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Abstract

The depreciation of the euro vis-à-vis the dollar over its first two years is a fact of life. By contrast the present paper offers some econometric evidence with daily data that, within a sticky price framework, monetary fundamentals may have played a role in this depreciation. A fast monetary expansion with continental European interest rate convergence in 1998 and an accommodative ECB monetary stance in 1999 would thus bear some responsibility in the weakening of the euro.

The depreciation of the euro against the dollar during its first two years existence is often presented as a new proof of incapacity of the fundamentals explain the movements of exchange .In contrast this article provides econometric elements on daily data that in a viscous price framework monetary fundamentals played a role in this depreciation. A strong monetary expansion associated with the convergence of European interest rates in 1998 and an accommodating monetary policy of the in 1999 would thus have a substantial responsibility in weakening euro

THE WEAKNESS OF THE EURO MONETARY EXPLANATION

Since its launch in early 1999 the performance of the euro in the foreign exchange market With regard to the other major currencies of many observers. A large part of them was waiting for a redeployment of large-scale international portfolios in favor of the new currency. De facto a stock equilibrium point of view it might seem rational to anticipate that the demand for euros would come from a need. This expectation was reinforced hypothesis according to which the European Central Bank would be endowed with a strong credibility both because of the strong independence it enjoys and because it could be considered it would inherit the reputation of the Bundesbank. For some observers such credibility had to have as a counterpart of low interest rates in the euro area. A negative interest rate differential with the United States could be seen as a positive trend in favor of the new currency. This could signal expectations appreciation of the euro leading to an increase in the demand for the new currency and thus its immediate appreciation. Yet as often the foreign exchange market has taken the opposite view of the forecasts a strong euro. The euro zone is found net capital exporter. During its first twenty-two months the European currency lost nearly a third of its initial value against the US dollar. This may seem to be a new anomaly in the foreign exchange market

An explanation of this poor performance often encountered The weakness of the euro is a new example of the free float of exchange rates well known for its long and long pendulum movements, which is difficult to explain by the economic fundamentals Favero et al [2000]. This article argues that fundamentals are able to contribute the initial and persistent weakness of the euro. These fundamentals are close to those described by the monetary approach

The weakness of the euro vis-à-vis the dollar is not a new phenomenon that would date the introduction of the new European currency euro already weaken the end of summer 1998, ie a few months after the final selection of the participating countries European Monetary Union. The Maastricht agreed convergence criteria implied in particular that the interest rates of the candidate countries should all converge towards the lowest rates in the euro zone lowered the average level of interest rates in the zone towards the level of German rates which were then low for internal reasons as described by Kirrane [2003].

The thesis we test and validate is based on the role a negative interest rate differential with the United States could play in euro weakening. One of the main approach limitations underlying the opposite thesis presented above in which low interest rates would engender a strong euro is that prices are assumed perfectly flexible even in the short run. It is, however, fairly widely accepted that prices are small in the short term as in Dombusch's approach adjustment

However, over-effects may not be sufficient in themselves to explain persistence of the depreciation of the euro. A combination of approach based on existence trend inflation and the thesis of the viscosity of short-term prices represents a more appropriate basis for testing the responsibility of monetary factors in the very pronounced rapid and sustained decline of euro. We thus implement the Real Interest Rate Differential (DTIR) model developed by Frankel in 1979 to explain the weakness of the mark in the 1970s following the transition to floating exchange rates. The strength of the vision based on price viscosity lies in its emphasis on the link between a lower interest rate relative and a depreciation of the currency while the flexible price vision highlights the link between the differential long-term inflation and the exchange rate In combined approach DHR) exchange rate deviation relative to its long-term level is then not only a negative function of the interest rate differential as in Dombusch but also depends positively on the expected inflation differential.

The difficulty with which the empirical estimate of the monetary model in the case of the euro comes up is that it usually requires data of macroeconomic conditions such as the available money supply to make an econometric study still possible. We are examining with high frequency data a subset of the model for which data are available Our study period focuses on the last two years spring 1998 autumn 2000 as preliminary estimates indicated the presence of insensabilities that prevent us from going further.

