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(Almost) A Quarter Century of Currency Expectations Data: Interest Rate Parity and the Risk Premium

by

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Abstract: Survey based measures of exchange rate expectations for the period August 1986 to September 2009 are used to investigate whether uncovered interest rate parity holds (namely that interest differentials or the forward discount equals expected depreciation). In addressing this question, I also examine the extent of bias in expectations, as well as the properties of the risk premium when the rational expectations hypothesis is dropped. As in Chinn and Frankel (1993) and Frankel and Chinn (1994), multiple (up to 17) currencies are examined for some of the hypotheses.

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1. INTRODUCTION

It is widely believed that uncovered interest parity (UIP) is a useful theoretical concept, but an empirically irrelevant construct. This belief is understandable, given the widespread failure to find evidence that ex post changes in exchange rates should be positively related to interest differentials with a coefficient of unity. However, as has been pointed out in careful analyses, this finding is at variance with the joint null hypothesis that UIP – which pertains to expected exchange rate changes – and unbiased expectations both hold. Frankel has termed this composite the “unbiasedness hypothesis”, and it is this proposition that has been widely violated in the empirical literature.

This paper extends earlier tests for uncovered interest parity, but dropping the assumption of rational expectations, by relying upon survey-based expectations of future exchange rates.¹ The empirical results presented in this paper are based on a data set derived from FXForecasts, the successor to *Currency Forecasters' Digest* and *Financial Times Currency Forecaster*. This data set has the advantage of spanning nearly a quarter of a century (24 years) for several of the currencies.

This paper is organized in the following fashion. In section 2, I discuss the uncovered interest parity condition, combined with the rational expectations hypothesis (sometimes called the risk neutral efficient markets hypothesis, or “RNEMH”), and in section 3, UIP is evaluated empirically, under the conventional rational expectations hypothesis as well as the case where survey data are used to measure expectations.

¹ Early contributions were Dominguez (1986), Frankel and Froot (1987), and Froot and Frankel (1989). Takagi (1991) reviewed the early literature. Chinn and Frankel (1994), and Frankel and Chinn (1993) use this data source.

Section 4 examines why these differing results might arise. Section 5 provides some panel estimates, while Section 6 concludes.

2. Uncovered Interest Parity

If the conditions for risk-free arbitrage exist, the log ratio of the forward to the spot exchange rate will equal the interest differential between assets with otherwise similar characteristics measured in local currencies,

$$f_{t,t+k} - s_t = (i_{t,k} - i_{t,k}^*). \quad (1)$$

where s_t is the price of foreign currency in units of domestic currency at time t , $f_{t,t+k}$ is the forward value of s for a contract expiring k periods in the future (both in logs), $i_{t,k}$ is the k -period yield on the domestic instrument, and $i_{t,k}^*$ is the corresponding yield on the foreign instrument. The left hand side of (1) is often called the forward discount.

Equation (1) is a risk-free arbitrage condition that holds regardless of investor preferences. To the extent that investors are risk averse, however, the forward rate can differ from the expected future spot rate by a premium that compensates for the perceived riskiness of holding domestic versus foreign assets. The risk premium, η , is defined as:

$$f_{t,t+k} = s_{t,t+k}^e + \eta_{t,t+k}. \quad (2)$$

Substituting equation (2) into (1) then allows the expected change in the exchange rate from period t to period $t+k$ be expressed as a function of the interest differential and the risk premium:

$$\Delta s_{t,t+k}^e = (i_{t,k} - i_{t,k}^*) - \eta_{t,t+k}, \quad (3)$$

Narrowly defined, UIP refers to the proposition embodied in equation (3) when the risk

premium is zero. UIP would hold if investors are risk-neutral investors, or the underlying bonds are perfect substitutes.² In this case, the expected exchange rate change equals the current interest differential. Equation (3) is not directly testable, however, in the absence of observations on market expectations of future exchange rate movements. To make UIP testable, it is tested jointly with the assumption of rational expectations. Using the rational expectations methodology, future realizations of s_{t+k} will equal the value expected at time t plus a white-noise error term $\xi_{t,t+k}$ that is uncorrelated with all information known at t , including the interest differential and the spot exchange rate:

$$s_{t+k} = s_{t,t+k}^{re} + \xi_{t,t+k} \quad (4)$$

Then, one obtains what is commonly, if somewhat misleadingly, known as the UIP regression,

$$\Delta s_{t,t+k} = (i_{t,k} - i_{t,k}^*) - \eta_{t,t+k} + \xi_{t,t+k} \quad (5)$$

where the left-hand side of equation (5) is the realized change in the exchange rate from t to $t+k$.

According to the unbiasedness hypothesis, the last two terms in equation (5) are assumed to be orthogonal to the interest differential. Thus, in a regression context, the estimated parameter on the interest differential will have a probability limit of unity in the following regression:

$$\Delta s_{t,t+k} = \alpha + \beta (i_{t,k} - i_{t,k}^*) + \varepsilon_{t,t+k} \quad (6)$$

The combined assumptions of no risk premium in equation (3) (i.e. that UIP holds) and

² Note that some approximations and simplifying assumptions have been made in order to arrive at this expression. See Engel (1996).

rational expectations is sometimes termed the “risk-neutral efficient-markets hypothesis” (RNEMH). In this case, the disturbance in equation (6) becomes simply the rational expectations forecast error $\xi_{t,t+k}$, which by definition is orthogonal to all information known at time t , including the interest differential.

Unbiasedness is a weaker condition than RNEMH. All that is required is that any risk premium and/or non-rational expectations error be uncorrelated with the interest differential, while the RNEMH requires in addition that no other regressors known at time t should have explanatory power.³

Estimates of equation (6) using values for k that range up to one year typically reject the unbiasedness restriction on the slope parameter. For instance, the survey by Froot and Thaler (1990), for instance, finds an average estimate for β of -0.88.⁴ One rare instance of a finding in favor of unbiasedness is provided by Lothian and Simaan (1998), who use time averaged interest rate differentials and exchange rate changes in a panel regression framework over the 1974-94 period.

3. Empirical Testing

As is well known, uncovered interest parity properly defined as relating to expected depreciation, is untestable. Estimation of the standard UIP regression equation relies upon the rational expectations methodology embodied in equation 4. Of course, reliance upon the assumption of mean zero expectational errors is by no means

³ The constant term may reflect a constant risk premium demanded by investors on foreign versus domestic assets. Default risk could play a similar role, although the latter possibility is less familiar because tests of UIP (as well as CIP) generally use returns on assets issued in offshore markets by borrowers with

uncontroversial. In a number of papers, Froot and Frankel (1989) demonstrate that the standard tests for UIP yield radically different results when one uses survey-based measures of exchange rate depreciation. They find that most of the variation of the forward discount appears to be related to expected depreciation, rather than a time varying risk premium, thereby lending credence to UIP. [Since covered interest parity holds for these currencies, the forward discount is equivalent to the interest differential].

Chinn and Frankel (1994, 2002) document the fact that it is difficult to reject UIP for a broader set of currencies, when using forecasts provided by the *Currency Forecasters' Digest (CFD)*, although there is some evidence of a risk premium at the 12 month horizon. Chinn and Frankel interpret the differing results as arising from a wider set of currencies – they examine 17 currencies as opposed to the 5 or so examined by Frankel and Froot – where the assumption of perfect substitutability of debt instruments is less likely to hold.

