

Equilibrium exchange rate and competitiveness within the euro area

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The external imbalances between major countries and within the euro area have brought back to the fore discussions about the rebalancing between surplus and deficit countries and about the focus placed on competitiveness and one of its instruments or indicators: the exchange rate. The European Commission decided to use the exchange rate as one of the indicators to be monitored in order to identify excessive external imbalances within the euro area.

In order to better understand the difficulties involved in assessing the competitiveness of an economy via the exchange rate, this paper reviews the different methods generally used to calculate the equilibrium exchange rate. It then analyses developments in these competitiveness measures (price and cost) within the euro area between 1999 and 2012 and highlights the deterioration observed in certain Member States as of 2000.

Key words: equilibrium exchange rate, competitiveness, inflation, euro area

JEL codes: F31, F41, E31

Macroeconomic imbalances have been central to international economic debate since the financial crisis. At the global level, the Group of Twenty (G20) has established a framework for member countries to identify and adopt the necessary reforms for global rebalancing in order to ensure strong, sustainable and balanced growth. At the European level, by introducing a set of six legislative measures (the Six-Pack), the European Commission has developed a new procedure for identifying excessive imbalances within the euro area that enables it to act to correct them.¹

At both levels, the exchange rate is considered one of the key variables to be monitored because it is both a variable in global rebalancing and an indicator of price or cost competitiveness. As a variable in rebalancing, the direction and magnitude of the necessary adjustments depend on the value of the equilibrium exchange rate, but there are several definitions of this rate. As a price-competitiveness indicator, monitoring the exchange rate allows us to determine its degree of flexibility.² However, it remains difficult to assess whether the adjustments observed are consistent with the country's fundamentals.

Surveillance of exchange rates, and therefore the estimation of equilibrium exchange rates, has always been a core task for the International Monetary Fund (IMF). In the absence of a sole definition of the equilibrium exchange rate, the IMF has developed a methodology that takes into account the different interpretations of this notion.³ However, the fundamental concepts inherent in the notion of the equilibrium exchange rate, and the resulting analysis by the IMF, remain a source of discussion within the international community.⁴

The IMF also proposes a *de facto* classification of exchange rates to measure their degree of flexibility and assess the extent to which the value of a country's currency is determined by the market. The value of a currency is directly linked to the notion of a country's price-competitiveness: by intervening to devalue its currency, a country can make its products relatively cheaper than those of its partners. This notion of price-competitiveness therefore remains just as relevant in a monetary union because, although the nominal exchange rate cannot adjust, price

1 The Six-Pack comprises the following:

- as regards budget policy: (i) enhanced budget surveillance and economic policy coordination, (ii) clarification of implementation of the excessive deficit procedure, (iii) budget surveillance in the euro area and (iv) requirements for the financial framework of the Member States;
- as regards macroeconomic imbalances: (v) prevention and correction of macroeconomic imbalances and (vi) enforcement measures to correct excessive macroeconomic imbalances in the euro area.

2 This article focuses on the most widely-used aggregate measures of competitiveness and does not address the problems inherent to these measures (like the choice of deflators or their lack of accuracy).

3 This assessment framework evolves in line with the macroeconomic and financial changes observed, as well as with the introduction of more reliable and sophisticated estimation techniques. For example, the IMF is currently working on a new assessment method that will replace the one used by the Consultative Group on Exchange Rate Issues (CGER), as mentioned in Lee et al. (2008). The question of equilibrium exchange rates is of course older; for a discussion of the concepts, see for example Driver and Westaway (2005), or Bussière, Chortareas and Driver (2003).

4 Abiad et al. (2009) show that CGER interest rate misalignments often forecast the direction of currency movements correctly, but they are systematically overestimated for undervalued currencies and underestimated for overvalued currencies.

levels in each country continue to change, which in turn changes the relative price of goods. This is why one of the indicators used by the European Commission, in its attempt to identify excessive imbalances, measures changes in relative prices within the euro area.⁵

For a better understanding of the discussions surrounding exchange rate assessment, the first part of this article examines the most widely-used methods and their limitations. These methods to measure competitiveness are applied to the eleven initial members of the euro area. The dispersion of the results suggests that it is necessary to consider all methods when valuing a currency. The second part focuses on the exchange rates observed and analyses their development within the same group of countries over the past twelve years. These competitiveness measures (price and cost) show a net deterioration of certain countries as of 2000, illustrating the importance of exchange rate surveillance within the euro area.

