Some Major Intra Euro Area Exchange Rate Misalignments: Is There any Way to Fix Them?*

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This version: May 30, 2012
Preliminary, please do not quote

Abstract

The sovereign debt crisis occurs in euro area countries that are characterized by high public deficits and debt levels, a lack of prospects for growth but also large current account deficits. With no possibility of nominal exchange rate devaluation, this could be done only by an adjustment of relative prices in the short term. We assess the magnitude of these adjustments by estimating misalignments of real effective exchange rate from a Fundamental Equilibrium Exchange Rate approach (FEER). Some of the Southern countries as Greece and Portugal appear massively overvalued. We then conduct two scenarios of adjustment according to accepted levels of inflation in surplus countries and at the euro area level.

Keyword: Exchange Rates, Current Account Adjustment, Euro Area.

JEL: F31, F32, F36.

*The views expressed in this paper are those of the authors and do not necessarily reflect those of the Institutions to which they belong

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1 Introduction

The crisis that appeared in some countries at the end of 2009 in the euro area has three interconnected dimensions. A large deleveraging that follows an unsustainable debt issuing by the private or the public sector, the lack of competitiveness and growing doubts on the solvency of the banking or the public sector. The solvency problem is exacerbated by two factors. First, debts can be considered as denominated in foreign currencies in a currency union as any adjustment of the real exchange rate could only be achieved by a change in the price level instead of the nominal exchange rate. Furthermore, a single country has not the ability to monetize it. Second, a significant part of the debt is held by non-residents who are more suitable to trigger a sudden stop in external financing without the affected country has the possibility to devalue (Gros, 2011).

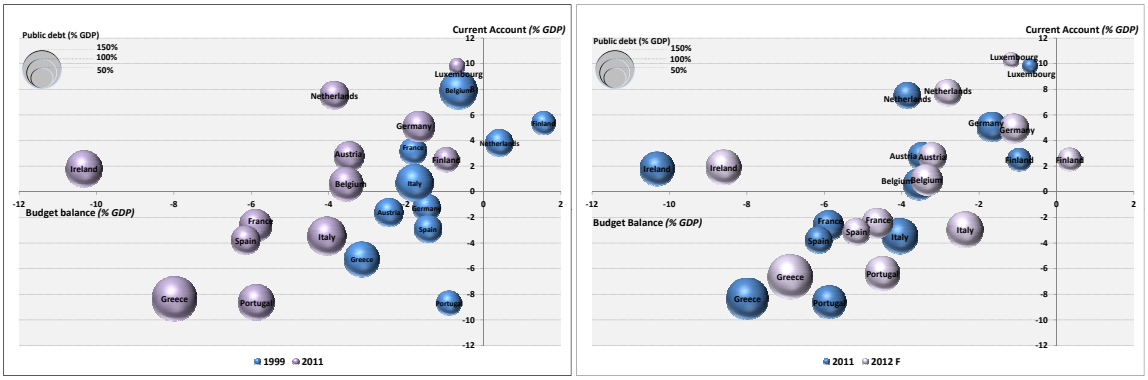
A vicious circle appears between the solvency problem of the government and the balance sheet of the financial sector, mainly banks in the euro area. Any deterioration of the solvency of the government (perceived or real) triggers a loss on sovereign bond. As a consequence, banks have to adjust their balance sheet (deleveraging). Either banks decrease credit to the private sector which is detrimental to growth and taxes, or they fire-sell assets including sovereign bonds. In the worth case, banks have to be bailed out with public funds. Above this stressed situation, these economies also face a huge reduction of private capital inflows (a sudden stop). The balance of payments equilibrium requires net "public" inflows in the form of large ECB liquidity provisions which are accounted in TARGET2.

Therefore, the challenge for countries in crisis is to simultaneously rebalance their fiscal and external balances, without using the weapon of nominal devaluation. Indeed, some countries have experienced a large deterioration of their competitiveness during the 2000's. The origin of the deterioration varies across countries: a house bubble in Spain, a sharp drift in wages in Greece fuelled by wage policy in the public sector, the lack of productivity gains in Portugal. In Greece, the remedy advocated by the "Troika" then rests on three pillars: fiscal adjustment, structural reforms and wage reductions. The three pillars are not independent: by compressing demand, fiscal adjustment slows imports (the trade balance is recovering) and price (the real exchange rate depreciates). But the trade balance improvement may not be sustainable if based on a fall in demand relative to supply. Conversely, an upturn in the trade balance carried by a sharp depreciation of the real exchange rate, as is observed in Ireland, can ease the burden of fiscal adjustment by reducing the contraction in demand. It is essential to have an idea of the magnitude of the necessary adjustment of real exchange rate.

Few countries have implemented an internal devaluation, i.e. an adjustment of the real exchange rate through a decrease in wages and prices, in recent years: Latvia and Ireland. In both cases, the improvement of competitiveness have been moderated (less than 10%) . This improvement came from wage moderation in the private sector and targeted wage decrease in the most damaged sectors (real estate) and the public sector (in order to contain the public

Figure 1: Budget balance, current account and debt level

(a) Evolution 1999-2011 (b) Evolution 2011-2012*



Source : WEO-FMI (January 2012).

deficit).

The aim of this paper is to estimate the intra euro area misalignments from a Fundamental Equilibrium Exchange Rate (FEER) approach in the vein of Williamson (1985) and to assess according different scenarios the length it should take to readjust these imbalances.

The rest of the paper is organized as follows. Section 2 is devoted to the euro area sovereign debt crisis and the necessary relative price adjustment. Section 3 introduces the fundamental equilibrium exchange rate as a measure of the size of the required adjustments. Section 4 presents the results of our estimations and a comparison with some other works. Section 5 deals with policy considerations and describes two scenarios of adjustments and Section 6 concludes.