After having briefly presented the structure of the monetary model used later in the tests, we will present the empirical results using the standard technique of multiple cointegration.

The starting frame of the model The first one expresses the expected depreciation rate helps an autoregressive specification. The agents expect that in the short term the exchange rate will return its equilibrium level a proportional current gap ratio between the two countries. two In the long term we expect that the exchange rate will vary a rate equal to the differential expected inflation We could link the speed adjustment parameter to the goods market The second equation assumes simply checked the unhedged parity of interest rates where is the logarithm the exchange rate spot national currency price a unit of foreign currency) the exchange rate long-term equilibrium and i * respectively the interest rate domestic and foreign while exhibitor indicates an anticipated variable by combining these two equations we get that connects the exchange rate its long-run level as well as nominal interest rate differentials and expected inflation.

Recent work has presented in a framework with microeconomic fundamentals the conditions under which a monetary shock can lead to an over-adjustment of the interest rate and exchange rate see eg Hairault et al [2000].

The Purchasing Power Phantom is assumed to be held long-term1= Pt-P *

where and p * are the logarithms of the country and foreign price levels The money market is assumed to be at the center of long-term rate movements. Currency demand in the country and abroad is modeled as follows

md

Pi Vt

Ci

where md is the logarithm of money demand and the logarithm of income money supply m0 is assumed exogenous equals m) in a world of rates of flexible exchange and the money market in equilibrium in both countries

md m0 rn

mf mf

m *

By replacing and in and 8) solving for the price level and using 4) we get

m * Ci y * C2

long term with the equations and imply that

-exp exp viuPante

that matches Fischer'sif we assume that the real interest rates are equalized between the country and foreigner Using 10 in 9) we get the long-term exchange rate of the form

* - *) + 11

We introduce this for the short-term exchange rate equation, we have the expression for

-c yy + b -i + b -K 12

where 1 / ë and 1 / ë The following statements are applied in the different versions of the monetary model.

In the model viscous prices and continuously in the model flexible prices. On the relevance of this assumption see Rogoff [1995]

In the flexible model is positive because a rise in the internal interest rate associated with an increase in money supply that reflects future inflation expectations and a decline in the desired holding of national currency must result in a depreciation of the national currency. On the contrary in the viscous model is negative to the extent that a depreciation of the current exchange rate in relation to its long-term value will be caused by a fall in the interest rate associated with an increase in the money supply leading to capital outflows. A positive coefficient corresponds to the fact that the gap between the two countries' inflation expectations influences the exchange rate.

The tests for such restrictions have been very numerous since the end of the seventies with different generations of work McDonald and Marsh [1999]. These studies ignored the possibility

endogeneity of interest rate reflecting the presence a reaction function of the monetary authorities McCallum [1994] exchange rate equation side. To take into account it can to retain for estimation an autoregressive vector model Parallel to other works insisted on importance to consider the relation of cointegration implicit in equation 12 insofar as the variables are certainly not stationary see for example McDonald and Taylor [1993]. An additional question concerns the adequate measurement differential rate of inflation expected. A preferred candidate is the relative slope of the term structure Future higher inflation expectations would be associated with a steeper slope of the yield curve Estrella and Mishkin [1995] Jondeau and Ricart [1999] Since at least work from Mishkin [1984] we have empirical evidence that the real interest rate varies over time. With a viscous model it is assumed that the real interest rates of the two countries converge gradually to a constant level We then obtain an equation of the form

m.-m - c y.-y + b -i + b Li 13

where and are the interest rates of maturity

In approach of the term structure based on expectations the long interest rate represents the average of the anticipated short rates over the term envisaged with a possible constant to allow a term rate. The expected inflation rate can then express a constant as a function p. The difference between any long-term inflation rate expected and any expected short-term inflation rate is proportional to the difference between a long-term and a short-term interest rate. The rate of which corresponds to the rate on which inflation forecasts are sought and forecasts should also be better. We then obtain an equation such that