If the standard UIP results can be overturned by appealing to survey data, it is of interest to investigate whether they are also overturned at longer horizons. In order to investigate this, we estimate the following regression:

$$\Delta \hat{s}_{t,t+k}^e = \alpha + \beta (i_{t,k} - i_{t,k}^*) + \tilde{\varepsilon}_{t,t+k}. \quad (7)$$

where $\hat{s}_{t,t+k}^e \equiv \hat{s}_{t,t+k}^e - s_t$ is the expected depreciation implied by the geometric mean of survey data on future spot exchange rates. In this case, the error term, $\tilde{\varepsilon}_{t,t+k}$ need not be mean zero and iid. Assuming covered interest parity holds, we substitute out for the

comparable credit ratings.

4 Similar results are cited in surveys by MacDonald and Taylor (1992) and Isard (1995).

interest differential with the forward discount.

Table 1 reports the results from estimating the standard ex post UIP regression (UIP incorporating rational expectations), often known as the “Fama regression” (1984). While data are available at the 1, 3, 6 and 12 month horizons, only results for the three and 12 months horizons are reported. Under the maintained hypothesis, the errors should be serially uncorrelated. However, we report the estimates using Newey-West standard errors, as there appears to be serial correlation, according the Durbin Watson statistics, and the Q-tests for serial correlation of order 12.

The results for the sample period 1986M08-2010M10 (up to 1998M12 for euro legacy currencies) are much in line with those reported elsewhere in the literature. In general, most of the point estimates are negative at both horizons; despite this, the standard errors are so large that one can reject the null of a coefficient of unity less than half of the time.

That being said, the proportion of variance is extremely low, except in the case of the Japanese yen at the 12 month horizon, in which case the adjusted R-squared rises to 0.21.5 Interestingly, the degree of bias is the most pronounced for this case.

The bias is also evident for the newest currency in the data set – the euro. In this case, the imprecision of the estimates is sufficiently large at the 3 month horizon that one cannot reject the null of a coefficient of unity at any horizon. However, one can reject UIP and rational expectations at the 12 month horizon.

An interesting result is that the point estimates are quantitatively close to the

5 The table reports a joint test for UIP as well, which is a $\beta=1$ and $\alpha=0$.

posited value of unity in two cases – Sweden and Spain. Italy’s coefficients at both horizons are very high, in excess of 2. It is interesting in the latter two countries’ currencies, the rate of the inflation over the sample period (which ends in 1998M12) is the highest. This result is consistent with the findings in Chinn and Meredith (2004).

The results of estimating *ex ante* uncovered interest parity stand in stark contrast to those from *ex post* UIP. In order to implement the tests, we use extended versions of the data used in Chinn and Frankel (1994). These are data provided by *FX Forecasts*, the successor organization to *Currency Forecaster’s Digest*, and the data used are at the 3 and 12 month horizons.

Table 2 presents the results. The most obvious and striking difference is that there is only one negative estimated coefficient for all the currencies (Japan at the 3 month horizon). In all other instances, the estimated coefficients are positive, and in most cases reject the null of zero.

On the other hand, one *can* reject the null hypothesis of a unit coefficient consistent with the UIP hypothesis in only 8 cases (of which four cases pertain to the situation where the point estimate is above unity).

If one wants to focus on the major currencies, such as the euro, the yen and the British pound, one finds that in almost all instances, one can’t reject the null hypothesis that the slope coefficient is unitary (the only case is the British pound at the 3 month horizon). So for key currencies, UIP does seem to hold.

Why do the results differ so widely between each approach to expectations?

One can examine this from a mechanical perspective. If exchange rate expectations, as measured by the survey data, point in a substantially different direction from the actual exchange rate changes, then one would expect differing results. One can quantify the differences by examining whether expected changes exhibit bias.

$$\Delta s_{t,t+k} = \gamma + \theta(\Delta \hat{s}_{t,t+k}) + u_{t,t+k}. \quad (6)$$

These results are reported in Appendix Tables A1. One interesting fact is that almost all the survey-based forecasts are biased – although the instances where the point estimates of θ are negative are rare. However, it is also notable that in most of the cases where the beta coefficients switch from negative to positive are the instances where the survey-based expected changes are negative correlated with the actual changes.

Another point of commonality with the rational expectations-UIP hypothesis is that the proportion of variation explained is very low. Hence, the linkage between the forward discount and the expected depreciation is very weak. Another common finding in both Tables 1 and 2 is that there is that the residuals are serially correlated. This could indicate misspecification. Returning to equation (5), one sees that the existence of an exchange risk premium could yield the results obtained, especially if the risk premium is correlated with the error term.

4. The Risk Premium

In simple models, the exchange risk premium arises from the correlation of currency returns with the marginal utility of consumption. Of course, numerous researchers have failed to relate the risk premium identified using rational expectations to macroeconomic

fundamentals.⁶

Here, I examine how the risk premium defined under rational expectations differs from that defined using survey data. These risk premia are illustrated in Figures 1 and 2 (for the three month and 12 month horizons). The solid line presents the risk premia obtained using survey data, while the dashed line depicts the conventional risk premia implied by the rational expectations hypothesis. Clearly, the risk premia obtained using the survey data are much more persistent than the rational expectations implied; they also exhibit much less high frequency volatility.

To quantify the degree of persistence, I sampled the three month risk premia every three months, so as to eliminate the overlapping data issue. The results of regressing these sampled data on the lagged risk premia are presented in Appendix Table A2.

The pattern is striking. In almost every case, the risk premium obtained using survey data is highly persistent, while that obtained using the rational expectations is not. In fact, the AR(1) coefficient for the rational expectations derived risk premium is essentially zero. The half-life of a typical survey-based risk premium is about 2 quarters.

The only exceptions to the general pattern is the commodity currencies of the Australian, Canadian and New Zealand dollars. For the Australian and New Zealand dollars, the risk premia calculated using either approach are persistent. In contrast, neither risk premium is persistent, for the Canadian dollar.

However, for all other cases, the pattern holds. Hence, one stylized fact that one

⁶ See Engel (1996) for a discussion, and Engel (2011) for a recounting of what attributes the risk premium

can discern from this approach is that the risk premium appears to be highly persistent.

5. Panel Estimates of the UIP Relationship

One of the difficulties in obtaining precise estimates is that the pure time series is oftentimes uninformative. In Chinn and Meredith (2004), we appeal to the cross sectional information in order to obtain more precise estimates.

I estimate the UIP relationship for both the three month and 12 month horizon using an unbalanced panel of 12 exchange rates, and using both methods of identifying the expected exchange rate. The results are reported in Table 3.

Using rational expectations, UIP fails to reject at the three month horizon, but does reject at the 12 month horizon. This result contrasts with Chinn and Meredith (2004), who rejected UIP at both horizons, but for a smaller panel of currencies. (Chinn and Meredith only fail to reject the unit coefficient at the three to ten year horizon.)