I | Rebalancing variable: assessment methods

I | I The real effective exchange rate

The real effective exchange rate (REER) is the most widely used measure when assessing a global value for a currency, as it reflects the position of the currency of one country in relation to that of its main trading partners.

The REER of country i is calculated using the following formula: $REER_i = \prod_{j \neq i} \left(e_{ij} \frac{IPC_i}{IPC_j} \right)^{w_{ij}}$

where e_{ij} is the bilateral nominal exchange rate between countries i and j , CPI_i and CPI_j are the respective consumer price indices of the two countries, and w_{ij} is the weight allocated to the currency of country j in trade between the two countries and represents the magnitude of their trade linkages, with $\sum_j w_{ij} = 1$.⁶

This indicator is then compared to its equilibrium level, which is a benchmark level (to be estimated) in line with the economic fundamentals of the relevant country, in order to measure any potential misalignment.

⁵ For these different measures of competitiveness, only the deflator changes: consumer price index for price competitiveness and unit labour cost for cost competitiveness.

⁶ The weighting system is double weighted by trade in manufactured goods that takes account of imports, exports and competition of third countries on France's export markets.

Among the different methods for assessing the exchange rate, four are generally used. They can be divided into two types of approach:

- methods that indirectly deduce the misalignment of the exchange rate from a relationship with the current account (the “Macroeconomic Balance” and “External Sustainability (ES)” approaches);
- and those that estimate it directly using information on relative prices (the “Behavioural Equilibrium” and “Purchasing Power Parity” approaches).

1 | 2 Current account approaches

These methods proposed by Williamson (1983 and 1994) are both descriptive and normative.

The macroeconomic equilibrium exchange rate

In the macroeconomic approach, the fundamental equilibrium exchange rate (or FEER) is explicitly compatible with the internal and external balance of the economy. Over the medium term, the economy is assumed to be at full employment (internal balance) and the foreign trade balance to be characterised by a sustainable current account position vis-à-vis other countries (external balance). In practice, this approach requires a full employment output level to be defined for the country and its trading partners, a sustainable current account position to be identified and a balance of trade equation to be estimated.

*Misalignment of the REER is obtained indirectly by:*⁷

$$\text{misalignment} = \frac{\text{REER} - \text{REER}^{\text{norm}}}{\text{REER}^{\text{norm}}} = \frac{\text{ca} - \text{ca}^{\text{norm}}}{\varepsilon}$$

where ca is the current account to GDP ratio and ε the long-term elasticity of the current account to the exchange rate which depends on import and export price elasticities.

This approach raises numerous theoretical and empirical difficulties. It is a coordination model in which countries must agree on consistent trade balance objectives that sum to zero at the global level. In practice, the choice of the sustainable level for the current account balance is open to debate. This approach is based on a static analysis and is subject to assumptions about the internal balance: the labour market must be in

⁷ See Lee et al. (2008) for a detailed explanation of this equality.

equilibrium and price and wage adjustment dynamics are not taken into account. Finally, the resulting exchange rate misalignment, derived from the current account deviation from its norm, depends on the trade elasticities used (and the corresponding ϵ).⁸ All these difficulties result in a high degree of uncertainty as to the exchange rate equilibrium level and the corresponding misalignment.⁹

The external sustainability method

The External Sustainability (ES) method is also based on the concept of the current account norm, however it derives its benchmark level from accounting principles in order to maintain the external debt at its sustainable level. The benchmark level at which external debt must be stabilised is generally the last observed value.

