrated below in Table 3 for the 12 initial countries which adopted the euro in 2002.

The nominal euro exchange rate is the same for all countries but the real rate does differ because of differences in domestic prices. The PPP of the eurozone countries do differ as do their REER. The previous section has shown that an overvalued REER has had a negative impact on Greek economic growth. In the euro years, the Greek REER was overvalued. In this section, we estimate this misvalued index using ECB's index of REER¹³ and compare them with the other eurozone countries and three non-eurozone countries: Sweden, Denmark and UK.

Table 3 gives the estimated values of the over (under) valuation index of the initial eurozone countries. These values have been estimated using Eq. (3). I want to keep the analysis as simple as possible. I use the simple equation for all countries but the coefficient estimate is not independent of the time period. Statistical significance and data availability determined the choice of the time period. Data are available from 1970 for all countries with the exception of Germany and Luxembourg; their data exist after 1992. The 1992–2014 period coincides with the introduction of the Economic and Monetary Union and the Maastricht Treaty of forming the European Union. The agreement was signed on 7th of February 1992.

Annual estimates of the over (under) valuation of euro, the mean of the 1992–2001 and 2002–2014 period and the standard deviations of the two periods are reported. What is important is to examine the overvaluation or undervaluation of REER for each country of the eurozone in the first years of the euro experiment. A negative (positive) sign shows overvaluation (undervaluation) of REER. In order to be able to show the crisis effect, the euro years should be divided in two distinct periods (pro-crisis and after-crisis), the only country which had its REER undervalued during the pre-crisis years (before 2010) was Germany followed by Belgium, Luxembourg and Finland. Germany's REER was slightly overvalued before 2002, it turned into undervaluation during the first eight years of euro (2002–2009) and only in the last four years (2011–2014) did

¹¹ Lane (2006) provides an excellent discussion of inflation rates in the early years of the euro period. Differences did exist between the initial eurozone countries but the standard deviation time trend of prices show convergence.

¹² They also explain the mechanism as follows "... a natural and practical remedy to the problems of the eurozone is monetary in nature. Specifically, a one-time rise in the overall price level in the euro area, a temporary period of inflation, would go a long way toward restoring full employment in the periphery of Europe. This monetary policy should be geared toward deflating the real value of wages in the periphery countries back to their pre-boom levels".

¹³ This section uses the real effective exchange rates (REER) as reported by the European Central Bank (ECB). The ECB's methodology of constructing the time series of effective exchange rates of euro is discussed in Schmitz, De Clercq, Fidora, Lauro, and Pinheiro (2012).

Table 3
Over (under) valuation of the real effective exchange rate of the initial 12 eurozone countries and Denmark, Sweden and UK.