14= wm * -Ci -y *) + - p + 14

where

we can assume the sequence of Dornbusch [1976] that production is constant in both countries y * The difference in output between the two economies then appears in a constant term If one considers 14 as an equation estimate stance with high data frequency must also assume that gap w * is constant or that this term is found in the error term because it does not have pa s money supply data, such a restriction does not pose a problem when estimating uses as we will here use the method of Johansen [1988] because this method is robust non-normal residuals Gonzalo [1994] With these assumptions we obtain 15

HT 15

The last question concerns the maturity of the interest rates that must intervene in the interest rate differential term. It is likely with the SICAV and PCP financial innovations that the very short-term interest rates are not necessarily the right indicators of the opportunity cost of the holding of the interest rate. Money should then be used instead interest rates of longer maturities

EMPIRICAL RESULTS

We use daily data where weekends are excluded. After a preliminary work on the period January 1995-November 2000 and sub-periods the light instability tests us we are limited the period from May 1, 1998 to November 16, 2000 All data provided by the SAMI of the Bank of France Foreign Exchange Department. The exchange rate is expressed in euros for one dollar synthetic rate before January 1999. The interest rates have maturities of three or six months and one two five and ten years for the United States as well as for Germany the euro zone after January 1999 for short-term maturities because as we have previously verified before 1999 the average

European rates using the weighting by relative GDP do not differ significantly German rates. After data tests we are looking for existence of long-term relationships.

Dickey-Fuller's increased standard unrelated tests have led us to the conclusion that the dollar-euro exchange rate is the interest rate differential. The different maturities retained and the slope of the structure by term ten years three months in Europe as in the United States are non stationary in presence and absence a constant As in general the power of the unit root tests is weak we verified the robustness of the results by applying the test of Johansen [1988] knowing that the cointegration only one series implies it is stationary. This test confirms that all our series are non-stationary at the precautionary title level we have also examined with the Johansen 1988] method the possible presence of a cointegration relationship between European and American interest rates for each maturity of three months five years because its absence would imply that the interest rate differential is not static. The results not reported here unambiguously indicate that such an absence of stationarity is accepted. In the same way we tested the presence of a cointegration relationship between the interest rates three months and ten years for continental Europe as for the United States. None Co-integration relation could be detected given the results of stationary equation 15 tests, there should be a cointegration relation between the logarithm of the euro / dollar exchange rate. e) an interest rate differential between EU11 and the United States ij and slope difference of the term structure between Europe and the United States sp sp * To test the presence of such a relationship we use the relationship search method multiples of cointegration based on the likelihood test of Johansen [1988] and Johansen and Juselius [1990] which leaves the place possible endogeneity of all the variables.

We examine two vectors called models and where the model is a particular case of the model

Model ij i *) sp sp * Model -r? where sp sp * i andy goes from three months to five years

We include four dummy variables to account for day-of-the-week effects and take two delays in order to remove autocorrelation of residuals see table note estimate is for the period May 1, 1998 - November 16, 2000 from the green light monetary union to the most recent available data. We verified the robustness of the results obtained by stopping the estimation period at the beginning of April 2000. These last results are not reported because the statistics and coefficients are extremely close to those corresponding overall period for the model regardless of the maturity of the differential interest rates that we consider zero hypothesis vector cointegrating 0) against alternative a co-integrating vector or more is rejected absence threshold constant and in presence a constant somewhere else hypothesis at most a vector cointegrating is not rejected.

Next step is to find out which version of the monetary model corresponds to the cointegration vector thus isolated for the models with interest rate differentials of different maturities. Whatever the maturity considered the differential interest the corresponding negative sign a model.