In contrast, while the UIP test using survey-based expectations rejects at both horizons, in both cases the slope coefficient is positive. At the short horizon, the coefficient is below unity, and above at the year long horizon.

6. Conclusions

In this study, I have re-examined the uncovered interest parity hypothesis, using the rational expectations hypothesis, and using survey data, to identify expected exchange rate changes. I obtain the following:

must fulfill.

- UIP generally does not hold on a currency by currency basis using the rational expectations hypothesis.
- UIP is rejected in about a third of the currencies when using survey data based expectations; however, typically the UIP slope coefficient estimates are positive, in contrast to the conventional finding.
- Oftentimes, the difference in the results is linked to the finding of bias in exchange rate expectations.
- The risk premium identified using survey data differs substantially in terms of persistence and high frequency volatility.
- Panel regression estimates indicate a failure to reject the RNEMH at the three month horizon, while the slope coefficient is always positive using survey data.

Future work should test for heterogeneity across major vs. minor currencies, and whether pooling across currencies is justified. In addition, I plan to investigate whether the risk premium identified using survey data is linked to any macro variables, including those suggested by theory (consumption growth, inflation, etc.).

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Table A1.1
Bias
3 month horizon

	UK	Euro	Denmark	Switzerland	Sweden	Norway	Japan	Australia	Canada
fore_spread3	-0.186 (0.128)	-0.077 (0.115)	-0.046 (0.146)	-0.004 (0.140)	0.175 (0.222)	-0.172 (0.250)	-0.004 (0.199)	-0.015 (0.014)	-0.151 (0.238)
Constant	0.026 (0.0185)	0.053* (0.028)	0.006 (0.021)	0.0055 (0.021)	0.044 (0.033)	0.021 (0.028)	0.000 (0.019)	0.0411* (0.021)	-0.000 (0.013)
r2	0.010	0.002	0.0005	0.000	0.002	0.005	0.000	0.002	0.004
r2_a	0.007	-0.006	-0.003	-0.004	-0.001	0.001	-0.000	-0.002	0.000
rmse	0.212	0.222	0.238	0.239	0.362	0.304	0.226	0.239	0.165
DW	0.661	0.679	0.614	0.599	0.459	0.586	0.555	0.573	0.829
Observations	278	128	277	277	277	240	277	277	277
Start Date	Aug-86	Jan-99	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86
End Date	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10

	New Zealand	Germany	France	Netherlands	Ireland	Belgium	Italy	Spain
fore_spread3	-0.338 (0.233)	0.010 (0.240)	0.019 (0.233)	0.027 (0.247)	0.167 (0.240)	0.155 (0.253)	0.189 (0.264)	0.202 (0.310)
Constant	0.090*** (0.028)	0.009 (0.030)	0.011 (0.030)	0.007 (0.031)	0.041 (0.028)	0.003 (0.031)	0.030 (0.032)	0.024 (0.032)
r2	0.031	0.000	0.000	0.000	0.007	0.005	0.005	0.007
r2_a	0.025	-0.007	-0.007	-0.007	0.000	-0.002	-0.002	-0.000
rmse	0.280	0.230	0.218	0.231	0.212	0.233	0.274	0.277
DW	0.678	0.534	0.524	0.537	0.538	0.522	0.460	0.634
Observations	171	144	143	144	144	144	144	144
Start Date	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86
End Date	Sep-10	Dec-98	Dec-98	Dec-98	Dec-98	Dec-98	Dec-98	Dec-98

Table A1.2
Bias
12 month horizon

	UK	Euro	Denmark	Switzerland	Sweden	Norway	Japan	Australia	Canada
fore_spread12	0.271 (0.269)	0.184 (0.410)	0.0708 (0.237)	0.0686 (0.212)	0.289 (0.371)	0.330 (0.243)	-0.0587 (0.301)	-0.0180 (0.182)	0.440 (0.479)
Constant	0.0108 (0.0150)	0.0217 (0.0280)	-0.00621 (0.0176)	-0.0124 (0.0170)	0.0104 (0.0212)	0.00395 (0.0179)	-0.0169 (0.0184)	0.0212 (0.0200)	0.00545 (0.0137)
r2	0.0233	0.00801	0.00187	0.00187	0.0203	0.0356	0.000905	0.000135	0.0264
r2_a	0.0197	0.000140	-0.00176	-0.00176	0.0167	0.0315	-0.00273	-0.00350	0.0229
rmse	0.0982	0.111	0.107	0.106	0.132	0.112	0.106	0.125	0.0747
DW	0.183	0.166	0.174	0.198	0.161	0.171	0.176	0.166	0.168
Observations	278	128	277	277	277	238	277	277	277
Start Date	Aug-86	Jan-99	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86
End Date	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10	Sep-10

	New Zealand	Germany	France	Netherlands	Ireland	Belgium	Italy	Spain
fore_spread12	-0.218 (0.590)	-0.137 (0.294)	-0.334 (0.292)	-0.131 (0.306)	-0.199 (0.329)	-0.281 (0.327)	0.137 (0.425)	0.125 (0.385)
Constant	0.050 (0.037)	0.007 (0.024)	0.018 (0.023)	0.007 (0.025)	-0.006 (0.022)	0.016 (0.025)	0.023 (0.019)	0.016 (0.023)
r2	0.006	0.006	0.030	0.005	0.010	0.019	0.005	0.003
r2_a	0.000	-0.001	0.023	-0.002	0.003	0.012	-0.002	-0.004
rmse	0.156	0.100	0.0963	0.101	0.0975	0.104	0.108	0.119
DW	0.134	0.164	0.178	0.157	0.159	0.160	0.144	0.126
Observations	171	144	143	144	144	142	142	142
Start Date	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86	Aug-86
End Date	Sep-10	Dec-98	Dec-98	Dec-98	Dec-98	Dec-98	Dec-98	Dec-98

Table A2
Three Month Risk Premia Persistence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Germany	Germany	France	France	Netherlands	Netherlands	Ireland	Ireland
	Survey	RE	Survey	RE	Survey	RE	Survey	RE
	RP	RP	RP	RP	RP	RP	RP	RP
Lagged Dep. Var.	0.756***	-0.111	0.635***	-0.0751	0.781***	-0.108	0.634***	-0.117
	[0.104]	[0.133]	[0.152]	[0.141]	[0.0963]	[0.134]	[0.119]	[0.130]
Constant	-0.00093	0.00547	-0.0013	0.00911	-0.000680	0.00614	0.00112	-0.0116
	[0.00258]	[0.0087]	[0.0030]	[0.0083]	[0.00241]	[0.00883]	[0.0030]	[0.0077]
Observations	45	45	45	45	45	45	45	45
Adj. R-squared	0.500	-0.0112	0.366	-0.0178	0.547	-0.0120	0.343	-0.0101
Mean	-0.00744	0.00617	-0.0049	0.00969	-0.00739	0.00677	0.00531	-0.0112
Standard Dev.	0.0238	0.0594	0.0246	0.0559	0.0234	0.0600	0.0232	0.0567
Q Test (4L) P-Value	0.795	0.497	0.0521	0.691	0.814	0.530	0.940	0.844
Q Test (6L) P-Value	0.494	0.293	0.0642	0.436	0.884	0.307	0.820	0.403
LM Test for ARCH	0.939	0.612	0.0183	0.649	0.790	0.614	0.881	0.374

Newey-West standard errors in brackets.

