Online Appendix for "What Does the Yield Curve Tell Us About Exchange Rate Predictability?" (Chen and Tsang 2011)

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This Online Appendix contains the following Sections, Tables, and Figures:

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  - These results demonstrate that the explanatory power of the relative factors is beyond the information contained in the time series of exchange rates themselves.
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OA1. Out-Sample Forecasting

To complement the in-sample predictive regression results in the main text, this section presents some illustrative comparisons for the out-of-sample forecasting performance of the factors model relative to that of two simpler models: the random walk model and the interest differential model eq.(19) in text. We note that pseudo out-of-sample forecast comparisons involve a different set of considerations from model evaluations using in-sample regressions. Specifications with good in-sample fits commonly fail to deliver good out-of-sample performance. It is also well-known that imposing parameter restrictions, even wrong ones, can lead to smaller forecast errors ("principle of parsimony").[1] Furthermore, inherent instabilities, choices of window size and sub-sample periods all contribute to the fragility of any conclusive results in the forecasting literature, except that the simplest univariate specifications often deliver the lowest root-mean-squared forecast errors (RMSEs). See, for example, Clark and McCracken (2009) and Rossi and Inoue (2011) and references therein for a full discussion.

Against this backdrop, we present selected results as illustrative support for the aforementioned observations. We use rolling windows of various sizes (from 4 to 9 years), and construct out-of-sample forecasts for one- to four-quarters ahead for the three models.[2] In Table OA1, we report the RMSEs ratios of the factor model against the random walk (OA1a) and the interest differential model (OA1b). We also report the p-values based on the Clark-West (2006) predictability test, which accounts for the upward shift of RMSEs in the factor model due to

[1] Parameter estimation error is one key reason, among others. If the marginal explanatory power associated with the additional parameters is low enough, in finite samples the extra estimation noise may raise the forecast error variance by more than the amount the extra information lowers it.

[2] The first regression uses the first $\tau + m$ observations, and makes a forecast for the exchange rate change from $\tau + m$ to $\tau + 2m$, where τ is window size. The second regression moves forward over time by one period and make another forecast, and so on. At the end of the rolling process, we calculate the root mean squared forecast error (RMSE) for our model, and compare it with RMSE produced by a drift-less random walk and by the interest differential model.

estimation noise.[3] We observe results consistent with the literature discussed above. First, our factor model, being the most general, tends to deliver larger RMSEs than the two more restricted models. However, using the Clark-West (2006) statistics, we are sometimes able to reject the null hypothesis of equal forecast performance in favor of our factor model, especially for Canada. The results are sensitive to window sizes, though overall, the models are mostly statistically indistinguishable. In Tables OA2a and OA2b, we report parallel results using more recent data samples, Jan 1991- May 2011, which show similar patterns.

OA2. Standard Errors for Overlapping Data: Simulated Critical Values

Following Parker and Julliard (2005), we set up a Monte Carlo experiment under the null hypothesis that the exchange rate follows a random walk. First, we sample with replacement from the 1-month exchange rate returns and create a series of size equal to our sample of "white noise" under the null. Using this re-sampled 1-month exchange rate change series, we generate the 1, 3, 6, 12, 18, and 24 month-ahead exchange rate changes as our LHS variables. We then regress these variables on the relative factors and keep the t-statistics. We repeat the three steps 2,000 times and use the critical values from the distributions of the t-statistics to do our inference. The setup for the excess currency return regression is similar except we use the actual yields to create the re-sampled excess returns. The rationale behind the experiment is that, if exchange rate is truly unpredictable as a random walk, the Monte Carlo results will tell us the probability that the predictability we find is spurious.

[3] Under the null of equal predictability, the sample RMSE of the factor model is expected to be greater than those of the more restricted models. The Clark and West (2006) test statistic adjusts for this upward shift in the sample MSFE. Their simulations show that the inference made using asymptotically normal critical values gives properly-sized tests for rolling regressions.

Table OA1(a): RMSE Ratios & Clark-West p-Values
Factors Model vs. Random Walk Model

1985m8 – 2005m7⁺

	Canada		Japan		UK	
	Window size = 48 months					
1	1.050*	0.075	1.093	0.441	1.017	0.224
3	1.097*	0.037	1.250	0.198	1.047*	0.049
6	1.094*	0.059	1.300	0.243	1.177*	0.058
12	1.024*	0.006	1.730*	0.052	1.398	0.278
	Window size = 60 months					
1	1.036*	0.068	1.091	0.245	1.025	0.481
3	1.084*	0.060	1.251+	0.042	1.065	0.266
6	1.071*	0.078	1.319	0.286	1.116	0.266
12	1.080*	0.020	1.659*	0.068	1.112	0.386
	Window size = 72 months					
1	1.017*	0.059	1.060	0.207	1.024	0.413
3	1.060*	0.085	1.155+	0.063	1.014	0.248
6	1.045*	0.069	1.182	0.345	1.049	0.323
12	1.077*	0.006	1.457*	0.047	1.013	0.248
	Window size = 84 months					
1	1.009*	0.047	1.049	0.244	1.026	0.362
3	1.047*	0.058	1.125	0.115	1.018	0.328
6	1.029*	0.030	1.143	0.462	1.040	0.378
12	1.047*	0.001	1.191*	0.073	1.052	0.460
	Window size = 96 months					
1	1.007*	0.036	1.032	0.342	1.029	0.116
3	1.016*	0.023	1.074	0.299	0.972*	0.058
6	0.995*	0.012	1.079	0.311	0.947*	0.043
12	1.063*	0.003	1.155	0.124	0.961	0.148
	Window size = 108 months					
1	1.005*	0.047	1.025	0.441	1.010	0.494
3	1.014*	0.035	1.090	0.258	0.994*	0.084
6	1.030*	0.066	1.095	0.370	1.001	0.221
12	1.187	0.144	1.154	0.203	1.159	0.369

Note: The 1st column under each country reports the RMSE-ratios for the factor model over the RW model, and the 2nd column are the p-values based on the Clark-West test. The sign * means the factor model is preferred to the RW model at 10% level, and the sign + means the RW model is preferred at 10% level. Data for the UK starts at 1992m10.

Table OA1(b): RMSE Ratios & Clark-West p-Values
Factors Model vs. Interest Differential Model

1985m8 – 2005m7+

	Canada		Japan		UK	
	Window size = 48 months					
3	1.062	0.361	1.114	0.163	1.001*	0.030
6	1.050	0.404	1.147	0.165	1.139	0.446
12	0.944*	0.011	1.020	0.401	1.164	0.136
	Window size = 60 months					
3	1.054	0.339	1.106+	0.050	1.034*	0.077
6	0.999	0.104	1.162	0.167	1.040	0.217
12	0.989*	0.040	1.234+	0.097	1.067	0.402
	Window size = 72 months					
3	1.033	0.282	1.083	0.285	0.995	0.127
6	0.997	0.126	1.175	0.158	1.109+	0.058
12	1.151	0.251	1.412+	0.017	1.007	0.334
	Window size = 84 months					
3	1.045	0.460	1.089	0.118	0.988	0.147
6	1.019	0.244	1.137+	0.052	1.046	0.263
12	1.237	0.416	1.206+	0.019	1.066+	0.031
	Window size = 96 months					
3	1.036	0.489	1.056	0.275	0.982	0.110
6	1.037	0.455	1.076	0.239	1.016	0.498
12	1.218	0.486	1.136+	0.037	1.134+	0.027
	Window size = 108 months					
3	1.036	0.422	1.074	0.174	0.992	0.202
6	1.046	0.320	1.069	0.343	1.067+	0.065
12	1.184	0.115	1.077	0.180	1.161+	0.004

Note: The 1st column under each country reports the RMSE-ratios for the factor model over the interest-differential model, and the 2nd column are the p-values based on the Clark-West test. The sign * means the factor model is preferred to the interest differential model at 10% level, and the sign + means the interest differential model is preferred at 10% level. Data for the UK starts at 1992m10.

Table OA2(a): RMSE Ratios & Clark-West p-Values
Factors Model vs. Random Walk Model

1991m1 – 2011m5

	Canada		UK	
	Window size = 48 months			
1	1.132	0.221	0.906	0.215
3	1.154*	0.043	0.915*	0.043
6	1.198	0.151	1.026*	0.017
12	1.315	0.415	1.240*	0.097
	Window size = 60 months			
1	1.148	0.186	0.925	0.481
3	1.198*	0.051	0.948*	0.071
6	1.216*	0.081	1.088	0.192
12	1.406	0.350	1.263	0.384
	Window size = 72 months			
1	1.166	0.212	0.922	0.381
3	1.206*	0.090	0.978	0.284
6	1.225	0.108	1.129	0.392
12	1.465+	0.097	1.292	0.250
	Window size = 84 months			
1	1.203	0.449	0.939	0.489
3	1.236	0.251	0.999	0.474
6	1.300	0.378	1.163	0.254
12	1.405	0.153	1.383+	0.049
	Window size = 96 months			
1	1.212	0.493	0.957	0.290
3	1.235	0.325	1.030	0.321
6	1.302	0.425	1.224+	0.089
12	1.397+	0.098	1.433+	0.029
	Window size = 108 months			
1	1.237	0.418	0.979	0.234
3	1.271	0.475	1.068	0.217
6	1.388	0.043	1.259+	0.044
12	1.558+	0.001	1.535+	0.009

Note: The 1st column under each country reports the Clark-West statistics and the 2nd column are the p-values based on the Clark-West test. The sign * means our model is preferred to the random walk model at 10% level, and the sign + means the random walk model is preferred at 10% level. Exchange rate data for Canada are available till May 2011, while yields data are available only till Feb 2011.

