ANNEX

Forecasting exchange rates of major currencies with long maturity forward rates

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Data sources

US dollar exchange rates:

https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H10

Long maturity interest rates

United States: https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H15

Germany: https://www.bundesbank.de/en/statistics/money-and-capital-markets/interest-rates-and-yields

Japan: http://www.mof.go.jp/english/jgbs/reference/interest_rate/index.htm

United Kingdom: https://www.bankofengland.co.uk/statistics/yield-curves

Switzerland: https://data.snb.ch/en/topics/ziredev#!/cube/rendoblid (available from 1988; 1983-1987 values are taken from DataStream for the 3-year and 5-year rates, and from the IMF International Financial Statistics for the 10-year rate; these earlier values were linked to more recent Swiss National Bank (SNB) data by adjusted the earlier data with the average difference to the SNB data in the first overlapping year)

Canada: https://www.bankofcanada.ca/rates/interest-rates/bond-yield-curves/ (available from 1986; earlier values for government bond yields are also from the Bank of Canada; the earlier values were linked to more recent zero coupon yields by adjusted the earlier data with the average difference in the first overlapping year)

Australia: http://www.rba.gov.au/statistics/tables/xls/f17hist.xls (available from July 1992; earlier values for 10-year and 5-year government bond yields are also from the Reserve Bank of Australia, while the 3-year yield is from the IMF International Financial Statistics; the earlier values were linked to more recent zero coupon yields by adjusted the earlier data with the average difference in the first overlapping year)

New Zealand: https://www.rbnz.govt.nz/statistics/b2

Norway: https://www.norges-bank.no/en/topics/Statistics/Interest-rates/

Sweden: http://www.riksbank.se/en/Interest-and-exchange-rates/search-interest-rates-exchange-rates/

Unit root tests

We use eight unit root tests to test the null hypothesis of unit root in spot and forward exchange rates. We use the standard tests for unit root of Dickey and Fuller (1979) and Phillips and Perron (1988) and six other unit root tests. Elliott *et al.* (1996) proposed a family of test statistics that are invariant to the trend parameters and suggested two particular tests: a modified version of the Dickey-Fuller t-test, which is based on a local GLS detrending, and another feasible point optimal test, both having substantially improved power when an unknown mean or trend is present. Ng and Perron (2001) exploited the findings of Elliott *et al.* (1996) and applied the idea of GLS detrending to modify existing tests and showed non-negligible size and power gains can be made when used in conjunction with an autoregressive spectral density estimator at frequency zero. They suggested modifications of three test statistics studied by Perron and Ng (1996) and the feasible point optimal test statistics of Elliott *et al.* (1996).

Table A1 shows the results. Our general finding is that test statistics decline with an increase in maturity of the forward rate, suggesting lower persistence for longer maturity forward rates. There are three currency pairs for which all tests suggest the 10-year maturity forward rate is stationary while the spot exchange rate is non-stationary: the three bilateral combinations of the US dollar, German mark and British pound sterling, which together account for almost 40 percent of global foreign exchange market turnover. For the Canadian dollar/US dollar, the Swiss Franc/US dollar and the Swiss Franc/German mark rates, all but two tests conclude stationarity of the long maturity forward rate. Few tests lead to this conclusion for the Australian dollar/US dollar rate and the Swedish krona/US dollar rate. For the US dollar Japanese yen, New Zealand dollar and Norwegian krona, as well as the German mark against the Japanese yen, all tests suggest the long-maturity forward rate has a unit root.

Table A1: Unit root tests for the logarithm of spot and theoretical forward exchange rates

	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
				DEM/USD, 1979-2020			
ADF	-1.78	-1.79	-1.79	-1.82	-1.99	-2.22	-2.87*
PP	-1.93	-1.95	-1.96	-2.01	-2.15	-2.30	-2.82*
DFGLS	-1.69*	-1.71*	-1.73*	-1.81*	-1.99**	-2.22**	-2.87***
ERS	4.33*	4.26*	4.13*	3.75*	3.13**	2.52**	1.55***
NP MZa	-5.71*	-5.80*	-5.97*	-6.52*	-7.81*	-9.68**	-16.06***
NP MZt	-1.69*	-1.70*	-1.72*	-1.8*	-1.98*	-2.20**	-2.83***
NP MSB	0.30	0.29	0.29	0.28	0.25*	0.23**	0.18**
NP MPT	4.30*	4.24*	4.11*	3.76*	3.14**	2.53**	1.55***

	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
				GBP/USD, 1979-2020			
ADF	-1.78	-1.79	-1.79	-1.82	-1.99	-2.22	-2.87*
PP	-1.93	-1.95	-1.96	-2.01	-2.15	-2.30	-2.82*
DFGLS	-1.69*	-1.71*	-1.73*	-1.81*	-1.99**	-2.22**	-2.87***
ERS	4.33*	4.26*	4.13*	3.75*	3.13**	2.52**	1.55***
NP MZa	-5.71*	-5.80*	-5.97*	-6.52*	-7.81*	-9.68**	-16.06***
NP MZt	-1.69*	-1.7*	-1.72*	-1.80*	-1.98*	-2.2**	-2.83***
NP MSB	0.30	0.29	0.29	0.28	0.25*	0.23**	0.18**
NP MPT	4.30*	4.24*	4.11*	3.76*	3.14**	2.53**	1.55***

	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
			JPY/USD, 1979-2020 for all but F12M, for which 1980-2020				
ADF	-1.56	-1.55	-1.54	-1.97	-1.62	-1.78	-2.14
PP	-1.57	-1.57	-1.54	-1.98	-1.71	-1.85	-2.17
DFGLS	-0.24	-0.24	-0.26	-0.08	-0.36	-0.44	-0.77
ERS	32.83	32.42	31.72	45.79	28.48	26.41	15.83
NP MZa	-0.32	-0.34	-0.36	-0.09	-0.53	-0.66	-1.48
NP MZt	-0.23	-0.24	-0.26	-0.08	-0.36	-0.43	-0.77
NP MSB	0.72	0.72	0.71	0.85	0.68	0.66	0.52
NP MPT	30.37	30.00	29.37	41.57	26.36	24.34	14.55

	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
		CHF/USD, 1979-2020 for Spot, F1M, F3M &F10Y, 1983-2020 for F3Y & F5Y, 1988-2020 for F12M					
ADF	-1.20	-1.20	-1.19	-1.28	-1.51	-1.50	-1.97
PP	-1.20	-1.20	-1.19	-1.2	-1.52	-1.49	-1.91
DFGLS	-0.50	-0.51	-0.55	-1.02	-0.15	-0.37	-1.98**
ERS	15.04	14.71	14.03	8.43	24.83	18.11	3.22**
NP MZa	-1.07	-1.11	-1.22	-2.83	-0.26	-0.73	-8.18**
NP MZt	-0.49	-0.51	-0.55	-1.01	-0.15	-0.37	-1.96*
NP MSB	0.46	0.46	0.45	0.36	0.59	0.50	0.24*
NP MPT	14.31	14.01	13.40	8.20	22.8	16.76	3.23*

CAD/USD, 1979-2020 for all but F12M, for which 1986-2020						
	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
ADF	-1.87	-1.88	-1.89	-1.87	-2.10	-2.23	-2.03
PP	-1.82	-1.83	-1.82	-1.8	-2.10	-2.03	-2.15
DFGLS	-1.72*	-1.72*	-1.73*	-1.23	-1.92*	-2.18**	-2.03**
ERS	4.18*	4.17*	4.11*	8.53	3.45*	2.67**	2.99**
NP MZa	-6.18*	-6.2*	-6.28*	-3.05	-7.63*	-9.59**	-8.21**
NP MZt	-1.71*	-1.71*	-1.73*	-1.23	-1.91*	-2.16**	-2.02**
NP MSB	0.28	0.28	0.27*	0.4	0.25*	0.23**	0.25*
NP MPT	4.13*	4.11*	4.06*	8.01	3.39*	2.67**	3.00**

AUD/USD, 1979-2020 for all but F1M & F12M, for which 1986-2020						
	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
ADF	-2.23	-2.03	-2.27	-2.27	-2.52	-2.62*	-2.76*
PP	-2.23	-2.17	-2.27	-2.37	-2.56	-2.65*	-2.77*
DFGLS	-0.43	-1.38	-0.42	-1.13	-0.49	-0.61	-0.86
ERS	19.79	6.89	20.59	10.27	21.06	18.72	13.78
NP MZa	-0.8	-3.79	-0.76	-2.6	-0.86	-1.11	-1.79
NP MZt	-0.43	-1.38	-0.42	-1.12	-0.49	-0.6	-0.86
NP MSB	0.54	0.36	0.55	0.43	0.57	0.54	0.48
NP MPT	18.03	6.46	18.73	9.36	19.06	16.93	12.48

NZD/USD, 1979-2020 for Spot, 1985-2020 for F1M, F3M, F3Y, F5Y, 1987-2020 for F12M						
	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
ADF	-2.71*	-2.37	-2.38	-2.02	-2.55	-2.61*	-2.48
PP	-2.75*	-2.35	-2.36	-2.05	-2.49	-2.59*	-2.48
DFGLS	-0.50	-1.00	-0.95	-1.49	-0.57	-0.47	-0.40
ERS	24.00	11.35	12.14	5.73	20.62	23.15	23.72
NP MZa	-0.80	-2.27	-2.10	-4.57	-0.99	-0.78	-0.67
NP MZt	-0.50	-0.99	-0.95	-1.48	-0.56	-0.46	-0.40
NP MSB	0.62	0.44	0.45	0.32	0.57	0.60	0.60
NP MPT	21.62	10.29	10.98	5.43	18.36	20.54	21.10

NOK/USD, 1979-2020 for Spot, F3Y, F5Y & F10Y, 1981-2020 for F3M, 1985-2020 for F12M, 1986 for F1M						
	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
ADF	-2.01	-1.68	-2.02	-2.07	-2.13	-2.19	-2.37
PP	-2.18	-1.8	-2.22	-2.07	-2.24	-2.31	-2.37
DFGLS	-0.31	-1.66*	-0.70	-1.15	-0.19	-0.28	-0.68
ERS	15.92	4.3*	10.23	10.01	20.95	20.03	13.37
NP MZa	-0.70	-6.39*	-2.02	-2.64	-0.36	-0.53	-1.55
NP MZt	-0.31	-1.65*	-0.70	-1.14	-0.19	-0.27	-0.68
NP MSB	0.44	0.26*	0.34	0.43	0.52	0.52	0.44
NP MPT	14.61	4.29*	9.44	9.26	19.09	18.24	12.21

