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Interest expectations and exchange rates news

Stefano Cavaglia[1], Kees G. Koedijk[2], Willem F. C. Verschoor[3], Christian C. P. Wolff[2]

[1] Pan Agora Asset Management, Boston, USA
[2] Limburg Institute of Financial Economics (LIFE), Maastricht University, P.O. Box 616, 6200 MD Maastricht, The Netherlands
[3] National Investment Bank, The Hague, The Netherlands

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Abstract. Using a new survey data set of *matched* exchange rate and interest rate expectations for eight currencies relative to the German mark, we examine empirically the relationship between exchange rate returns, 'news' and risk premia. "News" on interest differentials enters significantly in equations for the difference between the spot rate and the lagged forward rate for the British pound, Japanese yen, Spanish peseta and the US dollar. An unexpected rise in the interest rate differential tends to strengthen the domestic exchange rate. For each of these currencies, we also find significant effects of our ex-ante measure of the risk premium. In addition, we investigate the effect of lagged interest rate differentials as proxy for the risk premium and find that they do not capture time-varying risk premia as is widely suggested in the literature, but probably capture a peso-problem, learning about a policy change, a market-inefficiency or a combination of these factors.

Key words: Exchange rates, risk premia, survey data

JEL classification: F31

Introduction

Since the start of the current floating exchange rate system in 1973, the debate regarding the determination of exchange rates continues to be an issue of central concern in the financial economics literature. In the past two decades the asset market approach has become the principal tool for analyzing movements in exchange rates. According to this approach exchange rates are priced in highly efficient markets where asset prices can be adjusted on an instantaneous basis to whatever the market regards as the currently appropriate price. Thus, exchange rates fluctuate in response to the market's per-

ception of future fundamental determinants that affect the supply and demand for foreign exchange. The asset market approach typically places considerable emphasis on the importance of expectations and changes therein and is generally taken to imply that empirical research on the determinants of exchange rates should relate innovations in exchange rates to innovations in expectations about relevant future fundamentals. In the empirical literature this approach is often referred to as the "news" approach of exchange rate determination. Since expectations are inherently unobservable, any empirical study on the "news" approach involves choosing a specific model of the process of exchange rate determination and an appropriate method of generating expected values of its driving values.

In this paper we follow an alternative route and investigate empirically the relationship between exchange rate returns, "news" and risk premia using survey data of matched exchange and interest rate expectations. Employing a new survey data set on exchange rates and interest rates we test for the effect of news concerning interest rates and risk premia on exchange rates, thereby at least partially avoiding the problem of artificially generated expectations when using an econometric technique.

The plan of this paper is as follows. In section 1 we start with a description of our data set and provide summary statistics. In section 2 the methodology is described. The empirical results are presented and discussed in section 3, while section 4 offers some concluding comments.

1. The survey data

Since 1985, Business International Corporation has been conducting a monthly survey of exchange rate expectations covering eight currencies relative to the German mark which are published in its Cross Rates Bulletin. For publication purposes, survey participants are asked a few days prior to month's end to fax three, six and twelve month ahead expectations of a number of currencies with projections being made from the beginning of the following month. Thus, for instance, the three, six and twelve month ahead expected US dollar/Dmark rates recorded on December 27th, 1990 reflect a slightly longer forecast horizon as they represent the expected spot rate on April 1st, 1991, July 1st, 1991 and January 2nd, 1992 respectively.[1] The dates when the surveys are conducted have been recorded as well as the spot, three, six, and twelve month ahead forward rates recorded on that particular day.

Since 1988, survey respondants[2] have also been asked to provide their three, six and twelve month ahead expectations regarding domestic interest rates with a three month maturity. Thus, in the above example, on December 27th, 1990, respondants were asked to provide their expectations of three-month domestic interest rates starting April 1st, 1991, July Ist, 1991, January 2nd, 1992 and maturing July 1st, 1991, October 1st, 1991, and April 1st, 1992, respectively. Foreign currency deposits denominated in British pound, Cana-

[1] Although the notation used in sections 2 and 3 will be presented as if the survey was constructed on December 31 (in the example at hand), care has been exercised throughout the empirical analysis to ensure that conditional expectations are computed on the proper information set.

[2] It should be stressed that we are well aware of the fact that there may be a difference between what market participants say when polled and what they actually do.

dian dollar, French franc, German mark, Italian lira, Japanese yen, Spanish peseta, Swiss franc, and US dollar are the ones considered by the monthly survey. Since our study is concerned with matched interest rate and exchange rate expectations, survey data availability led us to focus our analysis on the three, six and twelve month ahead exchange rate and domestic interest rate expectations, using the most actively traded exchange rates relative to the Deutschmark. Actual interest rates used in this study have been obtained from Datastream.