The current account to GDP ratio (ca^{norm}) stabilising the net foreign asset position at a given level (b^{norm}) is defined by:¹⁰

$$ca^{norm} = \frac{g + \pi(1 + g)}{(1 + g)(1 + \pi)} b^{norm}$$

where g is the potential growth rate in GDP and π long-term inflation.

Misalignment of the REER is calculated as in the previous case.

In addition to the arbitrary choice of the benchmark external debt level, this approach is also highly sensitive to the choice of trade elasticities and the potential growth level used.

I | 3 Relative price approaches

The behavioural equilibrium exchange rate

The behavioural equilibrium exchange rate (BEER) developed by MacDonald (1997) and Clark and MacDonald (1998) is a composite econometric model. Unlike the previous approaches that aim to explain how the REER is determined using a theoretical model, the BEER shows changes in the REER in a mainly empirical manner. It seeks to identify the long-run relationships (cointegration) between the REER and the fundamental variables of the economy (net external assets, relative productivity, government spending, etc.) in order to determine its equilibrium level.

⁸ Imbs and Méjean (2010) show large variations in elasticities, depending on the assumptions used to estimate them.

⁹ This uncertainty as to both the "sustainable" level of the current account and the elasticities is discussed in Bussière et al. (2010).

¹⁰ See Lee et al. (2008) for a detailed explanation of this equality.

This dynamic approach explicitly shows the long-run determinants of the REER. However, their theoretical analysis and that of their misalignment is largely performed outside the model (contrary to that of the Fundamental Equilibrium Exchange Rate — FEER).

The equilibrium REER is determined by: $\log(\text{REER}^{\text{eq}}) = \sum_{k=1}^N \hat{\beta}_k x_k$

where $\hat{\beta}_k$ are estimated cointegration coefficients, and $\sum_{k=1}^N \hat{\beta}_k x_k$ the long-run relationship between the REER (its logarithm) and its determinants (the fundamentals of the economy).

Misalignment of the REER is obtained directly by:

$$\text{misalignment} = \log(\text{REER}) - \log(\text{REER}^{\text{eq}})$$

Given that the BEER is primarily an econometric model, this approach is subject to the usual robustness issues, meaning that the estimated long-run relationship is sensitive to the choice of variables, the group of countries and the period.

Purchasing Power Parity

The other approach based on relative prices is Purchasing Power Parity (PPP). Proposed by Cassel (1918), this measure of exchange rate misalignment is one of the oldest. It states that, over long periods of time, exchange rates adjust to offset the differences in inflation rates. Balassa (1964) and Samuelson (1964) built on this theory to show that a large part of the long-run movements in the real exchange rate can be explained by differences in productivity. Indeed, the Balassa-Samuelson effect gives a trend appreciation in real exchange rates of the least developed countries during their economic catch-up process, driven by relative productivity gains in the tradable goods sector.

In order to model deviations from purchasing power parity a preliminary regression of the relative price measure on the fundamental determinants (per capita income) is necessary to calculate the misalignment, i.e. the difference between the current relative price and projected relative prices. Contrasting with the BEER approach, the measure of relative prices used here is not based on a representative sample of the competition (REER) but on a measure of the relative cost of living in relation to a base country. Consequently, it is not necessarily a highly representative indicator of price competitiveness, but does allow comparison of cost of living.

The PPP approach generally considers the relationship between the measure of relative prices (PPP exchange rate) and the per capita income. This estimated relationship is sensitive to the time period used and the choice of countries.¹¹ Moreover, the use of a single explanatory variable also increases the risk of ignoring the impact of important explanatory variables, thereby causing bias in the identification of exchange rate misalignment.¹²

2| Differences in estimated misalignments

2|1 Illustration for the euro area

There is considerable uncertainty surrounding equilibrium REER estimates. Indeed, the calculations based on these four approaches require the empirical relationships to provide satisfactory characteristics of the underlying economy. Estimates of the BEER, the FEER and external sustainability also depend on assumptions regarding the equilibrium values of several macroeconomic variables.