SEK/USD, 1979 or Spot & F10Y, 1984 for F12M, 1987 for F1M, F3M, F3Y, F5Y						
	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
ADF	-2.32	-1.76	-1.78	-2.01	-2.09	-2.38	-2.75*

PP	-2.53	-2.05	-2.07	-2.37	-2.35	-2.68*	-2.89**
DFGLS	0.06	-1.12	-1.17	-1.83*	-2.08**	-2.19**	-0.83
ERS	33.6	7.10	6.77	3.75*	3.10**	2.71**	12.92
NP MZa	0.10	-3.73	-4.00	-6.99*	-9.67**	-9.61**	-1.84
NP MZt	0.07	-1.11	-1.16	-1.82*	-2.06**	-2.16**	-0.83
NP MSB	0.68	0.30	0.29	0.26*	0.21**	0.22**	0.45
NP MPT	30.34	6.70	6.40	3.70*	3.09**	2.67**	11.71

GBP/DEM, 1979-2020							
	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
ADF	-1.45	-1.45	-1.44	-1.44	-1.55	-1.82	-2.76*
PP	-1.51	-1.51	-1.52	-1.53	-1.67	-1.90	-2.72*
DFGLS	-0.24	-0.26	-0.30	-0.46	-1.00	-1.69*	-2.00**
ERS	22.69	22.08	20.77	16.55	8.54	4.23*	3.27*
NP MZa	-0.41	-0.45	-0.54	-0.94	-2.83	-6.51*	-7.87*
NP MZt	-0.23	-0.25	-0.30	-0.46	-1.00	-1.68*	-1.98**
NP MSB	0.57	0.56	0.55	0.49	0.35	0.26*	0.25*
NP MPT	21.10	20.53	19.35	15.51	8.18	4.18*	3.12**

JPY/DEM, 1979-2020 for all but F12M, for which 1980-2020							
	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
ADF	-2.28	-2.28	-2.28	-3.33**	-2.26	-2.29	-2.12
PP	-2.39	-2.39	-2.40	-3.41**	-2.44	-2.44	-2.19
DFGLS	-0.45	-0.45	-0.45	-0.13	-0.47	-0.51	-0.73
ERS	20.17	20.11	20.21	38.00	22.39	22.98	18.10
NP MZa	-0.81	-0.82	-0.81	-0.16	-0.78	-0.83	-1.31
NP MZt	-0.44	-0.45	-0.45	-0.12	-0.47	-0.50	-0.73
NP MSB	0.55	0.55	0.55	0.75	0.59	0.61	0.56
NP MPT	18.35	18.30	18.39	33.55	20.38	20.90	16.62

CHF/DEM, 1979-2020 for Spot, F1M, F3M &F10Y, 1983-2020 for F3Y & F5Y, 1988-2020 for F12M							
	Spot	F1M	F3M	F12M	F3Y	F5Y	F10Y
ADF	-0.35	-0.35	-0.36	-0.22	-0.43	-0.76	-2.17
PP	-0.20	-0.2	-0.20	-0.05	-0.23	-0.52	-1.92
DFGLS	0.75	0.73	0.70	0.34	-0.15	-0.71	-2.14**
ERS	32.32	31.80	30.73	24.04	14.30	9.12	2.86**
NP MZa	1.27	1.25	1.22	0.66	-0.37	-2.16	-9.74**
NP MZt	0.75	0.74	0.71	0.35	-0.15	-0.71	-2.12**
NP MSB	0.59	0.59	0.58	0.52	0.40	0.33	0.22**
NP MPT	30.46	29.98	29.00	23.02	13.97	9.05	2.87**

Notes. The sample includes monthly exchange rates against the US dollar between January 1979 and February 2020. spot: spot exchange rate; F1M: 1-month maturity theoretical forward exchange rate, F3M: 3-month maturity theoretical forward exchange rate, and so on. ADF: augmented test of Dickey-Fuller (1979); PP: test of Phillips-Perron (1988); ERS DF: DF test with GLS detrending suggested by Elliott-Rothenberg-Stock (1996); ERS FPO: feasible point-optimal test of Elliott-Rothenberg-Stock (1996), NP MZa & MZt

& MSB & MPT: four tests suggested by Ng-Perron (2001). Null hypothesis is unit root for all tests. The 1%, 5%, and 10% critical values are the following. ADF and PP: -3.45, -2.87, -2.57. ERS DF: -2.57, -1.94, -1.62. ERS FPO: 1.96, 3.23, 4.42. NP MZa -13.8, -8.1, -5.7. NP MZt: -2.58, -1.98, -1.62. NP MSB: 0.174, 0.233, 0.275. NP MPT: 1.78, 3.17, 4.45. ***, **, and * indicates rejection of the null hypothesis at 1%, 5%, and 10% significance level, respectively.

Table A2: Regression statistics of the one period change in the exchange rate on the previous period forward rate, annual frequency using January data of each year

Maturity of forward rate		DEM/USD	GBP/USD	JPY/USD	CHF/USD	CAD/USD	AUD/USD	NZD/USD	NOK/USD	SEK/USD	GBP/DEM	JPY/DEM	CHF/DEM	USD-Pool
1-year	δ_1	-0.214	-0.333	-0.128	-0.107	-0.218	-0.318	-0.325	-0.332	-0.340	-0.153	-0.347	-0.015	-0.219
	t	-2.19	-2.90	-2.26	-1.25	-2.03	-2.41	-2.46	-2.58	-2.52	-1.91	-3.81	-0.22	-6.55
	R2	0.11	0.18	0.12	0.05	0.11	0.15	0.16	0.17	0.16	0.09	0.28	0.00	0.12
	DW	1.62	1.69	1.41	1.93	1.91	1.95	1.92	1.74	1.63	2.04	1.89	2.30	1.83
	N	41	41	40	32	34	34	33	35	36	41	40	32	326
3-year	δ_1	-0.253	-0.400	-0.109	-0.142	-0.212	-0.225	-0.277	-0.253	-0.419	-0.192	-0.223	-0.022	-0.209
	t	-2.43	-3.43	-1.86	-1.86	-2.16	-2.50	-2.61	-2.60	-2.80	-2.22	-2.51	-0.33	-6.94
	R2	0.13	0.23	0.08	0.09	0.11	0.14	0.17	0.15	0.20	0.11	0.14	0.00	0.13
	DW	1.62	1.68	1.45	1.75	1.93	2.00	2.09	1.91	1.69	2.02	2.10	2.31	1.86
	N	41	41	41	37	41	41	35	41	33	41	41	37	351
5-year	δ_1	-0.295	-0.447	-0.111	-0.160	-0.203	-0.208	-0.234	-0.239	-0.479	-0.229	-0.203	-0.037	-0.213
	t	-2.69	-3.83	-1.86	-2.00	-2.11	-2.39	-2.41	-2.64	-3.23	-2.46	-2.41	-0.51	-7.15
	R2	0.16	0.27	0.08	0.10	0.10	0.13	0.15	0.15	0.25	0.13	0.13	0.01	0.14
	DW	1.61	1.67	1.44	1.75	1.94	2.03	2.15	1.95	1.71	2.00	2.12	2.28	1.88
	N	41	41	41	37	41	41	35	41	33	41	41	37	351
10-year	δ_1	-0.377	-0.449	-0.122	-0.205	-0.162	-0.151	-0.164	-0.188	-0.281	-0.253	-0.166	-0.072	-0.200
	t	-3.13	-4.27	-1.94	-2.36	-1.97	-2.03	-2.09	-2.42	-3.63	-2.62	-2.29	-0.94	-7.50
	R2	0.20	0.32	0.09	0.12	0.09	0.10	0.12	0.13	0.25	0.15	0.12	0.02	0.15
	DW	1.64	1.65	1.42	1.81	1.96	2.06	2.20	2.01	1.61	1.95	2.16	2.22	1.87
	N	41	41	41	41	41	41	35	41	41	41	41	41	363

Notes. Equation estimated: $s_{t+1} - s_t = \delta_0 + \delta_1 f_t^{(h)} + \varepsilon_{t+1}$, where s_t denotes the spot exchange rate; $f_t^{(h)}$ denotes the h-period maturity forward rate; h is showed in the first column. t: OLS t-statistics, R2: coefficient of determinant; DW: Durbin-Watson, N: number of observations. The sample includes January data in January 1979 – January 2020 (with a few data-driven exceptions). The maximum number of observations is 41 for currency pairs and 369 for the panel.

Table A3 corresponds to Table 4 of the paper by showing the results for currency pairs beyond the DEM/USD rate.

