Focus 1
Euro-dollar -- what does PPP say?

- **The euro is a currency which, since its creation, has tended to rise against the dollar.**
- **This rise can be accurately explained by the Purchasing Power Parity relationship.**
- **The fall in the dollar** (or the rise in the euro) **offsets the relative increase in the cost of goods and services produced in the USA, the latter having experienced greater inflation than in the euro zone.**
- **The PPP relationship is fairly rough and ready. However, over the long term it can constitute a target around which the exchange rate can fluctuate.**
- **The euro's equilibrium exchange rate would currently be around $1.21, indicating that the European currency is overvalued.**

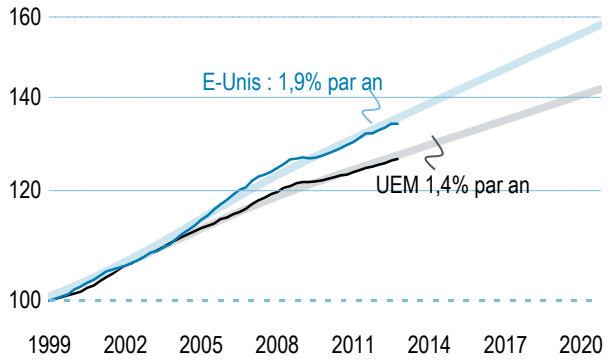
The USA has a tendency to generate greater inflation than the euro zone irrespective of the measure used (GDP deflator or the consumer price index, see figure 1). Thus according to PPP, the dollar will tend to fall against the single currency. The explanation is simple, not to say simplistic: if the price of US production rises faster than that in the euro zone, European demand for US goods and services -- which represents a source of demand for dollars against euros -- will, all things being equal, tend to fall in favour of local production. Conversely, US demand for European goods and services -- a source of supply of dollars against euros -- tends to increase. More dollars supplied and fewer dollars demanded will lead to a fall in the dollar and a rise in the euro.

An overvalued euro...

And indeed this is the trend observed since the creation of Economic and Monetary Union (EMU). At its introduction on 1 January 1999, one euro was worth $1.17. Its average value over the first quarter of 1999 was $1.13 (€0.88 per dollar), exactly equal to the PPP as calculated by the OECD[1] and Oxford Economic Forecasting (OEF). Over the intervening fourteen years, US prices have increased 6.4% relative to those in the euro zone[2]. Thus the PPP exchange rate would be $1.21 (1/0.88*(1-6.4%)). This is close to the equilibrium rate currently

A little more inflation in the USA

GDP deflators Q1 1999 = 100



*Trends extracted using a Hodrick-Presott filter

Figure 1 Sources: BEA, Eurostat

calculated by the OECD ($1.24 on average over 2012) and the OEF ($1.22 in the fourth quarter of 2012).

At $1.37 on 1 February (the most recent peak), the euro would thus be 13% overvalued against the dollar, although this is not an exceptional difference (it is easily within the interval of confidence, see Figure 2). PPP is a relationship that is empirically verified only over the long term (co-integration of relative prices and exchange rates, see inset). It struggles to describe correctly fluctuations of the exchange rate around the trend line, an observation that is not new[3].

...that is rising still further

In fact the current rebound in the euro has little to do with changes in inflation differentials. It is due primarily to the progress made in stabilising EMU during 2012: the conclusion of the budgetary "pact", ratification of the European Stability Mechanism (ESM), restructuring of Greek debt, launch of the banking union project and lastly the announcement by the ECB of a system of outright monetary transactions (OMTs) to help finance governments. The reduction in risk aversion, illustrated by a narrowing of spreads, has been accompanied by a return of portfolio investment in the euro zone, which has no doubt contributed to the currency's rise. Foreigner's bond purchases thus reached €108 billion in November 2012 (cumulative over 12 months), having fallen virtually to zero in June. A recent report

[1] Organisation for Economic Cooperation and Development

[2] The relative increase in US prices was 5% between January 1999 and December 2012 when measured by the consumer price indices and 6.4% when measured by GDP deflators (at the most recent known point of the third quarter of 2012).

[3] In the early 1980s two economists at the Federal Reserve had already demonstrated the inability of standard exchange rate models to predict extreme movements in the dollar, which would be better described by random walk. See: R. Meese, K. Rogoff (1983), "Empirical exchange rates model of the seventies: do they fit out of sample?", Journal of International Economics, 14:3 – 24.

indicated a marked return of private financing to "peripheral" nations (Italy, Spain, Portugal, Ireland, Greece)[4].

