EUROPEAN PARLIAMENT

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Explaining the strength of the euro

NOTE

Abstract

The appreciation of the euro is less detrimental to the Euro Area economy than often claimed. The recent strength of the euro is explained by current account surpluses due to excessive austerity and it is estimated that interventions by the ECB in the forex market are prohibitively expensive. Rather than asking the ECB to intervene in markets, policy makers should stimulate domestic demand in the Euro Area.

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CONTENTS

EXECUTIVE SUMMARY

- The exchange rate between the euro and the US dollar is the price between the two most important currencies in the world. Because many countries have pegged to either of the two currencies, exchange rate adjustment via the USD-euro rate would have to be large.
- The euro has appreciated against the USD since ECB President Draghi has restored confidence into the euro. However, the effect in nominal terms is moderate, and in real terms the euro has remained fairly stable when measured by effective exchange rates.
- Policy recommendation: The European Parliament ought to request ECB and Commission to harmonize the calculation of effective exchange rate indicators.
- The strength of the euro is less constraining Euro Area exports than the effects of the global recession and the fallout from the financial crisis.
- Our estimates show that the ECB does in fact have an exchange policy, although it seems mainly to be at the service of the ECB's primary objective of maintaining price stability.
- Despite the massive outflows of capital, the euro has strengthened due to current account surpluses, which have been caused by excessive austerity and a reduction in imports. Thus, we conclude that the recent strength of the euro is a consequence of austerity. In order to prevent an excess appreciation, the Euro Area needs a demand stimulus.

INTRODUCTION

Since mid-2012, effectively since ECB President Draghi said the European Central Bank would "do whatever it takes to save the euro", Europe's currency has had a tendency to appreciate. As usual, and with seemingly unshakable regularity after a period of appreciation, policy makers and business representatives have started to complain about the strong euro. Unemployment, recession, and fiscal crises are blamed on the currency's strength and the European Central Bank has been urged to weaken the euro. As it is often assumed that a weaker exchange rate could fix the underlying economic competitiveness problems, these voices are louder in member states with apparent problems of competitiveness.

In this paper I will first present the basic facts with respect to the USD-euro exchange rate and effective exchange rates; I will then turn to monetary policy and evaluate policy options for reducing excessive strength.

FACTS ABOUT THE STRENGTH OF THE EURO

1.1. Currency areas

The exchange rate between the euro and the US dollar is the price between the two most important currencies in the world. Well over one quarter of the foreign exchange spot market transactions consists of bilateral transactions between euro and dollar. See Table 1. In the Swap market the market share is even higher. The exchange rate is the outcome of supply and demand of foreign currency in foreign exchange markets. It therefore follows the logic of asset prices which are in principle unpredictable.[1] Nevertheless, between economies with different currencies, the exchange rate is an important factor for the determination of competitiveness, because it sets the relative price for goods and services and generates opportunities for trade arbitrage. However, contrary to earlier theories going back to the time of the Gold Standard, such as the law of one price and purchasing power parity, the exchange rate is not determined by relative prices for goods. This means that given the volumes in global financial markets, the exchange rate is to a large degree a function of financial payment flows. This makes freely floating exchange rates a persistent source of noise, distortions and uncertainty. As a consequence, it is not only the level of exchange rates, but also their volatility which influences trade and investment opportunities.

In order to reduce this volatility, numerous countries have pegged their currencies to either the USD or the euro. See Figure 1. As a consequence, changes in the bilateral exchange rate between the two main global currencies will not only affect trade between the Euro Area and the USA, but a much larger share of global trade. Hence, if a weaker USD-euro exchange rate is to improve export and trade performances, the variations in the bilateral rate would have to be large, because exchange rates within the currency blocs are relatively fixed.[2]

On the other hand, it is important to keep in mind, that transactions within the single market and the Euro Area are not "foreign" even if they are recorded in foreign trade and balance of payment statistics. Intra-European trade depends partly on intra-European supply chain developments, which have gained increasing importance since the single market and the single currency were set up, and partly on internal demand, which is a consequence of macroeconomic policies within the Euro Area (monetary and fiscal policy, wage settlements). A depreciation of the euro may (or may not) affect demand from the rest of the world for exports, but the national impact is much less than official export statistics seem to indicate. See Figure 2, which shows that in most member states intra-European exports are an important part of total exports.[3] This means that the exchange rate is less relevant for export promotion than domestic measures of competitiveness.

[1] In technical terms, this means that the daily USD-euro exchange rate has a unit root, which means it evolves as a random walk (see annex 1) where the probability of an appreciation or depreciation at any moment is 50:50, and the exchange rate at any point in time reflects the accumulated shocks of the entire past.

