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TIMO HÄMÄLÄINEN, SVERRIR SVERRISSON
AND LOTHAR WENIGER

EXCHANGE RATES AND NEWS

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ABSTRACT

This paper investigates the role of news on exchange rate determination. First different structural models, including monetary and portfolio balance models, and their empirical validity are briefly surveyed. Next, approaches modelling the so called news effect on exchange rates are evaluated, and, finally, the news effect on the DEM/USD, DEM/GBP and GBP/USD exchange rates is empirically tested. Within the context of a monetary model Frenkel (1981) has tested the news effect by regressing spot rate on forward rate and unexpected interest rate differential derived by instrumental variable method. In our test the term structure of interest rates is used to derive the unexpected interest rate differential, and some support for the news effect is obtained.

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Exchange Rates and News

by

Timo Hämäläinen,
Sverrir Sverrisson and Lothar Weniger

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1. Introduction

Since the breakdown of the Bretton Woods system of fixed exchange rates in 1971 and the shift to a regime of freely floating (or managed floating) exchange rates in 1973, the theoretical literature on exchange rates has been expanding voluminously. In the early years of the period, the simple monetary models were the most popular approach to exchange rate determination. In the second half of the period, the portfolio balance approach received more attention, but neither of these structural models succeeded in explaining the behaviour and increasing volatility of exchange rates.

The poor empirical performance of these models has drawn increasing attention to the effect of news on exchange rate determination. In the next chapter we present the different structural models. In chapter 3 we investigate the role of news and in chapter 4 we present some empirical tests on new effects.

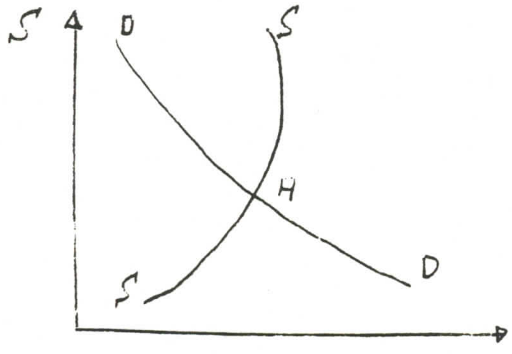
2. Different Models of Exchange Rate Determination

In this chapter the flow-market model, the monetary "flexible-price" model and the "sticky price" model and the portfolio-balance approach will be presented.

2.1 The Flow-Market Model

In the flow market model the equilibrium exchange rate is determined mainly by demand for foreign exchange arising from domestic demand for imported goods and supply of foreign exchange arising from foreign demand for domestic export. The interaction of these two determinants of the exchange rate can be shown in a standard diagram of the foreign exchange market presented in Figure 1.

Figure 1



On the vertical axis we have the exchange rate S (price of a unit of foreign currency in terms of domestic currency), and the quantity of foreign money (flow per unit of time) on the horizontal axis. The domestic demand for foreign exchange, shown by the DD-schedule, is downward sloping illustrating that an appreciation of the domestic exchange rate will increase the demand for imports and consequently the demand for foreign currency. The supply of foreign exchange is shown by the SS-schedule and point A shows the exchange rate in equilibrium. It is important to note that the slopes of the curves and the stability of the system depend on whether or not the Marshall-Lerner condition is satisfied. In recent years enormous increases in international capital transactions compared with the amount of transactions connected with international trade has almost eliminated the relevance of the flow-approach.[1)]

2.2 The Monetary Approach to Exchange Rate Determination

The monetary approach emphasizes the role of relative stocks of money. One can distinguish between the "flexible-price" version and the "sticky-price" version. In both versions perfect capital-mobility and perfect substitutability of bonds are assumed (only one bond in the world). In the first approach we have the Purchasing Power Parity assumption which is relaxed in the latter case.