Salto and Turrini (2010) highlighted the differences in the misalignment obtained depending on the method used. They considered the four methods (FEER, ES, BEER and PPP) within the euro area for different periods:

- 1986-1991: European Exchange Rate Mechanism;
- 1992-1998: post-Maastricht Treaty;
- 1999-2003: moderate imbalances;
- 2004-2007: large imbalances;
- 2008-2009: the financial crisis.¹³

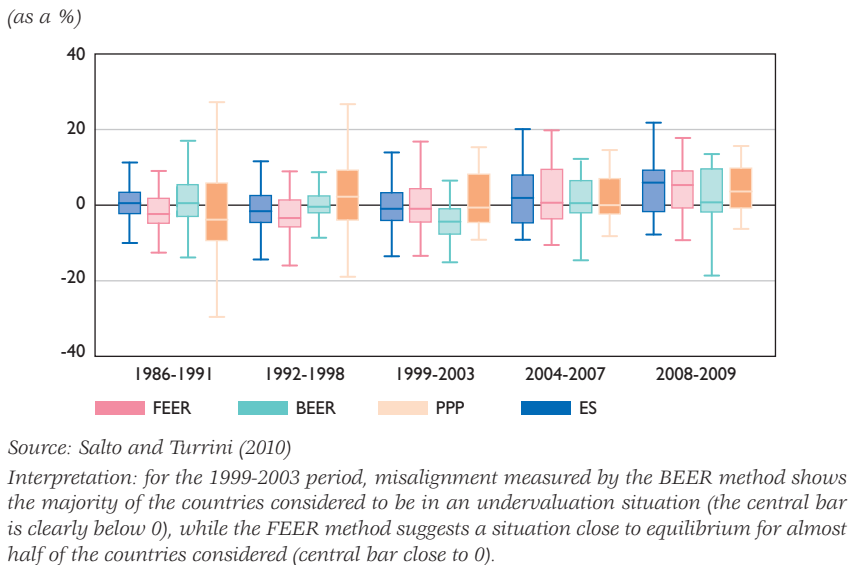
Chart 1 summarises the distribution of the deviations (25th, 50th and 75th percentiles) for each method within the euro area. Overall, the results are qualitatively and quantitatively different in level and dispersion. It is interesting to note, however, that since the creation of the euro, the misalignments measured by the current account methods (FEER and ES) provide consistent results for over half of the REERs considered (an overvaluation). For the 2008-2009 period, the four methods converge and indicate that the majority of the REERs considered are overvalued.

¹¹ Lopez et al. (2005) discuss this point, and more specifically the importance of modelling the autocorrelation.

¹² This divergence between the estimated results and the theory is known as the PPP puzzle, according to Rogoff (1996).

¹³ For the euro area (E11), the authors study the following countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal and Spain.

Chart I Uncertainty surrounding estimated misalignments for the eleven euro area countries



However, the misalignments are quantitatively different: the FEER and ES approaches suggest an overvaluation of between 5% and 18%, and 6% and 23% respectively, while it is between 1% and 15% for the BEER approach and 4% and 16% for the PPP approach. This makes it difficult to choose a path and a timetable for the adjustments required to restore balance.

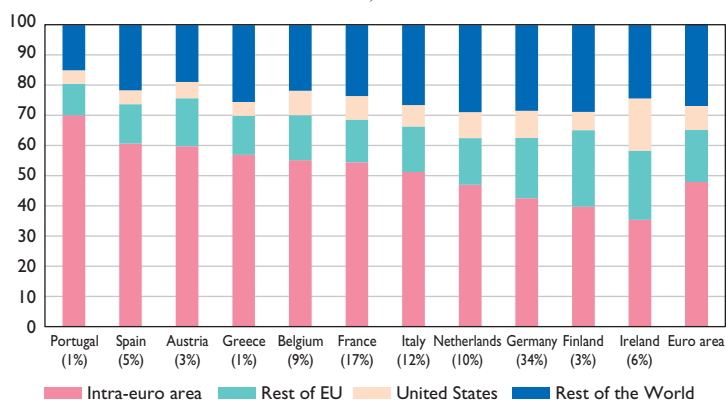
This illustration allows us to highlight two essential points in the analysis of equilibrium exchange rates: the different approaches used for determining the equilibrium exchange rate produce greatly varying results. Consequently, all exchange rate assessments must consider all these approaches in order to take account of the conceptual differences in the notion of equilibrium exchange rate and misalignment.

