

**Reply to the Comment
Currency in Circulation, The Cash Changeover
and the Euro-Dollar Exchange Rate**

by Franz Seitz and Ulrich Bindseil
to CESifo Working Paper 493, May 2001,
Why Has the Euro Been Falling?

By Hans-Werner Sinn and Frank Westermann

The paper by Seitz and Bindseil is a comment on our CESifo Working Paper (see above) on the determinants of the euro exchange rate. We welcome the publication of this comment in the *ifo Studien* as a matter of principle in a truly academic debate, but we do not believe that the authors have made a relevant contribution. We answer points made by the authors (in italics) one by one.

1. The liquidity management of the Eurosystem fully neutralises any reduction of the banknotes in circulation (with regard to interest rates) by simply reducing the funds provided to banks through open market operations.

The liquidity management we called "passive intervention". Passive intervention is the reason why the stock of money balances shrinks after a reduction in demand. Indeed, passive intervention fully neutralises all effects on interest rates, as we explained in detail, and yet there are clear cut exchange rate effects.¹ Pointing to a behaviour of the ECB which we explicitly assumed and

¹ Passive intervention that stabilises the interest rate cannot fully neutralise the effects on the exchange rate if the short-term debt instruments with which the Fed and the ECB carry out their interventions (collateralised loans, treasury bills etc.) are not perfect substitutes. Seitz and Bindseil mention in passing (Section III) that the neutralisation of interest effects would imply a neutralisation of exchange rates effects, too, but they give no argument whatsoever why that should be true. By contrast, in our paper, it is demonstrated formally why an imperfect substitutability of the debt instruments that US and European central banks use for passive intervention precludes a neutralisation of the effectiveness of. We show that the mechanism is the same as the one which implies the effectiveness of sterilised interventions in the foreign exchange market. As we do not want to counter an argument that has not been made we refer the reader to our paper.

modeled, and using a language that sounds like a counter argument, but isn't, is mere rhetoric.

2. *A change in the currency stock does not precede or "Granger cause" changes in the exchange rate.*

Of course, the decline in the stock of money balances does not precede or "Granger cause" the devaluation of the euro. According to our theory, the decline results from the described passive intervention of the ECB, i.e. from an implicit counter reaction attempting to compensate for the demand shock which caused the devaluation. Thus, if anything, a variation in the exchange rate should Granger cause the variation in the stock of money balances. Showing that the reverse causality does not prevail is, once again, a semantic exercise phrased in a way that suggests a contradiction with our findings, but it is not a counter argument.

Moreover, it is well known that applying the concept of Granger causality to a pair of financial time series and its fundamentals will produce meaningless results, as one of them is forward looking. This is a well-known textbook fallacy.²

3. *Until mid 2001, when the euro was particularly weak, the increase in total euro area reserve requirements overcompensated the decline in the stock of currency in circulation. The portfolio effect should therefore have worked in the opposite direction, implying a revaluation of the euro.*

This statement is empirically misleading and theoretically false. The reserve requirements in the euro-system grew from the beginning of 1999 (January) to the middle of 2001 (July) by 25.7 bn. euro. By contrast, the downward deviation of the currency in circulation from its trend, which had begun in 1997, was already about 36 bn. euro in July 2001. Until the end of 2002 (December), the reserve requirements had risen by 27.4 billion euros, while the stock of currency in circulation was down by 120 billion euro (about 25%) against the trend.

More importantly, an increase in reserve requirements cannot be netted out with a decline in currency in circulation because it has no exchange rate effect. Under the new ECB rules, reserve requirements are interest bearing assets. Thus an increase of these requirements does not imply a reduction in the stock of short term interest bearing assets which could have compensated for the increase of such assets in the international portfolio that resulted from the ECB's passive interventions following the negative money demand shock in eastern

² Suppose we test for Granger causality between share prices and dividends, we might find that the share prices Granger cause dividends due to the forward looking nature of the variable. The true causality is, of course, the other way around. Similarly, a variation in the exchange rate could be caused by a correctly expected money supply shock although it takes place before this movement. Furthermore, the causality can go both ways and the granger causality should thus be implemented as a two sided test. The relative money stocks Granger-causing the exchange rate would be consistent with our model as argued above.

Europe and that implied that these interventions could only mitigate, but not prevent a devaluation.

4. *In daily data, there is a negative correlation between the stock of European currency in circulation and the value of the euro.*

The negative correlation is an artifact. First, one wonders why the authors limit their observations to the period January 1999 to December 2001. This is strange, given that they possess the data for the full time series from 1993 onwards and given that the co-movements between the exchange value of the deutschemark and the stock of deutschemarks in circulation on which our paper focuses concerns the years before and after the Dublin Summit of 1996, i.e. the period where increasing amounts of deutschemarks were absorbed in, and repelled from, eastern Europe and other parts of the world.