Table A3: Out-of-sample forecast evaluation, baseline results

GBP/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	100.11	99.65	99.22	97.08	97.38	98.58	101.31	96.43	62.10	123.11	102.53	91.35
p	(0.532)	(0.459)	(0.438)	(0.320)	(0.351)	(0.421)	(0.572)	(0.304)	(0.046)	(0.995)	(0.610)	(0.091)
Model 3Y	99.42	97.65	94.07	91.05	79.82	71.35	62.05	57.95	78.02	52.76	61.73	94.21
p (CW)	(0.028)	(0.017)	(0.009)	(0.012)	(0.001)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.008)	(0.051)
Model 5Y	99.37	97.36	93.26	90.76	79.34	72.72	65.84	65.46	93.15	60.21	66.04	78.14
p (CW)	(0.021)	(0.011)	(0.005)	(0.010)	(0.001)	(0.000)	(0.000)	(0.000)	(0.026)	(0.000)	(0.008)	(0.007)
Model 10Y	100.31	98.74	94.84	95.46	87.90	90.78	92.19	101.87	109.12	118.76	76.16	59.74
p (CW)	(0.069)	(0.020)	(0.007)	(0.010)	(0.002)	(0.002)	(0.002)	(0.008)	(0.121)	(0.198)	(0.010)	(0.000)
Combined	99.49	97.41	93.25	90.90	80.17	75.44	70.11	71.07	91.91	71.10	67.43	75.55
p (CW)	(0.030)	(0.011)	(0.005)	(0.009)	(0.001)	(0.000)	(0.000)	(0.000)	(0.020)	(0.000)	(0.008)	(0.005)
Correct sign prediction compared to the spot rate, %												
Forward	50.3	48.3	47.1	49.9	47.2	44.6	49.8	64.7	44.0	42.9	37.5	49.1
p	(0.578)	(0.628)	(0.678)	(0.804)	(0.899)	(1.000)	(0.999)	(0.017)	n.a.	(0.806)	(0.996)	(0.844)
Model 3Y	54.7	55.6	62.2	64.4	69.9	69.7	72.7	68.6	71.4	90.5	56.3	59.1
p	(0.031)	(0.020)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.002)
Model 5Y	54.4	56.1	64.1	66.4	70.2	69.1	74.6	70.0	69.0	84.5	56.3	63.6
p	(0.042)	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.001)
Model 10Y	56.1	56.1	64.4	68.4	65.5	62.1	68.3	65.3	60.7	47.6	56.3	77.3
p	(0.011)	(0.008)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.043)	(0.058)	n.a.	(0.000)
Combined	56.1	56.7	63.9	66.7	69.6	67.3	74.6	70.3	66.7	77.4	56.3	65.5
p	(0.009)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	n.a.	(0.000)
Correct sign prediction compared to the forward rate, %												
Model 3Y	54.1	53.6	61.1	56.4	65.2	68.2	69.8	70.3	67.9	84.5	58.3	60.0
p	(0.056)	(0.287)	(0.000)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.024)	(0.000)	(0.123)	(0.000)
Model 5Y	55.5	58.6	64.1	63.2	68.1	72.5	77.8	73.9	66.7	91.7	56.3	69.1
p	(0.018)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.115)	(0.000)	n.a.	(0.000)
Model 10Y	58.6	58.6	67.2	69.8	69.0	72.2	76.5	70.0	60.7	77.4	56.3	83.6
p	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.725)	(0.000)	n.a.	(0.000)
Combined	56.4	58.9	63.9	63.0	68.1	72.2	77.1	73.3	65.5	89.3	56.3	70.9
p	(0.008)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.251)	(0.000)	n.a.	(0.000)
Mean annualized profit, % per year												
Carry trade	0.5	1.1	0.7	0.5	0.5	0.8	0.8	0.1	0.9	2.4	0.2	-0.3
p (=0)	(0.404)	(0.259)	(0.317)	(0.308)	(0.241)	(0.085)	(0.048)	(0.447)	(0.055)	(0.013)	(0.446)	(0.657)
Model 3Y	2.7	1.8	2.3	2.0	1.9	1.9	1.9	1.6	1.0	4.1	2.3	0.7
p (=0)	(0.066)	(0.122)	(0.043)	(0.024)	(0.003)	(0.000)	(0.000)	(0.000)	(0.047)	(0.000)	(0.060)	(0.173)
p (=CT)	(0.075)	(0.337)	(0.157)	(0.130)	(0.058)	(0.058)	(0.014)	(0.000)	(0.116)	(0.000)	(0.219)	(0.241)
Model 5Y	3.8	4.0	3.2	2.8	2.5	2.3	2.3	1.8	1.0	4.6	2.1	1.7
p (=0)	(0.014)	(0.005)	(0.009)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.052)	(0.000)	(0.086)	(0.005)
p (=CT)	(0.042)	(0.074)	(0.062)	(0.044)	(0.011)	(0.011)	(0.000)	(0.000)	(0.347)	(0.000)	(0.248)	(0.060)
Model 10Y	4.7	4.2	4.2	3.6	2.7	2.1	2.0	1.2	0.7	2.8	2.1	2.8
p (=0)	(0.004)	(0.003)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.118)	(0.002)	(0.086)	(0.000)
p (=CT)	(0.016)	(0.068)	(0.029)	(0.010)	(0.005)	(0.027)	(0.010)	(0.022)	(0.923)	(0.342)	(0.248)	(0.002)
Combined	4.1	4.1	3.3	2.7	2.6	2.3	2.3	1.8	0.9	4.4	2.1	1.8
p (=0)	(0.010)	(0.004)	(0.006)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.064)	(0.000)	(0.086)	(0.002)
p (=CT)	(0.032)	(0.065)	(0.052)	(0.045)	(0.008)	(0.012)	(0.000)	(0.000)	(0.759)	(0.000)	(0.248)	(0.046)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

JPY/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	101.04	102.74	104.40	110.98	112.69	110.34	111.15	118.49	131.08	163.31	56.30	97.97
p	(0.840)	(0.855)	(0.840)	(0.932)	(0.903)	(0.842)	(0.837)	(0.895)	(0.981)	(0.895)	(0.014)	(0.309)
Model 3Y	100.07	100.66	101.44	102.23	105.73	111.57	114.35	115.87	132.37	97.82	110.33	93.09
p (CW)	(0.478)	(0.619)	(0.646)	(0.614)	(0.770)	(0.887)	(0.914)	(0.896)	(0.972)	(0.206)	(0.997)	(0.023)
Model 5Y	100.08	100.69	101.39	101.98	104.21	108.35	109.34	110.56	120.93	110.09	111.29	93.51
p (CW)	(0.490)	(0.650)	(0.663)	(0.609)	(0.711)	(0.842)	(0.815)	(0.758)	(0.946)	(0.496)	(0.995)	(0.023)
Model 10Y	100.24	101.09	101.66	101.50	99.94	100.71	99.52	102.41	94.88	138.49	110.44	94.73
p (CW)	(0.513)	(0.658)	(0.605)	(0.422)	(0.202)	(0.163)	(0.061)	(0.142)	(0.063)	(0.663)	(0.986)	(0.037)
Combined	100.09	100.71	101.31	101.53	102.76	106.19	106.77	108.27	114.86	113.26	110.66	93.72
p (CW)	(0.494)	(0.664)	(0.658)	(0.557)	(0.598)	(0.766)	(0.700)	(0.660)	(0.904)	(0.527)	(0.994)	(0.024)
Correct sign prediction compared to the spot rate, %												
Forward	48.3	47.2	55.7	52.1	57.5	54.7	55.6	52.1	50.0	65.5	72.9	41.8
p	(0.968)	(0.945)	(0.000)	(0.999)	(0.986)	(0.899)	(0.814)	n.o.	(0.915)	n.a.	n.a.	n.a.
Model 3Y	50.0	54.7	54.1	51.9	53.4	47.4	41.0	44.9	25.0	53.6	27.1	69.1
p	(0.418)	(0.030)	(0.030)	(0.031)	(0.004)	(0.577)	(0.995)	(0.948)	(1.000)	(0.001)	n.a.	(0.000)
Model 5Y	48.9	53.6	53.2	48.7	51.6	48.0	43.8	46.5	42.9	40.5	27.1	67.3
p	(0.575)	(0.065)	(0.040)	(0.130)	(0.008)	(0.416)	(0.914)	(0.831)	(0.919)	(0.046)	n.a.	(0.000)
Model 10Y	49.2	51.1	50.1	47.0	54.0	52.6	52.4	49.5	67.9	35.7	27.1	64.5
p	(0.493)	(0.324)	(0.294)	(0.200)	(0.000)	(0.009)	(0.013)	(0.406)	(0.000)	(0.231)	n.a.	(0.001)
Combined	48.9	51.7	52.7	50.1	53.1	48.6	45.4	47.5	48.8	38.1	27.1	66.4
p	(0.566)	(0.248)	(0.059)	(0.034)	(0.001)	(0.332)	(0.775)	(0.713)	(0.626)	(0.099)	n.a.	(0.000)
Correct sign prediction compared to the forward rate, %												
Model 3Y	53.0	55.0	52.9	55.6	58.1	61.2	65.1	70.3	44.0	76.2	43.8	70.9
p	(0.165)	(0.106)	(0.622)	(0.000)	(0.000)	(0.099)	(0.815)	(0.828)	(0.974)	n.a.	n.a.	(0.000)
Model 5Y	53.3	55.6	53.2	53.6	57.5	63.0	67.9	72.3	47.6	76.2	43.8	73.6
p	(0.129)	(0.065)	(0.575)	(0.003)	(0.000)	(0.004)	(0.038)	(0.325)	(0.859)	n.a.	n.a.	(0.000)
Model 10Y	53.6	55.6	54.9	53.8	60.5	69.1	75.2	78.5	70.2	76.2	43.8	74.5
p	(0.085)	(0.063)	(0.193)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	n.a.	(0.000)
Combined	53.9	54.7	54.3	54.1	58.7	64.5	68.3	72.3	51.2	76.2	43.8	75.5
p	(0.074)	(0.144)	(0.322)	(0.001)	(0.000)	(0.000)	(0.018)	(0.231)	(0.562)	n.a.	n.a.	(0.000)
Mean annualized profit, % per year												
Carry trade	3.4	2.8	0.6	2.2	1.8	1.7	1.9	2.2	1.1	2.8	-0.9	2.6
p (=0)	(0.049)	(0.071)	(0.368)	(0.048)	(0.045)	(0.028)	(0.004)	(0.000)	(0.287)	(0.001)	(0.745)	(0.032)
Model 3Y	3.0	2.0	0.5	2.1	1.9	1.1	1.4	1.7	-1.5	2.8	-0.9	2.9
p (=0)	(0.063)	(0.133)	(0.367)	(0.040)	(0.026)	(0.087)	(0.022)	(0.001)	(0.800)	(0.001)	(0.745)	(0.017)
p (=CT)	(0.603)	(0.757)	(0.512)	(0.554)	(0.438)	(0.865)	(0.937)	(0.966)	(0.927)	n.a.	n.a.	(0.042)
Model 5Y	2.4	1.7	0.8	1.6	1.8	1.4	1.6	2.0	-0.5	2.8	-0.9	3.0
p (=0)	(0.104)	(0.170)	(0.301)	(0.099)	(0.033)	(0.039)	(0.007)	(0.000)	(0.611)	(0.001)	(0.745)	(0.013)
p (=CT)	(0.753)	(0.784)	(0.412)	(0.741)	(0.526)	(0.737)	(0.827)	(0.863)	(0.844)	n.a.	n.a.	(0.041)
Model 10Y	3.0	2.4	1.6	2.3	2.5	2.6	2.7	2.6	3.9	2.8	-0.9	3.0
p (=0)	(0.082)	(0.096)	(0.162)	(0.041)	(0.010)	(0.001)	(0.000)	(0.000)	(0.012)	(0.001)	(0.745)	(0.013)
p (=CT)	(0.585)	(0.602)	(0.121)	(0.444)	(0.015)	(0.009)	(0.008)	(0.008)	(0.005)	n.a.	n.a.	(0.069)
Combined	2.8	1.7	1.3	2.0	2.0	1.6	1.6	1.9	0.2	2.8	-0.9	3.0
p (=0)	(0.078)	(0.178)	(0.205)	(0.053)	(0.019)	(0.020)	(0.007)	(0.000)	(0.445)	(0.001)	(0.745)	(0.012)
p (=CT)	(0.661)	(0.796)	(0.211)	(0.596)	(0.345)	(0.587)	(0.822)	(0.894)	(0.749)	n.a.	n.a.	(0.032)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

Japanese yen – US dollar rate results when the sample for estimation starts in January 1985.