The flexible-price models, with rational expectations, have the following structure

(1) $m = p + \emptyset y - \lambda i$ domestic money demand

$m^* = p^* + \emptyset y^* - \lambda i^*$ foreign money demand

(2) $(m-m^*) = (p-p^*) + \emptyset (y-y^*) - \lambda (i-i^*)$

(3) $(i-i^*) = E(\Delta S)$ uncovered interest parity

substituting (3) into (2) gives

(4) $(p-p^*) = (m-m^*) - \emptyset (y-y^*) + \lambda E(\Delta S)$

(5) $S = p - p^*$ PPP assumption

(6) $E(\Delta S) = E(\Delta P) - E(\Delta P^*)$

combining (5), (4) and (6) gives

(7) $S = (m-m^*) - \emptyset (y-y^*) + \lambda (E\Delta P - E\Delta P^*)$

where

m = log of the domestic money supply

p = log of the domestic price level

y = log of the domestic real income

i = the domestic short run interest rate

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1) For further details of this approach, see Mussa (1979).

$\emptyset$ = the money demand elasticity with respect to income
λ = the money demand semielasticity with respect to the interest rate
$E(\Delta S)$ = expected depreciation of the domestic currency
$E(\Delta P)$ = expected changes in the domestic inflation
S = log of the spot rate
* = stands for foreign variables.

By assumption of uncovered interest parity and PPP, it is possible to replace the interest rate differential by the expected depreciation variable $E(\Delta S)$ in (4) and replace the latter by the expected inflation differential in (7). Equation (7) states that the exchange rate is determined by changes in relative supply of money, relative income, and relative inflation expectations. An increase in the relative money supply will lead to equiproportional changes in the exchange rate (depreciation); an increase in domestic real income will cause an appreciation of the exchange rate; and expectations about an increase in future inflation rates causes a depreciation.

In the sticky price model the purchasing power parity assumption is relaxed and prices adjust slowly over time. This can be due to the existence of contracts, imperfect information, different consumer habits etc. Dornbusch (1976) developed a "sticky-price" model, or the overshooting model, with rational expectations. In his model PPP only holds in the long run. In the short run the interest rates will fall when the money supply increases and stimulate an incipient capital outflow which leads to an instantaneous depreciation of the exchange rate to the degree that the following appreciation to the long run level exactly compensates the interest rate differential. This is overshooting phenomenon. In the model, equations (1) through (3) above are preserved but equation (5) is replaced by

$$(9)\quad \bar{S} = \bar{P} - \bar{P}^{*}$$

The equilibrium exchange rate equation (7) is then replaced by a long run version

$$(10)\quad \bar{S} = (m-m) - \emptyset\,(y-y^{*}) + \lambda\,(E(\Delta p) - E(\Delta p^{*}))$$

If we assume rational expectations, stability of the system and exogeneous real income with zero growth rate $(y-y^{*}=\bar{y}-\bar{y}^{*})$, the expected equilibrium inflation rate is equal to the rationally expected monetary growth rate. A benchmark specification of the money supply process is that changes in the growth of the money stock follow a random walk.[1)]

[1)] See Frankel (1983), p. 88-90.

In that case the relative money supply, the long run relative price level and the exchange rate will be expected to follow a path along which they increase at the current rate of relative monetary growth. We can then replace (10) by

$$(11)\quad \bar{S} = (m-m^*) - (y-y^*) + \lambda(\pi - \pi^*)$$

where $(\pi - \pi^*)$ stands for the current rate of relative monetary growth. Expected changes in the exchange rate are defined in a following way[1)]

$$(12)\quad E(\Delta S) = -\theta(S-\bar{S}) + (\pi - \pi^*)$$

where θ is the speed of adjustment to the long run equilibrium rate in case of short term deviation from the long run equilibrium exchange rate. In the long run the equilibrium exchange rate is expected to increase at $\pi - \pi^*$. If we combine the expectations equation (12) with the uncovered interest parity condition (3) we obtain the short run overshooting effect mentioned above.

$$(13)\quad S - \bar{S} = -(1/\theta)\left[(i - \pi) - (i - \pi^*)\right]$$

where the real interest rate differential represent the gap between the current exchange rate and the equilibrium rate. For example if the growth rate of the money supply is increased the interest differential will cause an incipient capital outflow and a depreciation of the exchange rate.

Combining (11) with (13) we obtain a general monetary equation of the exchange rate determination

$$(14)\quad S = (m-m^*) - \emptyset\,(y-y^*) + \lambda(\pi - \pi^*) - (1/\theta)\left[(i-\pi)-(i^*-\pi^*)\right].$$

As can be seen, this equation is identical to equation (7) in the flexible-price model except for the real interest differential term, for which the coefficient should be zero if the flex-price model is correct.