Table OA2(b): RMSE Ratios & Clark-West p-Values

Factors Model vs. Interest Differential Model

1991m1 – 2011m5

	Canada		UK	
	Window size = 48 months			
3	1.028*	0.085	1.055	0.123
6	1.034*	0.042	1.049*	0.066
12	1.111	0.278	1.129	0.197
	Window size = 60 months			
3	1.055	0.242	1.034	0.101
6	1.029*	0.067	1.073	0.345
12	1.139	0.293	1.086	0.372
	Window size = 72 months			
3	1.030	0.229	1.044	0.197
6	1.000	0.143	1.055	0.423
12	1.221+	0.001	1.043	0.231
	Window size = 84 months			
3	1.036	0.485	1.032	0.229
6	1.048	0.462	1.035	0.355
12	1.143+	0.018	1.054	0.293
	Window size = 96 months			
3	1.033	0.358	1.019	0.134
6	1.044	0.389	1.037	0.303
12	1.091	0.251	1.084	0.467
	Window size = 108 months			
3	1.025	0.371	1.030	0.349
6	1.053	0.255	1.057	0.305
12	1.108	0.120	1.138+	0.021

Note: The 1st column under each country reports the Clark-West statistics and the 2nd column are the p-values based on the Clark-West test. The sign * means our model is preferred to the interest differential model at 10% level, and the sign + means the random walk model is preferred at 10% level. Exchange rate data for Canada are available till May 2011, while yields data are available only till Feb 2011.

Table OA3: Canadian regressions with the inclusion of Lagged Dependent Variable

a) Exchange Rate $\frac{1200(s_{t+m}-s_t)}{m} = \beta_{m,0} + \beta_{m,1}L_t^R + \beta_{m,2}S_t^R + \beta_{m,3}C_t^R + \beta_{m,4}\frac{1200(s_t-s_{t-m})}{m} + u_{t+m}$

	m=1	m=3	m=6	m=12	m=18	m=24
L^R	-3.472*	-2.724*	-1.650	-1.265	-1.057	-0.657
$t/\sqrt{m}$	-2.291	-1.770	-1.074	-0.822	-0.602	-0.336
S^R	-0.732	-0.628	-0.528	-0.255	-0.127	-0.006
$t/\sqrt{m}$	-1.149	-0.972	-0.812	-0.385	-0.164	-0.007
C^R	-0.931*	-0.865*	-0.633	-0.512	-0.347	-0.235
$t/\sqrt{m}$	-1.977	-1.813	-1.305	-1.022	-0.547	-0.334
Lagged LHS	0.026	-0.015	0.016	0.031	0.014	0.002
$t/\sqrt{m}$	0.399	-0.407	0.591	1.638	0.760	0.081
N. obs.	238	234	228	216	204	192

b) Excess Return $i_t^{m*} - i_t^m + \frac{1200(s_{t+m}-s_t)}{m} = \gamma_{m,0} + \gamma_{m,1}L_t^R + \gamma_{m,2}S_t^R + \gamma_{m,3}C_t^R + i_{t-m}^{m*} - i_{t-m}^m + \frac{1200(s_t-s_{t-m})}{m} + v_{t+m}$

	m=3	m=6	m=12	m=18	m=24
L^R	-2.247	-2.535	-2.045	-2.109	-1.845
$t/\sqrt{m}$	-1.202	-1.631	-1.261	-1.151	-0.929
S^R	-1.609*	-1.145*	-0.868	-0.775	-0.631
$t/\sqrt{m}$	-1.913	-1.669	-1.231	-0.964	-0.712
C^R	-0.467	-0.736	-0.701	-0.637	-0.509
$t/\sqrt{m}$	-0.739	-1.505	-1.354	-0.985	-0.736
Lagged LHS	-0.096	0.126	0.291	0.085	-0.134
$t/\sqrt{m}$	-0.716	0.781	1.323	0.275	-0.314
N. obs.	132	210	216	204	192

Note: The sample is Aug 1985-Jul 2005. Exchange rate *s* is log(USD/CAD). The row $t/\sqrt{m}$ reports the re-scaled t-statistics for the estimates (see text for details). Estimates for the constant term are omitted, and * indicates significance level of 10% or below.

Table OA4: Japanese regressions with the inclusion of Lagged Dependent Variable

a) Exchange Rate $\frac{1200(s_{t+m}-s_t)}{m} = \beta_{m,0} + \beta_{m,1}L_t^R + \beta_{m,2}S_t^R + \beta_{m,3}C_t^R + \beta_{m,4}\frac{1200(s_t-s_{t-m})}{m} + u_{t+m}$

	m=1	m=3	m=6	m=12	m=18	m=24
L^R	-3.636	-2.357	-2.362	-2.770	-2.359	-1.604
$t/\sqrt{m}$	-1.206	-0.751	-0.812	-1.118	-0.998	-0.839
S^R	-3.572*	-3.586*	-3.712*	-2.642*	-2.747*	-2.395*
$t/\sqrt{m}$	-2.298	-2.194	-2.424	-2.053	-2.134	-2.341
C^R	0.299	0.696	0.402	-0.284	-0.098	-0.267
$t/\sqrt{m}$	0.265	0.601	0.376	-0.314	-0.102	-0.342
Lagged LHS	-0.010	-0.004	-0.032	0.000	-0.014	-0.018*
$t/\sqrt{m}$	-0.150	-0.111	-1.311	-0.009	-1.177	-2.233
N. obs.	238	234	228	216	204	192

b) Excess Return $i_t^{m*} - i_t^m + \frac{1200(s_{t+m}-s_t)}{m} = \gamma_{m,0} + \gamma_{m,1}L_t^R + \gamma_{m,2}S_t^R + \gamma_{m,3}C_t^R + i_{t-m}^{m*} - i_{t-m}^m + \frac{1200(s_t-s_{t-m})}{m} + v_{t+m}$

	m=3	m=6	m=12	m=18	m=24
L^R	-6.202	-3.666	-3.779	-3.602	-3.017
$t/\sqrt{m}$	-1.330	-1.240	-1.514	-1.522	-1.555
S^R	-4.824*	-4.957*	-3.372*	-3.417*	-2.924*
$t/\sqrt{m}$	-2.197	-3.150	-2.571	-2.624	-2.827
C^R	0.747	0.289	-0.515	-0.361	-0.554
$t/\sqrt{m}$	0.522	0.269	-0.570	-0.376	-0.702
Lagged LHS	-0.067	-0.164	-0.005	-0.230	-0.373*
$t/\sqrt{m}$	-0.443	-1.143	-0.027	-1.203	-2.187
N. obs.	103	216	216	204	192

Note: The sample is Aug 1985-Jul 2005. Exchange rate *s* is log(USD/JPN). The row $t/\sqrt{m}$ reports the re-scaled t-statistics for the estimates (see text for details). Estimates for the constant term are omitted, and * indicates significance level of 10% or below.