JPY/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	101.04	102.74	104.40	110.98	112.69	110.34	111.15	118.49	131.08	163.31	56.30	97.97
p	(0.840)	(0.855)	(0.840)	(0.932)	(0.903)	(0.842)	(0.837)	(0.895)	(0.981)	(0.895)	(0.014)	(0.309)
Model 3Y	99.16	97.68	94.08	88.43	74.53	66.63	63.63	66.36	52.40	58.99	105.37	68.58
p (CW)	(0.058)	(0.039)	(0.012)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.611)	(0.008)
Model 5Y	99.33	98.23	94.63	88.85	73.70	65.42	62.78	70.12	42.29	83.24	102.16	71.94
p (CW)	(0.070)	(0.051)	(0.014)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	(0.331)	(0.006)
Model 10Y	100.14	100.45	97.27	90.91	72.17	63.74	62.54	78.75	25.51	120.80	87.85	82.26
p (CW)	(0.119)	(0.100)	(0.026)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.055)	(0.001)	(0.003)
Combined	99.45	98.55	94.88	88.51	72.17	63.50	60.29	67.75	37.26	84.30	98.12	73.43
p (CW)	(0.078)	(0.059)	(0.015)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)	(0.106)	(0.005)
Correct sign prediction compared to the spot rate, %												
Forward	48.3	47.2	55.7	52.1	57.5	54.7	55.6	52.1	50.0	65.5	72.9	41.8
p	(0.968)	(0.945)	(0.000)	(0.999)	(0.986)	(0.899)	(0.814)	n.o.	(0.915)	n.a.	n.a.	n.a.
Model 3Y	55.5	58.3	59.7	65.0	72.6	70.0	63.5	70.6	85.7	77.4	39.6	65.5
p	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.053)	(0.001)
Model 5Y	55.5	58.6	59.9	65.5	69.9	67.9	62.9	67.7	88.1	71.4	43.8	60.0
p	(0.015)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.028)	(0.021)
Model 10Y	53.6	60.0	58.5	63.2	72.6	70.0	66.3	69.6	90.5	59.5	77.1	59.1
p	(0.076)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.027)
Combined	55.5	58.1	59.9	65.8	72.0	70.9	66.3	70.3	91.7	71.4	60.4	59.1
p	(0.015)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.032)
Correct sign prediction compared to the forward rate, %												
Model 3Y	53.9	60.3	61.1	61.3	67.8	72.8	79.0	82.5	85.7	78.6	43.8	70.9
p	(0.091)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	n.a.	(0.000)
Model 5Y	53.0	60.0	60.5	59.5	65.5	73.4	80.3	82.2	91.7	78.6	43.8	68.2
p	(0.163)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	n.a.	(0.000)
Model 10Y	51.1	58.1	57.7	56.7	63.4	72.5	78.4	76.6	98.8	78.6	43.8	60.0
p	(0.430)	(0.003)	(0.007)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	n.a.	(0.044)
Combined	52.5	59.4	59.9	59.3	64.3	73.4	81.0	81.5	91.7	78.6	43.8	68.2
p	(0.225)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	n.a.	(0.000)
Mean annualized profit, % per year												
Carry trade	3.4	2.8	0.6	2.2	1.8	1.7	1.9	2.2	1.1	2.8	-0.9	2.6
p (=0)	(0.049)	(0.071)	(0.368)	(0.048)	(0.045)	(0.028)	(0.004)	(0.000)	(0.287)	(0.001)	(0.745)	(0.032)
Model 3Y	4.9	4.5	3.9	3.6	3.5	3.3	3.3	3.1	6.8	2.8	-0.9	2.9
p (=0)	(0.011)	(0.007)	(0.006)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.745)	(0.016)
p (=CT)	(0.265)	(0.175)	(0.011)	(0.068)	(0.001)	(0.002)	(0.001)	(0.002)	(0.000)	(0.017)	n.a.	(0.135)
Model 5Y	2.8	3.9	3.3	3.2	3.3	3.6	3.4	3.1	8.1	2.8	-0.9	2.8
p (=0)	(0.080)	(0.021)	(0.023)	(0.007)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.745)	(0.020)
p (=CT)	(0.629)	(0.267)	(0.036)	(0.158)	(0.005)	(0.001)	(0.001)	(0.002)	(0.000)	(0.017)	n.a.	(0.273)
Model 10Y	1.3	2.4	2.6	2.7	3.2	3.6	3.1	2.7	8.7	2.8	-0.9	2.3
p (=0)	(0.264)	(0.090)	(0.052)	(0.018)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.745)	(0.042)
p (=CT)	(0.873)	(0.578)	(0.100)	(0.306)	(0.026)	(0.002)	(0.006)	(0.072)	(0.000)	(0.047)	n.a.	(0.710)
Combined	2.5	3.6	3.1	3.2	3.2	3.5	3.4	3.1	8.1	2.8	-0.9	2.7
p (=0)	(0.106)	(0.027)	(0.028)	(0.006)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.745)	(0.022)
p (=CT)	(0.687)	(0.311)	(0.046)	(0.154)	(0.009)	(0.002)	(0.001)	(0.003)	(0.000)	(0.017)	n.a.	(0.328)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

CHF/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	100.85	102.15	103.88	107.62	113.87	116.39	105.10	91.15	158.63	112.74	35.13	105.51
p	(0.886)	(0.876)	(0.896)	(0.946)	(0.963)	(0.939)	(0.657)	(0.251)	(1.000)	(0.803)	(0.000)	(0.814)
Model 3Y	100.56	102.00	104.40	107.50	108.25	108.85	114.62	121.64	47.68	51.06	306.60	234.79
p (CW)	(0.332)	(0.370)	(0.381)	(0.269)	(0.107)	(0.059)	(0.089)	(0.154)	(0.000)	(0.000)	(1.000)	(0.871)
Model 5Y	100.86	103.30	106.74	111.74	112.83	113.41	122.15	130.35	24.17	35.68	366.67	302.62
p (CW)	(0.204)	(0.247)	(0.228)	(0.129)	(0.033)	(0.013)	(0.027)	(0.057)	(0.000)	(0.000)	(1.000)	(0.806)
Model 10Y	102.75	109.93	118.52	136.80	141.12	136.55	136.18	140.13	118.00	55.59	210.69	323.31
p (CW)	(0.085)	(0.118)	(0.075)	(0.040)	(0.006)	(0.002)	(0.001)	(0.000)	(0.000)	(0.002)	(1.000)	(0.299)
Combined	100.65	102.99	105.89	110.96	108.25	103.61	106.73	111.84	30.55	37.99	289.10	277.05
p (CW)	(0.128)	(0.170)	(0.139)	(0.078)	(0.015)	(0.005)	(0.005)	(0.008)	(0.000)	(0.000)	(1.000)	(0.680)
Correct sign prediction compared to the spot rate, %												
Forward	51.4	54.4	51.3	55.0	50.4	53.2	55.2	65.0	21.4	65.5	100.0	47.3
p	(0.545)	(0.372)	(0.487)	(0.150)	(0.966)	(1.000)	(0.999)	(0.350)	(1.000)	n.a.	n.a.	(1.000)
Model 3Y	47.8	46.7	49.9	49.0	56.0	59.3	59.7	54.5	85.7	81.0	0.0	49.1
p	(0.665)	(0.512)	(0.211)	(0.192)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	n.a.
Model 5Y	48.3	47.8	51.8	51.3	58.1	62.4	61.6	54.8	96.4	81.0	0.0	49.1
p	(0.570)	(0.322)	(0.045)	(0.030)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	n.a.
Model 10Y	50.6	51.9	53.2	53.3	55.8	56.0	60.3	62.4	73.8	65.5	14.6	52.7
p	(0.344)	(0.114)	(0.070)	(0.059)	(0.010)	(0.008)	(0.000)	(0.000)	(0.000)	(0.320)	n.a.	(0.000)
Combined	50.0	49.4	51.8	51.3	54.3	58.4	62.5	64.0	90.5	71.4	0.0	49.1
p	(0.364)	(0.262)	(0.109)	(0.106)	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	n.a.	n.a.
Correct sign prediction compared to the forward rate, %												
Model 3Y	51.1	51.9	58.3	59.3	66.7	66.7	64.1	54.1	91.7	77.4	12.5	63.6
p	(0.415)	(0.161)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	n.a.	n.a.
Model 5Y	50.8	52.8	58.3	61.3	67.6	69.1	66.7	57.1	96.4	82.1	12.5	63.6
p	(0.468)	(0.082)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	n.a.
Model 10Y	53.9	55.3	58.8	59.8	65.5	64.2	63.2	62.0	75.0	78.6	14.6	66.4
p	(0.079)	(0.016)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.350)	(0.000)
Combined	51.1	52.8	58.3	59.5	67.0	68.8	66.3	60.1	90.5	84.5	12.5	64.5
p	(0.408)	(0.095)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.000)
Mean annualized profit, % per year												
Carry trade	0.5	0.4	0.8	0.6	1.0	1.1	0.5	0.1	5.1	-0.2	-1.9	0.3
p (=0)	(0.404)	(0.401)	(0.285)	(0.285)	(0.129)	(0.058)	(0.187)	(0.415)	(0.000)	(0.551)	(1.000)	(0.294)
Model 3Y	1.4	1.3	1.9	2.1	2.6	2.6	1.6	0.9	5.9	5.4	-1.9	-0.1
p (=0)	(0.236)	(0.229)	(0.104)	(0.028)	(0.001)	(0.000)	(0.003)	(0.037)	(0.000)	(0.000)	(1.000)	(0.533)
p (=CT)	(0.250)	(0.252)	(0.237)	(0.064)	(0.012)	(0.005)	(0.009)	(0.008)	(0.000)	(0.000)	n.a.	(0.937)
Model 5Y	1.7	2.0	1.8	2.6	2.8	2.7	1.8	1.1	6.2	5.8	-1.9	-0.1
p (=0)	(0.169)	(0.112)	(0.097)	(0.010)	(0.000)	(0.000)	(0.001)	(0.018)	(0.000)	(0.000)	(1.000)	(0.533)
p (=CT)	(0.210)	(0.145)	(0.253)	(0.029)	(0.005)	(0.002)	(0.003)	(0.004)	(0.000)	(0.000)	n.a.	(0.937)
Model 10Y	3.8	2.5	1.8	2.1	2.0	1.9	1.6	1.4	4.4	3.4	-1.8	0.4
p (=0)	(0.035)	(0.077)	(0.104)	(0.022)	(0.005)	(0.001)	(0.002)	(0.001)	(0.000)	(0.001)	(1.000)	(0.277)
p (=CT)	(0.035)	(0.090)	(0.274)	(0.117)	(0.138)	(0.161)	(0.040)	(0.003)	(0.893)	(0.057)	(0.010)	(0.445)
Combined	1.5	1.6	2.0	2.2	2.8	2.7	1.9	1.2	5.7	5.9	-1.9	0.1
p (=0)	(0.210)	(0.171)	(0.090)	(0.019)	(0.000)	(0.000)	(0.000)	(0.008)	(0.000)	(0.000)	(1.000)	(0.434)
p (=CT)	(0.188)	(0.146)	(0.214)	(0.051)	(0.006)	(0.003)	(0.002)	(0.001)	(0.032)	(0.000)	n.a.	(0.938)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