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1) For the rationale for this form of expectation, see Frankel (1983).

2.3 The Portfolio-Balance Approach

The portfolio-balance approach shares the perfect capital-mobility assumption with the monetary approach while there is imperfect substitutability between domestic and foreign bonds.

A simple model in three versions is given by Frankel (1983). First, where all active participants in the market have the same portfolio preferences; second, where the domestic residents are the only ones that wish to hold domestically denominated assets (small country assumption); and third, where residents of both countries hold assets issued by both countries but prefer to hold greater share of their portfolio in domestically issued bonds. He assumes that domestic and foreign bonds only differ in their currency of denomination. Investors, in order to diversify their exchange risk, choose their portfolio according to the expected relative rates of return. For the first case we have the aggregate asset demand equation

$$(15)\ \frac{B}{SF} = \beta\,(i - i^{*} - E\,(\Delta S))$$

Here B and F are net supplies of bonds denominated in domestic and foreign currency respectively. If it is assumed that governments issue debt denominated in their own currency, B represents the net indebtedness of the domestic government and F the net-debt of the foreign government. It is important to note that since residents of all countries have uniform asset preferences wealth redistribution via the current account is irrelevant and relative government bond supplies are all that matter. These types of models are called the uniform-preference type of models.

In the small country version it is assumed that only domestic residents are willing hold to domestically issued assets. Thus we obtain

$$(16)\ \frac{B_H}{S\,F_H} = \beta_H\,(i - i^* - E\,(\Delta\,S))$$

Here B_H is the sum of all domestic bonds held by home residents and F_H is the sum of all foreign bonds held by domestic residents; here the stock of domestically held foreign bonds is equal to the accumulation of past current account surpluses.

For the large countries version it is assumed that domestic residents wish to hold a greater share of their portfolio in domestically issued assets and foreign residents prefer a greater proportion of foreign assets (the "preferred local habitat" version). Then the current account will have the same effect on changes in wealth as in the small country version. Together with equation (16) of the asset demand function for the home country we have to specifiy a separate function for the foreign country

$$(17)\ \frac{B_F}{S\,F_F} = \beta_F\,(i - i^* - E\,(\Delta\,S))$$

Equations (16) and (17) can be solved independently for the exchange rate, but data on B_H, B_F, F_H and F_F is not available. The expected signs are as follows; an increase in supply of F lowers their relative price S. An increase in B raises S. An increase in foreign wealth W_F ($W_F = B_F + SF_F$) raises the overall world demand for domestic assets and thus lowers S.

If equation (15) is solved for the exchange rate term we get

$$(18)\quad E(\Delta\,S) = i - i^* + \frac{1}{\beta}\,(\frac{B}{S\,F})$$

This shows that the expected change of the exchange rate is equal to the nominal interest rate differential (i.e. forward differential because of interest rate parity) plus some risk premium. The risk premium depends on the relative supplies of foreign and domestic government bonds. The coefficient $\frac{1}{\beta}$ could be interpreted as a measure of the degree of risk aversion.[1)]

2.4 The Out of Sample Fit of Structural Models

Meese and Rogoff (1983) have tested the forecast abilities of structural models and compared them with a random walk model. Furthermore they tested an univariate timeseries models and unconstrained vector-autoregression. The currencies used were dollar/DM, dollar/pound, dollar/yen and trade weighted dollar. Their methodology was to compare the models by mean errors, mean absolut errors and root mean square errors for the out of sample forecasts. Their results indicate that the random walk model predicts the exchange rate just as well and in most cases even better than the other candidates. Meese and Rogoff suggest that the failure of the structural models could among others be due to structural instabilities, changes in political regimes, oilprice shocks as well as their inabilities to incorporate other real disturbances.[2)]

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1) See Dornbusch (1983)

2) For further details, see Meese and Rogoff (1983), p. 19

3. News Effects on Exchange Rates

3.1 The Evaluation of the News Effect

The proceeding section has shown that structural exchange rate models imply some expected path of the nominal exchange rate. Such a path should, in principle, be predictable. This would not contradict the rationality and efficiency of exchange markets because no extra profits can be made by arbitrage. In reality observed changes in exchange rates follow approximately a random pattern, though.[1] Temporary periods of drift in the exchange rate level cannot be predicted or well explained.[2] It seems, therefore, that the movement of exchange rates is largely determined by randomly arriving information or news and that only a small part is due to expected changes. News, in this context, are unanticipated bits of information which lead to a revision of expectations regarding future values of exchange rate determinants. As a result exchange rate expectations change and the spot rate adjusts instanteneously.