The thirty-odd participants of the survey are treasurers of multinationals and private banks residing in four of the world's continents. Although not all participants will provide their views regarding a particular currency, the response rate is at worst 60 percent. The Cross Rates Bulletin reports the geometric mean forecast of the responses received, thus minimizing the effect of extreme forecasts. Unfortunately disaggregated survey respondent data are not available, although the standard deviation of the respondents' expectations is reported.

Tables 1a and 1b provide summary statistics for the survey and forward exchange rate annualized forecast errors across forecast horizons and across currencies.[3] The summary statistics for the unanticipated three-month international interest differential and interest differential across horizons and across currencies are reported in Tables 1c and 1d. Table 1e provides summary statistics for the annualized exchange rate risk premium across horizons and across currencies. In the tables, as in the remainder of the paper, S_t is defined as the natural logarithm of the spot exchange rate at time t (the spot rate is stated in terms of domestic currency units per unit of the foreign currency – the Deutschmark), E_tS_{t+k} is defined as the natural logarithm of the expected spot exchange rate at time $t+k$ formed at time t, ${}_tF_{t+k}$ is defined as the natural logarithm of the forward exchange rate at time t for delivery at time $t+k$, d_{t+k} is defined as the three-month domestic interest rate differential, $i_{t+k} - i^*_{t+k}$, for deposits starting at time $t+k$ and maturing at time $t+k+3$, and E_td_{t+k} as the expected three-month international interest differential at time $t+k$ formed at time t. The use of survey data allows the direct measurement of a risk premium from the decomposition of the forward exchange rate into its two components – the expected future spot rate and a risk premium:

$$ {}_tF_{t+k} = E_tS_{t+k} + RP_t \tag{1}$$

The period analyzed is February 1st, 1988 through May 1st, 1992. It is interesting to note that both the absolute values and the standard deviations of the mean forecast errors are substantially smaller for the original EMS currencies – the FF/DM and IL/DM exchange rates – than for the SP/DM and BP/DM exchange rate or non-EMS currencies relative to the Dmark[4].

These empirical findings contrast with Table 1b which uses the forward exchange rate as a proxy for the expected future spot exchange rate in calcu-

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[3] Denoting k to be the forecast horizon in months, annualized returns are obtained by multiplying the log differences by $1200/k$.

[4] The Spanish peseta and British pound joined the ERM of the European Monetary System in July 1989 and October 1990, respectively. The United Kingdom suspended membership as of September 1992 until further notice.