CAD/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	100.16	100.43	100.03	99.21	99.24	97.09	96.20	95.36	48.05	129.25	102.11	87.80
p	(0.659)	(0.648)	(0.505)	(0.409)	(0.438)	(0.305)	(0.260)	(0.222)	(0.000)	(1.000)	(0.627)	(0.007)
Model 3Y	100.31	101.04	102.63	104.02	98.22	93.18	88.68	85.39	111.04	74.14	157.68	77.98
p (CW)	(0.346)	(0.352)	(0.409)	(0.358)	(0.076)	(0.020)	(0.004)	(0.002)	(0.711)	(0.001)	(0.981)	(0.005)
Model 5Y	100.38	101.34	103.25	104.63	98.39	93.90	90.50	88.36	110.35	68.84	173.10	78.78
p (CW)	(0.269)	(0.290)	(0.349)	(0.302)	(0.076)	(0.024)	(0.008)	(0.006)	(0.766)	(0.001)	(0.984)	(0.006)
Model 10Y	100.84	102.48	105.26	107.73	102.86	100.25	99.81	99.84	126.50	76.89	180.45	79.44
p (CW)	(0.348)	(0.361)	(0.447)	(0.444)	(0.197)	(0.116)	(0.102)	(0.128)	(1.000)	(0.001)	(0.993)	(0.006)
Combined	100.46	101.47	103.47	105.12	99.40	95.33	92.55	90.75	115.53	72.46	170.13	78.55
p (CW)	(0.317)	(0.331)	(0.400)	(0.367)	(0.107)	(0.038)	(0.015)	(0.012)	(0.958)	(0.001)	(0.988)	(0.005)
Correct sign prediction compared to the spot rate, %												
Forward	48.1	50.8	52.4	50.1	49.6	55.0	67.0	65.7	89.3	14.3	58.3	58.2
p	(0.827)	(0.476)	(0.420)	(0.754)	(0.905)	(0.367)	(0.000)	(0.000)	(0.698)	(1.000)	(0.393)	(0.100)
Model 3Y	49.2	51.4	52.1	52.1	54.9	50.5	57.8	57.8	36.9	56.0	33.3	63.6
p	(0.634)	(0.321)	(0.247)	(0.260)	(0.058)	(0.538)	(0.007)	(0.006)	(0.078)	(0.253)	(0.135)	(0.004)
Model 5Y	53.0	56.4	55.5	54.4	53.7	52.0	58.4	58.7	36.9	64.3	27.1	64.5
p	(0.142)	(0.013)	(0.053)	(0.104)	(0.272)	(0.545)	(0.009)	(0.004)	(0.078)	(0.003)	n.a.	(0.000)
Model 10Y	52.8	56.9	54.1	54.4	55.5	50.5	46.7	44.6	17.9	81.0	27.1	61.8
p	(0.175)	(0.008)	(0.178)	(0.139)	(0.184)	(0.879)	(0.995)	(0.998)	(0.212)	(0.000)	n.a.	n.a.
Combined	52.2	56.4	54.1	52.7	51.9	51.1	57.1	55.8	32.1	66.7	27.1	63.6
p	(0.226)	(0.012)	(0.135)	(0.267)	(0.496)	(0.668)	(0.029)	(0.062)	(0.103)	(0.001)	n.a.	(0.000)
Correct sign prediction compared to the forward rate, %												
Model 3Y	50.0	55.8	54.6	57.8	55.5	54.7	56.5	56.4	31.0	67.9	47.9	66.4
p	(0.496)	(0.012)	(0.037)	(0.002)	(0.023)	(0.041)	(0.008)	(0.010)	(0.076)	(0.000)	(0.017)	(0.000)
Model 5Y	50.6	56.7	56.9	56.7	55.5	56.0	55.6	53.8	31.0	76.2	47.9	63.6
p	(0.418)	(0.007)	(0.005)	(0.007)	(0.030)	(0.021)	(0.029)	(0.105)	(0.076)	(0.000)	(0.017)	(0.000)
Model 10Y	52.2	58.1	58.5	58.4	59.0	56.6	49.8	47.5	29.8	85.7	35.4	64.5
p	(0.199)	(0.001)	(0.001)	(0.001)	(0.002)	(0.028)	(0.687)	(0.867)	(0.097)	(0.000)	(0.388)	(0.000)
Combined	50.3	56.4	57.1	55.6	55.8	55.7	54.6	52.5	31.0	75.0	47.9	63.6
p	(0.462)	(0.009)	(0.004)	(0.020)	(0.026)	(0.030)	(0.073)	(0.227)	(0.076)	(0.000)	(0.017)	(0.000)
Mean annualized profit, % per year												
Carry trade	0.3	0.1	-0.4	0.1	0.7	0.4	0.2	0.0	-1.2	4.5	0.8	-1.4
p (=0)	(0.425)	(0.474)	(0.626)	(0.455)	(0.146)	(0.230)	(0.382)	(0.530)	(0.998)	(0.000)	(0.264)	(0.939)
Model 3Y	0.9	1.8	1.2	1.4	1.4	1.3	1.7	1.7	-1.1	3.8	-0.3	1.9
p (=0)	(0.275)	(0.081)	(0.135)	(0.058)	(0.014)	(0.013)	(0.000)	(0.000)	(0.996)	(0.000)	(0.615)	(0.013)
p (=CT)	(0.399)	(0.176)	(0.152)	(0.156)	(0.204)	(0.123)	(0.004)	(0.000)	(0.097)	(0.993)	(0.866)	(0.030)
Model 5Y	1.3	1.3	1.4	1.3	1.3	1.3	1.7	1.5	-1.1	4.2	-0.3	1.9
p (=0)	(0.184)	(0.139)	(0.100)	(0.060)	(0.021)	(0.008)	(0.000)	(0.001)	(0.996)	(0.000)	(0.615)	(0.016)
p (=CT)	(0.333)	(0.247)	(0.131)	(0.159)	(0.235)	(0.098)	(0.003)	(0.001)	(0.097)	(0.885)	(0.866)	(0.032)
Model 10Y	1.8	1.5	1.3	1.2	1.2	1.1	1.2	1.1	-1.2	4.5	-2.1	1.9
p (=0)	(0.096)	(0.115)	(0.128)	(0.096)	(0.032)	(0.024)	(0.009)	(0.011)	(0.998)	(0.000)	(0.976)	(0.015)
p (=CT)	(0.245)	(0.216)	(0.153)	(0.205)	(0.285)	(0.177)	(0.046)	(0.012)	n.a.	(0.453)	(0.964)	(0.031)
Combined	1.0	1.3	1.4	1.1	1.3	1.3	1.6	1.4	-1.1	4.1	-0.3	1.9
p (=0)	(0.226)	(0.150)	(0.108)	(0.098)	(0.022)	(0.009)	(0.001)	(0.001)	(0.996)	(0.000)	(0.615)	(0.016)
p (=CT)	(0.368)	(0.256)	(0.139)	(0.205)	(0.241)	(0.103)	(0.004)	(0.001)	(0.097)	(0.964)	(0.866)	(0.032)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