Table OA5: UK regressions with the inclusion of Lagged Dependent Variable

a) Exchange Rate $\frac{1200(s_{t+m}-s_t)}{m} = \beta_{m,0} + \beta_{m,1}L_t^R + \beta_{m,2}S_t^R + \beta_{m,3}C_t^R + \beta_{m,4}\frac{1200(s_t-s_{t-m})}{m} + u_{t+m}$

	m=1	m=3	m=6	m=12	m=18	m=24
L^R	-3.150*	-4.053*	-3.139*	-2.615*	-1.495	-1.173
$t/\sqrt{m}$	-1.641	-2.345	-2.005	-1.727	-0.940	-0.766
S^R	-1.796*	-2.312*	-1.969*	-1.433*	-0.763	-0.466
$t/\sqrt{m}$	-1.797	-2.527	-2.296	-1.720	-0.934	-0.597
C^R	-0.755	-1.131*	-1.007*	-0.820*	-0.429	-0.253
$t/\sqrt{m}$	-1.383	-2.301	-2.230	-1.862	-0.945	-0.584
Lagged LHS	0.002	-0.014	-0.007	-0.001	-0.009	-0.008
$t/\sqrt{m}$	0.029	-0.432	-0.310	-0.090	-0.657	-0.681
N. obs.	214	210	204	192	180	168

b) Excess Return $i_t^{m*} - i_t^m + \frac{1200(s_{t+m}-s_t)}{m} = \gamma_{m,0} + \gamma_{m,1}L_t^R + \gamma_{m,2}S_t^R + \gamma_{m,3}C_t^R + i_{t-m}^{m*} - i_{t-m}^m + \frac{1200(s_t-s_{t-m})}{m} + v_{t+m}$

	m=3	m=6	m=12	m=18	m=24
L^R	-2.929	-3.829*	-3.733*	-2.632*	-2.255
$t/\sqrt{m}$	-0.907	-1.720	-2.340	-1.649	-1.487
S^R	-5.065*	-2.890*	-2.254*	-1.382*	-1.009
$t/\sqrt{m}$	-2.095	-1.803	-2.355	-1.680	-1.295
C^R	0.803	-0.781	-1.068*	-0.727	-0.545
$t/\sqrt{m}$	0.544	-1.005	-2.192	-1.592	-1.258
Lagged LHS	-0.257	-0.087	0.002	-0.177	-0.256
$t/\sqrt{m}$	-1.297	-0.481	0.011	-0.715	-0.858
N. obs.	57	122	175	180	168

Note: The sample is Aug 1985-Jul 2005. Exchange rate *s* is log(USD/GBP). The row $t/\sqrt{m}$ reports the re-scaled t-statistics for the estimates (see text for details). Estimates for the constant term are omitted, and * indicates significance level of 10% or below.

Table OA6: Correlation between SPF Forecasts and the US Factors

Real GDP Growth: $E_t \Delta y_{t+m} = \beta_{0m} + \beta_{1m} L_t + \beta_{2m} S_t + \beta_{3m} C_t + u_{mt}$

Horizon m	$\boldsymbol{\beta_{1m}}$	$\boldsymbol{\beta_{2m}}$	$\boldsymbol{\beta_{3m}}$	**Adj. R-Sq.**
3	-0.244* (0.071)	-0.061 (0.076)	0.063 (0.055)	0.102
6	-0.187* (0.049)	-0.070 (0.053)	-0.035 (0.038)	0.214
9	-0.136* (0.034)	-0.066* (0.037)	-0.046 (0.026)	0.306
12	-0.165* (0.034)	-0.145* (0.036)	-0.091* (0.026)	0.563

CPI Inflation: $E_t \pi_{t+m} = \beta_{0m} + \beta_{1m} L_t + \beta_{2m} S_t + \beta_{3m} C_t + u_{kt}$

Horizon m	$\boldsymbol{\beta_{1m}}$	$\boldsymbol{\beta_{2m}}$	$\boldsymbol{\beta_{3m}}$	**Adj. R-Sq.**
3	0.458* (0.041)	0.154* (0.044)	0.050 (0.032)	0.698
6	0.449* (0.035)	0.118* (0.038)	0.072* (0.028)	0.756
9	0.448* (0.034)	0.094* (0.037)	0.080* (0.027)	0.768
12	0.461* (0.034)	0.086* (0.036)	0.081* (0.026)	0.779

Anxiety Index: $A_{t+m} = \beta_{0m} + \beta_{1m} L_t + \beta_{2m} S_t + \beta_{3m} C_t + u_{mt}$

Horizon m	$\boldsymbol{\beta_{1m}}$	$\boldsymbol{\beta_{2m}}$	$\boldsymbol{\beta_{3m}}$	**Adj. R-Sq.**
3	3.399* (0.914)	1.676 (0.981)	-2.150* (0.711)	0.148
6	2.585* (0.541)	2.235* (0.581)	-1.117* (0.421)	0.246
9	2.004* (0.312)	2.212* (0.335)	-0.175 (0.243)	0.530
12	1.731* (0.304)	1.754* (0.326)	0.555* (0.236)	0.585

Note: The quarterly sample is drawn from the last month of each quarter from the sample Aug 1985-Jul 2005. See the website http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters for details about the survey data.

Table OA7: Predicting the Canadian-US Exchange Rate and Excess Returns

Most Recent Data and Sub-Sample Results

(Jan 1991 – Dec 2004)

(a) Exchange Rate $\frac{1200(s_{t+m}-s_t)}{m} = \beta_{m,0} + \beta_{m,1}L_t^R + \beta_{m,2}S_t^R + \beta_{m,3}C_t^R + u_{t+m}$

	m=1	m=3	m=6	m=12	m=18	m=24
L^R	-2.436	-2.008	-0.790	-0.558	0.028	0.373
$t/\sqrt{m}$	-1.202	-0.802	-0.317	-0.224	0.011	0.133
S^R	-0.366	-0.239	-0.217	0.231	0.344	0.428
$t/\sqrt{m}$	-0.338	-0.213	-0.194	-0.208	0.287	0.342
C^R	-2.425*	-1.812	-1.094	-1.510	-1.563	-1.603
$t/\sqrt{m}$	-2.112	-1.527	-0.925	-1.279	-1.230	-1.209
N. obs.	168	168	168	168	168	168

(Jan 2005 – May 2011)

(b) Exchange Rate $\frac{1200(s_{t+m}-s_t)}{m} = \beta_{m,0} + \beta_{m,1}L_t^R + \beta_{m,2}S_t^R + \beta_{m,3}C_t^R + u_{t+m}$

	m=1	m=3	m=6	m=12
L^R	-13.341	-4.174	-9.278	9.369
$t/\sqrt{m}$	-0.726	-0.254	-0.551	0.459
S^R	10.954	15587*	14.071*	7.942
$t/\sqrt{m}$	1.231	1.959	1.716	0.956
C^R	-3.068	-4.403	-4.360	0.672
$t/\sqrt{m}$	-0.841	-1.349	-1.295	0.166
N. obs.	74	74	71	65

(Jan 1991 – Dec 2004)

(c) Excess Return $i_t^{m*} - i_t^m + \frac{1200(s_{t+m} - s_t)}{m} = \gamma_{m,0} + \gamma_{m,1} L_t^R + \gamma_{m,2} S_t^R + \gamma_{m,3} C_t^R + v_{t+m}$

	m=3	m=6	m=12	m=24
L^R	-2.999	-1.774	-1.591	-0.650
$t/\sqrt{m}$	-1.196	-0.712	-0.719	-0.233
S^R	-1.159	-1.043	-0.483	-0.099
$t/\sqrt{m}$	-1.034	-0.936	-1.504	-0.079
C^R	-1.885	-1.232	-1.763	-1.900
$t/\sqrt{m}$	-1.587	-1.043	-1.494	-1.438
N. obs.	168	168	168	168

(Jan 2005 – May 2011)

(d) Excess Return $i_t^{m*} - i_t^m + \frac{1200(s_{t+m} - s_t)}{m} = \gamma_{m,0} + \gamma_{m,1} L_t^R + \gamma_{m,2} S_t^R + \gamma_{m,3} C_t^R + v_{t+m}$

	m=3	m=6	m=12
L^R	-5.165	-10.290	8.388
$t/\sqrt{m}$	-0.314	-0.612	0.412
S^R	14.638*	13.253	7.280
$t/\sqrt{m}$	1.839	1.618	0.879
C^R	-4.482	-4.504	0.446
$t/\sqrt{m}$	-1.372	-1.339	0.111
N. obs.	74	71	65

Note: Exchange rate *s* is log(USD/CAD). The row $t/\sqrt{m}$ reports the re-scaled t-statistics for the estimates (see text for details). Estimates for the constant term are omitted, and * indicates significance level of 10% or below. Yields data (of 3-month, 6-month, and 1 to 10-year maturities) for the three countries are respectively from the Federal Reserve Board, Bank of England, and Bank of Canada. Exchange rates are from the FRED database at the St Louis Fed. Exchange rate data for Canada are available till May 2011, while yields data are available only till Feb 2011.