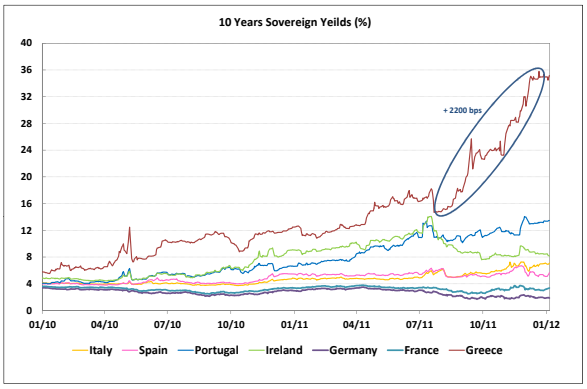
2 The sovereign debt crisis in the euro area

2.1 A twin deficit problem

The sovereign debt crisis in the euro area (substantial increase in market lending rates) occurs in countries that are characterized by high public deficits and debt levels, a lack of prospects for growth but also large current account deficits (see figure 1).

In autumn 2011, financial markets have begun questioning the ability of some member states to repay their debts in a deteriorated macroeconomic environment. This apprehension of sovereign risk in some euro area countries led in a substantial increase in lending rates for countries deemed insolvent by the markets. As an illustration, the Greek bond yields began to loosen in September 2011 and 10-year rate, for example, took more than 2,000 basis points in six months (see Figure 2).

Figure 2: Sovereign Yields



Source : Bloomberg

These countries, which are no longer able to finance themselves on capital markets at reasonable rates, then accepted financial assistance from the IMF and European authorities in exchange for a number of counterparts. These countries had to include a commitment to drastically reduce the government deficit and to implement structural reforms to reduce the structural deficit (retirement reforms, revenue mobilization) and increase their potential growth (rebuilding the industrial sector, increasing innovation efforts, improving the qualification of the labor force, etc.).

However, these structural reforms can only be beneficial in the medium-long term. Under these conditions, short-term debt reduction can be achieved only by reducing domestic demand and imports as well as lower prices, notably through wage compression. In a context of weak growth at the euro area level, the room for maneuver on domestic demand is narrow.

These countries face a dilemma: either they are rapidly reducing their deficit at the expense of a sharp drop in growth considering the current macroeconomic environment, or they reduce it more gradually but may not sufficiently control their debt and may lose the financial support of international institutions. Note that in this second case, if the European authorities do not implement the necessary economic policies (continued loans to stressed countries in the short term and fiscal federalism in the longer term), the risk of the euro area break up cannot be excluded.

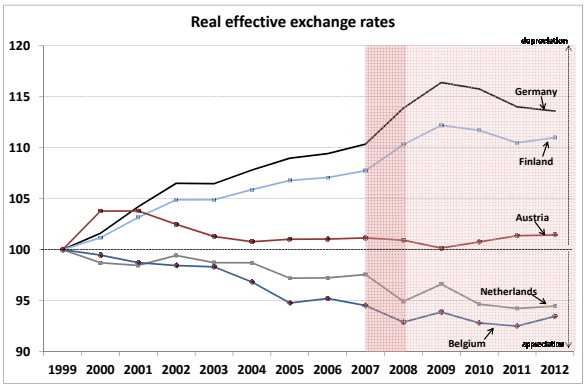
2.2 The necessary relative price adjustments

The dilemma faced by some countries is exacerbated by the lack of possibility of nominal devaluation that could restore competitiveness without heavily increasing the burden of external debt. In order to reduce both the public and the current account deficit and avoid a growth collapse, an adjustment of relative prices in the euro area is therefore necessary.

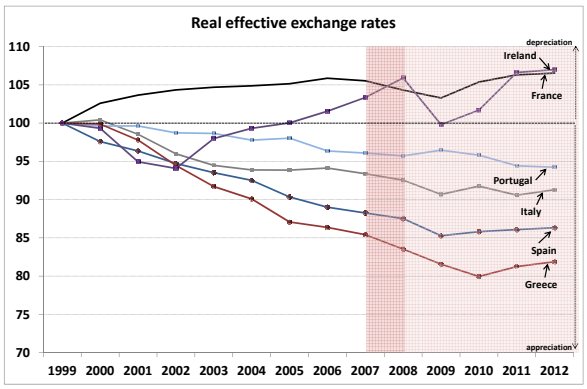
Until now, this relative price adjustment has been effective in Ireland but is still moderate in

Figure 3: Real Effective Exchange Rates

(a) Northern countries



(b) Southern countries



Source : author's calculations

Greece, Portugal and Spain. Therefore, the public deficit decrease has insufficiently reduced the current account deficit and was accompanied by a large drop in activity and the emergence of mass unemployment. The changes in real effective exchange rate calculated from the weights in third markets and deflated by the price of exports (see Figures 3a and 3b) show that most countries of the euro area, with the exception of Germany, Finland and to a lesser extent France and Ireland, have experienced a deterioration of their competitiveness, since the creation of the euro. While this latter was relatively contained for all Northern countries, for some countries of Southern Europe including Spain and Greece, it was substantial. This deterioration in competitiveness has not allowed countries that recorded large current account deficits early in the period to improve their situation. In some cases, Italy and Greece for example, it would have been even highly unfavorable. Thus, the real effective exchange rate of Greece as we have calculated will be appreciated by almost 20% over the period in line with a worsening current account balance of nearly 4 percentage points of GDP.