Test for null of zero coefficient.

*** p<0.01, ** p<0.05, * p<0.1

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Belgium	Belgium	Italy	Italy	Spain	Spain	UK	UK
	Survey	RE	Survey	RE	Survey	RE	Survey	RE
	RP	RP	RP	RP	RP	RP	RP	RP
Lagged Dep. Var.	0.633***	-0.0765	0.626***	-0.110	0.678***	-0.0645	0.398**	-0.0505
	[0.121]	[0.135]	[0.145]	[0.129]	[0.129]	[0.175]	[0.159]	[0.110]
Constant	-0.0019	0.00864	0.00059	0.00786	0.00110	0.0124	0.00017	-0.0090
	[0.0029]	[0.0091]	[0.0027]	[0.0085]	[0.0028]	[0.0090]	[0.0027]	[0.0064]
Observations	45	45	45	45	45	45	87	87
Adj. R-squared	0.377	-0.0176	0.351	-0.0112	0.400	-0.0192	0.146	-0.0093
Mean	-0.0055	0.00951	0.00027	0.00827	0.00203	0.0123	0.00033	-0.0077
Standard Dev.	0.0235	0.0616	0.0241	0.0645	0.0264	0.0599	0.0279	0.0584
Q Test (4L) P-Value	0.766	0.430	0.261	0.585	0.672	0.608	0.112	0.925
Q Test (6L) P-Value	0.711	0.374	0.404	0.340	0.546	0.580	0.264	0.912
LM Test for ARCH	0.551	0.471	0.164	0.0008	0.949	0.639	0.000	0.431

Newey-West standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
	EURO	EURO	Denmark	Denmark	Switzerland	Switzerland	Sweden	Sweden
	Survey	RE	Survey	RE	Survey	RE	Survey	RE
	RP	RP	RP	RP	RP	RP	RP	RP
Lagged Dep. Var.	0.356**	-0.0427	0.483***	-0.0553	0.308*	-0.0671	0.349**	0.0471
	[0.159]	[0.124]	[0.139]	[0.105]	[0.159]	[0.0970]	[0.174]	[0.0945]
Constant	-0.008*	-0.0036	0.00121	0.0111	-0.00314	0.00533	0.00118	0.00459
	[0.0040]	[0.0097]	[0.0023]	[0.0068]	[0.00318]	[0.00641]	[0.0027]	[0.0076]
Observations	43	43	86	86	86	86	86	86
Adj. R-squared	0.105	-0.0225	0.222	-0.0089	0.0821	-0.00760	0.111	-0.0097
Mean	-0.0126	-0.0018	0.00107	0.0109	-0.00496	0.00439	0.00188	0.00512
Standard Dev.	0.0313	0.0618	0.0240	0.0596	0.0283	0.0607	0.0274	0.0713
Q Test (4L) P-Value	0.105	0.962	0.515	0.576	0.0198	0.513	0.507	0.699
Q Test (6L) P-Value	0.227	0.872	0.745	0.773	0.0439	0.620	0.606	0.584
LM Test for ARCH	0.518	0.799	0.0320	0.993	0.000735	0.847	0.000	0.164

Newey-West standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)
	Norway Survey RP	Norway RE RP	Japan Survey RP	Japan RE RP	Australia Survey RP	Australia RE RP	Canada Survey RP	Canada RE RP	New Zealand Survey RP	New Zealand RE RP
Lagged Dep. Var.	0.401*** [0.112]	-0.107 [0.123]	0.427* [0.222]	0.0697 [0.0981]	0.378** [0.156]	0.181** [0.0902]	0.0199 [0.158]	0.0702 [0.0939]	0.273** [0.124]	0.319** [0.142]
Constant	0.0072*** [0.00241]	0.0187* [0.0094]	-0.0073** [0.00325]	0.00109 [0.0062]	-0.0056** [0.00224]	-0.0066 [0.0070]	0.0031* [0.0016]	0.00403 [0.0044]	-0.0135*** [0.00408]	-0.0126 [0.0125]
Observations	62	62	86	86	86	86	86	86	42	42
Adj. R-squared	0.139	-0.0054	0.165	-0.0072	0.134	0.0209	-0.0115	-0.0069	0.0488	0.0761
Mean	0.00789	0.00987	-0.0118	0.00158	-0.00860	-0.0099	0.00344	0.00443	-0.0184	-0.0160
Standard Dev.	0.0255	0.0656	0.0261	0.0564	0.0262	0.0641	0.0179	0.0398	0.0355	0.0716
Q Test (4L) P-Value	0.724	0.907	0.0540	0.287	0.0498	0.685	0.138	0.709	0.159	0.286
Q Test (6L) P-Value	0.895	0.889	0.0213	0.529	0.0962	0.827	0.236	0.371	0.356	0.540
LM Test for ARCH	6.06e-05	0.917	0.0492	0.931	0.158	0.00132	0.0592	0.00952	2.49e-06	0.121

Newey-West standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table 1.1 Ex Post Uncovered Interest Rate Parity (3-Month Horizon)

VARIABLES	(1) Germany	(2) France	(3) Netherlands	(4) Ireland	(5) Belgium	(6) Italy	(7) Spain	(8) UK
3-Mon Fwd Spread	-0.283*** [0.253]	-0.106 [0.886]	-0.119 [1.042]	-0.167 [0.926]	-0.418 [0.874]	2.727 [1.693]	1.189 [1.228]	0.585 [0.362]
Constant	0.009 [0.0272]	0.013 [0.0262]	0.008 [0.0277]	0.032 [0.0274]	0.011 [0.0276]	-0.070 [0.0593]	-0.022 [0.0480]	0.0414** [0.0182]
Observations	144	143	144	144	144	144	144	273
R-squared	0.006	0.000	0.000	0.001	0.003	0.095	0.026	0.012
Adj. R-squared	-0.001	-0.007	-0.007	-0.006	-0.004	0.088	0.019	0.008
DW Stat	0.542	0.525	0.538	0.530	0.518	0.534	0.639	0.599
P-Value for Q test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-Value of joint test for UIP	0.000	0.449	0.503	0.074	0.259	0.497	0.838	0.022

VARIABLES	(9) Euro	(10) Denmark	(11) Switzerland	(12) Sweden	(13) Norway	(14) Japan	(15) Australia	(16) Canada	(17) New Zealand
3-Mon Fwd Spread	-0.217 [1.063]	-0.113 [0.710]	-0.383 [0.855]	1.568 [0.440]	0.403*** [0.256]	-2.353*** [0.831]	-1.062* [0.649]	-0.504*** [0.519]	-1.514** [0.711]
Constant	0.0514* [0.0286]	0.006 [0.0202]	-0.002 [0.0267]	0.014 [0.0255]	0.009 [0.0276]	-0.0660** [0.0259]	0.014 [0.0253]	0.004 [0.0166]	0.024 [0.0394]
Observations	128	272	272	272	235	272	272	272	171
R-squared	0.000	0.000	0.002	0.146	0.006	0.050	0.012	0.003	0.022
Adj. R-squared	-0.007	-0.004	-0.002	0.143	0.001	0.047	0.008	-0.001	0.017
DW Stat	0.669	0.604	0.587	0.595	0.543	0.586	0.570	0.765	0.596
P-Value for Q test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-Value of joint test for UIP	0.168	0.293	0.120	0.436	0.064	0.000	0.000	0.003	0.000

Newey-West Standard Errors in Brackets.