AUD/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	100.83	102.40	103.96	107.47	111.08	112.23	110.49	104.60	80.56	122.29	169.72	101.37
p	(0.802)	(0.819)	(0.817)	(0.918)	(0.960)	(0.943)	(0.893)	(0.697)	(0.115)	(1.000)	(1.000)	(0.538)
Model 3Y	99.16	97.49	94.95	91.10	85.40	82.00	78.12	76.77	84.77	80.59	156.67	69.34
p (CW)	(0.036)	(0.033)	(0.019)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.012)	(0.000)	(0.999)	(0.002)
Model 5Y	98.93	97.02	94.33	90.34	84.75	82.31	79.87	80.20	89.41	78.93	165.06	68.99
p (CW)	(0.017)	(0.018)	(0.011)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.061)	(0.000)	(0.999)	(0.001)
Model 10Y	99.04	97.52	95.61	92.86	90.31	92.41	93.96	97.49	100.64	89.71	187.65	75.72
p (CW)	(0.027)	(0.027)	(0.019)	(0.007)	(0.002)	(0.013)	(0.028)	(0.057)	(0.187)	(0.013)	(1.000)	(0.003)
Combined	99.02	97.28	94.85	91.24	86.48	85.08	83.38	84.10	90.89	82.40	169.31	71.13
p (CW)	(0.024)	(0.024)	(0.014)	(0.003)	(0.000)	(0.001)	(0.001)	(0.001)	(0.074)	(0.000)	(1.000)	(0.002)
Correct sign prediction compared to the spot rate, %												
Forward	43.4	41.7	39.2	38.2	44.5	48.6	50.5	52.5	69.0	22.6	16.7	66.4
p	(0.999)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(0.971)	(0.141)	n.a.	(1.000)	n.a.	(0.000)
Model 3Y	53.0	53.6	59.1	59.0	63.1	65.4	66.3	67.0	67.9	82.1	16.7	72.7
p	(0.057)	(0.027)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.751)	(0.000)	n.a.	(0.000)
Model 5Y	52.2	53.6	58.5	58.1	65.8	65.7	65.4	63.4	61.9	90.5	16.7	71.8
p	(0.090)	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.957)	(0.000)	n.a.	(0.000)
Model 10Y	52.5	52.8	57.7	56.7	58.4	56.0	53.0	49.2	59.5	59.5	16.7	68.2
p	(0.033)	(0.016)	(0.000)	(0.000)	(0.001)	(0.088)	(0.685)	(0.954)	(0.977)	(0.000)	n.a.	(0.000)
Combined	52.2	53.1	58.5	57.5	65.2	64.5	62.5	59.4	61.9	85.7	16.7	71.8
p	(0.079)	(0.024)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.957)	(0.000)	n.a.	(0.000)
Correct sign prediction compared to the forward rate, %												
Model 3Y	56.6	56.9	62.7	67.2	75.2	74.9	72.1	68.6	65.5	83.3	43.8	89.1
p	(0.006)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.032)	(0.000)
Model 5Y	58.8	57.2	62.5	68.7	75.2	76.5	71.4	65.3	59.5	92.9	39.6	92.7
p	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.144)	(0.000)	(0.047)	(0.000)
Model 10Y	59.1	59.4	66.1	69.2	71.1	67.3	66.3	56.1	48.8	84.5	39.6	80.0
p	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.015)	(0.757)	(0.000)	(0.047)	(0.000)
Combined	59.1	57.5	63.0	69.5	74.3	75.5	71.1	63.7	57.1	92.9	39.6	91.8
p	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.282)	(0.000)	(0.047)	(0.000)
Mean annualized profit, % per year												
Carry trade	5.2	5.5	5.2	4.6	3.2	2.6	2.1	1.6	0.4	6.4	4.7	0.6
p (=0)	(0.009)	(0.003)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.007)	(0.304)	(0.000)	(0.000)	(0.335)
Model 3Y	4.2	4.1	4.4	4.7	4.7	3.9	3.2	2.2	1.3	7.4	-0.6	5.5
p (=0)	(0.027)	(0.020)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.053)	(0.000)	(0.656)	(0.000)
p (=CT)	(0.693)	(0.784)	(0.716)	(0.482)	(0.037)	(0.015)	(0.048)	(0.185)	(0.087)	(0.001)	(1.000)	(0.000)
Model 5Y	5.1	4.6	4.8	5.3	5.1	3.9	3.0	1.8	0.5	8.4	-1.1	5.5
p (=0)	(0.011)	(0.009)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.215)	(0.000)	(0.770)	(0.000)
p (=CT)	(0.516)	(0.687)	(0.603)	(0.301)	(0.010)	(0.020)	(0.094)	(0.402)	(0.445)	(0.000)	(1.000)	(0.000)
Model 10Y	5.9	5.6	5.6	5.2	4.8	3.0	2.1	0.9	-0.5	6.2	-1.1	5.2
p (=0)	(0.003)	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.002)	(0.094)	(0.744)	(0.000)	(0.770)	(0.000)
p (=CT)	(0.356)	(0.468)	(0.410)	(0.338)	(0.040)	(0.321)	(0.517)	(0.819)	(0.777)	(0.579)	(1.000)	(0.000)
Combined	5.3	4.8	5.0	5.3	5.0	3.9	2.9	1.7	0.2	8.4	-1.1	5.5
p (=0)	(0.010)	(0.007)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.381)	(0.000)	(0.770)	(0.000)
p (=CT)	(0.469)	(0.643)	(0.569)	(0.287)	(0.015)	(0.031)	(0.126)	(0.484)	(0.590)	(0.000)	(1.000)	(0.000)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

NZD/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	100.78	102.15	103.58	107.68	114.44	119.58	123.04	125.75	108.17	116.67	170.91	131.10
p	(0.769)	(0.764)	(0.780)	(0.900)	(0.983)	(0.995)	(0.997)	(0.996)	(0.737)	(0.991)	(0.984)	(0.929)
Model 3Y	101.64	104.59	104.31	100.73	88.81	79.77	74.04	75.19	97.66	50.58	266.69	111.82
p (CW)	(0.205)	(0.194)	(0.100)	(0.029)	(0.002)	(0.000)	(0.000)	(0.000)	(0.044)	(0.000)	(0.574)	(0.032)
Model 5Y	100.75	102.65	102.86	102.33	98.93	98.16	98.24	102.22	175.42	59.61	241.60	103.64
p (CW)	(0.104)	(0.125)	(0.085)	(0.042)	(0.010)	(0.006)	(0.004)	(0.004)	(0.598)	(0.000)	(0.554)	(0.022)
Model 10Y	100.52	102.18	103.46	106.16	110.81	118.71	123.70	128.65	253.89	76.01	190.78	88.59
p (CW)	(0.094)	(0.131)	(0.123)	(0.120)	(0.111)	(0.193)	(0.218)	(0.170)	(0.951)	(0.000)	(0.585)	(0.009)
Combined	100.72	102.44	102.44	101.41	97.16	96.08	95.58	98.43	168.30	60.52	230.08	99.66
p (CW)	(0.126)	(0.143)	(0.093)	(0.045)	(0.009)	(0.006)	(0.004)	(0.003)	(0.577)	(0.000)	(0.570)	(0.020)
Correct sign prediction compared to the spot rate, %												
Forward	44.8	43.1	42.3	40.7	49.0	47.1	43.8	42.2	50.0	36.9	37.5	56.4
p	(0.870)	(0.995)	(1.000)	(1.000)	(0.997)	(0.981)	(0.871)	n.o.	n.a.	(0.993)	n.a.	n.a.
Model 3Y	49.7	49.7	52.1	52.1	58.7	58.4	59.0	63.0	54.8	67.9	37.5	62.7
p	(0.160)	(0.239)	(0.038)	(0.022)	(0.000)	(0.000)	(0.000)	(0.000)	(0.020)	(0.002)	n.a.	(0.000)
Model 5Y	48.3	48.9	52.1	52.1	59.6	60.6	57.1	55.4	50.0	81.0	37.5	62.7
p	(0.252)	(0.285)	(0.015)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.000)	n.a.	(0.000)
Model 10Y	48.6	50.3	52.7	53.3	62.2	59.0	55.2	53.1	50.0	76.2	37.5	61.8
p	(0.109)	(0.044)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.000)	n.a.	(0.000)
Combined	48.6	48.9	51.5	51.0	59.6	59.6	57.5	56.8	50.0	77.4	37.5	62.7
p	(0.225)	(0.294)	(0.033)	(0.032)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.000)	n.a.	(0.000)
Correct sign prediction compared to the forward rate, %												
Model 3Y	49.7	50.3	50.4	54.1	55.2	59.0	66.3	68.0	66.7	72.6	20.8	60.0
p	(0.200)	(0.181)	(0.094)	(0.003)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.312)	(0.000)
Model 5Y	48.1	48.6	49.0	50.4	52.8	56.3	61.9	64.4	41.7	78.6	29.2	62.7
p	(0.209)	(0.212)	(0.061)	(0.017)	(0.004)	(0.000)	(0.000)	(0.000)	(0.016)	(0.000)	(0.126)	(0.000)
Model 10Y	53.6	54.4	54.3	58.4	61.4	63.6	63.2	61.7	35.7	86.9	43.8	76.4
p	(0.003)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.472)	(0.000)	(0.026)	(0.000)
Combined	48.9	50.3	49.6	51.9	54.0	58.1	63.5	67.7	42.9	78.6	29.2	67.3
p	(0.163)	(0.091)	(0.059)	(0.011)	(0.001)	(0.000)	(0.000)	(0.000)	(0.012)	(0.000)	(0.126)	(0.000)
Mean annualized profit, % per year												
Carry trade	3.7	3.9	4.3	3.7	3.3	3.0	2.9	2.7	2.3	4.6	2.7	2.5
p (=0)	(0.052)	(0.031)	(0.011)	(0.008)	(0.002)	(0.001)	(0.000)	(0.000)	(0.042)	(0.025)	(0.007)	(0.017)
Model 3Y	0.5	0.0	1.5	2.2	2.2	2.3	2.9	2.6	2.1	7.4	-2.3	0.8
p (=0)	(0.400)	(0.494)	(0.182)	(0.063)	(0.024)	(0.006)	(0.000)	(0.000)	(0.041)	(0.000)	(0.990)	(0.226)
p (=CT)	(0.866)	(0.939)	(0.879)	(0.761)	(0.788)	(0.742)	(0.480)	(0.567)	(0.553)	(0.013)	(0.992)	(0.865)
Model 5Y	-0.4	-0.3	0.5	1.2	1.9	2.0	2.4	2.2	-1.5	8.4	-1.4	1.6
p (=0)	(0.568)	(0.552)	(0.386)	(0.200)	(0.039)	(0.013)	(0.002)	(0.001)	(0.875)	(0.000)	(0.938)	(0.044)
p (=CT)	(0.925)	(0.950)	(0.957)	(0.895)	(0.835)	(0.809)	(0.696)	(0.754)	(0.930)	(0.001)	(0.986)	(0.759)
Model 10Y	2.7	2.0	2.0	2.8	3.3	2.9	2.4	1.6	-2.3	9.3	0.2	3.5
p (=0)	(0.122)	(0.165)	(0.139)	(0.027)	(0.002)	(0.001)	(0.001)	(0.016)	(0.968)	(0.000)	(0.414)	(0.000)
p (=CT)	(0.650)	(0.805)	(0.864)	(0.677)	(0.498)	(0.523)	(0.676)	(0.909)	(0.965)	(0.000)	(0.942)	(0.063)
Combined	-0.2	0.2	0.2	1.5	2.1	2.2	2.5	2.4	-1.4	8.2	-1.4	2.2
p (=0)	(0.529)	(0.461)	(0.457)	(0.144)	(0.027)	(0.008)	(0.001)	(0.000)	(0.871)	(0.000)	(0.938)	(0.009)
p (=CT)	(0.922)	(0.934)	(0.970)	(0.870)	(0.801)	(0.768)	(0.652)	(0.652)	(0.929)	(0.001)	(0.986)	(0.580)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