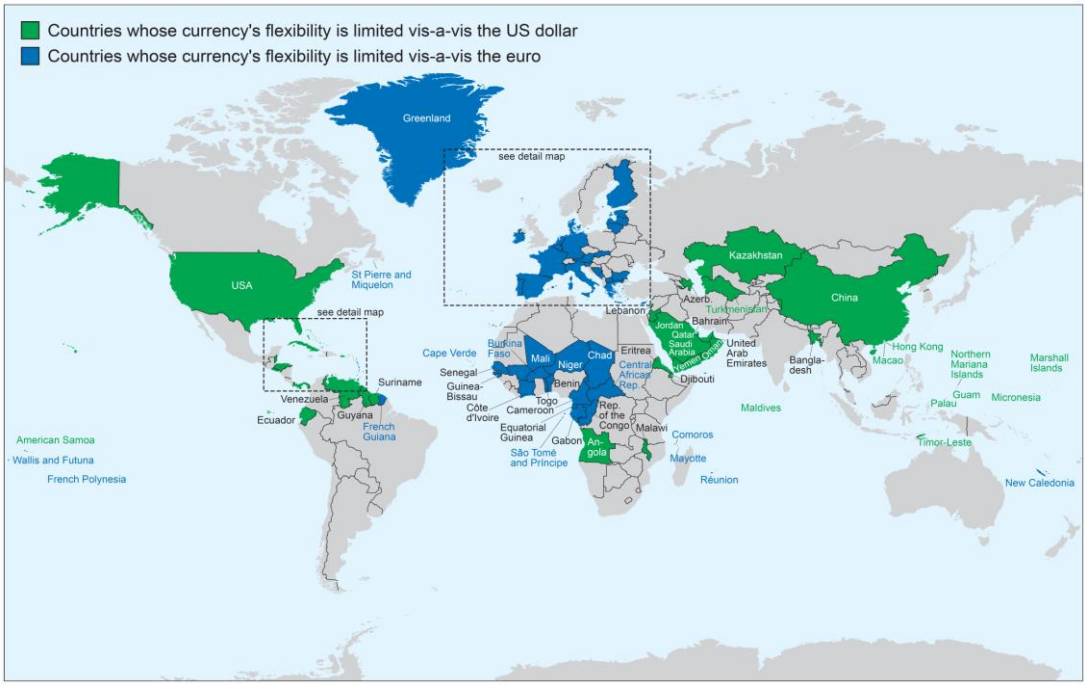
[2] For an explanatory theory of currency blocs, see Collignon, 2002; for evidence: Fischer 2012.

[3] Note the differences in scale in Figure 2.

Table 1.

FOREIGN EXCHANGE SPOT TRANSACTIONS 2013		
Average Daily Volume, Millions of U.S. Dollars		
Currency Pair	**Total**	**Percent**
U.S. DOLLAR versus		
Euro	105,227	27.2%
Japanese yen	66,892	17.3%
British pound	41,671	10.8%
Canadian dollar	22,299	5.8%
Swiss franc	14,488	3.7%
Australian dollar	25,500	6.6%
Argentine peso	29	0.0%
Brazilian real	3,744	1.0%
Chilean peso	714	0.2%
Mexican peso	13,955	3.6%
All other currencies	35,414	9.2%
EURO versus		0.0%
Japanese yen	12,056	3.1%
British pound	8,344	2.2%
Swiss franc	5,977	1.5%
ALL OTHER CURRENCY PAIRS	30,560	7.9%
Total	**386,870**	100.0%
Source: New York Federal Reserve Bank		
http://www.newyorkfed.org/fxc/volumesurvey/		

Figure 1. Map of the two major currency blocs in 2008



Source: Fischer 2012

Figure 2. Export intensities by area

Source: own elaboration on Eurostat-Comext

1.2. The euro exchange rate

Since the start of monetary union, one can distinguish three phases in the evolution of the external value of the euro with respect to the US dollar. See Figure 3. In the initial phase, when it was uncertain whether the new currency would work, the euro lost value. After the burst of the dot.com bubble and 9/11 until the initial phase of the financial crisis, the euro became very strong, appreciating by nearly 80 percent and reaching an all-time peak at 1.60 USD per euro. Especially in the second half of the 2000s when the economy grew rapidly, creating more jobs than ever before and reducing fiscal deficits, the euro gained strength; yet, during those years hardly anyone complained that it was too strong.

The third phase started after the Lehman disaster. At first the Euro strengthened as the US economy was at the brink of depression, but then Europe's home-made problems became dominant. After the election of G. Papandreou and the revelation that the Greek deficit had been underreported, the euro weakened again; after the bailout in form of the EFSF and the ESM, it returned to the previous level, but in early 2011, economic problems worsened again and the euro fell to its low level of USD 1.20. Only in the summer of 2012, after Mario Draghi's announcement which subsequently led to the creation of the Outright Monetary Transaction program (OMT), did financial markets regain their confidence in the European currency. Since then the euro has appreciated by nearly 15 percent, which is significant, although the exchange rate is still 12.5 percent below the 2007-peak.