Table 1.2 Ex Post Uncovered Interest Rate Parity (12- Month Horizon)

VARIABLES	(1) Germany	(2) France	(3) Netherlands	(4) Ireland	(5) Belgium	(6) Italy	(7) Spain	(8) UK
12-Mon Fwd Spread	-0.468*** [0.741]	-0.272 [0.925]	-0.708*** [0.809]	-0.520 [0.960]	-0.872 [1.018]	2.181 [1.482]	1.149 [1.262]	-0.633 [1.225]
Constant	0.061 [0.0860]	0.078 [0.0946]	0.061 [0.0872]	0.036 [0.0913]	0.093 [0.0894]	-0.127 [0.213]	-0.015 [0.195]	0.046 [0.0757]
Observations	144	143	144	144	142	142	142	273
R-squared	0.013	0.004	0.028	0.013	0.035	0.189	0.063	0.009
Adj. R-squared	0.006	-0.003	0.021	0.006	0.028	0.184	0.056	0.006
DW Stat	0.193	0.187	0.188	0.192	0.193	0.228	0.170	0.209
P-Value for Q test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-Value of joint test for UIP	0.123	0.383	0.098	0.165	0.132	0.708	0.993	0.046

VARIABLES	(9) Euro	(10) Denmark	(11) Switzerland	(12) Sweden	(13) Norway	(14) Japan	(15) Australia	(16) Canada	(17) New Zealand
12-Mon Fwd Spread	-2.198*** [1.659]	-0.525** [0.819]	-1.408 [0.927]	1.290 [1.217]	0.264 [0.577]	-2.953*** [0.705]	-1.050 [0.870]	-0.161** [0.659]	-3.052** [1.281]
Constant	0.231* [0.117]	0.060 [0.0765]	-0.076 [0.0878]	0.088 [0.105]	0.039 [0.0880]	-0.331*** [0.0640]	0.095 [0.128]	0.003 [0.0588]	0.010 [0.176]
Observations	128	272	272	272	233	272	272	272	171
R-squared	0.076	0.013	0.061	0.050	0.004	0.216	0.020	0.001	0.104
Adj. R-squared	0.069	0.009	0.057	0.047	0.000	0.213	0.017	-0.003	0.099
DW Stat	0.309	0.201	0.233	0.183	0.173	0.291	0.216	0.240	0.232
P-Value for Q test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-Value of joint test for UIP	0.083	0.178	0.020	0.642	0.444	0.000	0.000	0.172	0.000

Newey-West Standard Errors in Bracket

Table 2.1 Ex Ante Uncovered Interest Rate Parity (3- Month Horizon)

VARIABLES	(1) Germany	(2) France	(3) Netherlands	(4) Ireland	(5) Belgium	(6) Italy	(7) Spain	(8) UK
3-Mon Fwd Spread	0.614** [0.264]	0.883 [0.426]	1.646** [0.368]	1.027 [0.454]	0.937 [0.378]	1.370 [0.310]	0.427 [0.379]	0.114*** [0.127]
Constant	0.0301** [0.0139]	0.0317** [0.0146]	0.0331** [0.0136]	-0.013 [0.0153]	0.0290** [0.0144]	-0.007 [0.0175]	0.024 [0.0220]	-0.011 [0.0102]
Observations	144	143	144	144	144	144	144	273
R-squared	0.116	0.060	0.165	0.090	0.073	0.160	0.019	0.002
Adj R-squared	0.110	0.053	0.159	0.084	0.067	0.154	0.013	-0.002
DW Stat	0.356	0.340	0.288	0.427	0.339	0.412	0.386	0.995
P-Value for Q test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-Value of joint test for UIP	0.048	0.086	0.002	0.600	0.109	0.418	0.323	0.000

VARIABLES	(9) Euro	(10) Denmark	(11) Switzerland	(12) Sweden	(13) Norway	(14) Japan	(15) Australia	(16) Canada	(17) New Zealand
3-Mon Fwd Spread	0.486* [0.310]	0.954 [0.291]	1.239 [0.296]	0.198*** [0.134]	0.857 [0.262]	-0.470*** [0.360]	1.825*** [0.190]	0.591*** [0.172]	1.086 [0.322]
Constant	0.0324*** [0.0113]	0.002 [0.00899]	0.0337*** [0.0101]	0.001 [0.00889]	-0.0271** [0.0121]	0.010 [0.0133]	0.0651*** [0.0109]	-0.0122** [0.00493]	0.0865*** [0.0180]
Observations	128	272	272	272	235	272	272	272	171
R-squared	0.008	0.059	0.074	0.032	0.157	0.010	0.119	0.021	0.043
Adj R-squared	0.000	0.055	0.070	0.028	0.153	0.007	0.116	0.018	0.038
DW Stat	2.033	1.239	1.229	0.649	0.704	0.637	1.184	2.224	1.382
P-Value for Q test	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-Value of joint test for UIP	0.015	0.978	0.004	0.000	0.018	0.000	0.000	0.000	0.000

Newey-West Standard Errors in Bracket

Table 2.2 Ex Ante Uncovered Interest Rate Parity (12-Month horizon)

VARIABLES	(1) Germany	(2) France	(3) Netherlands	(4) Ireland	(5) Belgium	(6) Italy	(7) Spain	(8) UK
12-Mon Fwd Spread	1.572*** [0.242]	1.145 [0.277]	1.449** [0.244]	0.823 [0.343]	1.251 [0.252]	1.203 [0.176]	0.735 [0.224]	1.574 [0.456]
Constant	0.199*** [0.0330]	0.165*** [0.0405]	0.189*** [0.0376]	-0.0907*** [0.0327]	0.183*** [0.0408]	0.055 [0.0462]	0.0786* [0.0463]	0.057 [0.0522]
Observations	144	143	144	144	142	142	142	273
R-squared	0.430	0.217	0.356	0.182	0.244	0.310	0.194	0.197
Adj. R-squared	0.426	0.211	0.351	0.177	0.238	0.305	0.188	0.194
DW Stat	0.516	0.443	0.424	0.496	0.485	0.508	0.459	0.461
P-Value for Q test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-Value of joint test for UIP	0.000	0.000	0.000	0.022	0.000	0.073	0.230	0.451