Table 1. Summary statistics: February 1, 1988 through May 1, 1992

	3 Months		6 Months		12 Months	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Table 1A	Survey Forecast Error: $S_{t+k} - E_t S_{t+k}$ (percent per annum)					
BP/DM	−2.00	13.65	−1.47	9.23	−1.44	5.99
CD/DM	−5.49	34.55	−3.64	22.97	−1.90	12.00
FF/DM	−1.29	3.79	−1.13	3.11	−0.94	1.49
IL/DM	−1.58	7.07	−1.53	4.50	−0.65	2.97
JY/DM	2.69	23.95	2.55	17.28	1.83	12.92
SF/DM	3.17	9.69	2.43	5.87	1.87	4.01
SP/DM	−5.28	9.91	−5.75	6.09	−4.86	4.04
US/DM	0.22	31.44	2.28	19.10	3.61	10.62
Table 1B	Forward Rate Forecast Error: $S_{t+k} - {}_tF_{t+k}$ (percent per annum)					
BP/DM	−3.98	13.65	−4.08	9.16	−4.81	6.67
CD/DM	−4.64	28.12	−4.11	20.54	−5.33	11.32
FF/DM	−2.12	3.46	−2.26	2.07	−2.35	1.37
IL/DM	−5.04	6.98	−5.29	6.72	−4.25	2.65
JY/DM	2.36	22.54	1.55	17.95	0.50	14.11
SF/DM	2.52	9.71	2.17	6.94	1.84	4.08
SP/DM	−6.94	9.68	−7.68	7.02	−8.38	5.07
US/DM	2.41	28.59	1.98	19.55	0.77	11.02
Table 1C	Unanticipated Interest Differential: $d_{t+k} - E_t d_{t+k}$ (percent per annum)					
BP/DM	−0.33	1.27	−0.47	1.77	−0.85	2.05
CD/DM	−0.15	1.16	−0.60	1.69	−1.36	2.33
FF/DM	−0.33	0.62	−0.71	0.72	−1.48	0.85
IL/DM	−0.26	0.70	−0.64	0.84	−1.39	1.07
JY/DM	−0.16	0.86	−0.45	1.19	−0.67	1.57
SF/DM	0.28	0.74	0.25	0.78	0.33	0.99
SP/DM	−1.54	1.14	−1.87	1.24	−2.05	1.04
US/DM	−0.27	0.99	−0.73	1.51	−1.72	1.91
Table 1D	Interest Differential: d_t (percent per annum)					
BP/DM	3.85	2.21	4.15	1.93	4.73	1.20
CD/DM	3.04	2.78	3.45	2.34	4.19	1.41
FF/DM	1.37	1.52	1.51	1.48	1.82	1.38
IL/DM	4.67	1.92	4.88	1.82	5.24	1.72
JY/DM	−3.40	0.89	−3.32	0.86	−3.32	0.88
SF/DM	−0.60	0.79	−0.53	0.76	−0.49	0.80
SP/DM	7.00	1.40	7.13	1.37	7.32	1.39
US/DM	−0.70	2.61	−1.01	2.38	−1.55	2.04
Table 1E	Exchange Rate Risk Premium: ${}_tF_{t+k} - E_t S_{t+k}$ (percent per annum)					
BP/DM	1.98	6.44	2.60	3.51	3.37	2.37
CD/DM	−0.85	16.70	0.47	8.40	3.42	5.08
FF/DM	0.85	2.10	1.15	1.80	1.42	1.09
IL/DM	3.46	6.54	3.76	6.88	3.60	1.73
JY/DM	0.34	5.84	0.99	3.74	1.34	2.67
SF/DM	0.55	3.91	0.26	2.53	0.03	1.13
SP/DM	1.67	4.09	1.94	3.21	3.52	3.01
US/DM	−2.19	8.31	0.30	4.64	2.84	3.45

Legend: BP = British Pound; CD = Canadian Dollar; DM = German Mark; FF = French Franc; IL = Italian Lire; JY = Japanese Yen; SF = Swiss Franc; SP = Spanish Peseta; US = US Dollar.

lating the forecast errors and suggests the presence of exchange risk premia, as evidenced by Table 1e.

Table 1c provides surprises in interest rate differentials. Overall, we note that innovations in interest differentials are small relative to innovations in exchange rates. It is also interesting to note that both the absolute values and the standard deviations of surprises in interest differentials rise markedly with the forecast horizon.

2. Interest rate "news" and exchange rate surprises

In order to obtain a relationship between interest rate "news" and exchange rate surprises, it is useful to decompose the forecast error resulting from the use of the forward exchange rate as a predictor of the subsequent spot rate (at the maturity date of the forward contract) as follows:

$$S_{t+k} - {}_tF_{t+k} = (S_{t+k} - E_tS_{t+k}) + (E_tS_{t+k} - {}_tF_{t+k}) \tag{2}$$

The forecast error $S_{t+k} - F_{t+k}$ is often referred to as the "return to forward speculation" or the "exchange rate return". The above identity shows that the forecast error consists of two components: the surprise in the spot rate and the risk premium for the currency in question.

In this paper we focus our attention on a number of different regression relationships that are closely linked to equation (2) and that can be estimated on the basis of our new survey database that contains *matched* exchange rate and interest rate expectations. Following Frenkel (1981), we will focus on surprises in interest rate differentials as the most important source of unexpected exchange rate movements. We will investigate the sources of relationship (2) by means of the following three regression equations:

$$S_{t+k} - {}_tF_{t+k} = \alpha + \beta_1(d_{t+k} - E_td_{t+k}) + \beta_2({}_tF_{t+k} - E_tS_{t+k}) + \varepsilon_{t+k} \tag{3}$$

$$S_{t+k} - {}_tF_{t+k} = \alpha + \beta_1(d_{t+k} - E_td_{t+k}) + \beta_2(d_t) + \varepsilon_{t+k} \tag{4}$$

$$S_{t+k} - E_tS_{t+k} = \alpha + \beta_1(d_{t+k} - E_td_{t+k}) + \beta_2(d_t) + \varepsilon_{t+k} \tag{5}$$

Equation (3) relates the forecast error resulting from the forward rate to "news" about the interest differential and the level of the risk premium, which is also directly observable from our survey data. In equation (4) we replace the ex-ante measure of the risk premium by the lagged interest differential as a proxy for the risk premium, following Bekaert and Hodrick (1992). In equation (5), finally, we relate the innovation in the spot exchange rate to "news" about the interest differential and the level of the lagged interest differential.