Figure 3.

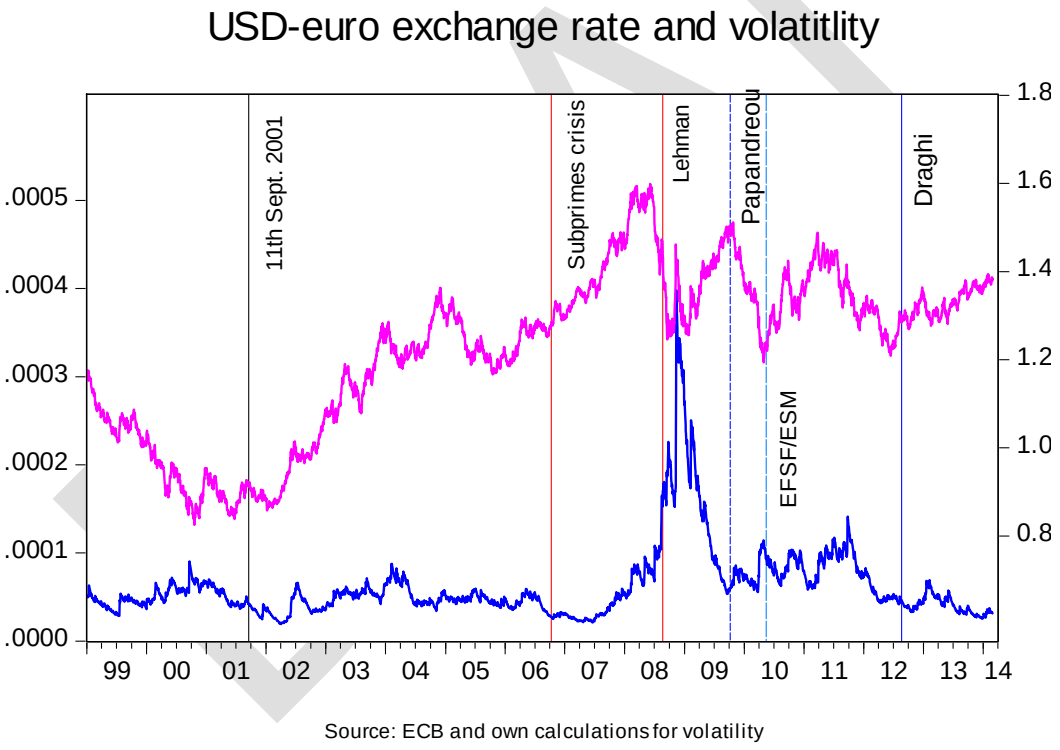


Figure 3 also shows the volatility of the bilateral exchange rate.[4] Volatility was relatively low until the early phase of the financial crisis in 2007. It exploded after the Lehman bankruptcy and then stayed at a higher level during the euro crisis, until President Draghi's declaration in 2012 helped to restore confidence into the euro.

[4] Measured by a Garch model. See Centro Europa Ricerche, 2014.

1.3 The exchange rate and competitiveness

Because the exchange rate does determine the relative prices for goods and services between different currency areas, it has an effect on price and cost competitiveness. This is measured by constructing so-called effective exchange rates, which are the weighted average of different currency exchange rates, where the weights reflect the importance of trade. These effective exchange rate indices are calculated by various international organisations, such as the ECB, European Commission, BIS and IMF.[5] Given different methodologies, they generate different results. The European Commission's index deviates from the ECB's and the BIS indices, largely because the Commission does not sufficiently take into account changes in the structure of world trade, especially the growing weight of Euro-Chinese exchanges. Lauro and Schmitz (2012) therefore emphasize that "it would be desirable to follow the same methodology in constructing these indicators – in particular as regards the composition of trading partner groups".

Policy recommendation: The European Parliament ought to request ECB and Commission to harmonize the calculation of effective exchange rate indicators.

Table 2 shows the variation of effective exchange rates based on the BIS methodology (which is very similar to the ECB). One distinguishes between nominal and effective exchange rates. Nominal rates are the trade-weighted basket of nominal exchange rates, while real rates take into account the relative inflation rates. The real effective exchange rate (REER) is therefore an indicator for price competitiveness. Table 2 shows that while the nominal effective exchange rate (NEER) appreciated for all member states of the Euro Area, price competitiveness only deteriorated in Estonia, Slovakia, Austria and Luxemburg.

By contrast, countries with national currencies like Sweden, Czech Republic and Hungary did experience nominal effective depreciations which re-enforced competitive improvements. Japan is an clear outlier, as the depreciation of the yen was the direct consequence of Prime Minister Abe's economic stimulus packet. We also notice that the USD effectively *appreciated* against the most important trade partners of the United States in nominal terms, but nevertheless slow inflation improved the price competitiveness of American exports. Finally, China, which had been accused of exchange rate dumping only a few years ago, has effectively seen its currency appreciate in nominal and real terms, thereby losing comparative advantages.