	GRE [*] 70–13	GER [*] 92–14	NET [*] 92–13	IRE [*] 70–14	ITA [*] 72–14	POR [*] 92–14	SPA ^{***} 92–14	FRA [*] 70–14	BEL [*] 81–14	AUS [*] 92–14	FIN ^{**} 70–14	LUX [*] 93–14	DEN [*] 70–14	SWE [*] 70–14	UK [*] 70–14
2002	-0.0108	0.0081	0.0002	0.1006	0.0865	-0.0128	0.0671	0.0338	0.0243	0.0308	0.0917	0.0743	0.0398	0.0444	-0.1603
2003	0.0203	0.0117	-0.0208	0.0425	0.0432	-0.0481	0.0473	0.0191	0.0215	0.0270	0.0902	0.0644	0.0223	0.0306	-0.0447
2004	0.0391	0.0220	-0.0081	0.0205	0.0304	-0.0258	0.0318	0.0184	0.0447	0.0352	0.0906	0.0732	0.0358	0.0317	-0.0813
2005	-0.0356	0.0358	0.0105	-0.0134	0.0228	-0.0403	0.0139	0.0065	0.0443	0.0299	0.0717	0.0726	0.0249	0.0444	-0.0731
2006	0.0148	0.0376	0.0275	-0.0316	0.0132	-0.0221	-0.0041	-0.0060	0.0365	0.0142	0.0619	0.0665	0.0195	0.0321	-0.0957
2007	0.0225	0.0349	0.0297	-0.0633	0.0114	0.0039	-0.0266	-0.0093	0.0341	0.0126	0.0674	0.0733	-0.0160	-0.0047	-0.1041
2008	-0.0132	0.0133	0.0116	-0.1431	-0.0203	-0.0007	-0.0721	-0.0235	0.0033	-0.0044	0.0239	0.0201	-0.0626	0.0053	0.0574
2009	-0.0746	0.0284	-0.0177	-0.1055	-0.0530	-0.0196	-0.0662	-0.0188	-0.0076	-0.0050	-0.0139	-0.0558	-0.0978	0.1132	0.1464
2010	-0.1041	0.0061	-0.0029	-0.0199	-0.0495	0.0038	-0.0465	-0.0312	0.0032	-0.0076	0.0028	-0.0285	-0.0779	0.0098	0.0881
2011	-0.1433	-0.0268	-0.0063	0.0218	-0.0495	0.0163	-0.0311	-0.0387	-0.0170	-0.0138	-0.0107	-0.0441	-0.0644	-0.0752	0.1123
2012	-0.1121	-0.0287	-0.0142	0.0553	-0.0471	0.0468	0.0248	-0.0241	-0.0210	-0.0131	-0.0210	-0.0613	-0.0458	-0.1136	0.0421
2013	-0.0467	-0.0433	-0.0212	0.0196	-0.0559	0.0296	0.0387	-0.0245	-0.0308	-0.0241	-0.0227	-0.0878	-0.0522	-0.1246	0.0953
2014	-0.0060	-0.0595	-0.0079	0.0848	-0.0558	0.0504	0.0598	-0.0212	-0.0120	-0.0342	-0.0208	-0.0840	-0.0575	-0.0816	0.0456
M92-01	0.0164	-0.0160	0.0173	0.0504	0.0683	-0.0055	0.0317	0.0314	-0.0169	-0.0006	0.0825	0.0447	0.0608	0.0689	-0.0117
SD92-01	0.0562	0.0470	0.0302	0.0531	0.0799	0.0162	0.0569	0.0254	0.0458	0.0305	0.1723	0.0595	0.0170	0.0691	0.1383
M02-14	-0.0346	0.0030	-0.0015	-0.0024	-0.0095	-0.0014	0.0028	-0.0092	0.0095	0.0037	0.0316	0.0064	-0.0255	-0.0068	0.0021
SD02-14	0.0580	0.0320	0.0169	0.0710	0.0470	0.0310	0.0474	0.0222	0.0262	0.0228	0.0479	0.0673	0.0483	0.0707	0.0990

Note: A negative (positive) number indicates overvaluation (undervaluation);

* 1% level of statistical significance;

** 5% level of statistical significance;

*** 10% level of statistical significance.

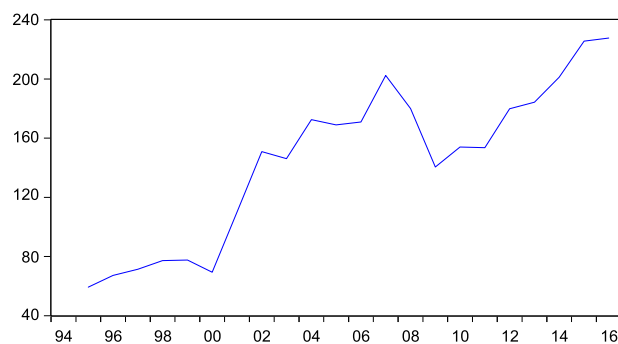


Fig. 6. Germany's trade balance in millions of 2010 euro, 1995–2014.

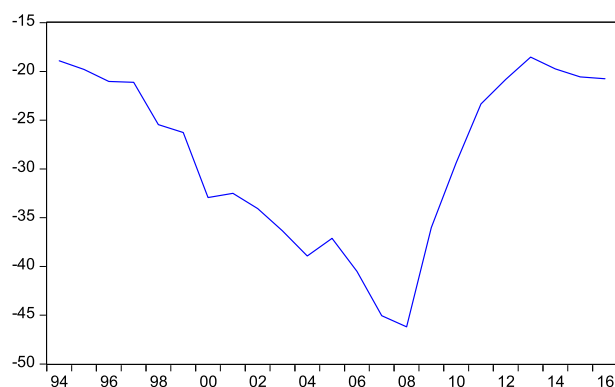


Fig. 7. Greece's trade balance in millions of 2010 euro, 1995–2014.

Germany's REER appreciated. No other country has had such a favored record of REER values. On the other hand, Greece had its REER overvalued in nine out of the thirteen years of the euro period and its average was the highest overvalued REER in the eurozone.