The news can affect the spot exchange rate by affecting the expected equilibrium rate or the path to it, before any observed values of underlying factors change. This is true if the spot rate represents some short run equilibrium which deviates from the long run equilibrium and approaches it over time. As shown earlier, the long run rate is often represented by purchasing power parity. In an approach by Frenkel the exchange rate is always in or near PPP equilibrium, i.e. the real exchange rate is constant, but news can shift the nominal exchange rate because of instantaneous price level adjustments to new information.

In general, news cannot be predicted of course but it may be possible to relate unexpected exchange rate movements to some underlying variables, on which new information has arrived, to find out in which way exchange rates are affected by different news. One can basically differentiate between news on real factors and on monetary factors. The evaluation of news on real factors seems to be the most troublesome area. In many cases investigations have taken the form of event studies.[3] This approach is unsatisfactory, though, because each event is unique and it is difficult

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1) See e.g. Gaab, 1983

2) See e.g. Meese and Rogoff, 1983

3) See e.g. Sheffrin and Russell, 1984

to find a systematic relationship between the news, the underlying factors who's expectations are changed, and the impact on the exchange rate. Other studies have tried to model expectations by using forecasts of international organizations like the OECD.[1] Deviations from these forecasts should be due to unexpected developments, and information about these developments must have come out before or simultaneously with the publication of the actual numbers. That means, the revision of expectations may already have taken place before the actual figures are published. Furthermore, it is not at all certain whether official forecasts really represent market expectations.

Another potential difficulty in identifying news effects is the still largely unexplained role of risk premia in the exchange market. If there is a risk premium the unexpected change in the exchange rate cannot be measured by deviations of the spot rate from the previous forward rate. Deviations may be due to either the expected risk premium or unexpected news. Again, such an expected deviation of the spot rate from the forward rate is no contradiction of the efficient market hypothesis because the extra profit can only be reaped on assuming risk and should be equal to the market evaluation of risk times the amount of risk.

The problem is not very troublesome if the risk premium is constant over time. It can then be estimated by regression analysis. But the existence of a constant risk premium has not been demonstrated very convincingly and many economists have concluded that it varies over time. In this case the effect of news and of changes in the risk premium cannot be separated unless the determinants of the risk premium are known. The mechanics of changes in the risk premium may be as intricate as those of the effects of news.

3.2 Two Approaches to Modelling News

The following sections are largely restricted to monetary aspects, especially to news concerning relative inflation rates. Frenkel[2] approaches the subject based on the simple monetary or monetarist model as Frankel called it.[3] Continuous purchasing power parity, the Fisher condition and unbiasedness of the forward rate as predictor

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1) See e.g. Dornbusch, 1980

2) Frenkel, 1981

3) Frankel, 1983

of the future spot rate are assumed. In this case news affect interest differentials and exchange rates at the same time and in the same direction. The exchange rate rises (depreciates) when the interest differential increases unexpectedly. This result is derived from the money market behaviour. A rise in interest rates caused by increased inflationary expectations leads to a reduction in the demand for real money balances. Assuming an exogeneous money supply, prices have to rise to reestablish equilibrium in the money market. Assuming, further, an unchanged foreign price level, the nominal exchange rate has to rise to maintain PPP. At the same time the forward rate, which is equal to the expected future spot rate, has to rise even more because of the increased expected rate of depreciation of the home currency resulting from the increased expected inflation difference. The real exchange rate always remains constant in this model. It is clear that this is a very limited model entirely based on monetary considerations. It can only give good results when real effects on the exchange rate are small relative to monetary effects.

Frenkel tests the following regression equation to investigate his theory:

$$(19)\ \ln S_t = a + b \ln F_{t-1} + c\left[(i-i^*)_t - E_{t-1}(i-i^*)_t\right] + u_t$$

The previously observed forward rate, F_{t-1}, represents the expected level of the current exchange rate, S_t. Any deviation of S_t from F_{t-1} is attributed to randomly arriving news (i.e. no risk premium). The same news are also expected to effect the interest differential. The unexpected change in the interest differential is then expected to correlate positively with S_t. That means, the coefficient c is expected to be positive. Frenkel's results are somewhat mixed even though he picks the 'inflationary' period from 1973 to 1979. This may be partly due to the fact that the previously expected inflation differential is represented by a set of proxies.