In the empirical literature concerning risk premia on foreign exchange short term interest differentials across countries have played a dominant role in recent years as at least proximate determinants of these risk premia. Hansen and Hodrick (1983) show that excess returns on five major currencies relative to the US dollar systematically depend on lagged excess returns and the forward premium. Their sample covers the period 1976–1980 and includes the German mark, the Japanese yen, the British pound, the Swiss and French franc. Hodrick and Srivastava (1984) extend the analysis to the period 1976–

1982 and provide a theoretical foundation for the inclusion of the forward premium using the dynamic asset pricing model of Lucas (1982). Giovannini and Jorion (1987) further extend the analysis by using data for Italy and the Netherlands in addition to the other currencies mentioned above. The sample period covers the period 1973–1984. Allowing the two components of the forward premium, that is the US interest rate and the interest rate of the country under investigation, to have independent effects, their results indicate a negative and often significant coefficient on the US interest rate and a positive and somewhat less frequently significant coefficient on the foreign interest rate. This suggests that a high US interest rate coincides with the perception of a risky domestic currency and a high premium on the US dollar.

3. Empirical results

In this section we report the empirical results which are obtained when estimating equations (3)–(5). The equations were fitted for each currency and for each forecast horizon ($k = 3$, $k = 6$, and $k = 12$). Realized spot exchange rates were obtained from Datastream.[5] Hansen and Hodrick (1980) demonstrate that when the forecast horizon is longer than the observational frequency, the forecast error ε_{t+k} will be serially correlated. While OLS point estimates of β, and β remain consistent in spite of the serially correlated residuals, the OLS standard errors for the regression coefficients are biased. This can be corrected via the Newey-West (1987) estimation procedure. More importantly, if the disturbance at time $t + k$ is correlated with some of the explanatory variables at time $t + k$, OLS will not, in general, be consistent. In this section, the difficulty with applying the standard OLS procedure arises because of the endogeneous variables appearing on the right-hand side of the equations and they will not in general be independent of the disturbance term, since they are partly determined by the dependent variable in that equation.[6] It therefore seems quite unsatisfactory to impose the exogeneity assumption. A general approach to estimation problems of this kind is provided by the method of instrumental variables. In this section, we implemented the instrumental variables estimation technique outlined in Hansen (1982), assuming a moving average process of order k for the monthly k-month ahead forecast errors.[7] Instruments used were a constant term and lagged explanatory variables. We found that the results were insensitive with respect to the number of lags that was used.

Some interesting results emerge from the Tables. In Table 2 we find that "news" about the interest rate differential enters significantly in the equations for the British pound, Japanese yen, Spanish peseta, French franc and US dollar. Moreover, in most cases the significant coefficients are negative, reflecting that an unexpected rise in the interest rate differential tends to

[5] The spot exchange rates at time $t + k$, S_{t+k}, used to compute the change in the spot rate are obtained from Datastream on days corresponding to the survey forecast dates. If the forecast date falls on a holiday or weekend, the previous business day is chosen. The spot rate series chosen are London Bourse closing prices.

[6] This is usually referred to as "simultaneous equation bias".

[7] Note that the k-month ahead forecast is in reality a k-month *plus* a few days ahead forecast.

Table 2. $S_{t+k} - {}_tF_{t+k} = \alpha + \beta_1(d_{t+k} - E_t d_{t+k}) + \beta_2({}_tF_{t+k} - E_t S_{t+k}) + e_{t+k}$