The sign of the term structural deviation per term is negative for maturities ranging from three months to two years. This result may seem to validate the Frenkel model but this is not the case because the coefficient of the interest rate differential is highly significant structure gap by term is insignificant for one- and two-year maturities. In the latter two cases we estimate the model for which a co-integrating vector hypothesis is not rejected. For the two maturities the results validate the restrictions of Dombusch rather than those of Bilson insofar as the coefficient of the different interest rate is negative it is for the maturity of five years term structure spread positive sign postulated by theory DTIR.

It remains to be ensured that the long-term equation obtained in the different cases does indeed correspond to an exchange equation. In the error correction vector model associated with the model for a maturity of five years as for the one associated with the model for the maturities of one and two years the term correction error a significant coefficient than in exchange rate equation. This indicates in particular that in these three cases long-term equation does not correspond a reaction function of authorities.

CONCLUSION

An anomaly that seems to constitute the persistent weakness of euro since its birth was examined in this article the light of monetary approach of the exchange rate use such an approach is justified by observation that the convergence of interest rates between countries of Euro 11. The monetary easing of the euro has been associated with a very high relative growth of the European money supply. Thus during the period 1998-1999 narrow monetary aggregate grew twice as fast in the Euro 11 zone than in the United States.

On daily data we have systematically tested the different versions of the money market model for interest rate differentials with five different maturities Using Johansen's technique of multiple cointegration relations we have isolated a single long-term relationship corresponding to a Euro exchange rate dollar equation over the period from the green light European monetary union spring 1998 autumn 2000. Such a relationship never corresponds to the flexible price model but seems to validate the viscous price model rather than the model

References

BILSON J.F.O [1978] The monetary approach to the exchange rate some empirical evidence I.M.F Staff Papers 25 48-75

DORNBUSCH [1976] Expectations and exchange rate dynamics, *Journal of Political Economy* 84 1161-76

ESTRELLA and MISHKiN F.S [1995] The term structure of interest rates and its role in monetary policy for the European central bank NBER Working Paper no 5279

PAVERO C. FREIXAS X. PERSSON and WYP OSZ [2000] Monitoring the European Central Bank Update Center for Economic policy Research London June

FRANKEL J.A [1979] On the mark theory of floating exchange rates based on real interest differentials *American Economic Review* 601-622

FRANKEL J.A [1993] International financial integration relations between interest rates and exchange rates in DAS D.K ed. *International Finance Contemporary Issues* London Routledge 333-60

FRENKEL J.A [1978] The monetary approach to the exchange rate doctrinal aspects and empirical evidence in FRENKEL et JOHNSON H.G (eds) *The Economics of Exchange Rates* Addison-Wesley 1-25

GONZALO [1994] Five alternative methods of estimating long run relationships Journal of Econometrics 60 203-233

HAIRAULT J.O. PATUREAU et SOPRASEUTH [2000] Dombusch revisited Document de travail EURE Qua Université Paris 1er November

JOHANSEN [1988] Statistical analysis of cointegration vectors *Journal of Economic Dynamics and Control* 12 231-54

JOHANSEN and JUSELIUS [1990] Maximum likelihood estimation and inference on cointegration with applications to the demand for money *Oxford Bulletin of Economics and Statistics* 52 169-210

JONDEAU and RICART [1999] Le contenu en information de la pente des taux application au cas francais economie et Prévision 140-41 1-20

KIRRANE, C. [2003] The IMS and the Euro. *European Political Economy Review No. 1 (March 2003), pp. 153-65*

McCALLUM B.T 1994] Reconsideration of uncovered interest parity relationship, *Journal of Monetary Economics* 33 105-32

McDoNALD and MARSH [1999] Exchange Rate Modelling Kluwer

McDoNALD and TAYLOR [1993] The monetary approach to the exchange rate rational expectations long-run equilibrium and forecasting I.M.F Staff Papers 40 89-107

MISHKIN [1984] The real interest rate multi-country empirical study, *Canadian Journal of Economics* 17 283-311

ROGOFF [1995] The purchasing power parity puzzle, *Journal of Economic Literature*, 34 647-68