In a later section we shall repeat this test, using the interest rate expectation implicit in the term structure of interest rates. We shall also check whether this approach can be generalized to the less inflationary period of the 80's.

In a model presented by Isard[1] the purchasing power parity condition is relaxed and interest rates are not expected to follow inflation

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[1] Isard, 1983

expectations very closely. The forward differential is equal to the nominal interest differential but the expected change in the exchange rate may differ from this by a risk premium. The long run equilibrium real exchange rate is not just some purchasing power parity relationship but depends on real factors, which especially require a long run balance of payments equilibrium. The adjustment time to the equilibrium real exchange rate from an initial deviation is estimated to be between 2 and 5 years. This is much longer then generally implied in the overshooting models and allows for quite large movements in the spot rate as a result of changes in interest rates assuming no change in the long run equilibrium spot rate. In the absence of news the long run equilibrium nominal spot rate is expected to follow the inflation differences (relative PPP) and real interest rates are thought to be equal.

In such a setting news can affect exchange rates through three channels. They may affect the term structure of interest rates relative to the term structure of expected inflation rates and just change the distance of the spot rate from the long run equilibrium rate and or the path to it (the rope as Isard called it). News may also affect the level of the expected equilibrium real exchange rate (anchor) or the size of the risk premium.

As described earlier, the size of the risk premium may depend on the relative supply of outside interest bearing assets determined in any currency in relation to the desired levels that would go into a minimum variance portfolio. Any news on expected debt financed budget deficits should therefore affect the size of the risk premium. Another factor should be news on the variability of exchange rates relative to that of the returns of other assets.

The expected real exchange rate, which should assure long run balance of payments equilibrium, would be affected by unexpected current account imbalances and also, of course, by news on a large number of other factors affecting the balance of payments. The formulation of the equilibrium real exchange rate level has not been very successful so far.[1)] It will probably require us to look back at more traditional models of exchange rate determination and will lead to the closing of circle inthe development of exchange rate theory.

If the changes in the equilibrium rate and the risk premium are not very large, one can concentrate on the behaviour of the 'rope'.

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1) For an attempt see Hooper and Morton, 1984.

When the expected inflation rate and the interest rate are not closely related (as empirically observed fluctuations in real interest rates seem to indicate) the relative changes of these two factors will affect the spot rate in relation to the fixed long run real rate.

A rise in the domestic interest rate will result in an appreciation of the spot rate to preserve interest rate parity. News leading to a decline in the expected domestic inflation rate result in a lower expected nominal rate (real rate is assumed constant) and again via IRP to a spot rate appreciation. In this model a test of news could possibly compare the exchange rate with real interest rate differentials. One would expect to find a negative correlation.

Isard tries to relate exchange rate fluctuations to news which may have caused changes in inflationary expectations. He finds some correspondence but he concludes that a substantial change in the risk premium, due to changes in expected US-government debt supplies, may have been important too. Again this is a somewhat ad hoc approach, though.

4. Empirical Tests

4.1 The Estimating Equation

In our test we are going back to the Frenkel approach described in section 3.2. We are applying the concept to more recent data which, in particular, enables us to split our sample into a more inflationary time period from 1976 to 1981 and the period of low inflation of the early 80's. If in periods of high inflation, changes in interest rates are more strongly dominated by changes in inflation expectations the results of the earlier period should be better.

To improve the representation of expected interest rate differentials we extract them from the term structure of interest rates. To get good correspondence between lagged and current values the 3 month and 6 month Eurodeposit rates and the 3 month forward rate are chosen. The use of Eurodeposit rates is designed to eliminate influences of changes in domestic conditions in the three countries, like for instance changes in the tax structures.