The main result, as one would have expected, was huge and unprecedented accumulation of German trade surpluses (see Fig. 6). Germany has accumulated a trade surplus of 2.2 trillion of euro during the euro years (2002–2014), an annual average of 170 billions of euro. In the pre-euro years the trade surplus of Germany was 76 billion euro per year. No wonder why Germany from a sick man became an economic superstar. This star, however, seems to be *eterofotous*, “stealing” its light from the sunny countries of the eurozone, like Greece. Hopefully Germany is not a supernova and become unable to sustain itself against its own gravity and collapse into a black hole.

Greece's story is exactly the opposite (see Fig. 7). Greece always had a trade balance deficit problem but it became unprecedented during the euro years. From an annual average of 25 billions of euro trade deficit in the pre euro period, it became 33 billion euro in the euro years (2002–2014), reaching annual values of 44 billions of euro during the three years before the crisis (2006–2008).

The rest of the eurozone countries lie between Greece and Germany. Two distinct groups emerge in the eurozone. The first group consists of the “winners” from ECB's REER policy. These countries are Germany, Austria, the Netherlands, Finland, Belgium and Luxembourg. The losers are the rest of the eurozone countries: Greece, France, Ireland, Italy, Portugal, Spain. Fig. 8 shows the trade balances of the two groups. The trade surpluses of one group of the eurozone countries almost match the trade deficits of the other group. Before the introduction of the euro, the trade surplus of the first group was about 117 billion euro per annum and the trade deficit of the second group was 17 billion euro. The difference was 134 billion euro. In the euro years, the average trade surplus of the first group was 225 billion euro and the average trade deficit of the second group was 127 billion euro. The difference skyrocketed to 352 billion of euro.

If the REER does influence the trade balances of the countries, then euro's REER has definitely benefited certain countries at the expense of others. The big winner was Germany and the big loser was Greece. If Germany had the power to shape the ECB's exchange rate policy, as some commentators claim, then it would not have asked for any change of this policy.

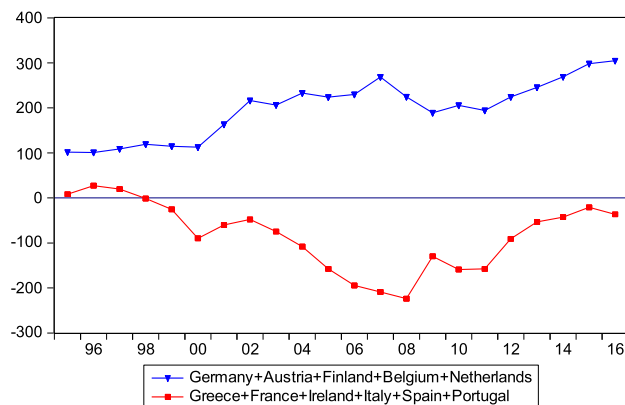


Fig. 8. Trade balances of winners and losers in millions of 2010 euro, 1995–2014.

According to this consideration, it is not surprising that Germany was a strong opponent to ECB's new policy of quantitative easing announce in March of 2015.¹⁴

Feldstein (2000) commemorating the first anniversary of the euro in 2000, claimed that the devaluation of the euro in its first year of existence "... has helped to strengthen aggregate demand by increasing Europe's net exports, and has done so without any obvious increase in overall inflation" (p. 346). However, the benefits were not equally distributed among the eurozone countries. Feldstein stated that the undervalued euro did not help Germany because for a German firm "... the sharp decline of the euro has meant an equally sharp increase in the cost of production and a corresponding loss of competitiveness" (p. 347). It seems that Germany was able to take care of this problem through a number of channels in the first decade of the implementation of the common currency policy.

First, Germany followed a policy of nominal wage growth suppression. There was a sharp decline in unionization and wages, with wage bargaining shifting from the central to the firm level. The result was much lower wage growth compared to the other eurozone countries. Dustmann et al. (2014, p. 169) have argued that "... Germany's gains in competitiveness with regard to France, Italy, and Spain cannot be due to currency depreciation (and in fact the euro appreciated relative to the currency of most trading partners), because these countries all share the euro, and so it must have arisen because German wages grew at a slower pace than productivity relative to these other eurozone countries". Their statement is correct but it does not tell the whole story. The depression of wages in Germany could not by itself result in a competitive advantage. The euro appreciated from 2002 to 2009 but Germany's REER devalued as is depicted in Table 3. The depreciation of German REER created an additional competitive advantage over Germany's partners in the eurozone. Along with the appreciation of euro relative to all other currencies have helped Germany to increase its international competitiveness and reach a record number of exports.