So it seems to emerge greater room for maneuver in terms of competitiveness, hence the idea to adjust prices and wages and regain market share for exports. In summary, in the short term, the countries of the euro area have circumscribed room for maneuver and will have no choice but to make price adjustments if they do not want to leave the euro aera. Even if the refinancing by the monetary authorities as the long-term refinancing operation (LTRO) were successful and helped to maintain some financial stability, they would be only short term solutions because they cannot be declined to infinite. Similarly, debt restructuring, which occurred in Greece the 9th of March 2012, for example, has certainly reduced the level of debt stock, but in the absence of price adjustment and efficient growth policy, this operation will not reverse the spiral of debt (see Figure 1).

3 The fundamental equilibrium exchange rate as a measure of the scale of required adjustments

There is an extensive literature to calculate equilibrium exchange rates. There are two main approaches. The first consists in estimating a long run relationship between real effective exchange rate of a country and its determinants called "fundamental" (productivity, net foreign assets in particular), and then measuring the deviation between the current real exchange rate and its long-term value predicted by the model. This first method has the advantage of being based on a robust econometric relationship. However, it is conservative in the sense that the behavior observed in the past are expected to remain valid. For example, the relationship is estimated over a period during which the country risk has been underestimated in Europe, distorting the relationship between net foreign assets and real exchange rate.

The second approach relies on foreign trade equations. The idea is to calculate what the real effective exchange rate would reduce the sustainable current account at a "target" judged sustainable. This assumes that the output gap (particularly large in the euro area today) is cleared and we have therefore simultaneously the internal (output at its potential level) and external balances (current account at its "target"). This second approach is often considered as too "normative" but more transparent than the first one. However it is based on demand and price elasticities of international trade necessarily fragile and "targets" that are inevitably questionable. We belong here in the second approach that we apply consistently for 11 member countries of the euro area (France, Germany, Italy, Spain, Netherlands, Finland, Portugal, Greece, Belgium, Austria and Ireland) and for the rest of the world. The method is presented and detailed in Carton & Hervé (2012).

3.1 Definition and advantages of the fundamental equilibrium exchange rate

As shown earlier, in the short term, one of the only way to reduce foreign debt is through the adjustment of relative prices. If the analysis of competitiveness indicators gives us an idea of the magnitude of these adjustments, they remain approximate.

To assess the magnitude of relative price adjustments that would reduce current account imbalances within the euro area, we rely on a method proposed by Williamson (1985). The fundamental equilibrium exchange rate (FEER) is defined as one that allows the simultaneous realization of internal (activity is at its potential) and the external balances (current account level).The external equilibrium is defined as a level of the current account that closes the gap between domestic saving and investment when the economy is on a balanced growth path. This desired level of current account is also called "target". In the short term, current account equilibrium can be achieved by a change in domestic demand. But in the medium term, for the adjustment being consistent with a return of activity to its potential, the real effective

exchange rate must vary. The two conditions are given by

$$Y = \bar{Y} \qquad \text{(Internal equilibrium)}$$
$$CA(Y, FEER) = CA^{\text{target}} \qquad \text{(External equilibrium)}$$

This definition was originally used in the case of small open economies. When the idea of creating a European monetary union has materialized, there were a plethora of literature works on misalignments between European countries (Alberola et al., 2000; Barrell & Wren-Lewis, 1989; Borowski & Couharde, 1999; Wren-Lewis & Driver, 1998; Williamson, 1991). With the creation of the euro, this literature has dried.

However, it was widely taken to assess changes in exchange rates consistent with resorption of global imbalances, particularly between industrialized and emerging countries. Today, with the euro area sovereign debt crisis, the debate on exchange rate misalignments in relation to the current account imbalances among member countries reappeared.

This method has two merits in particular as regards the problem of global imbalances: it is, first, the only method that allows world trade consistency and secondly, it allows a translation in exchange rate terms of what should be a form of "global structural current account equilibrium ", if the evolution of current accounts is compliant with the economic theory (ie a deficit and not a current account surplus for all countries in catching up) and assuming full liberalization of capital flows.

3.2 The methodology

Initially, this methodology, based on foreign trade equations, was applied to a single country. The extension of this model to a coherent global model, poses three main difficulties. (i) depending on how they are estimated, the target current account (net outflow of capital consistent with a model of balanced growth) in different countries are not necessarily consistent at the world level (all countries cannot be current account surplus), (ii) the trade equations, estimated country by country, do not automatically lead to a balance of world trade, (iii) the N-1 independent bilateral exchange rates cannot provide saving investment balance of N countries (overdetermination).

In the case of a closed economy, the saving investment balance in the medium term is provided by an adjustment of interest rates. Transposed to the global economy, this theory solves two of the three difficulties: the current account targets are dependent on the world interest rate; they are compatible with each other since the saving investment balance in the world is assured; the introduction in the model of the world interest rate as additional endogenous variable eliminates the problem of overdetermination. The methods used in practice go away from this principle.

The authors therefore proposed a number of ad hoc methods to approach the world equilibrium without reaching it altogether (the world interest rate is exogenous). The differences between estimates are sometimes important according the method used, especially when the overdetermination problem is solved by ignoring macroeconomic equilibrium of one of the model zones. A consensus appears to prefer a method that treats symmetrically all the zones of the model and divides the readjustment on all areas Faruqee & Isard (1998). The third issue (global consistency of the trade model underlying the estimation of exchange rates) has, however, been little discussed in the literature.

The method used in this article reflects the three difficulties mentioned above and propose innovative solutions. Without being less ad hoc than the others, however, this method allows to solve problems in more detail.

On the one hand, global target consistency and overdetermination issues are treated more equally. The proposed solution is an alternative to the work of Faruqee & Isard (1998) and involves in minimizing the distance between the target current account ex ante and ex post current account consistent with the equilibrium exchange rate estimated.