NOK/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	99.46	99.84	100.52	102.51	106.66	111.25	111.17	106.04	111.58	144.75	88.99	87.92
p	(0.359)	(0.478)	(0.549)	(0.669)	(0.846)	(0.945)	(0.945)	(0.792)	(0.772)	(1.000)	(0.112)	(0.018)
Model 3Y	99.82	99.10	97.71	94.05	85.59	74.92	66.05	62.38	51.10	60.45	220.13	70.59
p (CW)	(0.160)	(0.127)	(0.094)	(0.024)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.955)	(0.001)
Model 5Y	99.56	98.77	97.19	93.21	84.87	75.30	66.73	63.87	56.92	59.09	237.74	67.55
p (CW)	(0.106)	(0.104)	(0.076)	(0.019)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.964)	(0.000)
Model 10Y	99.54	99.07	97.73	94.68	88.69	81.30	75.06	74.19	70.61	68.30	272.71	63.35
p (CW)	(0.106)	(0.121)	(0.083)	(0.028)	(0.003)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.978)	(0.000)
Combined	99.61	98.90	97.39	93.69	85.87	76.50	68.56	66.09	58.79	61.72	242.79	66.70
p (CW)	(0.119)	(0.115)	(0.082)	(0.022)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.968)	(0.000)
Correct sign prediction compared to the spot rate, %												
Forward	47.8	46.4	47.9	50.1	46.0	48.3	51.4	61.7	54.8	20.2	60.4	59.1
p	(0.805)	(0.942)	(0.827)	(0.726)	(0.989)	(0.933)	(0.776)	(0.000)	(0.970)	(1.000)	(0.153)	(0.206)
Model 3Y	45.3	47.5	45.7	52.1	57.8	67.0	72.4	72.9	79.8	78.6	35.4	61.8
p	(0.966)	(0.860)	(0.961)	(0.430)	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.054)
Model 5Y	47.2	48.1	46.8	53.8	59.9	68.5	72.4	71.6	77.4	84.5	35.4	63.6
p	(0.860)	(0.817)	(0.913)	(0.229)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	n.a.	(0.021)
Model 10Y	48.6	52.8	54.6	65.0	66.7	66.7	67.0	64.7	76.2	75.0	35.4	67.3
p	(0.715)	(0.142)	(0.020)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	n.a.	(0.010)
Combined	45.9	47.8	47.9	55.3	60.8	67.3	69.8	70.0	77.4	81.0	35.4	62.7
p	(0.953)	(0.854)	(0.826)	(0.112)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	n.a.	(0.038)
Correct sign prediction compared to the forward rate, %												
Model 3Y	48.6	51.9	52.7	57.0	61.1	67.9	74.0	78.5	83.3	84.5	37.5	56.4
p	(0.703)	(0.230)	(0.156)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.184)
Model 5Y	49.4	54.2	53.8	59.0	63.1	68.8	73.0	75.6	79.8	89.3	37.5	58.2
p	(0.563)	(0.055)	(0.069)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.133)
Model 10Y	51.7	55.0	54.3	61.8	68.4	68.5	70.5	71.9	75.0	77.4	37.5	70.0
p	(0.169)	(0.020)	(0.028)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.000)
Combined	48.9	53.9	53.5	61.0	64.9	67.3	71.4	73.9	78.6	85.7	37.5	57.3
p	(0.630)	(0.065)	(0.083)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	(0.200)
Mean annualized profit, % per year												
Carry trade	2.5	1.7	1.4	1.1	1.5	1.2	1.1	0.2	1.8	5.9	-0.6	-2.1
p (=0)	(0.121)	(0.183)	(0.209)	(0.193)	(0.057)	(0.070)	(0.069)	(0.364)	(0.018)	(0.000)	(0.761)	(0.958)
Model 3Y	0.4	0.8	1.8	2.4	2.8	3.2	3.4	3.4	3.2	6.4	-1.8	3.0
p (=0)	(0.423)	(0.312)	(0.129)	(0.026)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.973)	(0.004)
p (=CT)	(0.830)	(0.644)	(0.421)	(0.206)	(0.101)	(0.009)	(0.001)	(0.000)	(0.005)	(0.151)	(0.880)	(0.012)
Model 5Y	1.3	1.7	2.2	2.7	3.2	3.3	3.4	3.3	2.8	6.9	-1.8	3.2
p (=0)	(0.243)	(0.172)	(0.092)	(0.012)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.973)	(0.002)
p (=CT)	(0.692)	(0.508)	(0.366)	(0.148)	(0.046)	(0.006)	(0.001)	(0.000)	(0.078)	(0.000)	(0.880)	(0.009)
Model 10Y	2.4	2.2	2.9	3.5	3.6	3.1	3.1	3.0	2.2	6.0	-1.8	3.7
p (=0)	(0.109)	(0.125)	(0.040)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.973)	(0.000)
p (=CT)	(0.503)	(0.429)	(0.266)	(0.082)	(0.021)	(0.013)	(0.005)	(0.000)	(0.332)	(0.452)	(0.880)	(0.003)
Combined	0.7	1.9	2.1	3.1	3.4	3.1	3.3	3.2	2.6	6.7	-1.8	3.1
p (=0)	(0.342)	(0.156)	(0.102)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.973)	(0.003)
p (=CT)	(0.779)	(0.473)	(0.379)	(0.108)	(0.027)	(0.010)	(0.002)	(0.000)	(0.131)	(0.002)	(0.880)	(0.011)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

SEK/USD	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	99.45	99.03	99.20	98.91	99.91	94.29	93.23	87.13	56.57	118.66	98.30	101.59
p	(0.383)	(0.405)	(0.442)	(0.441)	(0.495)	(0.240)	(0.151)	(0.030)	(0.009)	(1.000)	(0.464)	(0.621)
Model 3Y	102.17	100.41	96.13	95.53	94.11	91.87	81.60	76.75	92.68	96.49	159.42	71.75
p (CW)	(0.554)	(0.163)	(0.058)	(0.031)	(0.008)	(0.002)	(0.000)	(0.000)	(0.017)	(0.135)	(0.659)	(0.002)
Model 5Y	100.81	99.94	94.42	88.40	78.60	79.88	73.87	74.68	95.89	53.77	322.55	58.12
p (CW)	(0.276)	(0.107)	(0.014)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.131)	(0.000)	(0.777)	(0.001)
Model 10Y	99.07	97.58	94.87	90.41	85.00	92.60	95.20	99.19	116.75	69.96	286.18	63.79
p (CW)	(0.042)	(0.034)	(0.018)	(0.003)	(0.000)	(0.003)	(0.005)	(0.010)	(0.718)	(0.000)	(0.763)	(0.001)
Combined	100.24	98.43	93.94	89.81	83.69	85.14	80.06	79.98	99.60	70.53	247.33	61.48
p (CW)	(0.265)	(0.061)	(0.015)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.207)	(0.000)	(0.751)	(0.001)
Correct sign prediction compared to the spot rate, %												
Forward	46.1	42.5	35.0	39.9	41.3	46.5	54.9	67.0	73.8	20.2	41.7	47.3
p	(0.939)	(0.998)	(1.000)	(1.000)	(1.000)	(0.991)	(0.241)	(0.000)	(0.859)	(1.000)	(0.940)	(0.902)
Model 3Y	54.1	51.7	51.5	51.6	54.3	56.0	57.1	65.7	57.1	56.0	45.8	60.0
p	(0.051)	(0.258)	(0.295)	(0.244)	(0.049)	(0.014)	(0.009)	(0.000)	(0.005)	(0.500)	n.a.	(0.077)
Model 5Y	56.9	55.6	54.3	58.4	66.4	65.7	63.5	67.0	51.2	92.9	45.8	65.5
p	(0.005)	(0.017)	(0.041)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.692)	(0.000)	n.a.	(0.045)
Model 10Y	56.4	57.2	58.3	61.5	67.3	62.4	58.1	56.4	46.4	76.2	45.8	71.8
p	(0.006)	(0.001)	(0.000)	(0.000)	(0.000)	(0.003)	(0.091)	(0.455)	(0.106)	(0.000)	n.a.	(0.000)
Combined	57.7	55.3	54.6	59.8	66.7	64.5	63.2	63.4	47.6	92.9	45.8	64.5
p	(0.002)	(0.022)	(0.033)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.469)	(0.000)	n.a.	(0.082)
Correct sign prediction compared to the forward rate, %												
Model 3Y	55.0	56.1	54.3	56.4	57.5	57.2	67.3	72.3	46.4	66.7	60.4	56.4
p	(0.027)	(0.011)	(0.054)	(0.007)	(0.001)	(0.001)	(0.000)	(0.000)	(0.029)	(0.000)	(0.025)	(0.235)
Model 5Y	59.4	60.0	62.2	66.4	69.0	68.8	69.2	70.0	46.4	95.2	54.2	71.8
p	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.057)	(0.000)	n.a.	(0.000)
Model 10Y	59.7	61.9	65.8	68.1	68.4	65.4	67.0	69.0	47.6	85.7	54.2	68.2
p	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	(0.000)	n.a.	(0.000)
Combined	59.9	62.2	64.1	67.8	70.2	68.8	69.8	70.6	47.6	94.0	54.2	71.8
p	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	(0.000)	n.a.	(0.000)
Mean annualized profit, % per year												
Carry trade	4.8	3.5	4.1	2.9	2.6	1.6	1.1	0.1	-0.1	5.6	1.0	0.3
p (=0)	(0.016)	(0.049)	(0.011)	(0.018)	(0.004)	(0.012)	(0.032)	(0.434)	(0.541)	(0.000)	(0.115)	(0.405)
Model 3Y	2.7	4.1	4.5	3.0	2.1	1.7	2.3	2.3	0.5	3.2	0.2	2.3
p (=0)	(0.114)	(0.016)	(0.004)	(0.016)	(0.016)	(0.003)	(0.000)	(0.000)	(0.305)	(0.009)	(0.432)	(0.010)
p (=CT)	(0.756)	(0.422)	(0.441)	(0.483)	(0.701)	(0.446)	(0.045)	(0.000)	(0.186)	(0.967)	(0.888)	(0.126)
Model 5Y	5.2	3.6	4.8	4.6	4.1	3.1	2.8	2.2	0.4	7.6	-0.3	3.4
p (=0)	(0.014)	(0.041)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.329)	(0.000)	(0.608)	(0.000)
p (=CT)	(0.450)	(0.485)	(0.380)	(0.140)	(0.029)	(0.011)	(0.004)	(0.000)	(0.252)	(0.000)	(0.935)	(0.017)
Model 10Y	4.6	5.2	5.5	5.0	3.9	2.8	2.3	2.0	0.7	6.4	-0.3	3.0
p (=0)	(0.018)	(0.005)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.242)	(0.000)	(0.608)	(0.001)
p (=CT)	(0.541)	(0.259)	(0.265)	(0.083)	(0.041)	(0.038)	(0.023)	(0.000)	(0.091)	(0.014)	(0.935)	(0.046)
Combined	5.2	5.2	5.1	4.8	4.2	3.2	2.8	2.2	0.7	7.6	-0.3	3.4
p (=0)	(0.013)	(0.005)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.242)	(0.000)	(0.608)	(0.000)
p (=CT)	(0.457)	(0.269)	(0.326)	(0.117)	(0.016)	(0.007)	(0.004)	(0.000)	(0.091)	(0.000)	(0.935)	(0.017)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