Table OA8: Predicting the UK-US Exchange Rate and Excess Returns

Most Recent Data and Sub-Sample Results

(Oct 1992 – Dec 2004)

(a) Exchange Rate $\frac{1200(s_{t+m}-s_t)}{m} = \beta_{m,0} + \beta_{m,1}L_t^R + \beta_{m,2}S_t^R + \beta_{m,3}C_t^R + u_{t+m}$

	m=1	m=3	m=6	m=12	m=18	m=24
L^R	-2.545	-2.983	-3.272	-3.576*	-3.042	-2.017
$t/\sqrt{m}$	-0.825	-1.143	-1.382	-1.853	-1.312	-0.836
S^R	-0.720	-1.462	-2.013	-1.559	-0.993	-0.448
$t/\sqrt{m}$	-0.357	-0.857	-1.300	-1.046	-0.655	-0.284
C^R	-1.782	-1.139	-0.926	-1.235	-1.316	-1.227
$t/\sqrt{m}$	-1.361	-1.028	-0.921	-1.277	-1.337	-1.200
N. obs.	147	147	147	147	147	147

(Jan 2005 – May 2011)

(b) Exchange Rate $\frac{1200(s_{t+m}-s_t)}{m} = \beta_{m,0} + \beta_{m,1}L_t^R + \beta_{m,2}S_t^R + \beta_{m,3}C_t^R + u_{t+m}$

	m=1	m=3	m=6	m=12
L^R	8.075	1.396	2.666	5.962
$t/\sqrt{m}$	0.608	0.106	0.225	0.502
S^R	10.525*	12.894*	12.647*	7.818*
$t/\sqrt{m}$	3.429	3.789	4.107	2.715
C^R	3.058	1.699	1.958	2.989
$t/\sqrt{m}$	1.010	0.566	0.720	1.253
N. obs.	76	74	71	65

(Oct 1992 – Dec 2004)

(c) Excess Return $i_t^{m*} - i_t^m + \frac{1200(s_{t+m} - s_t)}{m} = \gamma_{m,0} + \gamma_{m,1} L_t^R + \gamma_{m,2} S_t^R + \gamma_{m,3} C_t^R + v_{t+m}$

	m=3	**m=6**	**m=12**	**m=24**
$\mathbf{L^R}$	-3.948	-4.258*	-4.626*	-3.031
$t/\sqrt{m}$	-1.514	-1.792	-2.020	-1.255
$\mathbf{S^R}$	-2.361	-2.988*	-2.311	-0.985
$t/\sqrt{m}$	-1.384	-1.900	-1.543	-0.624
$\mathbf{C^R}$	-1.218	-1.109	-1.478	-1.514
$t/\sqrt{m}$	-1.100	-1.100	-1.521	-1.477
N. obs.	147	147	147	147

(Jan 2005 – May 2011)

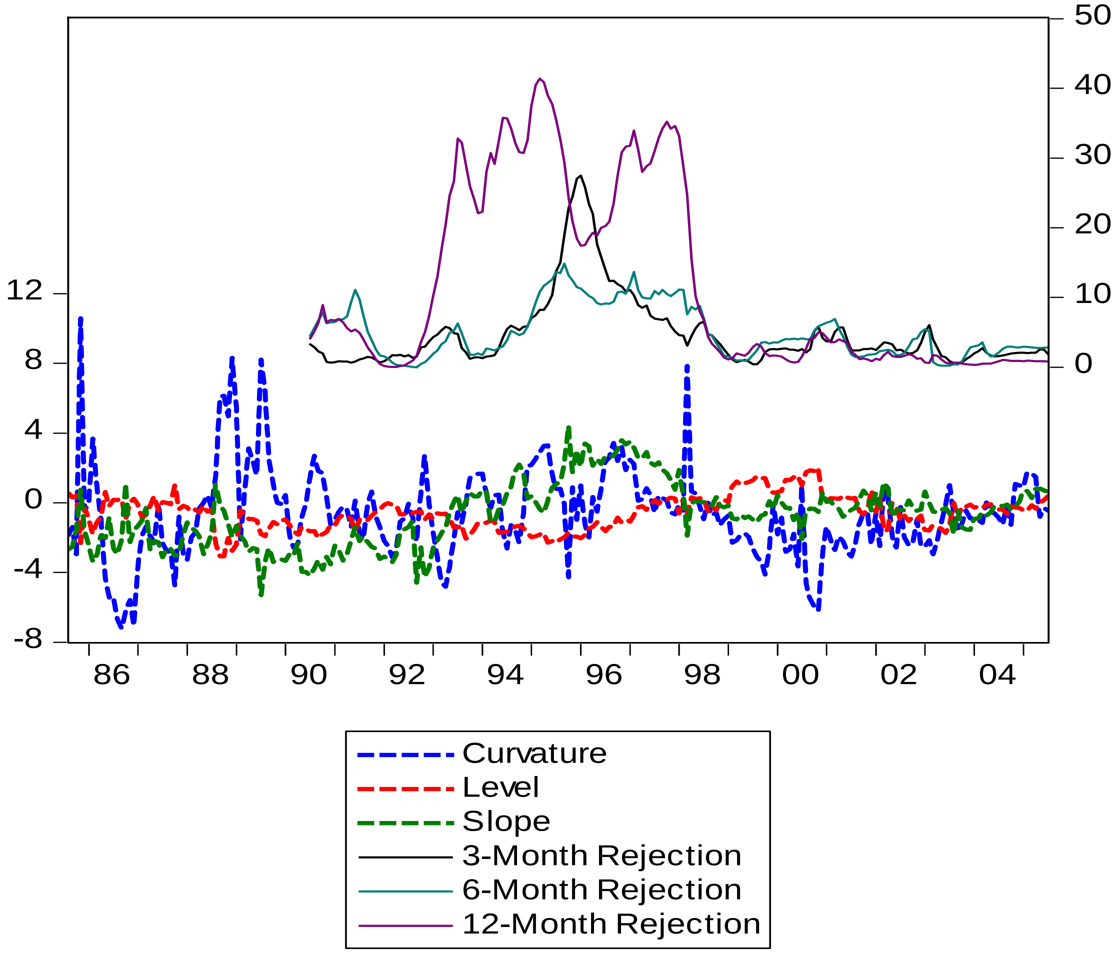
(d) Excess Return $i_t^{m*} - i_t^m + \frac{1200(s_{t+m} - s_t)}{m} = \gamma_{m,0} + \gamma_{m,1} L_t^R + \gamma_{m,2} S_t^R + \gamma_{m,3} C_t^R + v_{t+m}$

	m=3	**m=6**	**m=12**
$\mathbf{L^R}$	0.399	1.677	4.977
$t/\sqrt{m}$	0.030	0.141	0.421
$\mathbf{S^R}$	11.973*	11.807*	7.110*
$t/\sqrt{m}$	3.523	3.834	2.483
$\mathbf{C^R}$	1.610	1.812	2.783
$t/\sqrt{m}$	0.380	0.667	1.173
N. obs.	74	71	65

Note: Exchange rate s is log(USD/GBP). The row $t/\sqrt{m}$ reports the re-scaled t-statistics for the estimates (see text for details). Estimates for the constant term are omitted, and * indicates significance level of 10% or below. Yields data (of 3-month, 6-month, and 1 to 10-year maturities) for the three countries are respectively from the Federal Reserve Board, Bank of England, and Bank of Canada. Exchange rates are from the FRED database at the St Louis Fed.

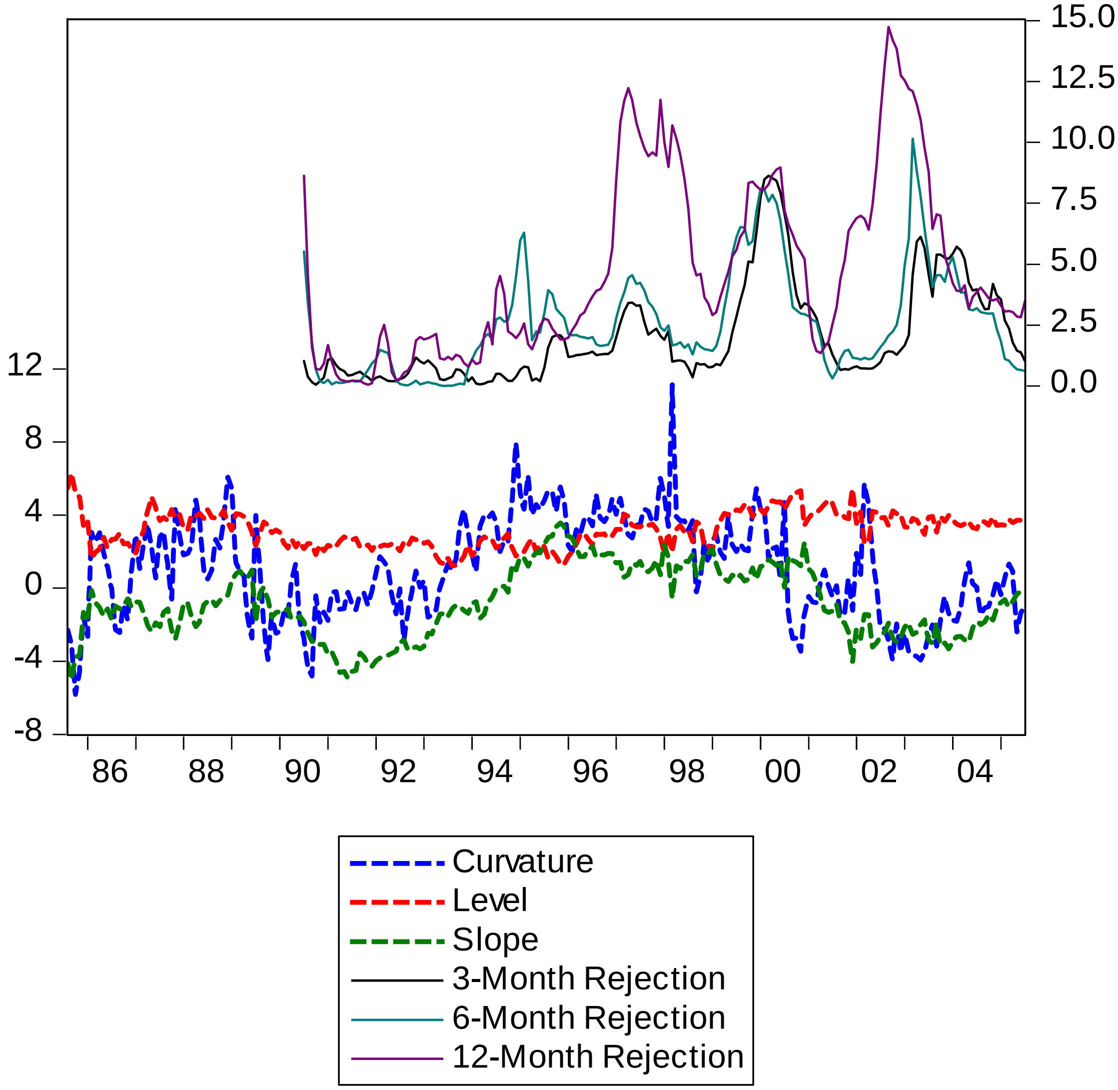
Figure OA1: Juxtaposing Rejections of the Interest Differential Model and the Factors