According to Frankel inflation expectations affect interest rates of different maturities in the same way.[1)]

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1) Frankel, 1983 (Comment to Isard)

The same should then be true for news on inflation differentials. Frenkel investigates this issue by testing 12 month rates as well as 1 month rates.[1)] His results are affirmative. Using 3 month differentials should therefore be legitimate. The expected interest differential is calculated under the assumption that longer run interest rates are the compound of successive expected short run rates (expectations hypothesis of the term structure of interest rates).

The equation is:

$$(20) \quad E_t\,({}_3i_{t+3}) = \left\{ 1 + \frac{(1+{}_6i_t)^{1/2} - (1+{}_3i_t)^{1/4}}{(1+{}_3i_t)^{1/4}} \right\}^4$$

where ${}_3i$ is the three month and ${}_6i$ the six month deposit rate. Equation (20) is approximated in our test by:

$$(21) \quad E_t\,({}_3i_{t+3}) = 4\left(\frac{{}_6i_t}{2} - \frac{{}_3i_t}{4}\right) = 2\,{}_6i_t - {}_3i_t$$

The currencies used are the US dollar, the British pound, and the German mark. These currencies are broadly traded and were freely floating against each other over the whole time period. This also allows a good comparison with Frenkel's results.

The regression equation is:

$$\ln S_t = a + b \ln F_{t-3} + c\left[(i_t - i_t^*) - (E_{t-3}i_t - E_{t-3}i_t^*)\right] + u_t$$

S_t is the current spot rate, F_{t-3} the three month forward rate lagged by three month, i_t the three month deposit rate currently quoted and $E_{t-3}i_t$ the three month deposit rate expected for the present, three month ago.

4.2 Results

The results of empirical testing are reported in the accompanying tables. Table 1 A shows the results for the period January 1976 - September 1984. According to the theory that the forward rate is an unbiased estimator of the future spot rate, the coefficient of lagged forward rate ($\ln F_{t-3}$) should equal 1 and the constant term should equal 0. This hypothesis is confirmed in the cases of DM/dollar and dollar/pound, but not in the case of DM/pound.

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1) Frenkel, 1981

For the DM/pound exchange rate the coefficient of lagged forward rate is significantly less than 1 and the constant term greater than one.[1)]

While lagged the forward rate was to measure the anticipated spot rate the unexpected interest rate differential, $\left[(i-i^*)-E_{t-3}(i-i^*)\right]$, was to measure unanticipated "news" effects as it is explained in the proceeding section. The coefficient of unexpected interest rate differentials is significant and positive only in the DM/pound equation. However, the regression results can be interpreted to support weakly Frenkel's hypothesis that "inflation news" described by unexpected interest rate differentials are reflected in the spot rates.

According to the portfolio balance model on exchange rates the constant term could be interpreted as a risk premium. The results suggest that for DM/pound there could be a positive risk premium.

The estimated equations show a strong positive autocorrelation.[2)] This may indicate inefficiency of the exchange market. But the changes in the Durbin-Watson statistics for the two sub-periods in Table 1, parts B and C, indicate that the pattern of autocorrelation is changing over time. Therefore, exploitable profit opportunities may not exist.[3)] In addition, news on some events might appear in successive stages effecting the exchange rates over a certain period of time in the same direction. The resulting deviations from random walk are not predictable ex ante, though. Looking at the errativ movements of the residuals in Figure 2, this seems quite plausible. A good exposition of this phenomenon is given in Isard (1983). Another interpretation of autocorrelation may be a time varying risk premium.[4]

[1)] Unfortunately, the computer used did not produce the standard error for the constant term. Our own calculations, however, support our assertion.

[2)] The computer program did not allow the correction for autocorrelation. To give an impression of the pattern of autocorrelation we include a graph of the residuals (Figure 2).

[3)] See Mussa (1979).

[4] In addition, there is also the so called overlapping data problem, since monthly data on 3 month interest rates and forward rates are used.