On the other hand, global consistency of the trade model, in volume and value, is ensured by imposing a constraint on the price elasticities of export equations. This constraint is very intuitive: in response to a change in bilateral exchange rates, market shares of each country should evolve in a way so that their sum is always equal to unity.

In order to achieve internal and external balances in each country of the euro area, we generalize this approach originally developed in the case of one country to the 11 largest countries in the euro area (France, Germany, Italy, Spain, Netherlands, Finland, Portugal, Greece, Belgium, Austria and Ireland) and the rest of the world. The current account targets are selected according to criteria established ad hoc as suggested by Cline & Williamson (2011): countries cannot register surpluses or current account deficits above 3%. Under this rule, Spain, Portugal and Greece, must reach a target set at -3%, Germany, the Netherlands and Finland a target of 3%. The other countries (i.e France, Belgium, Italy, Ireland and Austria) are assumed in our estimates to reach a target which is the average of their current account levels registered the last 10 years. For the euro area as a whole, the target is very close to zero. The current account adjustments are therefore within the euro area countries and not vis-à-vis the rest of the world, even if this requires changes in market shares outside the euro area.

4 Results

4.1 Trade parameters and other structural data

The calculations of the fundamental equilibrium exchange rate are very sensitive to trade price elasticities. As shown by various studies (Bayoumi, 1999; Hervé, 2001; Murata et al., 2000; Hooper et al., 1998; Marquez, 1990), trade elasticities vary widely according to the econometric method used and the scope of trade (manufactured goods, goods, goods and services, etc.).

In this paper, to ensure the locking up of the model, some trade elasticities are constrained. The foreign demand elasticity of exports is fixed to unity because the foreign demand is a balanced sum of other countries' imports. The elasticity of imports to domestic demand is also constrained to unity. The import price elasticities are not constrained and we use the elasticities of the IMF model, Multimod. On the opposite, price elasticities of exports are constrained by the condition of locking up in volume. These elasticities are not independent of each other because they measure changes in market shares of each country in world trade and the sum of market share by definition must always be equal to 1.

Table 1 provides a summary of the various elasticities chosen for our estimates. Price elasticities of exports are generally close to unity, except for Germany (0.7). These elasticities are in the upper range of those used in most macro-econometric models. Price elasticities of imports vary from single to double and are between 0.7 and 1.4.

The country's openness also plays a key role in estimating the fundamental equilibrium exchange rate. In general, small countries have in theory open rates higher than the larger countries and this is reflected in the euro area. Belgium, the Netherlands and Ireland have open rates above 60%. also it is notable that Northern European countries (Germany, Finland and Austria) have higher open rates than Southern countries (France, Italy, Spain, Greece and Portugal) .

The current account sensitivity to the exchange rate is given by the term $1/\beta$, which follows from the Marshall-Lerner condition. It represents the percentage of depreciation of the real exchange rate to improve the current account of a country by one percentage point of GDP. Countries with a weak $1/\beta$ have a strong sensitivity of their current account to exchange rate variations.

Thus for these countries, a small correction of the exchange rate is needed to bring the current account to its target. According to the assumptions we made about trade elasticities, for the Member States of the euro area, an improvement of the current account of 1 percentage point of GDP would require a depreciation of the real effective exchange rate comprised between 1.3% (Ireland) and 5.1% (Greece).

For some countries, the gap between the current account target and the underlying current

Table 1: Structural data for 2010

	X/PIB	M/PIB	ε_x	ε_m	$1/\beta$	ca^*
France	0.30	0.34	0.90	1.28	4.11	-0.28
Belgium	0.86	0.85	0.95	0.73	1.66	+2.29
Germany	0.51	0.45	0.71	1.04	2.68	+3
Italy	0.33	0.34	0.90	1.26	3.86	-1.78
Netherlands	0.83	0.74	0.92	0.77	1.69	+3
Ireland	1.12	0.90	0.97	0.64	1.29	-1.36
Finland	0.43	0.39	1.01	1.13	2.96	+3
Austria	0.59	0.55	1.00	0.94	2.25	+2.07
Spain	0.31	0.32	0.92	1.29	4.05	-3
Greece	0.23	0.28	1.02	1.41	5.05	-3
Portugal	0.37	0.41	0.97	1.17	3.47	-3

X/PIB et M/PIB are respectively openness ratio,ε_x and ε_m export and import price elasticities, $1/\beta$ current account sensitiveness to exchange rate variations and ca^* the current account target.
Source : author's calculations

account , that is to say, the current account adjusted by past exchange variations and relative output gap, is considerable (see appendix). As an illustration, in 2011, the underlying current account of Greece recorded a deficit of nearly 11% of GDP. With a target set at 3%, the remaining gap was 7.5 percentage points of GDP which would correspond to a devaluation of nearly 40% (7.5 *times* 5.05).

4.2 The required adjustments of relative price

The changes in exchange rate misalignments between 2000 and 2011 are represented on Figure 4b for the countries of Southern Europe and Ireland and on the Figure 4a for the countries of Northern Europe.

Unsurprisingly, Greece appears massively overvalued since the creation of the euro. In 2001, this overvaluation has been above 25%. In 2007-2008, it was close to 50% and would have fallen only slightly since, remaining above 35% in 2011. Indeed, the Greek current account deficit has fallen little since 2008 and this decline is not the result of restoring competitiveness but is only induced by the contraction of domestic demand.