A) Canada



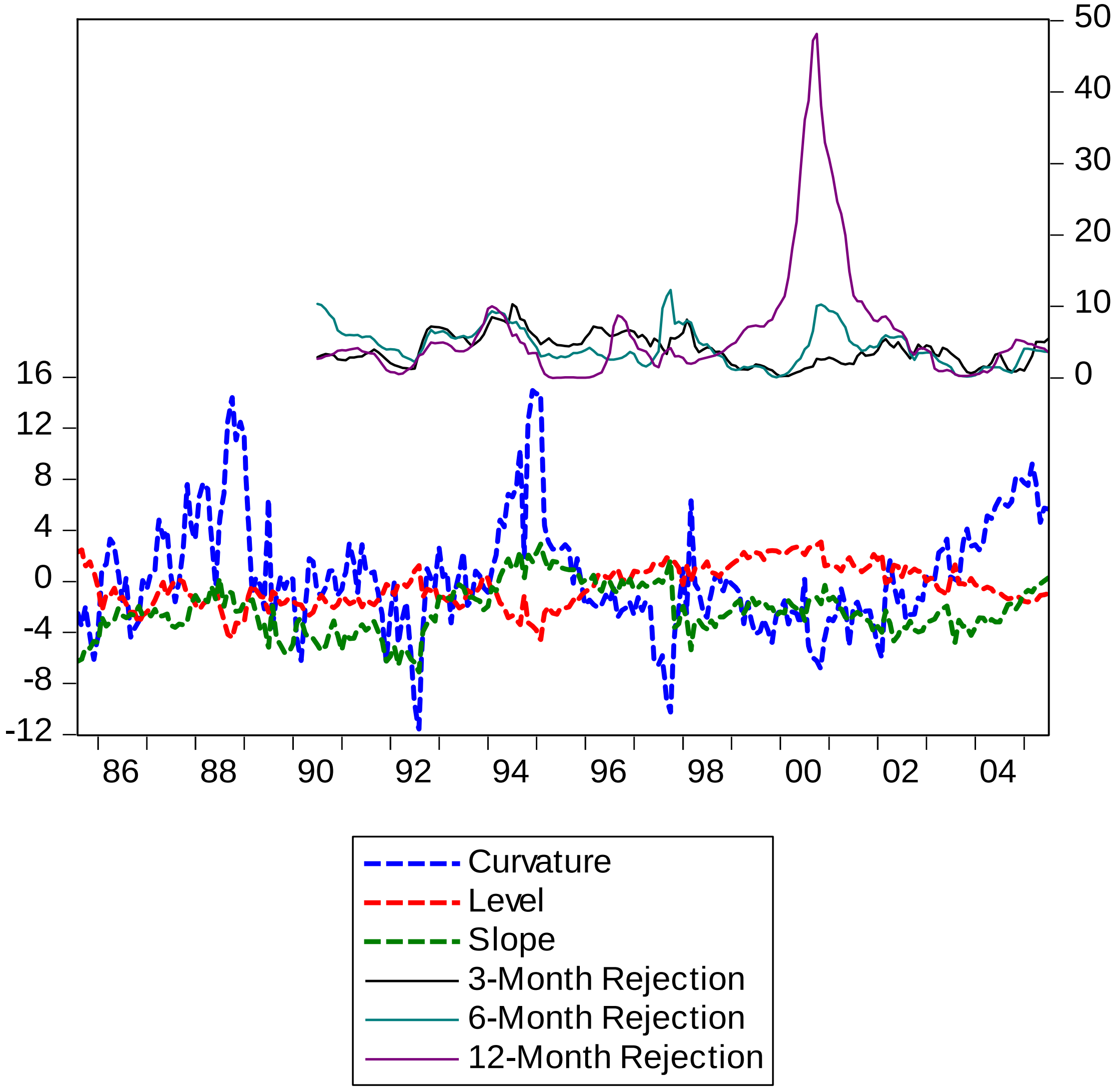
Note: The sample period is Aug 1985 – Jul 2005. We are simply plotting the factors against the F-statistic of the rejection of the interest differential model.

B) Japan



Note: The sample period is Aug 1985 – Jul 2005. We are simply plotting the factors against the F-statistic of the rejection of the interest differential model.

C) UK

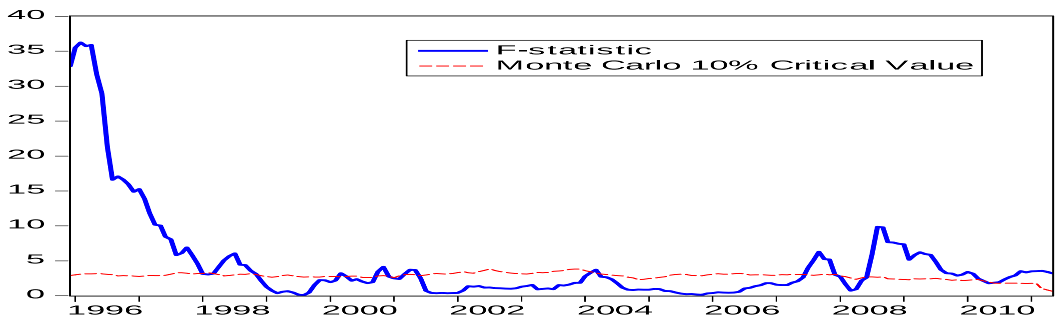


Note: The sample period is Aug 1985 – Jul 2005. We are simply plotting the factors against the F-statistic of the rejection of the interest differential model.

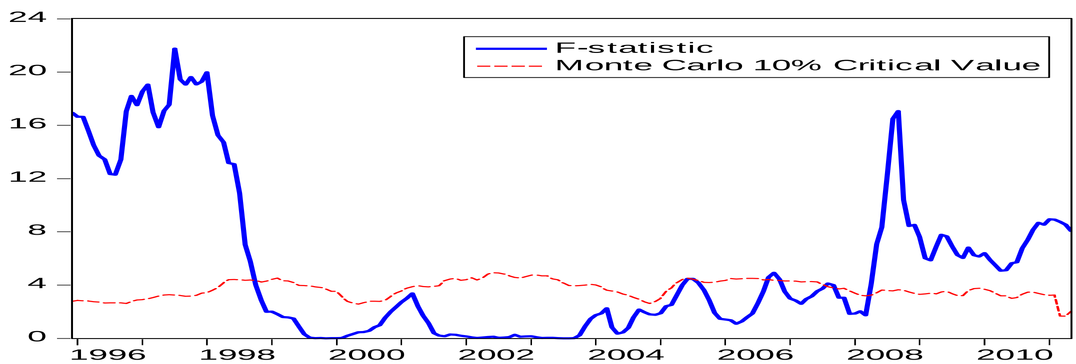
Figure OA2(a): Rolling Test of the Interest Differential Restrictions (Canada)

(Jan 1991– May 2011)