VARIABLES	(9) Euro	(10) Denmark	(11) Switzerland	(12) Sweden	(13) Norway	(14) Japan	(15) Australia	(16) Canada	(17) New Zealand
12-Mon Fwd Spread	1.629 [0.549]	1.435 [0.295]	1.569 [0.414]	1.164 [0.354]	0.854 [0.370]	0.441 [0.416]	2.012*** [0.216]	0.751 [0.210]	1.433 [0.328]
Constant	0.150*** [0.0508]	0.012 [0.0395]	0.157*** [0.0426]	-0.026 [0.0410]	-0.053 [0.0463]	0.141*** [0.0453]	0.276*** [0.0338]	-0.0441*** [0.0152]	0.307*** [0.0558]
Observations	128	272	272	272	233	272	272	272	171
R-squared	0.178	0.258	0.196	0.308	0.157	0.019	0.459	0.151	0.228
Adj. R-squared	0.172	0.255	0.193	0.306	0.153	0.016	0.457	0.148	0.223
DW Stat	0.703	0.555	0.476	0.576	0.407	0.303	0.605	1.045	0.761
P-Value for Q test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
P-Value of joint test for UIP	0.007	0.290	0.001	0.803	0.372	0.000	0.000	0.002	0.000

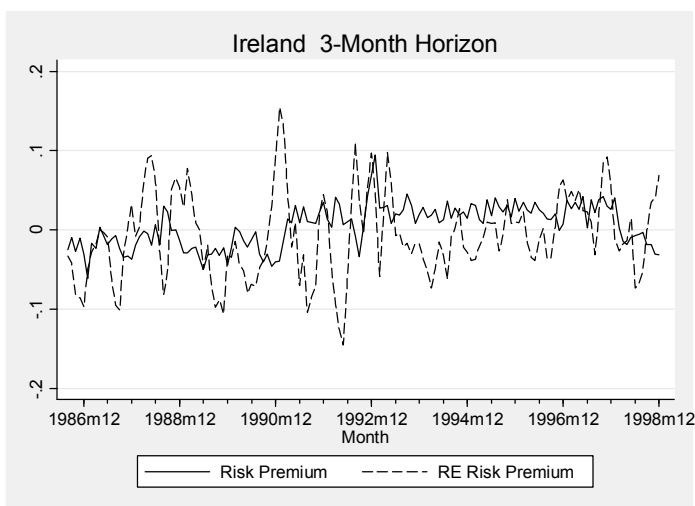
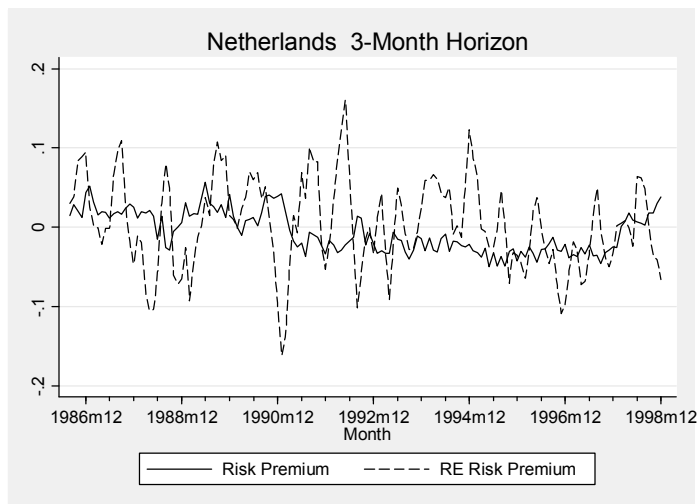
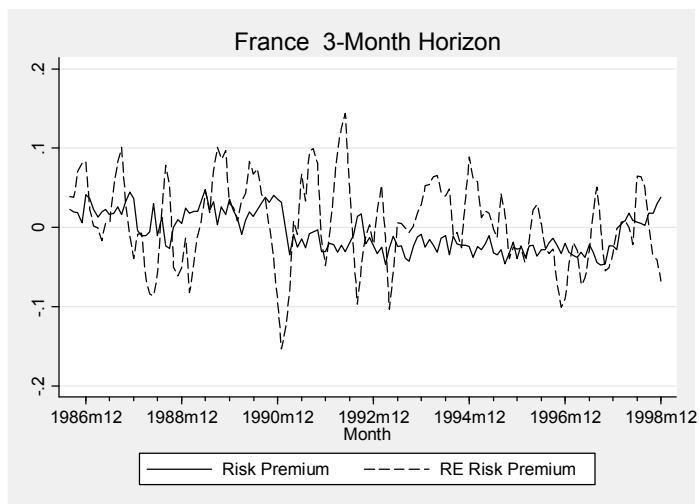
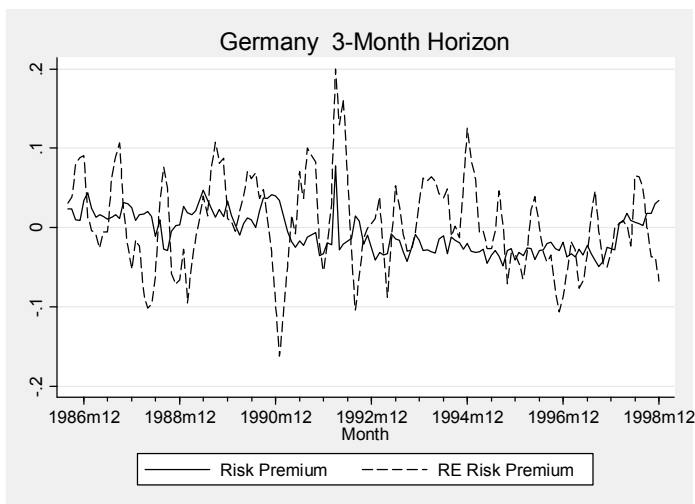
Newey-West Standard Errors in Bracket

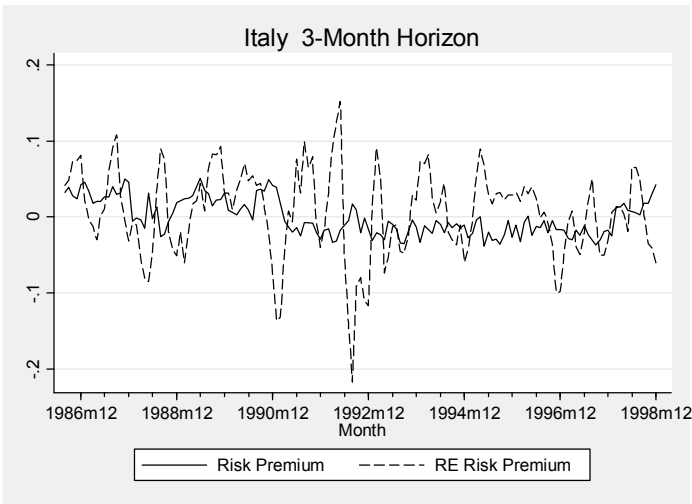
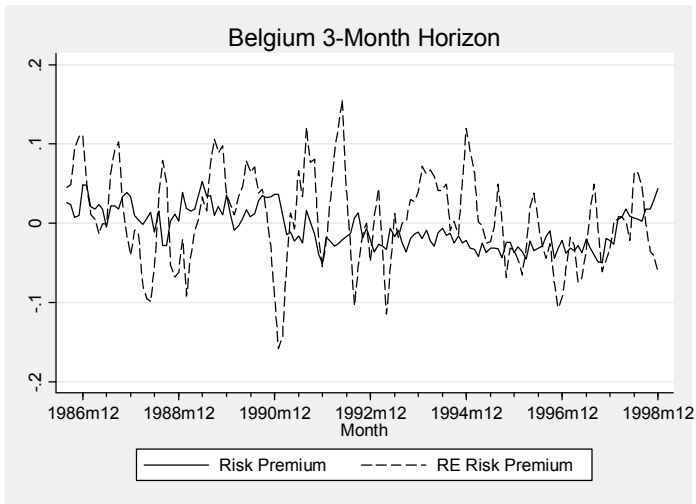
Table 3
Panel UIP Regressions