The overall conclusion is that the concerns with a strong euro are hardly supported by the facts. One may object that the competitiveness improvements, which have taken place despite nominal appreciations, are due to deflation in the appreciating countries, but this argument places the policy debate on a different level than simple exchange rate policies. In particular it raises questions about Euro Area macroeconomic policies and the role of austerity in the context of global trade and capital flows.

[5] For a comparison of these different indices and their methodological differences, see Lauro and Schmitz (2012).

Table 2.

Chances in Effective Exchange Rates: September 2008- April 2014						
	NEER	***REER***			***NEER***	***REER***
Estonia	6.1%	3.2%		Lithuania	5.4%	4.4%
Slovakia	5.1%	2.0%		Bulgaria	6.0%	1.3%
Austria	4.5%	1.2%		United Kingdom	2.4%	0.1%
Luxembourg	3.3%	1.0%		Latvia	4.0%	-0.6%
Slovenia	4.0%	-0.8%		Denmark	5.9%	-1.4%
Netherlands	6.8%	-1.0%		Sweden	-2.7%	-2.0%
Belgium	5.5%	-1.1%		Romania	6.5%	-4.6%
Italy	6.0%	-1.6%		Croatia	2.3%	-6.4%
Spain	5.1%	-1.8%		Czech Republic	-4.3%	-12.3%
Greece	4.6%	-1.9%		Hungary	-4.5%	-14.2%
Finland	7.5%	-2.3%		Poland	2.9%	-15.5%
Portugal	3.2%	-2.6%				
Germany	7.1%	-3.9%		China	5.1%	16.8%
France	5.7%	-4.0%		Korea	12.3%	10.1%
Malta	7.2%	-4.2%		United States	1.7%	-2.7%
Euro area	12.2%	-4.5%		Japan	-24.2%	-11.5%
Cyprus	4.9%	-5.4%				
Ireland	7.3%	-12.5%				
Source: BIS						

In order to check and estimate the conventional assumption that a depreciation of the USD-euro exchange rate would boost European exports, we have regresses exports and imports on the exchange rate, its volatility and industrial production abroad and at home ass a proxy for aggregate demand. The results are shown in the annex 2. The results are somewhat surprising.

The long-run tendency of the Euro Area is that a depreciation of the USD-euro exchange rate will very moderately improve exports, while volatility is not significant. However, an improvement in foreign demand for European goods has a much stronger effect than a depreciation. On the other hand, imports do not significantly respond to the exchange rate, but to exchange rate volatility. However, here too, effective demand is much more powerful in increasing imports.

We must therefore conclude that the strength of the euro is less constraining Euro Area exports than the effects of the global recession and the fallout from the financial crisis.

CURRENT ACCOUNTS, CAPITAL FLOWS AND THE EXCHANGE RATE

The estimates in annex 2 indicate that a depreciation of the euro would affect exports less than imports and will therefore increase the current account balance by lower imports, unless domestic demand in the Euro Area is simultaneously expanded. However, current account dynamics are often mirrored by financial flows which might lead to over- or undershooting of market movements. The European Central Bank could smooth such movements by intervening in the market and buying foreign currency to avoid a strengthening of the euro. However, such interventions are largely counterproductive, as I will now show.

2.1. Foreign exchange reserves

When the foreign exchange market is in equilibrium, the exchange rate ought to be stable. While it is true that such equilibrium might constantly be disturbed by expectations and speculations, it is useful to take the equilibrium as a benchmark for our discussion.

The supply of foreign currency originates from exports or from financial inflows, which may be foreign direct investment (FDI), portfolio investment or transfers. The demand for foreign currency expresses the need to pay for imports, financial outflows such as investing abroad, buying securities abroad or making transfers. The difference of supply (S) and demand (D) in foreign currency is the change in foreign exchange reserves (FXR) accumulated by the central bank. This is shown by the accounting identity:

(1) S-D = (Exports-Imports) + (financial inflows – financial outflows) =

= current account + net financial outflows = ΔFXR

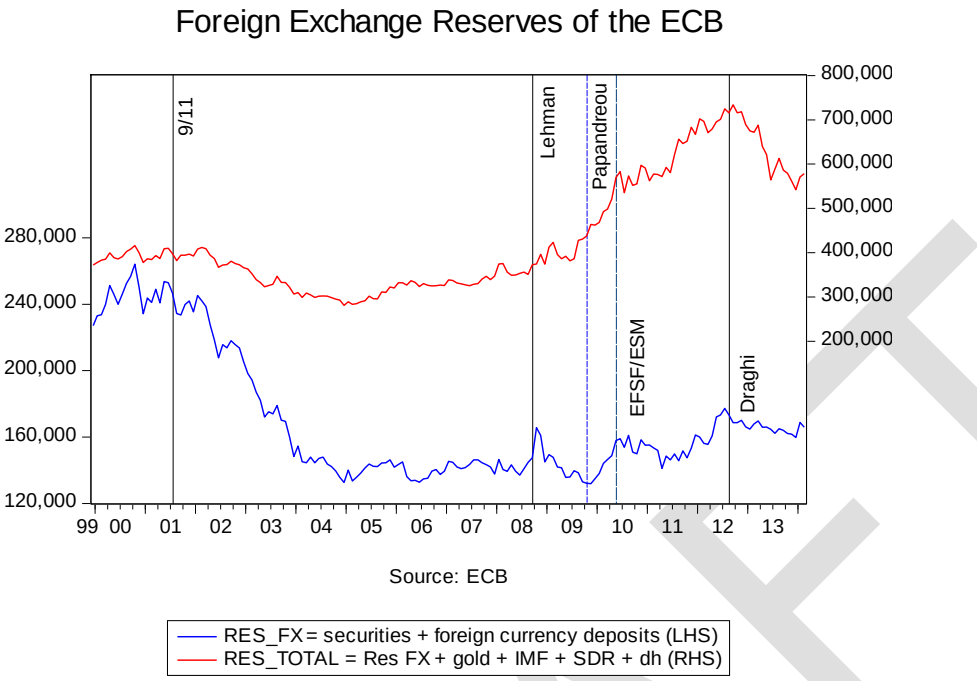
If the central bank stays out of the market, an excess of supply of foreign exchange will lead to an appreciation of the domestic currency, or to depreciation in the opposite case. However, the central bank can intervene in the market in order to stabilise the exchange rate by buying the excess of foreign currency or selling reserves. In that case the disequilibrium in the exchange market does not show up as the appreciation of the exchange rate but as an increase (loss) of central bank foreign reserves (ΔFXR).

The variations of foreign reserves are therefore an indicator for central bank behaviour with respect to the exchange rate. Figure 4 shows the evolution of foreign exchange reserves since the beginning of the Euro. First we must distinguish between market driven reserves (securities and deposits) and total reserves, which include institutional reserves such as gold, which has appreciated during the crisis, and reserves with the IMF, which were increased in 2009. For our purposes, the lower blue line is more relevant. We find a clear correlation between the loss of reserves between 2001 and 2004 and the strengthening of the euro during this time. Thus, the ECB used the exchange rate during the boom period to lean against inflationary pressures.

After the Lehman crisis, the ECB also first lost reserves and then started to accumulate them again moderately. During the Euro crisis, the ECB increased foreign exchange reserves, which meant it resisted an appreciation when the Euro Area was at the brink of deflation. Since the Draghi-announcement on OMT in August 2012, reserves have remained rather constant, which means the exchange rate presently reflects market forces.

We conclude that the ECB does in fact have an exchange policy, although it seems mainly to be at the service of the ECB's primary objective of maintaining price stability.

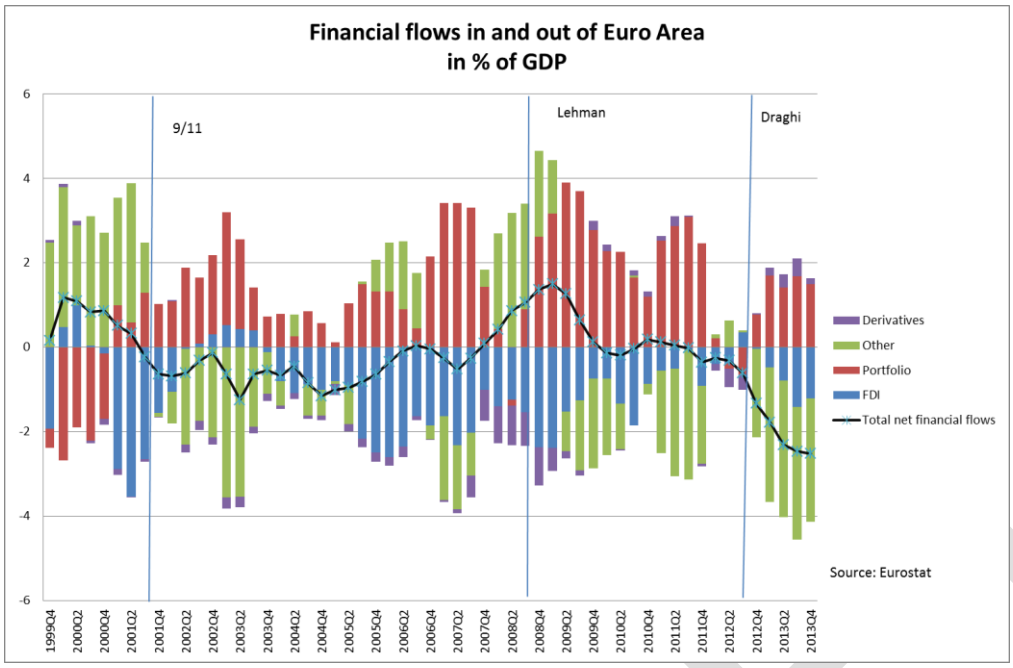
Figure 4.