In the euro area, all four methods identify an overvaluation in the case of over 50% of the REERs observed at the beginning of the financial crisis.

3| Developments in the price and cost competitiveness indicator: what do we observe?

3| I Importance of intra-euro area trade

The positioning in terms of price and cost of each of the countries within the euro area is extremely important as the rest of the euro area is their

Chart 2 Relative weight of international trade for the euro area*(breakdown of international trade based on w_{ij} weights as a percentage)*

Source: Banque de France calculations

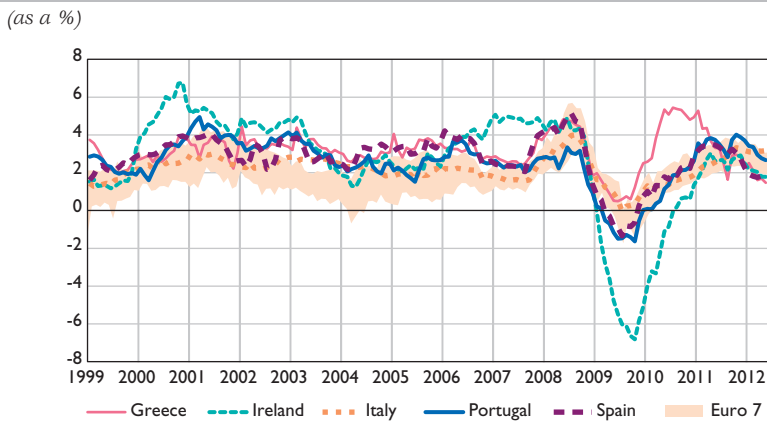
biggest trading partner. Chart 2 shows that more than 50% of the trade of Portugal or Greece is intra-euro area. For Germany, which alone accounts for over 30% of intra-euro area trade, this trade amounts to 43% of its foreign trade, while trade with the European Union totals 63%. Any rebalancing of the REER for euro area countries therefore primarily implies a realignment of relative prices and costs, i.e. the differences in inflation and unit labour costs between Member States.

3|2 Developments in price competitiveness between 1999 and 2012?

Lopez and Papell (2012) show that, statistically, inflation rates within the euro area have displayed common behaviour since 1999, with the exception of the 2009-2010 period. Their analysis also highlights two important points:

- the stable relationship between Member States' inflation rates does not imply that these rates are identical;
- in order to identify potential imbalances, not only must the euro area inflation rate be observed, but also that of individual Member States.

Over the 1999-2008 period, average euro area inflation was very close to 2%. However, during that period, Ireland, Greece and Spain recorded significantly higher levels of inflation than the other Member States, causing a loss of competitiveness in terms of relative prices in relation to the rest of the euro area. Chart 3 also shows that from 2009 to 2010,

Chart 3 Inflation rate within the euro area, 1999-2012

Note: Euro 7 inflation is the unweighted average of the inflation rates of Germany, Austria, Belgium, Finland, France, Luxembourg and the Netherlands.

Source: Lopez and Papell (2012)