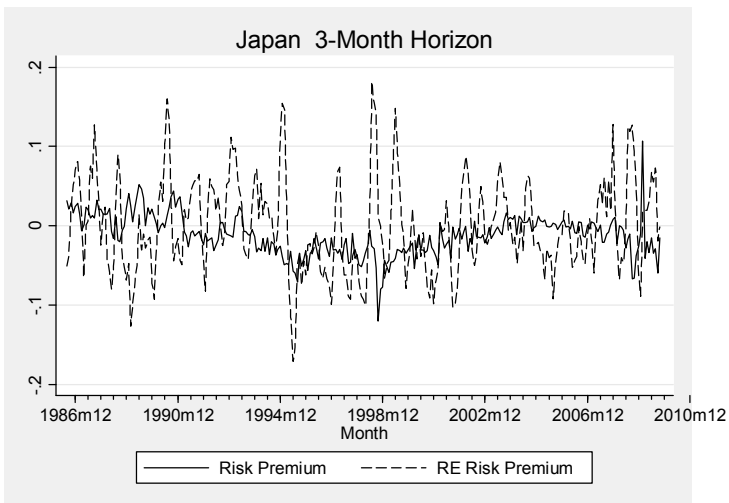
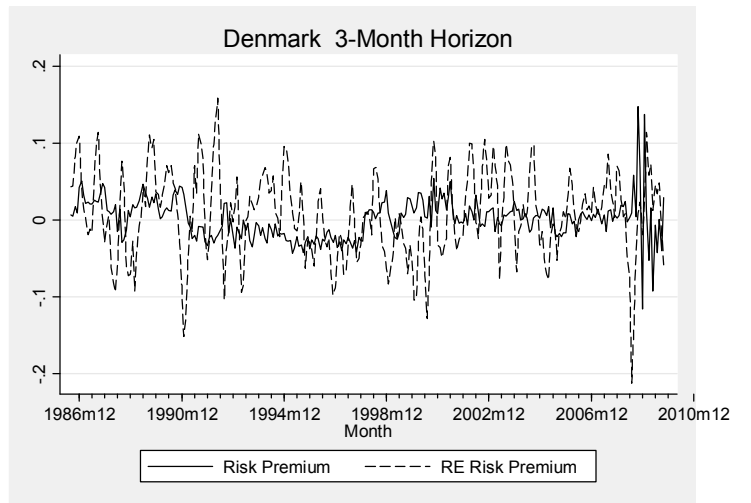
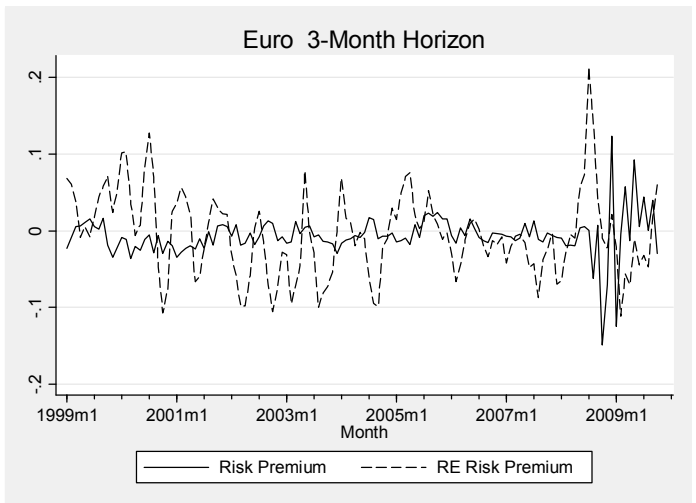
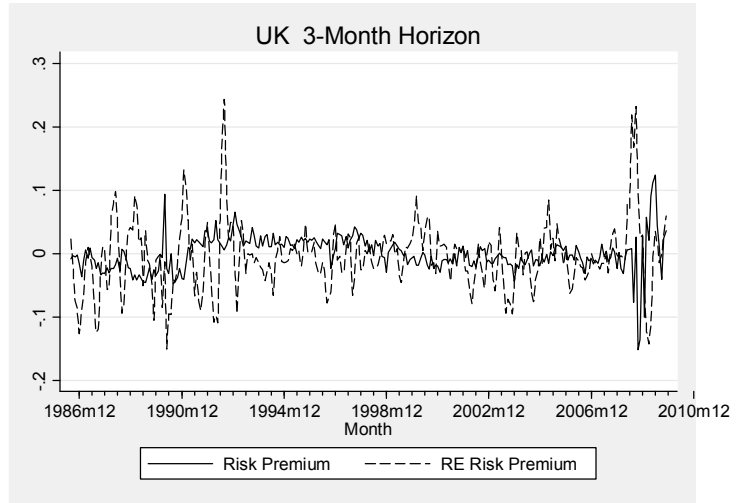
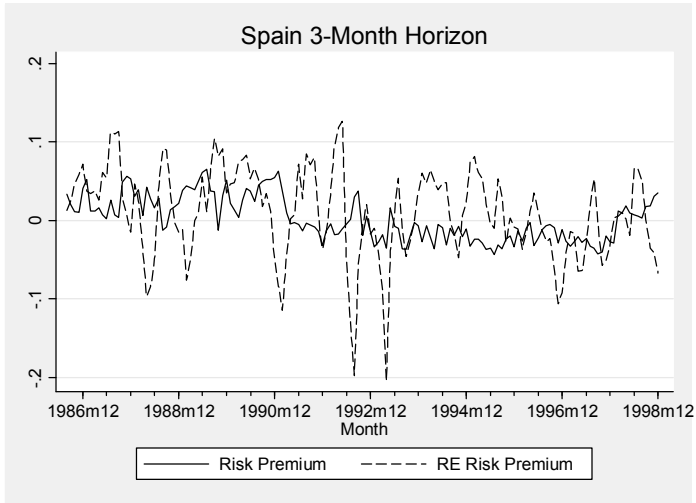
	RE 3 Month	Survey 3 Month	RE 12 Month	Survey 12 Month
12-Mon Fwd Spread	0.923 (0.253)	0.490*** (0.132)	-0.063*** (0.057)	1.308*** (0.085)
r2	0.028	0.050	0.015	0.287
r2_a	0.024	0.046	0.012	0.284
Observations	3070	2871	3070	2869

Notes: OLS point estimates from fixed effects regressions. White standard errors (cross-section) in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, for null $\beta = 1$.