2.2. Financial flows

Given the accounting identity in equation (1), it is clear that pressures for a euro appreciation may result from current account surpluses or from net financial outflows. Figure 5 shows some of the major items in the financial balance. For most of the time, the Euro Area had net outflows of foreign direct investment (FDI), and a net inflow of portfolio investment, although the volumes vary enormously. The highest FDI outflow was in 2001 at more than 3.5% of GDP, and the highest portfolio inflow was in 2009 with 3.9% of GDP. Other financial flows have also been important. It is, however, remarkable how strongly financial flows have been influenced by the crisis, especially in 2011 and 2012. Hence, the political uncertainty about the future of the euro was a major handicap for financial markets.

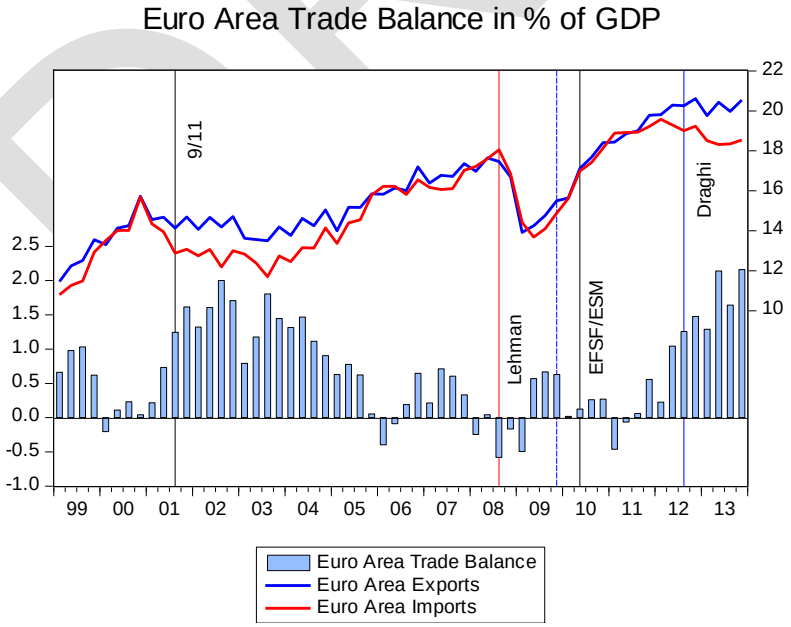
Figure 5.



In aggregate, the Euro Area has experienced massive financial net outflows since the euro crisis became critical in 2011. Despite the trust-building measures of the ECB, this capital outflow has not stopped. If the euro has strengthened despite these developments, it must be because the current account balance has turned into huge surpluses. Yet, contrary to the boom period in the early 2000s, this surplus is not a consequence of higher exports, but of the reduction in imports due to austerity and slow growth in the Euro Area. See Figure 6.

Thus, we conclude that the recent strength of the euro is a consequence of austerity. In order to prevent an excess appreciation, the Euro Area needs a demand stimulus.

Figure 6.



Source: Eurostat

2.3. How to stabilise the euro

Given these trends, one may argue that the euro ought to be weakened and exports strengthened, by the ECB taking a more active stance in the foreign exchange market. To test whether this is a reasonable policy action, we have estimated the model in Annex 3, which estimates the interactions between exchange rates, current accounts, trade balances, and reserves.[6]

An increase in foreign reserves by the ECB has a very small effect on the exchange rate so that a reduction of the USD-euro exchange rate by 15 cents would require accumulating reserves equivalent to 3.6% of the Euro Area GDP. Given the size of the ECB balance sheet this amount seems to be not easily compatible with the monetary policy objectives. In particular, it would greatly reduce the ECB's capacity to conduct unconventional monetary policies and OMT.

As pointed out above, the change in foreign exchange reserves is partly determined by the current account position. The effect of a change in the current account balance appears to be much more effective in moving the exchange rate. An exogenous shock to the current account balance of 1.1% of GDP has a cumulated effect on the exchange rate of almost 3 cents after a year and 4.7 cents after two years. This effect of current account changes is driven by the balance of trade in goods, while a shock to the balance of services has practically no effect on the exchange rate dynamics. Given our estimates, a reduction of the surplus form 2.2% to 0.1% of GDP would lower the USD-euro exchange rate by 13-14 cents. Thus, the rebalancing of the current accounts would be significantly more effective and less costly in bringing down the exchange rate than market interventions by the ECB.