Second, even for the limited time period chosen, the correlation does have the right sign if a serious mistake in the authors' calculation is corrected. The authors correlate the trend in the level of the European stock of money balances with the exchange rate between the dollar and the euro. This makes little sense since they forget about the US stock of money balances. Suppose all advanced economies have positive time trends in the levels of their currencies and the exchange rates between them have (positive or negative) time trends, too. In this case the test of Seitz and Bindseil will confirm that the currency is positively correlated with the exchange rate in 50% of the cases and negative in the other 50%, but both findings would be meaningless.

To correct for this mistake we measured the correlation of the exchange value of the euro with the ratio of the German and US stocks of currency in circulation. This correlation turned out positive regardless of the frequency (quarterly, weekly or daily), the type of filtering (ARIMA, HP-Filter, or no filter)³, or the choice of time period after 1990 (including the pre-euro DM period, or not).⁴ In particular, it turned out positive if the same data and the same time period were used as in the comment by Seitz and Bindseil.

³ When looking at the ratios, the correlation is 0.65 (Weekly 1-1-1999 to 12-31-2001) and 0.43 (daily 1-1-1999 to 9-12-2000), using the preferred filter of Seitz and Bindseil. This also holds for most of the subperiods (0.97, 0.37, -0.75, 0.13, 0.95 in weekly and 0.61, 0.48, -0.89, 0.43 for daily data). The only exception is a few months around the date 1-1-2000, as there was a larger year Y2K effect in the US. We thank the authors for supplying us with the daily and weekly data.

⁴ The positive correlation we reported refers to 11 years of quarterly data from 1990:1 to 2000:4. Our findings have been confirmed in monthly data for a wider range of currencies and longer time periods by (Breidon and Fornasarri, CESifo Forum, Fall 2001).

5. A good exchange rate model is one that includes the risk premium in the forex markets measured by the difference between the consensus exchange rate forecast and the forward rate.

We do not share this view either, because it confuses explanatory and dependent variables. Any meaningful theory of the exchange rate has to explain variations in the exchange rate, given the expected future spot rate, because these variations reflect fundamentals. In other words, it is necessary to explain the change of the exchange rate from one point in time to another or, which is equivalent when the interest rates are given, the difference between the future expected spot rate and the forward rate. The authors regard the difference between a consensus forecast of the expected future spot rate and the forward rate as an explanatory variable in their estimation equation for the exchange rate rather than the dependant variable that needs to be explained. They therefore effectively explain the exchange rate with the difference between an exogenous variable and itself. This must indeed yield truly wonderful and significant results, but again there is very little to be learned from such an exercise.

We find it remarkable that the multiple regression Seitz and Bindseil use for this type of "explanatory" variable does, in fact, yield the positive regression coefficient between cash and currency value that we claim and they deny (see figure 5). Unlike the correlation coefficients reported in table 3, here they indeed regress the exchange rate to the ratio of German and US currency stocks. The authors downplay this contradiction to their earlier empirical conclusions by arguing that the coefficient is not statistically significant. This is true, but trivial, given that the estimation was limited to a maximum of 30 data points and explains the exchange rate with itself.⁵

We conclude that most of the points Seitz and Bindseil make are irrelevant and that their econometric apparatus is fundamentally flawed. Their comment gave us the opportunity to document that the positive correlation between the currency in circulation and the exchange value of this currency is robust in high frequency data, although our model was aimed to explain only longer-term fluctuations.

Concerning the validity of our theory we finally wish to point to the strong increase of the euro and the stock of euro currency in circulation that happened after the physical currency conversion in February 2002. This was exactly what we had predicted.

References

- Breedon, F. and F. Fornasari (2001), The Impact of Euro Notes and Coins, CESifo Forum (Autumn), 49–51.
- Seitz, F. and U. Bindseil (2001), Currency in Circulation, the Cash Changeover and the Euro-Dollar Exchange Rate, *ifo Studien* 47, 531–548.
- Sinn, H.-W. and F. Westermann (2001), Why has the Euro Been Falling?, CESifo Working Paper 493, May.

⁵ The model has seven variables and is estimated with only two and a half years of monthly data. This is an obvious case of a small sample bias. As can be seen in figure 5, the standard errors decrease as the sample size increases. The estimation starts with only seven data points on the left-hand side of the diagram and has thirty data points on the right-hand side.