	$k = 3$		$k = 6$		$k = 12$	
	β_1	β_2	β_1	β_2	β_1	β_2
BP/DM	−2.922*	−0.479	−3.188***	−2.807***	−1.997***	−3.050***
	(1.571)	(1.042)	(0.672)	(0.841)	(0.520)	(0.635)
CD/DM	−5.935	0.617*	−2.792	0.388	−0.823	−0.279
	(5.183)	(0.337)	(2.900)	(0.361)	(1.715)	(0.744)
FF/DM	−0.861	−0.239	1.133**	0.135	0.756***	−0.151
	(2.377)	(0.949)	(0.526)	(0.298)	(0.255)	(0.566)
IL/DM	4.354	0.697	−0.452	−0.239	−0.037	−0.685
	(4.776)	(0.458)	(1.270)	(0.283)	(0.706)	(0.664)
JY/DM	−19.008**	3.972	−3.227	−2.091*	1.603	−4.856***
	(7.606)	(3.305)	(3.161)	(1.097)	(1.589)	(0.943)
SF/DM	−11.675	4.501	1.646	−0.849	−0.612	0.347
	(14.687)	(4.405)	(3.012)	(0.829)	(0.629)	(0.579)
SP/DM	−10.212**	−2.826**	−5.204***	−2.956**	−2.789*	−2.091*
	(4.698)	(1.426)	(2.107)	(1.276)	(1.664)	(1.281)
US/DM	−11.517*	−0.056	−3.407	−0.859	−2.503**	−1.163**
	(6.667)	(0.985)	(3.038)	(1.325)	(1.069)	(0.555)

All equations are estimated by OLS. The heteroskedasticity consistent standard errors are given in parentheses.

* (**) [***] denotes significance at the 10% (5%) [1%] level for the hypotheses $\beta_1 = 0$ and $\beta_2 = 0$, respectively. Data are monthly and the period of analysis is February 1st, 1988 through May 1st, 1992.

strengthen the domestic exchange rate, i.e to reduce S_{t+k}. The results indicate that a 1 per cent unanticipated increase in the interest differential for the British pound will lead to approximately 3 per cent (unanticipated) appreciation of the British pound. Noteworthy is the significantly positive coefficient for the FF/DM exchange rate. As suggested by Frankel (1979) this is consistent with a monetary model of exchange rate determination in which a rise in domestic interest rates may be primarily due to inflationary expectations. For each of the four currencies exhibiting the Dornbusch effect, we also find significant effects of the ex-ante measure of the risk premium. It is interesting to note that the significance of the risk premium increases as the length of the forecast horizon rises from 3 months to 12 months.

As noted in the previous section it is widely reported in the literature – see, for instance Bekaert and Hodrick (1992) – that the lagged interest differential tends to predict movements in the excess returns in the foreign exchange market, which are by definition equal to the difference between the spot rate and the lagged forward exchange rate. As a consequence it is argued that the interest rate differential can serve as a proxy for the risk premium in the foreign exchange market. The significant effect of lagged interest differentials in equations for the excess return in the foreign exchange market is confirmed in Table 3. For the six and twelve month forecast horizons, the lagged interest differential has a statistically significant effect for 6 out of 8 currencies. Noteworthy is that the US dollar is the only currency where we fail to find signifi-

Table 3. $S_{t+k} - {}_tF_{t+k} = \alpha + \beta_1(d_{t+k} - E_t d_{t+k}) + \beta_2(d_t) + e_{t+k}$

	$k = 3$		$k = 6$		$k = 12$	
	β_1	β_2	β_1	β_2	β_1	β_2
BP/DM	−3.867***	−0.421	−1.175***	−0.391	0.182	2.035*
	(1.604)	(0.856)	(0.414)	(0.773)	(0.494)	(1.211)
CD/DM	−5.460	−1.507	1.093	−3.004*	−0.798	2.343
	(5.332)	(1.330)	(2.724)	(1.729)	(1.720)	(2.260)
FF/DM	−1.231	−0.781*	0.336	−0.526***	−0.044	−0.886***
	(1.092)	(0.408)	(0.422)	(0.169)	(0.143)	(0.155)
IL/DM	2.698	−0.907*	−0.103	−0.780*	−1.238***	−1.148***
	(2.329)	(0.550)	(1.386)	(0.8)	(0.153)	(0.131)
JY/DM	−15.462**	−19.370***	−8.005***	−15.770***	−28.637***	−55.418***
	(4.170)	(5.522)	(2.599)	(3.798)	(4.642)	(10.059)
SF/DM	−12.263**	−13.988***	−2.327	−3.241**	−1.917***	−4.508***
	(5.746)	(3.672)	(3.359)	(1.492)	(0.795)	(1.370)
SP/DM	−6.146***	−0.522	−3.537***	−1.684***	−2.807***	−2.733***
	(2.187)	(1.430)	(0.771)	(0.702)	(0.322)	(0.222)
US/DM	−7.595	−1.563	−4.970***	−1.994	−2.857***	0.607
	(6.260)	(1.937)	(1.932)	(1.532)	(0.926)	(0.885)

All equations are estimated by OLS. The heteroskedasticity consistent standard errors are given in parentheses.