These results suggest that the accumulation of foreign exchange reserves by the ECB aimed at bringing down the euro would be ineffective as its current value is mainly the result of the high international net lending which results from the current account surplus. The implication is that the strength of the euro is due to the recession in many countries which kept imports low and improved the Euro Area's net position with the rest of the world.

[6] This is based on unpublished research by *Centro Europa Ricerche*, Rome. It will appear in CER, Rapport on Europe, 2014

ANNEX 1. UNIT ROOT TEST

Null Hypothesis: EXC_USD has a unit root
Exogenous: Constant
Lag length: 0 (Spectral GLS-detrended AR based on SIC, maxlag=30)
Sample (adjusted): 1/01/1999 2/28/2014
Included observations: 3956 after adjustments

		MZa	MZt	MSB	MPT
Ng-Perron test statistics		-2.82625	-1.08123	0.38257	8.38020
Asymptotic critical values*:	1%	-13.8000	-2.58000	0.17400	1.78000
	5%	-8.10000	-1.98000	0.23300	3.17000
	10%	-5.70000	-1.62000	0.27500	4.45000

*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR)	6.19E-05

Null Hypothesis: D(EXC_USD) has a unit root
Exogenous: Constant
Lag length: 0 (Spectral GLS-detrended AR based on SIC, maxlag=30)
Sample (adjusted): 1/04/1999 2/28/2014
Included observations: 3955 after adjustments

		MZa	MZt	MSB	MPT
Ng-Perron test statistics		-1976.96	-31.4400	0.01590	0.01245
Asymptotic critical values*:	1%	-13.8000	-2.58000	0.17400	1.78000
	5%	-8.10000	-1.98000	0.23300	3.17000
	10%	-5.70000	-1.62000	0.27500	4.45000

*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR)	6.20E-05

ANNEX 2. TRADE ESTIMATES

Exports

Dependent Variable: LOG(EXP_G)
Method: Dynamic Least Squares (DOLS)
Date: 06/06/14 Time: 11:39
Sample (adjusted): 1999M02 2013M12
Included observations: 179 after adjustments
Cointegrating equation deterministics: C @TREND
Automatic leads and lags specification (lead=0 and lag=0 based on SIC criterion, max=12)
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 11.2872, NW automatic lag length = 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXR_AVG_)	-0.343148	0.112469	-3.051040	0.0026
LOG(GARCH01)	0.016123	0.022713	0.709854	0.4788
LOG(IPI_US)	1.495764	0.209405	7.142916	0.0000
C	4.465307	0.937386	4.763573	0.0000
@TREND	0.004832	0.000376	12.86004	0.0000

R-squared	0.960712	Mean dependent var	11.60742
Adjusted R-squared	0.959103	S.D. dependent var	0.254708
S.E. of regression	0.051509	Sum squared resid	0.453699
Durbin-Watson stat	0.301092		

Imports

Dependent Variable: LOG(IMPORTS)
Method: Dynamic Least Squares (DOLS)
Date: 06/06/14 Time: 11:39
Sample (adjusted): 1999M11 2012M12
Included observations: 158 after adjustments
Cointegrating equation deterministics: C
Automatic leads and lags specification (lead=12 and lag=9 based on SIC criterion, max=12)
HAC standard errors & covariance (Bartlett kernel, Newey-West automatic bandwidth = 5.9817, NW automatic lag length = 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXR_AVG_)	-0.043359	0.069088	-0.627592	0.5325
LOG(GARCH01)	-0.070471	0.031685	-2.224152	0.0296
LOG(IPI_EA)	4.331154	0.253009	17.11857	0.0000
CRISIS	0.532352	0.025573	20.81685	0.0000
C	-9.338515	1.099975	-8.489751	0.0000

R-squared	0.996569	Mean dependent var	11.56714
Adjusted R-squared	0.991713	S.D. dependent var	0.242243
S.E. of regression	0.022052	Sum squared resid	0.031608
Durbin-Watson stat	0.794962		

ANNEX 3. A VAR MODEL FOR THE USD-EURO EXCHANGE RATE

In order to stabilize or reduce the level of the exchange rate the ECB could accumulate of foreign exchange reserves. We test whether a change in foreign reserves affects the exchange rate dynamics by estimating a Vector Auto Regressive (VAR) model which relates changes in the exchange rate to the current account position and to the variation of foreign exchange reserves. The VAR specification is a system of equations where each of the three variable is alternatively the dependent one and is expressed as function of its lagged levels as well as the lags of the other two variables as in equations 1- 3:

$$Y_t = \alpha_1 + \alpha_2 Y_{t-1} + \alpha_3 Y_{t-2} + \alpha_4 X_{t-1} + \alpha_5 X_{t-2} + \alpha_6 Z_{t-1} + \alpha_7 Z_{t-2} + \varepsilon_{1,t} \quad (1)$$