The overvalued euro increased the migration of skilled workers from all the world to Germany. This increased the productivity of German manufacturing companies suppressing the wage growth. It even increased the migration from within the eurozone countries because the overvalued euro increased the unemployment rate in the peripheral countries of the eurozone. This is ignored by Dustmann et al. (2014). They instead emphasize the specific system of German industrial relations. However, it would be of interest to study what was the wage effect of legal and illegal immigration to Germany during this period of euro appreciation.

The higher value of the euro has increased the outsourcing of German firms' manufacturing inputs to neighboring countries (Poland, Hungary, Czech and Slovak Republics). Sinn (2006, pp. 1160–1161) has stated that "[I]nstead of 'Made in Germany', 'Designed, assembled and sold in Germany' would often be a more appropriate label, and even that may in part be an exaggeration. Take the Porsche Cayenne as an example; that car is seemingly produced in Leipzig, but in truth the assembly line is located in Bratislava, Slovakia. Little more than the engine is added in Leipzig ... about a third of the production value of the vehicle is generated in Germany. No wonder, then, that Porsche has no problems with German wage costs!" The study's conclusion is even more interesting. Sinn (2006, p. 1174) concluded that "[G]ermany cannot continue with this strategy for any length of time because it leads to *mass unemployment* and *chaos*" (emphasis added). Germany in the 2005–2009 period was able to export mass unemployment and chaos to other eurozone countries through its REER of the euro. There was a huge and unprecedented appreciation of the nominal value of the euro. At some point in 2008 one euro was traded at 1.6 US dollars. Table 3 shows that for Germany this period is marked by the highest values of undervaluation of German's REER of euro.

¹⁴ The impact of this policy announcement was an instantaneous fall of the euro. This is the nominal exchange rate. It is to be seen whether this policy would affect the Greek REER. Anecdotal evidence from the Greek tourism industry shows that the low value of euro and of course other political developments in the wider area have increased Greek tourism flows to unprecedented numbers in 2014 and 2015.

Another reason which might explain the huge increase in exports and the creation of gigantic trade surpluses is the structure of the manufacturing sector. The industry is characterized by oligopolistic and monopolistic firms that enjoy economies of scale. Thus, the per unit cost decreases with an increase in the volume of production. The increasing volume of production is absorbed by an increase in exports. It is also true that many manufacturing German exports are durable commodities which need maintenance and parts. In such cases, the demand is inelastic and an appreciation of the euro increases export revenue, even if demand decreases.

Finally, as was stated by Rodrik (2008), an overvalued currency increases corruption. This was definitely the case of Greece in the euro years, the country with the most overvalued REER of euro. Corruption of public officials is usually related to public procurements. The recent legal investigations of corrupted public officials in Greece have shown, without even one exception, that German companies like Siemens were on the supply side of corruption. Notwithstanding morality and ethical corporate behavior, the economic benefits of corruption were asymmetric for Greece and Germany. Greece was receiving German products that were overpriced harming Greece's trade balance and deteriorating its public budget position while Germany was able to increase its exports. In an actual free trade environment, German firms would have to sell at much lower price if they were able to sell at all.

5. Conclusions

It is my contention, as demonstrated in this paper, that a large part of the current Greek economic crisis can be explained by an overvalued euro. The euro-dollar misalignment has had a negative impact on Greek economic growth. The ECB's monetary and foreign exchange rate policy seems to serve the economic interests of Germany and harms the interests of the peripheral countries of the eurozone. An appropriate foreign exchange rate policy would have mitigated the severity of the recent deep and prolonged recession.

Greece's future in the eurozone cannot rely solely on correcting the euro misalignments. Alesina and Barro (2002) presented a model where the optimal currency area depends on a number of variables such as "... a history of high inflation and is close in a variety of ways to a large and monetarily stable country" (p. 435). Greece has had a long history of high inflation. The euro years are characterized by an unprecedented low and stable Greek inflation rate. On the other hand, Greece is the only country of the region that is a member of the eurozone. Most of the surrounding countries are not even members of the European Union.

The present study's results being indicative of European exchange rate policy's impact on the duration and severity of the recession in Greece, further research, taking under consideration the bilateral economic connections with its neighboring countries, is needed in order to shed some light on this issue.

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