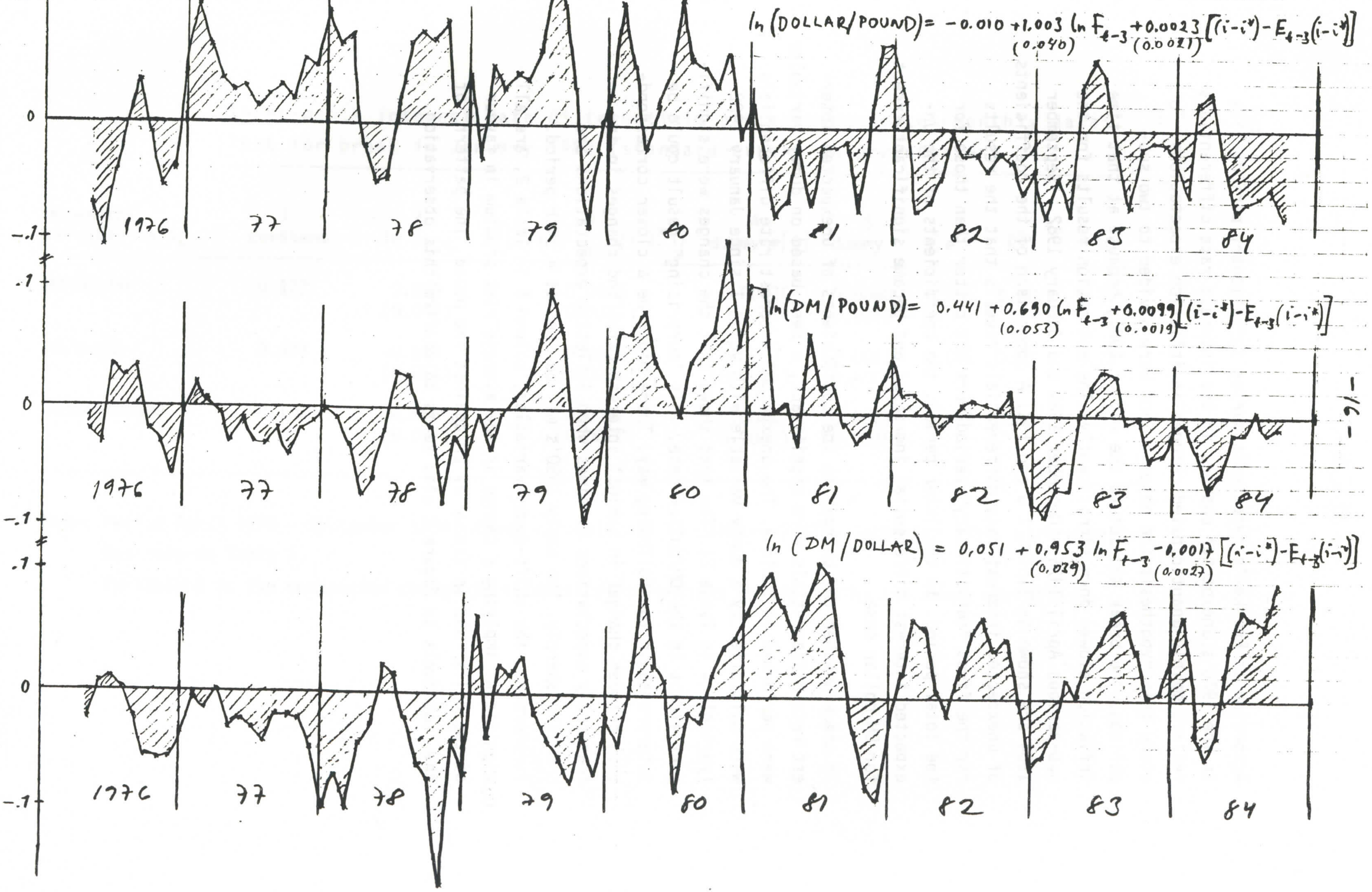
Table 1

Three month interest rate differentials and exchange rates-monthly data (standard errors in parentheses)

Dependent variable $\ln S_t$	1 Constant	2 $\ln F_{t-3}$	3 $\left[(i-i^*)-E_{t-3}(i-i^*)\right]$	s.e.	$\bar{R}^2$	D.W.
A. Period: April 1976 - September 1984						
DM/Dollar	0.051	0.953 (0.039)	-0.0017 (0.0027)	0.055	0.86	0.62
DM/Pound	0.441	0.690 (0.053)	0.0099 (0.0019)	0.044	0.64	0.68
Dollar/Pound	-0.010	1.003 (0.040)	0.0023 (0.0021)	0.060	0.86	0.59
B. Period: April 1976 - December 1981						
DM/Dollar	0.123	0.839 (0.044)	-0.0015 (0.0030)	0.054	0.81	0.65
DM/Pound	0.476	0.670 (0.063)	0.0078 (0.0022)	0.047	0.62	0.69
Dollar/Pound	0.124	0.825 (0.062)	0.0012 (0.0023)	0.061	0.72	0.52
C. Period: January 1982 - September 1984						
DM/Dollar	0.179	0.843 (0.117)	0.0091 (0.9900)	0.042	0.62	0.72
DM/Pound	0.508	0.632 (0.082)	0.0210 (0.0027)	0.026	0.77	1.25
Dollar/Pound	-0.010	0.945 (0.055)	0.0120 (0.0030)	0.032	0.91	1.58