$$X_t = \beta_1 + \beta_2 Y_{t-1} + \beta_3 Y_{t-2} + \beta_4 X_{t-1} + \beta_5 X_{t-2} + \beta_6 Z_{t-1} + \beta_7 Z_{t-2} + \varepsilon_{2,t} \quad (2)$$

$$Z_t = \gamma_1 + \gamma_2 Y_{t-1} + \gamma_3 Y_{t-2} + \gamma_4 X_{t-1} + \gamma_5 X_{t-2} + \gamma_6 Z_{t-1} + \gamma_7 Z_{t-2} + \varepsilon_{3,t} \quad (3)$$

where Y=Δ(Exchange rate), X=current account balance, balance of goods, balance of services, Z=change in reserves. The VAR is estimated on a sample of quarterly data from Q1-1999 to Q4-2013. This formulation allows us to calculate impulse response functions (IRF) which describe the evolution of the variables in the system in response to an exogenous shock to one of the three variables. IRF are calculated using the Cholesky decomposition which implies an ordering of the variables from the least endogenous (i.e. the one that is subject to the initial exogenous shock) to the most endogenous. In order to test the significance of an ECB intervention aimed at reducing the exchange rate we first verify the impact of an exogenous shock to foreign exchange reserves. The IRF function is shown in figure A. An increase in foreign reserves of 0.24% of GDP (1 standard deviation) has a very small effect on the exchange rate (close to 1 cent) so that a reduction of the exchange rate by 15 cents would cost 3.6% of the Euro Area GDP in terms of accumulation of foreign reserves.

The effect of a change in the current account balance appears to be much more effective in moving the exchange rate. As we show in figure B an exogenous s.d. shock to the current account balance (1.1% of GDP) has a cumulated effect on the exchange rate of almost 3 cents after a year and 4.7 cents after two years. In figure C we show that this effect of current account changes is driven by the balance of trade in goods, while a shock to the balance of services (figure D) has practically no effect on the exchange rate dynamics. Given that the standard deviation of the trade balance is 0.7% of GDP, a reduction of the surplus form 2.2% to 0.1% would lower the exchange rate by 13-14 cents. Rebalancing the current accounts would be significantly more effective and less costly in bringing down the exchange rate.

Figure A. Cumulated response of exchange rate changes to changes in foreign exchange reserves

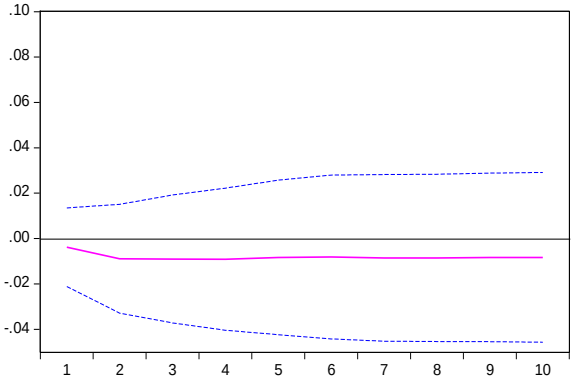


Figure B. Cumulated response of exchange rate changes to the current account to GDP ratio

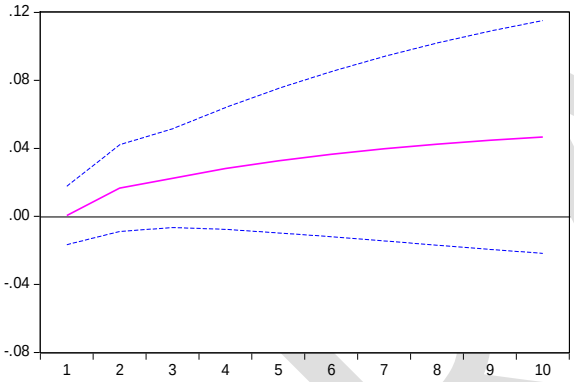
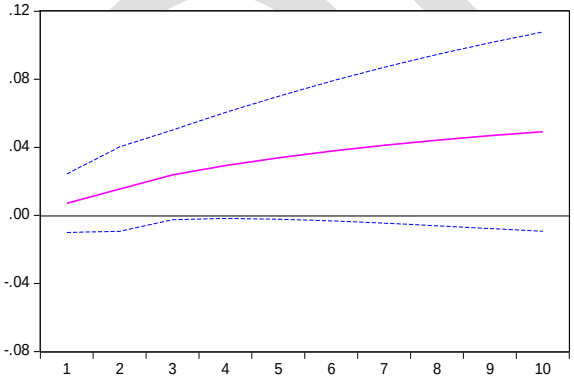


Figure C. Cumulated response of exchange rate changes to the balance of goods to GDP ratio



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