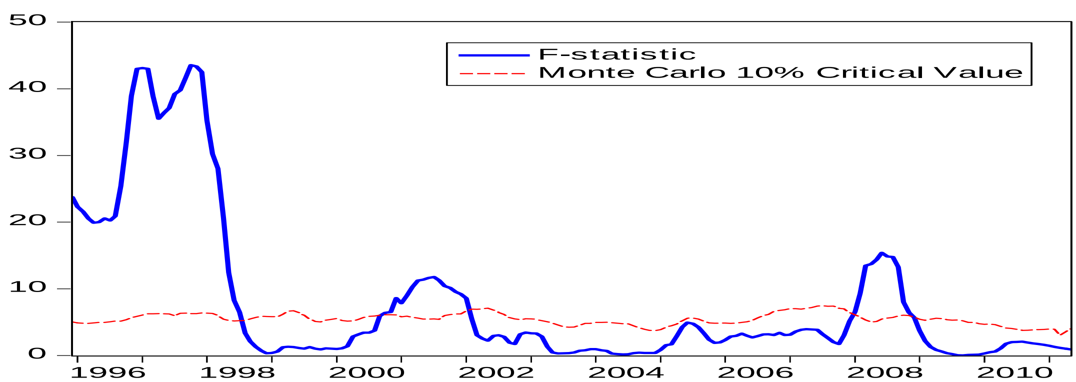
3-Month Horizon



6-Month Horizon



12-Month Horizon

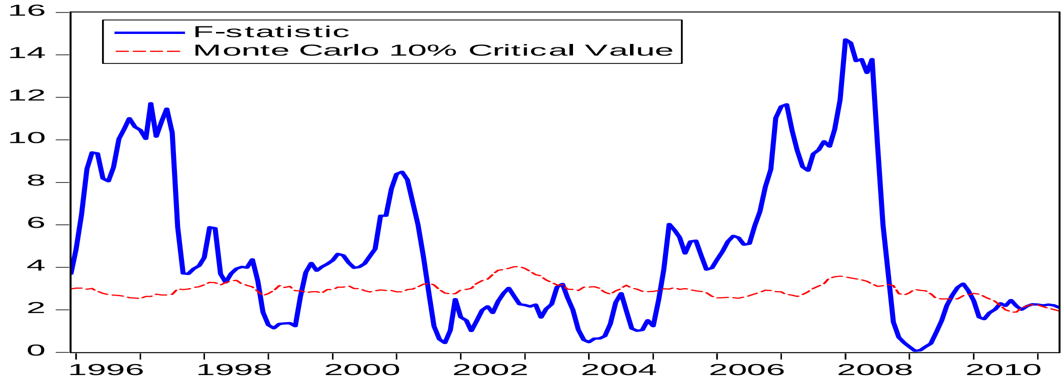


Note: The solid line plots the F-statistic for the null hypothesis that the restriction imposed by the UIP on the N-S factors is correct. The red dotted line is the Monte Carlo 10% critical value, accounting for small sample bias and persistence of the data. Exchange rate data for Canada are available till May 2011, while yields data are available only till Feb 2011. For more details see the Appendix.

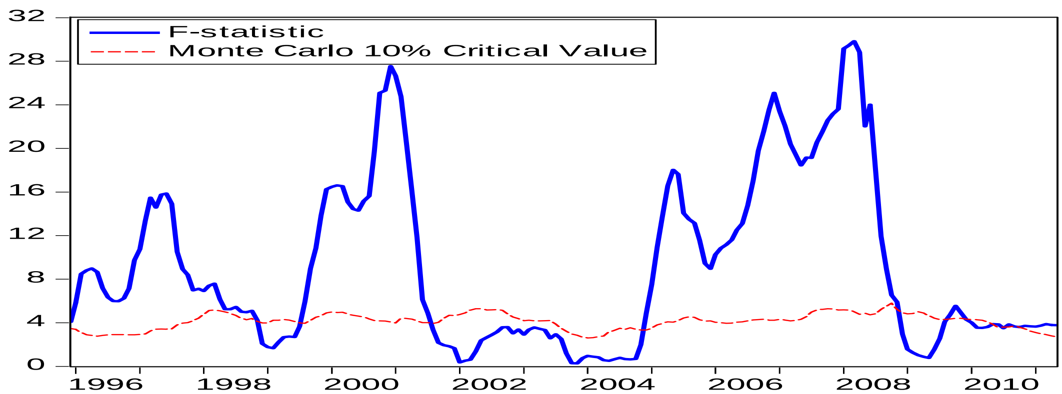
Figure OA2(b): Rolling Test of the Interest Differential Restrictions (United Kingdom)

(Jan 1991 – May 2011)

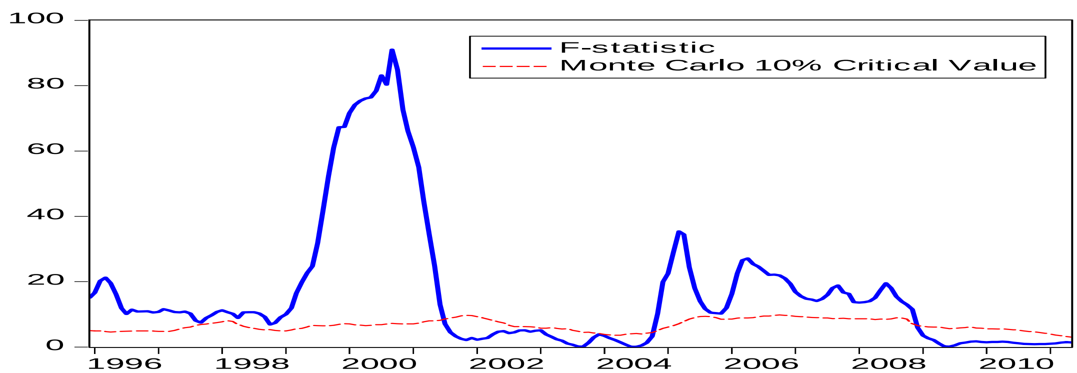
3-Month Horizon



6-Month Horizon



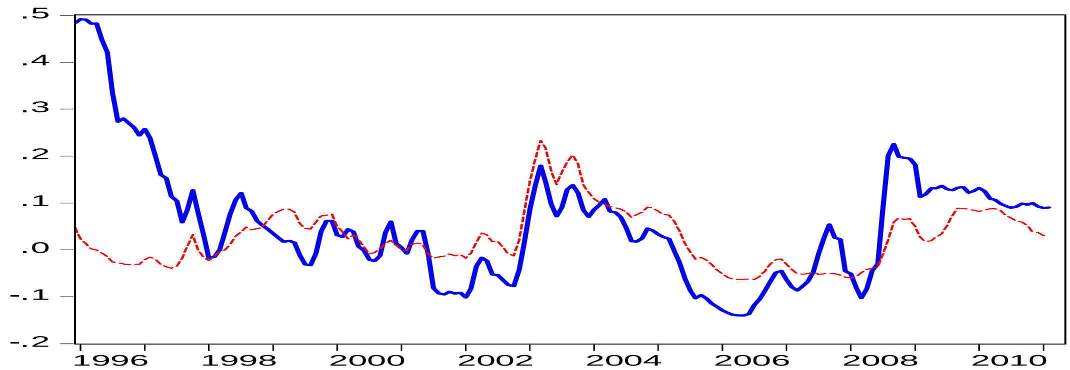
12-Month Horizon



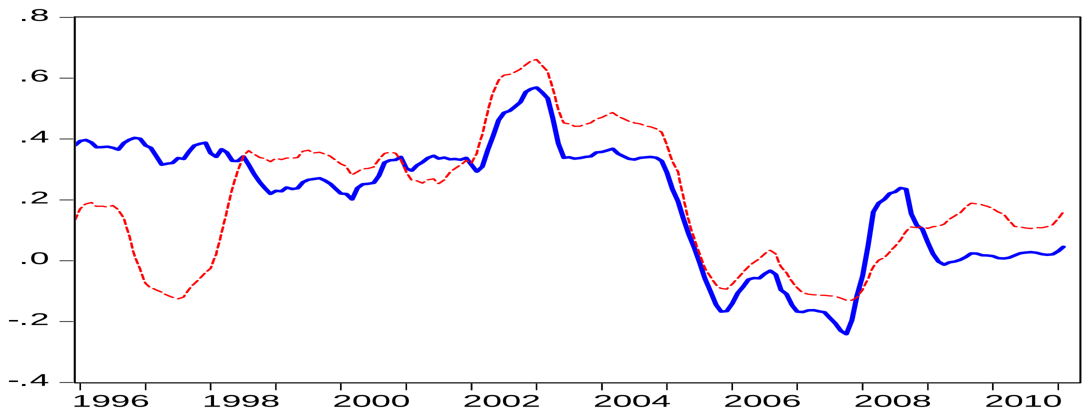
Note: The solid line plots the F-statistic for the null hypothesis that the restriction imposed by the UIP on the N-S factors is correct. The red dotted line is the Monte Carlo 10% critical value, accounting for small sample bias and persistence of the data. For more details see the Appendix.