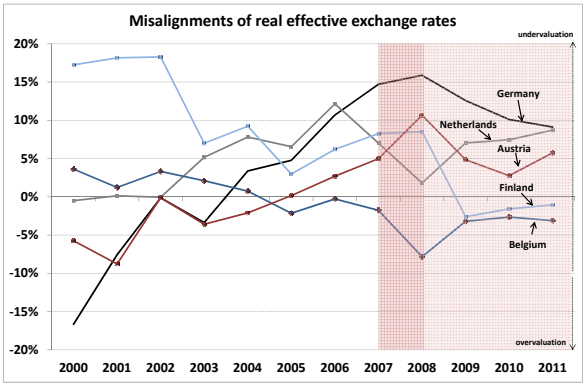
The Figure 4b also shows an overvaluation more marked in Spain and Portugal between 2001 and 2008, but this time a substantial correction occurred after 2008. The overvaluation is no more than 10% for Spain and 27% for Portugal in 2011.

Ireland is characterized by a real effective exchange rate close to its equilibrium level before the crisis. The real depreciation observed since 2009 led to a slight undervaluation in 2011, given the observed current account surplus in that year (1.9% of GDP).

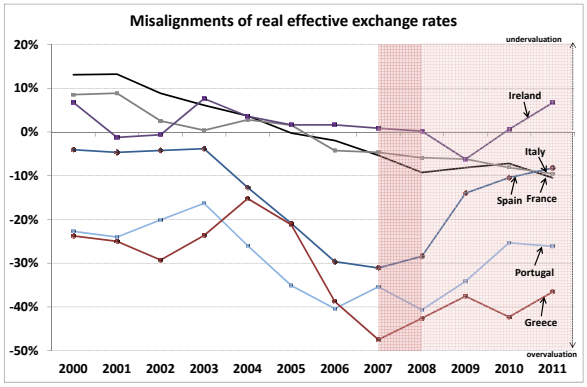
Italy and France did not experience the same excesses of public debt (as in Greece) or private

Figure 4: Real Effective misalignments

(a) Northern countries



(b) Southern countries



Source : author's calculations

(eg Spain) before the crisis. However, both countries experienced a continuous deterioration of their export performance. Today the Italian and French real effective exchange rates are overvalued respectively 5 and 10%. In both countries, the deterioration in competitiveness does not seem to come from a drift in prices and domestic demand, but rather a lack of adaptation of the production system to changes in world trade.

Countries with current account deficits do not face the same challenges. Structural reforms which aimed at increasing the supply and giving a boost to the export sector are needed everywhere. However, given the magnitude of estimated misalignments and the probably low pace of productivity gains, they are insufficient in Greece and Portugal, which therefore cannot escape a downward adjustment of prices and wages.

The Figure 4a suggests weaker currency misalignments in the northern countries of the euro area. Given the uncertainties surrounding the calculation of real effective exchange rate, we can consider that only Germany and the Netherlands are undervalued.

The undervaluation estimated for Germany and the Netherlands does not exceed 10% in 2011. According to our estimates, the German real effective exchange rate, which was still overvalued in 2001, has reached a level of undervaluation of 15% in 2008. The crisis has reversed this trend. German's undervaluation would now be below 10%. The sharp fall in world trade during the 2008-2009 economic crisis has stymied the growth of current account surpluses of Germany. The concomitant reversal of the global crisis hides more structural changes at work. If we correct the current account evolution by the economic cycle, the correction in progress in Germany appears mainly due to a more dynamic domestic demand than in the previous decade.

4.3 Comparison with other estimations

There are few estimates of exchange rate misalignments within the euro area in particular from the FEER approach. For comparison we present Cline and Williamson's estimates. Unfortunately they give in their article results for only six countries of the euro area (Germany, Greece, Portugal, Italy, Spain and Ireland).

These authors impose a target of -3% for countries whose deficit exceeds this level (and conversely for surplus countries) and countries with current account balance is between -3% of GDP and 3% of GDP, a target equals to their current account level while in the latter case we used a ten year average target. In fact, among the six countries considered, only the targets for Italy and Ireland diverge between the two studies. In our study the target are respectively for Italy and Ireland -1.78% and -1.36% of GDP while in Cline and Williamson they are set to -3.5% and 1.8% of GDP.

Also note that Cline and Williamson assume that the impact on the current account of currency fluctuations and deviations of output gap occurred the first year so that the underlying current account is equal to the actual current account. This assumption is not neutral : with identical targets, we get a deviation from the target by 7.5 percentage points of GDP for Greece, while for Cline and Williamson this difference is only 5.4. Finally, as explained inCarton & Hervé (2012), the methodology differs in many ways, including solving the problem of overdetermination of the model, and can therefore cause gaps between results.

Despite many differences, the results are relatively close and go for less in the same direction (see Table 2). Portugal and Greece appear to be strongly overvalued (more than 20%). Target is the same in our paper and in Cline and Williamson, but not the deviation from the target. We can then suppose that this partly explains the difference between the estimated magnitude of overvaluation. Italy would be very little overvalued (2-5%) and Germany significantly undervalued (5.4 and 8%). The main divergences were for Ireland and Spain, which we estimate would be respectively undervalued and overvalued by 8% to 9% according to our estimations while for Cline and Williamson, Ireland and Spain are close to balance.

For Ireland, the difference can be explained in part by choosing a different target as described above. However, for Spain, it would be the difference in calculating the underlying current account and the methodology that would explain this discrepancy.

In order to test the robustness of equilibrium exchange rate calculations, it is relevant to compare the misalignments estimated using different methods. We then compare our results for 2010 with those of Coudert et al. (2012), calculated from a long-term relationship between real effective exchange rate and two of its fundamental determinants: the net external position and relative productivity (measured as the ratio between GDP per capita in purchasing power parity and the average per capita GDP of trading partners).