Figure 1
Three Month Risk Premia







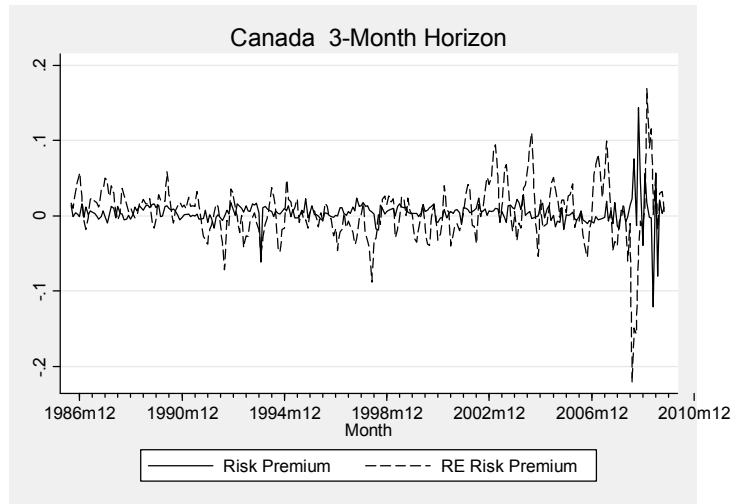
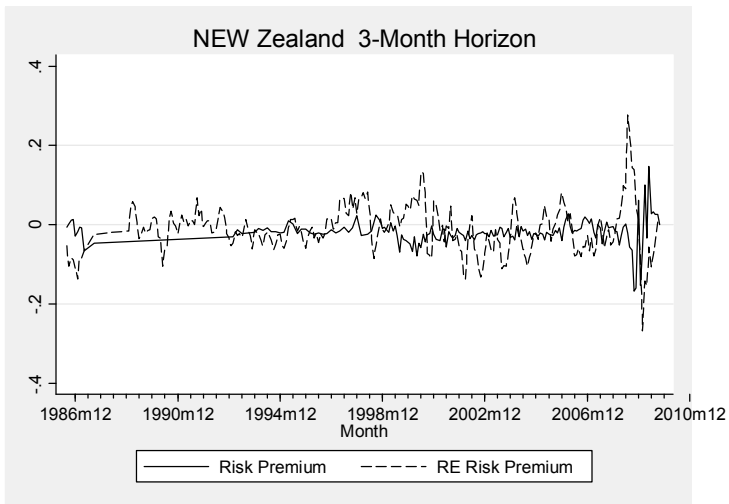
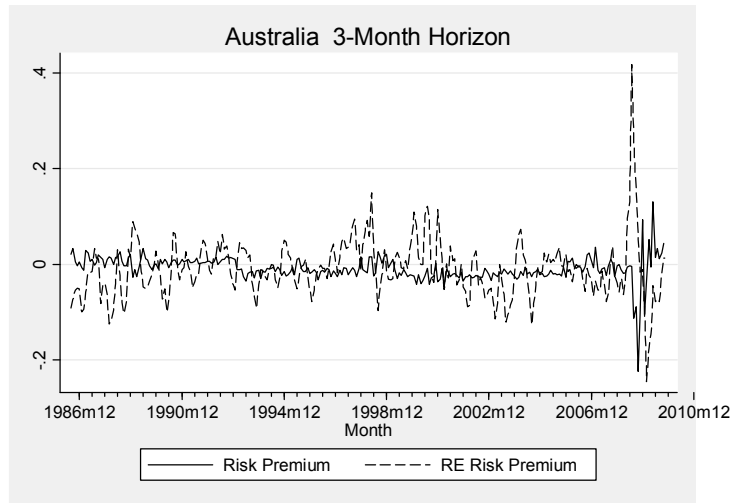
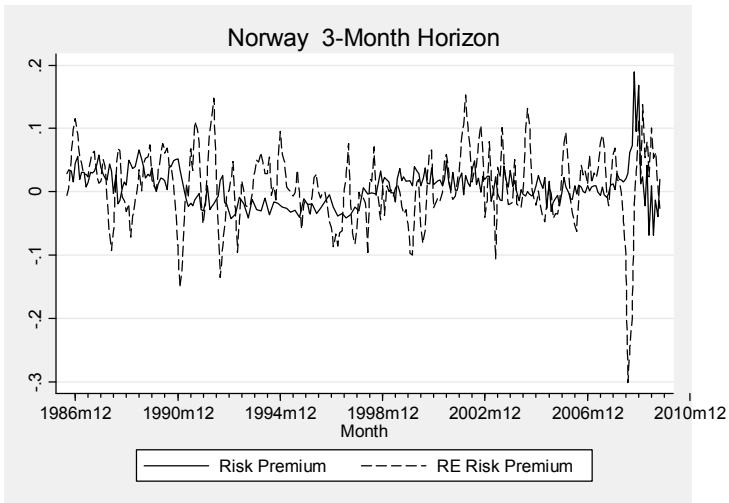
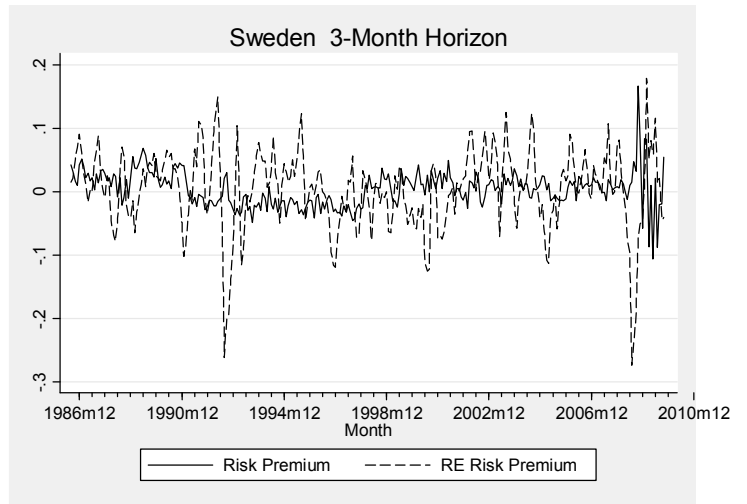
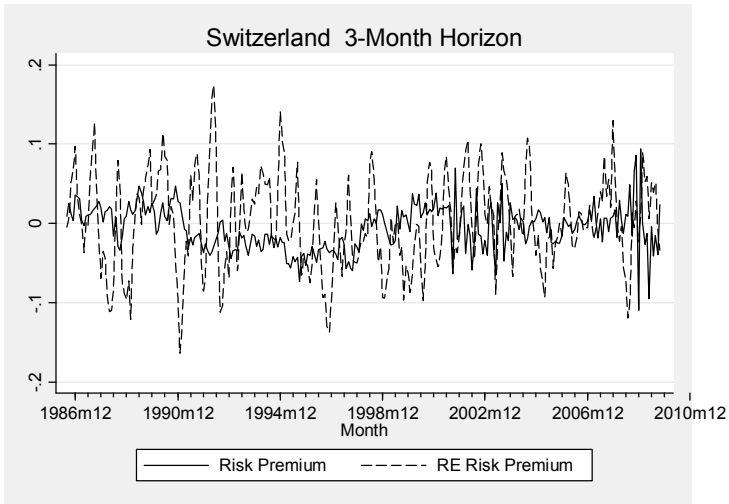


Figure 2
Twelve Month Risk Premia