Figure OA3(a): Recursive Adjusted R-squares with a 5-Year Rolling Window (Canada)

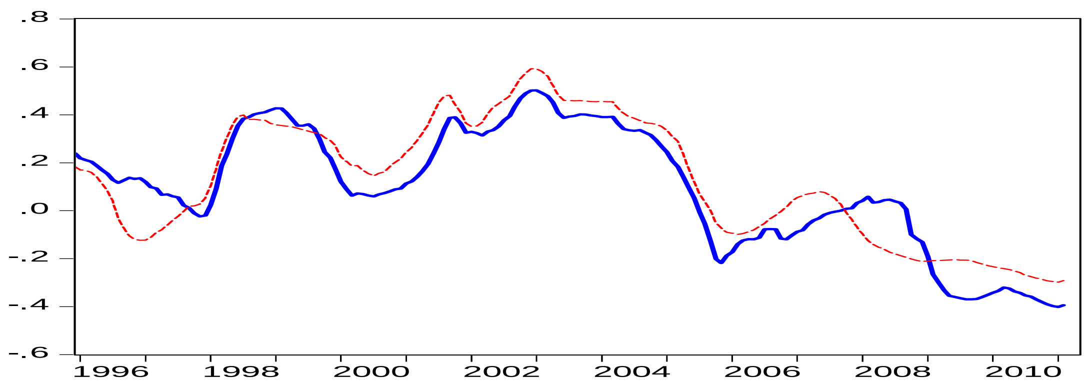
3-Month Horizon



12-Month Horizon



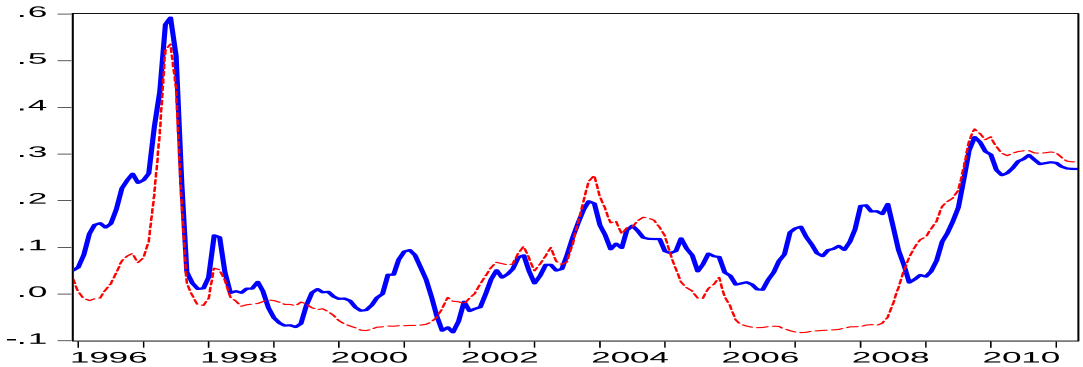
24-Month Horizon



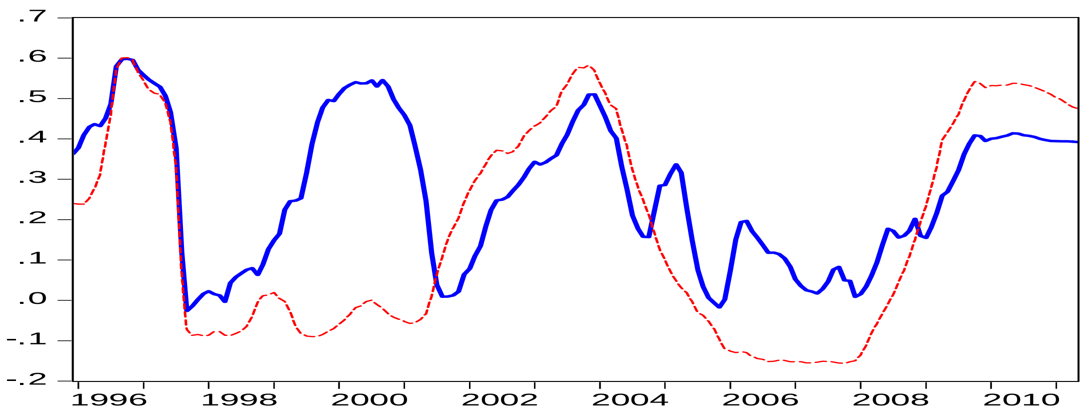
Note: The sample period is Jan 1991 – May 2011. See the paper for the calculation of the R-square and the correction of bias. Exchange rate data for Canada are available till May 2011, while yields data are available only till Feb 2011. Blue solid line (factor model); red dotted line (interest differential model).

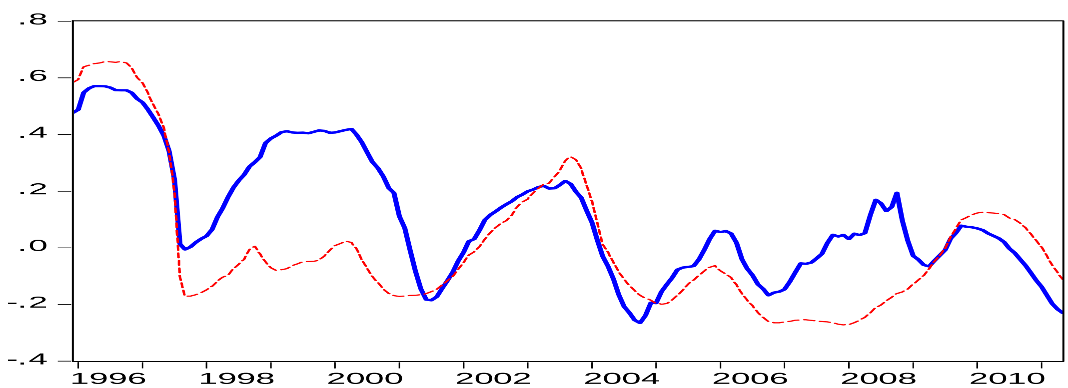
Figure OA3(b): Recursive Adjusted R-squares with a 5-Year Rolling Window (United Kingdom)

3-Month Horizon



12-Month Horizon

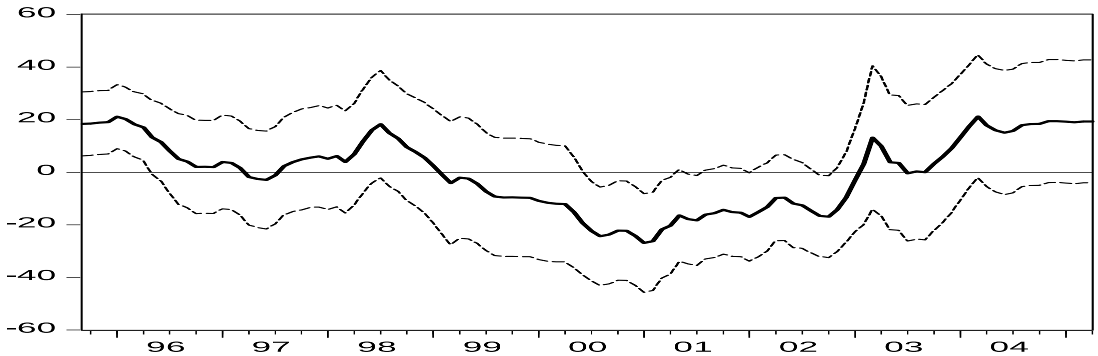




Note: The sample period is Jan 1991 – May 2011. See the paper for the calculation of the R-square and the correction of bias. Blue solid line (factor model); Red dotted line (interest differential model)

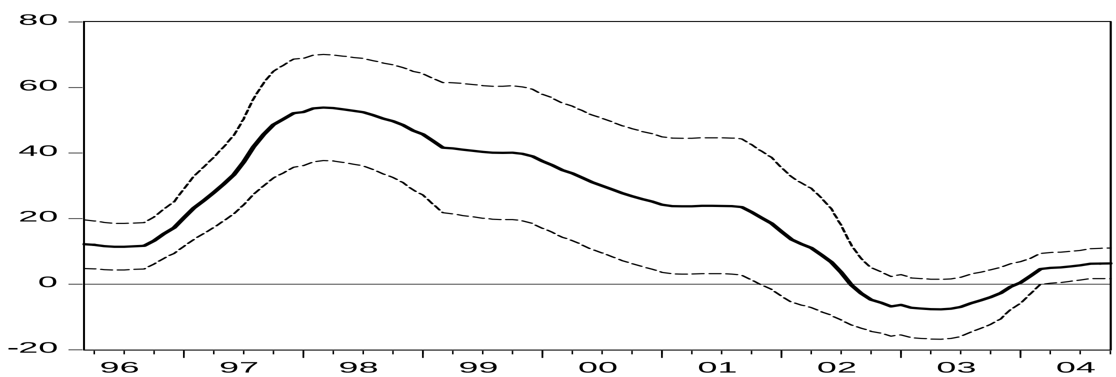
Figure OA4(a): Rolling Clark-West Estimate with 90% Confidence Interval for Comparing Model with Factors to Model with Interest Differential (Canada)