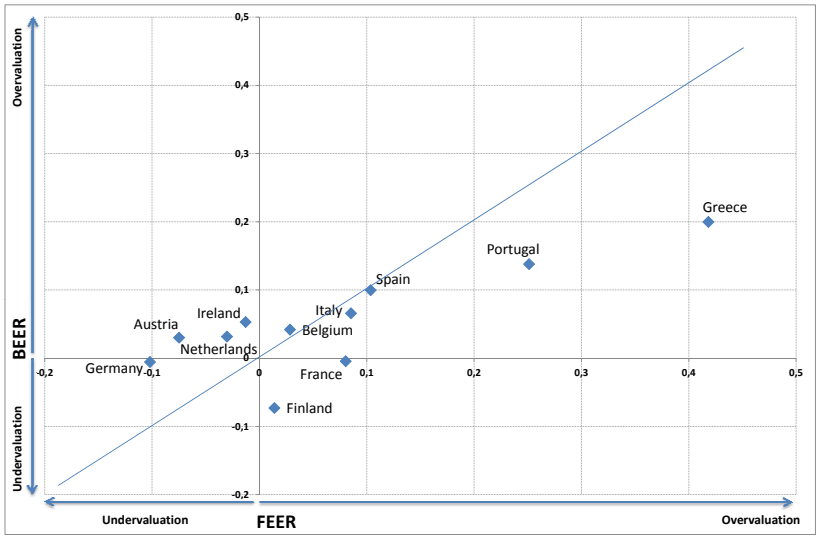
The results are shown in Figure 5. Overall, both methods yielded the same qualitative

Table 2: Comparison of FEER's estimation for 2011

	This paper		Cline and Williamson	
	$\overline{CA} - CA^*$	FEER – FEER*	$\overline{CA} - CA^*$	FEER – FEER*
Greece	7.5	37.0	5.4	27.0
Ireland	5.5	-8.0	0.0	0.0
Italy	1.2	5.0	0.5	2.0
Portugal	7.1	27.0	5.6	20.7
Spain	1.6	9.0	0.8	3.5
Germany	-2.5	-8.0	-2.0	-5.4

Source : author's calculations, Cline & Williamson (2011)

Figure 5: Comparison between BEER and FEER approaches



Source : author's calculations and Coudert et al.(2012)

diagnoses: overvaluation in Greece, Portugal, Spain and, to a lesser extent in Italy, and exchange rates are close to balance for Austria, Belgium and Ireland; undervaluation for Finland. However, two differences appear: (1) the degree of overvaluation is much lower at Coudert et al. (2012), which is typical given their method, (2) our calculations result in an undervaluation of about 10% in Germany and the Netherlands and an overvaluation of the same amount in France, while Coudert et al. (2012) place these countries close to balance in 2010. Our results are directly linked to the contrast level of current account balances in all three countries in 2010.

4.4 A situation that should improve very little

In order to have a slightly forward looking approach of exchange rate misalignments between Member States, we incorporate macroeconomic forecasts (mostly growth and current accounts) for the year 2012 from the WEO (IMF) in our model of FEER (see Table 3). On

Table 3: Forecasts for GDP growth and Current Account

	GDP Growth		Current Account	
	2011	2012	2011	2012
Austria	3.3	1.6	2.8	2.7
Belgium	2.4	1.5	0.6	0.9
Finland	3.5	2.2	2.5	2.5
France	1.7	1.4	-2.7	-2.5
Germany	2.7	1.3	5.0	4.9
Greece	-5.0	-2.0	-8.4	-6.7
Ireland	0.4	1.5	1.8	1.9
Italy	0.6	0.3	-3.5	-3.0
Luxembourg	3.6	2.7	9.8	10.3
Netherlands	1.6	1.3	7.5	7.7
Portugal	-2.2	-1.8	-8.6	-6.4
Spain	0.8	1.1	-3.8	-3.1

Source : WEO-FMI (January 2012).

the whole, these projections indicate a deterioration of the activity of euro area between 2011 and 2012, with the exception of Spain and Ireland. Portugal and Greece remain in recession even though it should be less pronounced than in 2011. The current account of most countries of the North would be stable. Southern countries should, in turn, experience a decline in their current account deficit but inadequate with respect to initial imbalances.

In 2012, the misalignment should very little change in northern countries of the euro area (see Figure 6). In the South, where misalignments are highest (e.g Greece and Portugal), the situation should evolve in the right direction. The overvaluations should decrease by 10%.

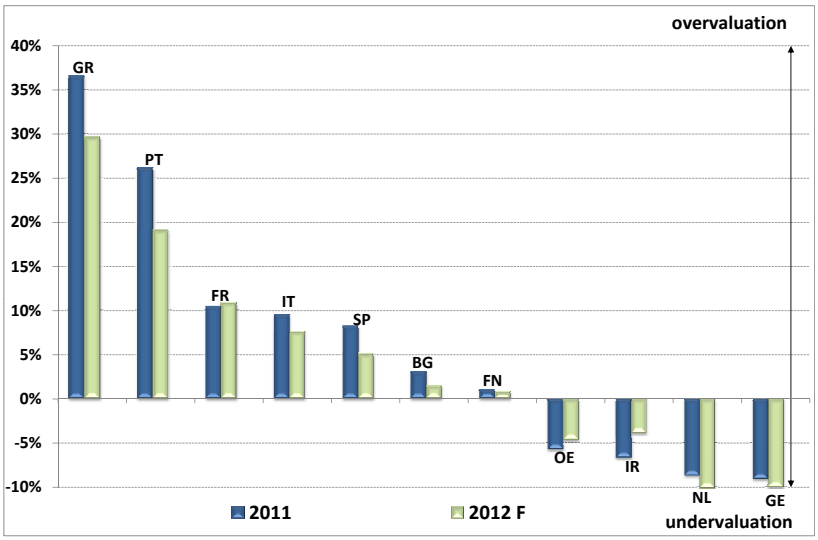
Nevertheless, it would remain very critical. Overvaluations for Spain and Italy should very little decrease in line with the low current account deficit improvement.