* (**) [***] denotes significance at the 10% (5%) [1%] level for the hypotheses $\beta_1 = 0$ and $\beta_2 = 0$, respectively. Data are monthly and the period of analysis is February 1st, 1988 through May 1st. 1992.

cant evidence of the lagged interest rate differential. The effect of the "news" about the interest differentials is very similar to the results reported in Table 2: the effect seems to dominate for the British pound, Japanese yen, Spanish peseta and US dollar. In order to sort out whether the significant effects of the interest differential in Table 3 really reflect time-varying risk premia, we run the same regressions but this time with the difference between the realized spot rate and the expected future spot exchange rate as the dependent variable. If the interest differential truly reflects risk premia we would expect it to be insignificant in the equations for the difference between the actual exchange rate and the expected future spot exchange rate in Table 4. As is apparent from Table 4, the lagged interest differential is highly significant in most of the equations for "news" on the exchange rate, which tends to suggest that the interest differential does not reflect risk premia. Whether the effect of the interest differential reflects peso problems, learning about policy changes, or market inefficiencies remains an open question. In general the empirical evidence indicates that "news" concerning changes in interest rate differentials contributes significantly to explaining exchange rate fluctuations that are not taken into account by the lagged forward rate.

4. Conclusions

In this paper we investigated "news" and "risk premia" in foreign exchange markets using matched survey data on interest and exchange rate expecta-

Table 4. $S_{t+k} - E_t S_{t+k} = \alpha + \beta_1(d_{t+k} - E_t d_{t+k}) + \beta_2(d_t) + e_{t+k}$

	$k = 3$		$k = 6$		$k = 12$	
	β_1	β_2	β_1	β_2	β_1	β_2
BP/DM	−3.884***	−0.418	−1.834***	0.099	0.591*	1.751**
	(1.570)	(0.927)	(0.390)	(0.531)	(0.370)	(0.880)
CD/DM	−7.195	−3.628**	1.116	−4.331***	−0.644	1.440
	(6.519)	(1.712)	(3.126)	(1.376)	(1.932)	(1.923)
FF/DM	0.391	−1.019**	0.326	−1.320***	0.273	−0.883***
	(1.129)	(0.465)	(0.548)	(0.273)	(0.125)	(0.107)
IL/DM	0.052	−1.606***	−1.548**	−2.138*	−1.176***	−1.514***
	(1.993)	(0.646)	(0.768)	(0.354)	(0.241)	(0.514)
JY/DM	−14.885***	−21.888***	−5.880***	−15.637***	−25.426***	−50.147***
	(4.551)	(5.835)	(2.491)	(3.624)	(3.990)	(8.172)
SF/DM	−10.984**	−14.269***	−4.091	−4.689***	−2.175***	−5.228***
	(5.085)	(3.770)	(3.081)	(1.486)	(0.682)	(1.128)
SP/DM	−6.668***	−0.407	−4.016***	−2.117***	−3.056***	−2.396***
	(2.797)	(1.426)	(0.719)	(0.530)	(0.772)	(0.623)
US/DM	−9.313	−2.667	−4.266***	−2.925	−2.507***	−0.313
	(6.745)	(2.172)	(1.807)	(1.518)	(0.718)	(0.852)

All equations are estimated by OLS. The heteroskedasticity consistent standard errors are given in parentheses.
* (**) [***] denotes significance at the 10% (5%) [1%] level for the hypotheses $\beta_1 = 0$ and $\beta_2 = 0$, respectively. Data are monthly and the period of analysis is February 1st, 1988 through May 1st, 1992.

tions. The survey data contained both three, six and twelve months ahead forecasts. In our empirical results we find that "news" about interest rates enters significantly in the equation for the British pound, Japanese yen, Spanish peseta, French franc and the US dollar. For most of these currencies we find that "news" on the interest rate differential enters the equations with a negative coefficient suggesting that an unexpected rise in the differential tends to strengthen the domestic currency. For each of these, we also find significant effects of the risk premium for the British pound, Japanese yen, Spanish peseta and US dollar.

The set-up we have taken also allows for an evaluation of the widely held claim in the literature that lagged interest differentials might capture time-varying risk premia and can be used as such (see for instance Bekaert and Hodrick (1992)). Using actual interest differentials, we find the effect of the lagged interest differential to be highly significant both in the equation for the difference between the realized spot rate and the lagged forward rate and the equation for the difference between the realized spot rate and its expectation. The fact that the actual interest differential is significant in both equations implies that it can not capture time-varying risk premia but probably captures a peso problem, learning about a policy regime, a market inefficiency or a combination of these factors.

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