1-month



3-month

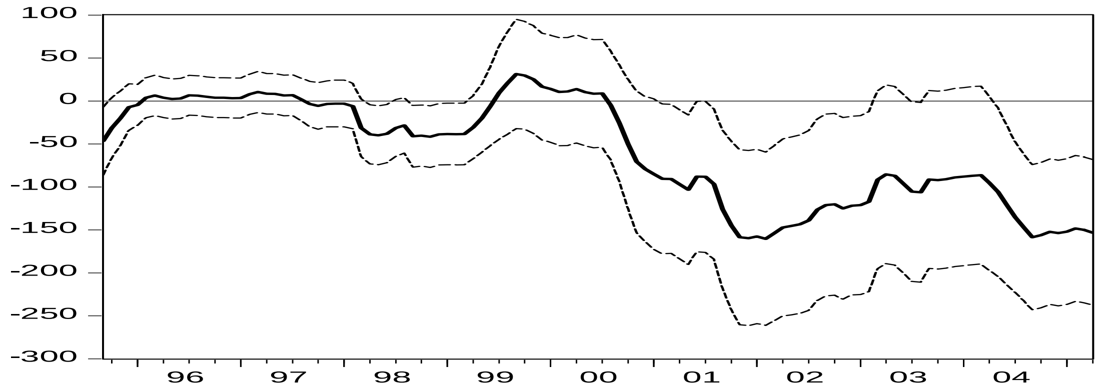
12-month



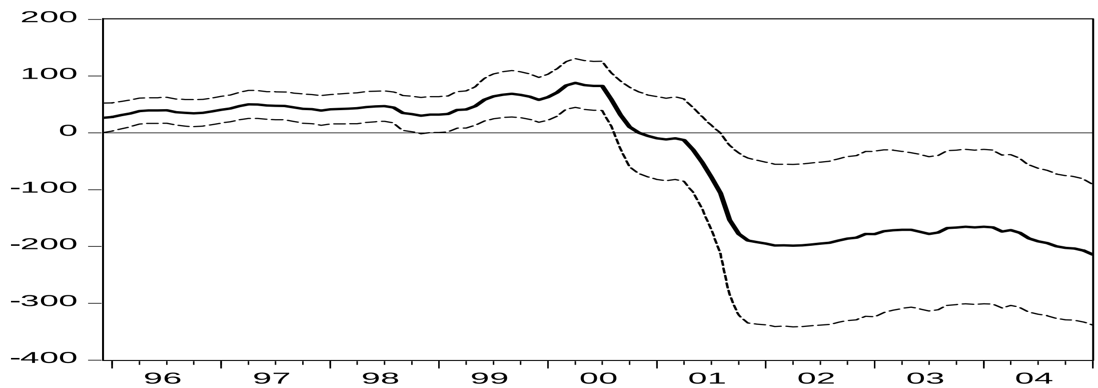
Note: The sample period is Aug 1985-Jul 2005. We are simply doing the Clark-West recursively using a 5-year window, based on recursive regressions with factors or interest differential using, again, a 5-year window. A test statistic (solid line) significantly above zero means the model with factors is preferred to the model interest differential, and vice versa.

Figure OA4(b): Rolling Clark-West Estimate with 90% Confidence Interval for Comparing Model with Factors to Model with Interest Differential (Japan)

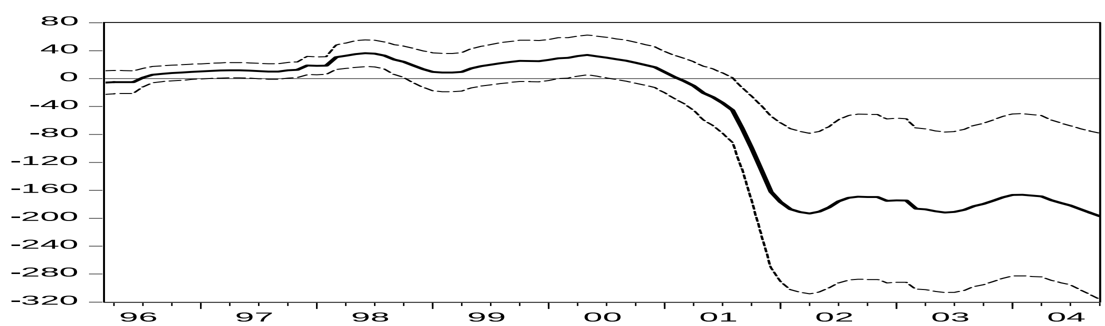
1-month



3-month



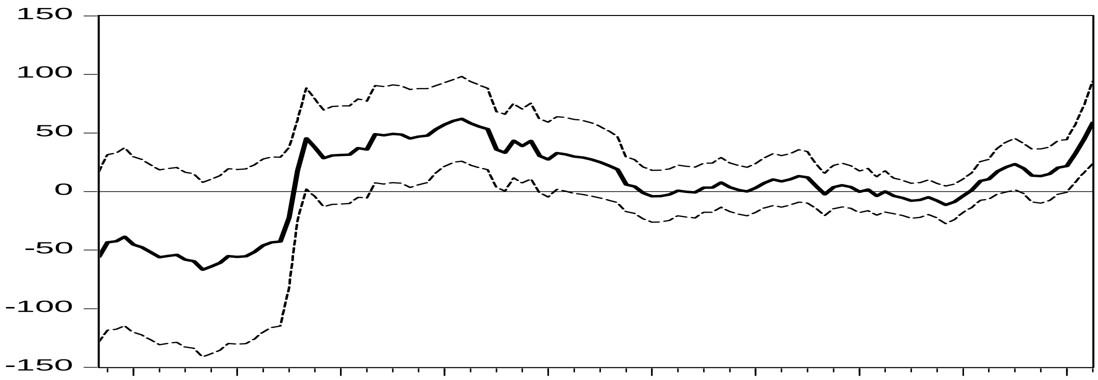
12-month



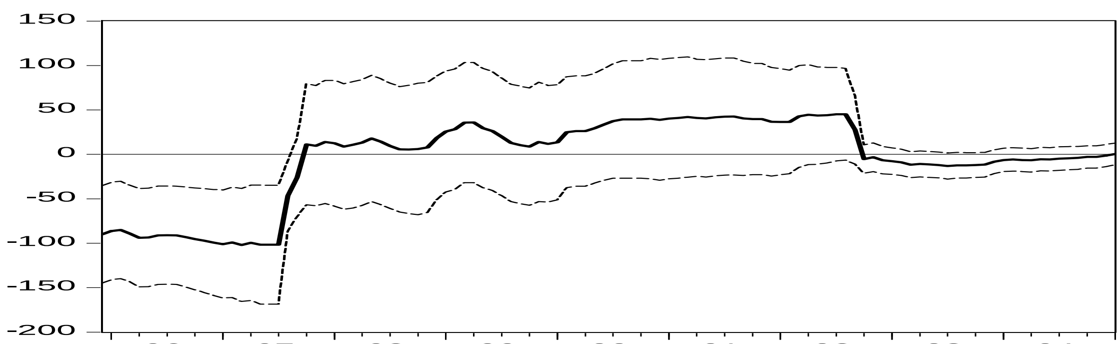
Note: The sample period is Aug 1985-Jul 2005. We are simply doing the Clark-West recursively using a 5-year window, based on recursive regressions with factors or interest differential using, again, a 5-year window. A test statistic (solid line) significantly above zero means the model with factors is preferred to the model interest differential, and vice versa.

Figure OA4(c): Rolling Clark-West Estimate with 90% Confidence Interval for Comparing Model with Factors to Model with Interest Differential (United Kingdom)

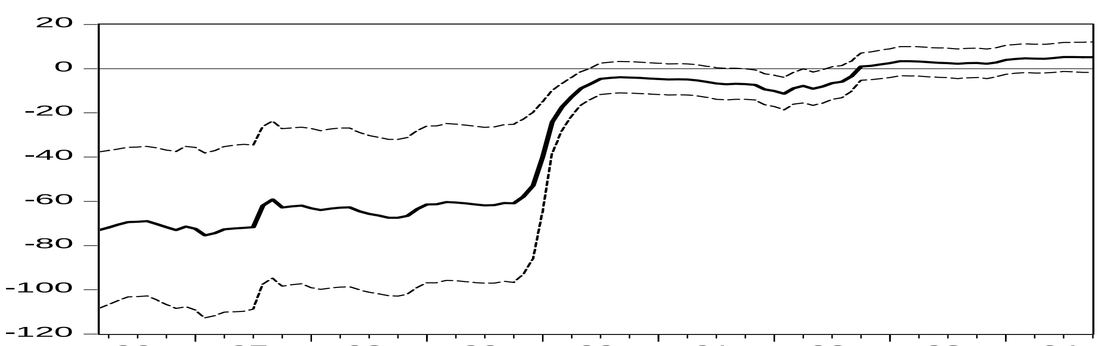
1-month



3-month



12-month



Note: The sample period is Aug 1985-Jul 2005. We are simply doing the Clark-West recursively using a 5-year window, based on recursive regressions with factors or interest differential using, again, a 5-year window. A test statistic (solid line) significantly above zero means the model with factors is preferred to the model interest differential, and vice versa.