5 The economic policy coordination between Member States is the only way to fix euro area problems

5.1 An unfeasible unilateral adjustment of relative prices

A first approach to reduce the overvaluation of the Southern countries and restore their competitiveness is the internal devaluation, that is to say, lower domestic prices and wages relative to their trade partners. In the best case, this decrease is coordinated by social actors so that it is the same for everyone and that the impact on domestic prices is fast, reproducing the effects of a managed nominal devaluation. Such a process is difficult to implement given the weakness of social partners and the large number of situations to consider (most wages and

Figure 6: Evolution in euro area misalignments for 2012



Source : author's calculations

prices are determined by long-term contracts or non-competitive). As mentioned by Blanchard (2012) "The best way forward would have been a negotiation between social partners to reduce wages and prices, and avoid a long and painful process of adjustment. This did not happen." Therefore, the adjustment could be only gradual, uncoordinated and generate relative price differentials, a misallocation of productive factors, a lower activity and a strong income redistribution. The economic and social implications are comparable to those of hyperinflation periods. Moreover, the existence of nominal rigidities implies that it would take years of recession to achieve the required adjustment. In addition, deflation induced would lead to a sharp rise in real interest rates and a steepening of the initial recession. Finally, the decline in household nominal income but also enterprises would result in chain defaults in the private sector, loss of activity and intangible capital that would be counterproductive. With this additional loss of potential GDP, the return to a path of stable and balanced growth would take much longer.

A second approach would be to raise prices of euro area countries that are undervalued. Because a country that wants to devalue its real effective exchange rate has no direct control over foreign prices, only the establishment of a coordinated process between the countries of the euro area would achieve such a result. In this sense the minimum wage, public wages and the negotiation power of employees (through the improvement of unemployment benefit) could be for example relevant policy tools.

The objective would be to raise prices of undervalued countries, decrease those of overvalued countries and those of countries close to balance. This would require, avoiding deflation in the south, having a higher aggregate rate of inflation for the euro area and change temporarily the definition of price stability considered by the ECB. This option, economically feasible,

requires a degree of coordination and credibility of macroeconomic policies well above what has been observed since the adoption of the single currency.

A third approach would be to lower the cost of labor and to restore competitiveness through structural reforms that result in an increase in productivity. The beneficial effects of these measures will take time to prove benefits. However, most countries whose real effective exchange rate is overvalued suffered from low rates of productivity growth over the past decade so that rooms for maneuver exist. While they are mainly in the non-tradable sector, there may be spreading effects on the tradable sector (eg business services).

A fourth approach would be to use certain tax measures. A change in the composition of taxation in favor of labor rather than consumption would improve competitiveness by reducing the cost of labor. However, due to the fiscal challenge which Greece and Portugal are facing such a tax change would involve an unprecedented increase in VAT rates, detrimental to willingness to pay taxes.

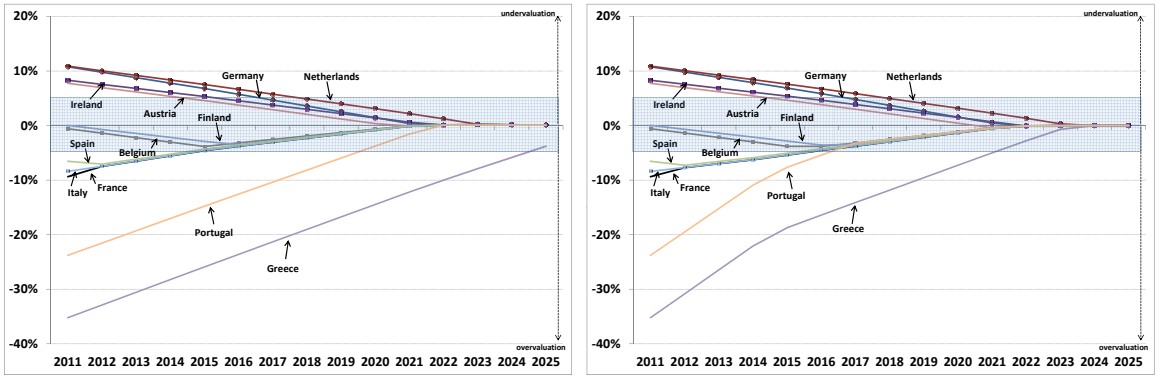
5.2 Scenarios of adjustments

We propose two scenarios of adjustment according to accepted levels of inflation in surplus countries and at the euro area level. Each scenario is built on the assumption that inflation differentials in the future allow to correct real exchange rate misalignments. Furthermore, we assume that the general level of prices can not fall (downward rigidity of wages). In the first scenario (slow), the euro area aggregate inflation target is set to 2%. In the second scenario (fast), the target is increased to 3% from 2012 to 2014 before going back to 2% in 2016. In both scenarios, the inflation rate in the North cannot exceed 1% of the ECB target.

In the « slow » scenario, most countries could significantly reduce their misalignment in a relative short horizon (2014), (see Figures 7). This would lead to an inflation rate of around 3% in Northern countries (Germany, Netherlands and Austria). However, Portugal and Greece could not divide in two their misalignment before respectively 2018 and 2020. In the « fast » scenario, the ECB inflation target is raised by 1 point, in order to rebalance faster Portugal and Greece misalignments. In this scenario, the length of the adjustment is reduced by three years . This is at the cost of an inflation rate of 4% in Northern countries at least during the four first years, which seems politically unrealistic.