Note: Interest rates are the three-month Euromarket rates (at the end of the month), source: Morgan Guaranty Trust, World Financial Markets various issues. Spot and three-month forward exchange rates are end-of-month figures, source: Statistische Beihefte zu den Monatsberichten der Deutschen Bundesbank, Reihe 5, Die Währungen der Welt, various issues, s.e. is the standard error of the equation, $\bar{R}^2$ is multiple correlation coefficient adjusted for degrees of freedom and D.W. is the Durbin-Watson statistic for autocorrelation of residuals.

FIGURE 2: RESIDUALS OF EQUATIONS (IN TABLE 3A)



According to Frenkel's hypothesis during inflationary periods like in the 1970's unexpected changes in the interest rate differentials reflect mainly unanticipated changes in inflation expectations. To study this hypothesis the observations were divided to two sub-periods. The break was set to the end of 1981, because at that time inflation slowed down significantly. The estimation results for the sub-periods April 1976 - December 1981 and January 1982 - September 1984 are shown in Tables 1 B and 1 C. A comparison of the coefficients of unexpected interest rate differentials reveals that the results for the first "inflationary" period were not better than those for the total period. In the later period, the coefficients of the unexpected interest differential increased and became significant except for DM/dollar case.

To check whether the changes in the coefficients of unexpected interest rate differentials were significant, a test based on dummy variables were performed in Table 2. The unexpected interest rate differentials were multiplied by a dummy variable with value 1 since January 1982 (variable 4 in Table 2). The test shows that the changes were significant except in the DM/dollar case. This "surprising" result could be interpreted in the following way. There might be a closer correspondence between changes in nominal interest rates and changes in inflationary expectations at times when inflation expectations are changing sharply. The early 1980's may be seen as a such period. Furthermore, the shift-dummy variables, column 5 in Table 2, are all significant implying a change in the average risk premium in favour of the dollar and in favour of DM against the pound. The pattern of the residuals in Figure 2 also seems to confirm this observation.

Table 2

Three-month interest rate differentials and exchange rates-monthly data: Test for break in January 1982 (standard errors in parentheses)

Dependent variable $\ln S_t$	1 constant	2 $\ln F_{t-3}$	3 $[(i-i^*)-E_{t-3}(i-i^*)]$	4 dummy $*[3]$	5 dummy	s.e	$\bar{R}^2$	D.W.
DM/Dollar	0.122	0.839 (0.044)	-0.0015 (0.0027)	0.00020 (0.00074)	0.0060 (0.0013)	0.051	0.88	0.67
DM/Pound	0.484	0.664 (0.051)	0.0078 (0.0019)	0.0013 (0.0005)	-0.0021 (0.0009)	0.042	0.67	0.77
Dollar/Pound	0.102	0.856 (0.047)	0.0012 (0.0020)	0.0011 (0.0005)	-0.0071 (0.0015)	0.053	0.89	0.63

Note: Period April 1976 - September 1984, dummy variable = 1 in January 1982 - September 1984, otherwise 0.
See note on Table 1.
Variable 4 is the unexpected change in interest differentials multiplied by the dummy variable.

5. Conclusions

In this paper we have surveyed briefly the recent structural exchange rate models and the role of news. We also tested empirically the news effect within the context of a monetary model. We found some support for the hypothesis that the news effect on exchange rates can be measured by unexpected changes in interest differentials. It seems obvious, though, that this is only one factor which by itself has explanatory power only in certain time periods.

Our results do not support strict monetary model because there seems to be some indication of the presence of risk premia. Since we looked only at the monetary phenomena, further research would have to take into account also changes in risk premia and real exchange rates.

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