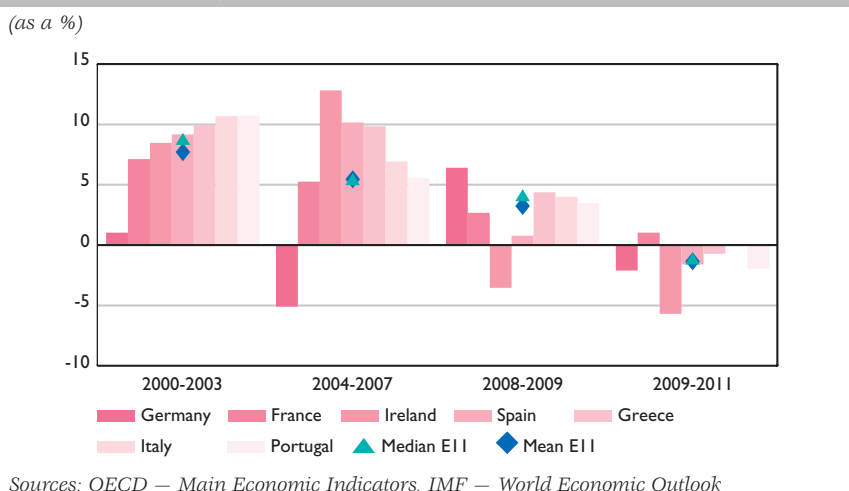
Ireland's inflation rate fell sharply before converging once again towards the group trend. Spain's inflation rate followed a fairly similar path, although to a lesser magnitude, while inflation in Greece continued to be the highest in the euro area up to the end of 2011.

3|3 Developments in cost competitiveness between 1999 and 2012?

The competitiveness gap in terms of prices for these countries can also be observed in costs. Developments in unit labour costs in the euro area economy as a whole are shown in Chart 4 and confirm the marked drop in inflation rates as of 2000 in certain Member States. It also shows that inflation rates rose over the 2004-2007 period: those of Greece, Spain and Ireland increased by over 10% between 2004 and 2007, while euro area inflation rose by 5% on average and those of Germany fell by 5% over the same period. However, only Ireland showed a significantly sharper decline in unit labour costs than the other euro area countries for the 2009-2011 period. Moreover, French unit labour costs remained in line with the euro area average between 2000 and 2009, but differed over the 2009-2011 period, in that they rose by 1% while those of the other Member States fell by 1.3% on average.¹⁴

¹⁴ Gaulier and Vicard (2012) analysed developments in unit labour costs by sector within the euro area.

Chart 4 Developments in unit labour costs



4| Are the adjustments likely to result in rebalancing?

If intra-euro area relative prices adjusted in line with estimates of the equilibrium exchange rate, the estimated overvaluation for over half of the euro area for the 2008-2009 period should coincide with a decline in relative prices. In other words, overvalued countries should see a fall in their inflation rate while undervalued countries should see a rise. This gain in price competitiveness should also be reflected in cost competitiveness.

The sharp fall in the Irish inflation rate coincides with an almost 10% fall in unit labour costs in Ireland between 2008 and 2011, confirming the efforts made to rebalance (price and cost) competitiveness. However, for the same period, the rest of the euro area (E11) experienced relatively stable inflation and an average increase in unit labour costs of almost 2% (and a median of over 4.5%). The statistical evidence given by Lopez and Papell (2012) corroborate these observations: the changes observed within the euro area since 2010 are not sufficient to achieve the adjustment in relative prices (costs) required to realign (price and cost) competitiveness within the euro area.¹⁵

¹⁵ There may be a number of reasons for the divergence observed in the REER of euro area countries. Bussière, Chudik and Mehl (2011) show that the responses of the REERs of these countries to global shocks have converged since the introduction of the euro, suggesting that the shocks causing divergences between their REERs are likely to be country-specific.

The financial and economic crisis has highlighted the dangers inherent to macroeconomic imbalances within the euro area. More specifically, this article focuses on the notion of (price and cost) competitiveness, and shows that Member States rarely act spontaneously to make the changes necessary for rebalancing.

In order to prevent this situation, the euro area has introduced a set of six measures, the Six-Pack, to enhance the economic governance of the European Union. The package came into force on 13 December 2011 and one part of it proposes a new surveillance mechanism aiming to prevent and correct macroeconomic imbalances within the euro area. Among the ten indicators used in the scoreboard of this early-warning system, real effective exchange rates and unit labour costs are used to identify competitiveness gaps.¹⁶ This legislative package also provides for the possibility of imposing financial sanctions on Member States that do not follow the EU recommendations.

¹⁶ The other indicators are the current account balance, the net international investment position, export market share, private sector debt, credit to the private sector, general government debt, housing prices and the unemployment rate.

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