Beyond the massive misalignments of Greece and Portugal, the three other main Southern countries (France, Italy and Spain) also require a sizeable inflation differential vis-à-vis Northern countries. In both scenarios, inflation differential reaches 1.5% and lasts ten years. As a consequence, a substantial real interest rate differential will appear between the two sub-areas exacerbating growth heterogeneity.

Figure 7: Misalignments' evolutions in the two scenarios



Source : author's calculations

5.3 Beyond the relative price adjustment, the required balance sheet adjustment

Irving Fisher in 1933 (Fisher, 1933) described the devastating consequences of a fall in prices that is not going with an equal reduction of agents' balance sheets. This type of mechanism is at work for example when a country devalues its currency and that the State or the banking system had borrowed in foreign currency (we denote by the term "original sin" the fact that a country cannot borrow in its own currency). To some extent, countries in monetary union are comparable to indebted countries in foreign currency and those who today are overvalued would see their debt ratio (percentage of income or GDP) increase dramatically if the adjustment took place only by lower domestic prices. The debt ratio would become unbearable for many households, industry or financial institutions leading to bankruptcies, defaults and need for recapitalization.

The reduction of the Greek government debt occurred March 9, 2012 may be only the prelude to a series of larger public and private defaults (public institutions, banks, etc.). This default risk weighs on the balance sheets of financial institutions in the euro area which cannot properly assess the Greek debt they bought. Therefore, financial institutions themselves become vectors of contagion of the crisis.

The existing financial tools that go with these adjustments (European Financial Stability, European Stability Mechanism, interventions of the ECB) are very unsatisfactory in that they do not prevent the deleterious mechanisms of debt deflation. Only a major financial reform, allowing a quasi-automatic adjustment of facial value of securities when the value of the implicit collateral decreases, would be able to provide the euro area financial architecture resistant to the balance of payments crises.

Many authors have proposed different types of eurobonds (European Commission, 2011; Hellwig & Philippon, 2011; von Weizsacker & Delpla, 2011). Pooling sovereign securities and collective guarantees mainly help to reduce the risk of self-fulfilling insolvency and decrease the

financing cost volatility. However, the participation constraint with imperfect credible commitment leads to limit the extent of such an agreement (euro-bills, blue-bonds). What is the destiny of the remaining securities, those which are not pooled? Facing the same self-fulfilling insolvency problem, they should be swapped against a contingent-convertible security. Such an asset allows an automatic adjustment of its face-value to a predefined benchmark, the value of which is closed to the value of the implicit collateral (the taxable base for sovereign bonds).

The banking sector faces a similar self-fulfilling insolvency crisis. Thanks to the financial integration provided by the euro creation, the banking sector in Southern countries had lent to the domestic economy using short-term financing from abroad. Then, in addition to the maturity mismatch, which is the natural outcome of a bank operation, these banks have generated large regional mismatch. As far as sudden stop was perceived unlikely in a currency union, this regional mismatch was not an issue. With the current sudden stop, in a context of overvaluation and inability to control inflation, this regional mismatch has proved to be closed to a currency mismatch. To the same disease, the same remedies. The interbank market has overflowed its own role: instead of allocating excess liquidities among banks, it has been used for long-term loans. To limit the scope of the interbank market, banks should complete the set of available securities with a new asset: a contingent security. The face-value of the latter has to rely on the macro-financial situation. Absent this instrument, the government has to bail out weak banks which is tough considering its indebtedness.

In this context, a substitute to the contingent security is a euro-wide banking sector recapitalization. This option however forces for more federalism: both regulation and supervision of banks should be transfered to a euro-area institution, which will be the financial pending of the ECB.

6 Conclusion

Countries that face a sovereign debt crisis are also characterized by large current account deficits. These countries which are unable to finance their external deficit are therefore in front of a real balance of payments crisis. The proposed structural reforms to improve competitiveness, reduce current account deficits and boost economic growth may not prove beneficial before many years.

In the short term, two solutions are possible: a sharp contraction in domestic demand that would reduce imports and / or an improvement in price competitiveness in order to gain market share for exports. Weakening domestic demand has the advantage of rapidly improving the current account but weighs on the country's activity. Also, in a highly deteriorated economic environment, as for most of the euro area countries, such a process may delay the reduction of the fiscal deficit. To prevent the eruption of social crises, governments would

be forced to increase public spending. Restoring price competitiveness appears to be a more relevant plan. Traditionally, the country devalues its nominal exchange rate. As part of the euro area, this option is not feasible. Thus, the depreciation of the exchange rate can only be done by a relative price adjustment.

In this paper, we proposed estimates of real effective exchange rate to measure the magnitude of required price adjustments. It appears that for most affected countries by the crisis, notably Greece and Portugal, these adjustments are significant between 25 and 35%. It is therefore difficult to envisage an unilateral adjustment of prices. To the extent that the euro area as a whole has a current account close to balance, the adjustment should be made between euro area members and non vis-à-vis the rest of the world. The realization of such an adjustment is for one country already relatively difficult to implement but between different countries, this requires significant coordination effort of economic policies. However, until now, in the euro area, these efforts have been limited.

Moreover, even assuming that the euro area countries willingly participate in this adjustment, we show that it would take for countries in difficulties at least a decade to go back to equilibrium. The projected scenarios also put in evidence that there is little chance that the Northern countries agree to this adjustment because it would imply that they accept inflation rate around 4%. This would also imply an increase in the ECB's inflation target.

In a short-medium term horizon, just a subtle balance between the proposals described in this paper, a moderated slowdown in domestic demand in countries that registered current account deficits (and vice versa), a coordinated adjustment of relative prices within countries of the euro area and a continuation of financing facilities established by the European authorities in line with medium term financial reform and major structural reforms will avoid the break up of the euro area.

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