Meanwhile, the US Federal Reserve has done nothing to prevent the fall in the dollar. By holding interest rates close to zero over a long period and doubling the rate of its bond purchases ($85 billion per month since January 2013, from $40 billion before) it has discouraged investments in dollars, the supply of which it has also increased. Granted the dollars created could remain stocked as liquidity in banks. But they could also be invested in the euro zone once investors believe its level or risk has fallen.

How high?

Just how high could the euro climb? Over the long term, PPP argues for further increases. The monetary and fiscal policy mix in the USA is fundamentally more inflationary than in the euro zone with substantial government deficits, abundantly monetised by the Federal Reserve, which now holds 14% of the stock of debt (federal government and agencies) compared to barely over 2% for the ECB. The euro zone also remains an area of low inflation, particularly because labour costs will remain under pressure in a number of countries which are unable to devalue (Italy, Spain, Portugal and to a lesser extent France). Thus the projected gap between inflation rates in the euro zone and the USA is unlikely to alter the past trend of an increase in the PPP rate (Figure 2).

But in the immediate term, the euro looks overvalued against the US dollar[5]: any further rise would increase the opportunity to buy, on relatively good terms, goods, services or assets denominated in dollars, which could have a regressive effect. We also know that the progress which has driven its rise since the beginning of the crisis has followed a jagged path. Thus the risk that Italy might find itself without a clear majority after the 25 February elections (and thus with a divided Parliament) has caused it to weaken recently. The exchange rate may also be influenced by expectations of changes in the interest rate spread, and thus in monetary policies. A comparison of economic conditions does not argue for a strong euro: unemployment in the euro zone has risen to record levels (reaching 11.7% of the workforce in December 2012), whereas it is falling in the USA. To the extent that the Taylor rule still holds true, this should encourage the ECB to maintain key rates at a very low level, whilst the Federal Reserve should consider raising its rates at on point.

Before returning to a long-term rising trend against the dollar, the euro could see a downward correction or at least a stabilisation at around its recent peak.

The euro against the dollar over a long period

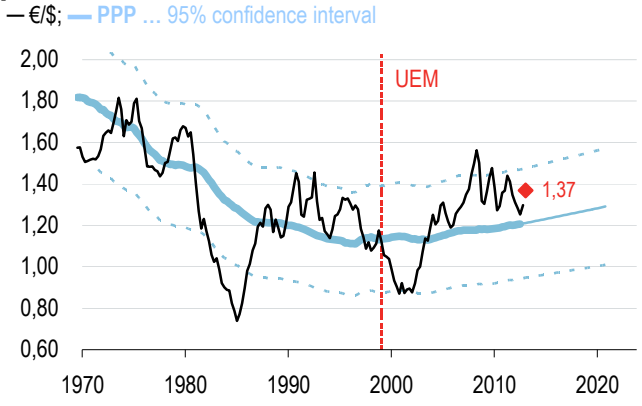


Figure 2 Sources: Eurostat, Thomson Reuters, BNPP

PPP: the empirical justification

We have tested the co-integration of exchange rates and relative prices (whether or not they represent a stable linear combination) using the method established by Engel and Granger [1987] and applying the Augmented Dickey-Fuller (ADF) unit root test to the variable μ_t such that:

$$s_t = \alpha\left(p_t^{US} - p_t^{UEM}\right) + \beta + \mu_t \qquad (1)$$

where s_t is the logarithm of the euro-dollar exchange rate and p_t^{US} and p_t^{UEM} the logarithms of price indices (GDP deflators) in the USA and euro zone respectively.

The test was conducted on half-yearly data from the second half of 1971 (end of the Bretton Woods system, free floating of currencies) to the first half of 2012 (80 observations). Data prior to the creation of EMU (exchange rates and GDP deflators) are those provided by Thomson Reuters and Eurostat. It is worth noting that the introduction of a disruptive variable (introduction of EMU) had no influence on the results.

The test demonstrates the stationarity of the error term μ_t at the 10% threshold (see Table 1). Re-running the test on a restricted model conforming to the PPP (α=1) does not change the result, indifference confirmed by a Chow test. This validates the hypothesis of the stationarity of the real euro-dollar exchange rate over a long period, and thus the PPP relationship.

Results of ADF test on half-yearly data (1971-2002)

$\Delta\mu_t = \delta\mu_{t-1} + \lambda\Delta\mu_{t-1} + \varepsilon_t$		Error threshold 5%	10%
T-Stat	-2.83	-2.89	-2.58
Z-Stat	-17.00	-13.70	-11.00

Table 1

[4] See: Financial Times, 29/01/2013.

[5] That is not the case against all currencies. The real effective exchange rate of the euro (its weighted average adjusted from CPI differentials) is running slightly below its long term average.