GBP/DEM	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	101.19	102.85	104.67	106.65	108.18	104.02	99.58	100.91	120.64	149.84	73.92	81.50
p	(0.931)	(0.905)	(0.922)	(0.923)	(0.885)	(0.681)	(0.482)	(0.533)	(0.954)	(0.983)	(0.000)	(0.008)
Model 3Y	99.93	99.71	99.44	98.97	98.28	96.64	97.45	100.34	103.18	69.09	96.07	99.33
p (CW)	(0.237)	(0.185)	(0.144)	(0.089)	(0.050)	(0.018)	(0.034)	(0.138)	(0.761)	(0.001)	(0.009)	(0.097)
Model 5Y	99.80	99.20	98.32	96.78	94.00	91.26	90.47	91.81	93.33	73.63	87.25	103.08
p (CW)	(0.143)	(0.082)	(0.045)	(0.013)	(0.001)	(0.000)	(0.000)	(0.001)	(0.005)	(0.006)	(0.000)	(0.166)
Model 10Y	100.04	99.14	97.72	95.44	94.12	97.16	100.61	108.15	100.62	142.57	67.63	104.11
p (CW)	(0.123)	(0.052)	(0.026)	(0.005)	(0.004)	(0.022)	(0.042)	(0.089)	(0.277)	(0.147)	(0.000)	(0.607)
Combined	99.81	99.04	97.96	96.27	94.19	93.10	93.64	96.50	97.88	87.71	82.80	100.33
p (CW)	(0.131)	(0.063)	(0.032)	(0.008)	(0.002)	(0.004)	(0.008)	(0.033)	(0.237)	(0.030)	(0.000)	(0.164)
Correct sign prediction compared to the spot rate, %												
Forward	52.2	48.3	51.8	57.5	55.2	59.3	65.1	67.0	51.2	47.6	97.9	57.3
p	(0.152)	(0.593)	(0.166)	(0.001)	(0.142)	(0.010)	(0.000)	(0.000)	(0.947)	n.a.	n.a.	(0.000)
Model 3Y	50.8	53.3	54.1	51.0	61.1	60.9	56.2	55.8	59.5	61.9	70.8	56.4
p	(0.344)	(0.129)	(0.053)	(0.255)	(0.000)	(0.000)	(0.040)	(0.163)	(0.062)	(0.000)	(0.065)	(0.183)
Model 5Y	53.0	56.4	57.4	55.8	61.9	64.2	61.0	60.1	70.2	51.2	95.8	56.4
p	(0.097)	(0.009)	(0.002)	(0.007)	(0.000)	(0.000)	(0.001)	(0.038)	(0.000)	(0.045)	(0.559)	(0.183)
Model 10Y	53.3	54.2	56.3	62.4	58.4	57.8	55.2	60.1	54.8	47.6	97.9	50.0
p	(0.097)	(0.062)	(0.008)	(0.000)	(0.003)	(0.057)	(0.767)	(0.960)	n.a.	n.a.	n.a.	(0.654)
Combined	53.3	53.9	56.0	55.3	58.7	59.6	59.0	60.7	52.4	47.6	97.9	57.3
p	(0.093)	(0.082)	(0.011)	(0.025)	(0.002)	(0.003)	(0.018)	(0.058)	(0.905)	n.a.	n.a.	(0.098)
Correct sign prediction compared to the forward rate, %												
Model 3Y	53.9	56.4	56.9	62.4	65.8	62.7	57.1	53.5	61.9	96.4	25.0	54.5
p	(0.151)	(0.050)	(0.079)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	n.a.	n.a.
Model 5Y	54.7	57.2	56.9	64.4	66.1	64.5	57.8	52.8	67.9	96.4	27.1	54.5
p	(0.069)	(0.018)	(0.075)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.278)	n.a.
Model 10Y	54.7	52.8	53.8	63.0	67.6	59.3	52.1	55.4	73.8	53.6	70.8	48.2
p	(0.070)	(0.359)	(0.211)	(0.000)	(0.000)	(0.000)	(0.346)	(0.254)	(0.000)	(0.004)	(0.007)	(0.986)
Combined	54.4	57.2	56.0	63.2	66.7	63.3	55.2	51.5	69.0	90.5	27.1	54.5
p	(0.094)	(0.018)	(0.128)	(0.000)	(0.000)	(0.000)	(0.003)	(0.033)	(0.000)	(0.000)	(0.278)	n.a.
Mean annualized profit, % per year												
Carry trade	1.0	0.6	0.7	0.1	0.3	0.1	-0.1	0.3	2.0	1.1	-4.0	-0.2
p (=0)	(0.241)	(0.321)	(0.270)	(0.480)	(0.372)	(0.439)	(0.593)	(0.243)	(0.082)	(0.082)	(1.000)	(0.650)
Model 3Y	1.3	1.3	1.6	1.3	1.3	1.0	0.7	0.6	3.0	3.4	-4.0	0.1
p (=0)	(0.199)	(0.173)	(0.089)	(0.110)	(0.049)	(0.044)	(0.109)	(0.089)	(0.009)	(0.000)	(1.000)	(0.424)
p (=CT)	(0.410)	(0.146)	(0.057)	(0.009)	(0.000)	(0.000)	(0.001)	(0.090)	(0.004)	(0.000)	n.a.	(0.046)
Model 5Y	1.5	1.6	2.0	1.6	1.4	1.3	0.7	0.6	3.8	3.4	-3.8	0.1
p (=0)	(0.151)	(0.113)	(0.044)	(0.048)	(0.029)	(0.016)	(0.075)	(0.109)	(0.001)	(0.000)	(1.000)	(0.424)
p (=CT)	(0.339)	(0.088)	(0.029)	(0.003)	(0.000)	(0.000)	(0.003)	(0.199)	(0.001)	(0.000)	(0.021)	(0.046)
Model 10Y	0.6	0.7	1.4	2.2	2.4	1.5	0.8	0.2	3.9	0.2	3.4	-0.3
p (=0)	(0.333)	(0.295)	(0.108)	(0.013)	(0.000)	(0.005)	(0.062)	(0.285)	(0.000)	(0.388)	(0.003)	(0.681)
p (=CT)	(0.605)	(0.486)	(0.269)	(0.034)	(0.010)	(0.045)	(0.089)	(0.550)	(0.053)	(0.750)	(0.000)	(0.514)
Combined	1.2	2.0	1.7	1.5	1.6	1.3	0.6	0.5	4.0	3.1	-3.8	0.1
p (=0)	(0.191)	(0.063)	(0.069)	(0.059)	(0.015)	(0.016)	(0.115)	(0.129)	(0.000)	(0.000)	(1.000)	(0.424)
p (=CT)	(0.440)	(0.115)	(0.092)	(0.012)	(0.000)	(0.000)	(0.033)	(0.285)	(0.001)	(0.000)	(0.021)	(0.046)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

JPY/DEM	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	99.84	99.49	99.29	99.24	99.86	103.69	110.54	122.92	91.20	134.92	91.74	88.50
p	(0.422)	(0.405)	(0.425)	(0.444)	(0.493)	(0.635)	(0.766)	(0.878)	(0.288)	(0.954)	(0.340)	(0.115)
Model 3Y	99.87	99.78	99.13	98.07	96.06	92.59	89.56	88.28	109.60	99.36	83.16	75.34
p (CW)	(0.270)	(0.315)	(0.229)	(0.154)	(0.064)	(0.008)	(0.001)	(0.003)	(0.804)	(0.279)	(0.004)	(0.000)
Model 5Y	99.95	100.08	99.78	99.21	98.06	95.45	92.94	92.23	112.43	102.15	84.24	79.36
p (CW)	(0.335)	(0.405)	(0.323)	(0.244)	(0.138)	(0.037)	(0.011)	(0.017)	(0.890)	(0.418)	(0.002)	(0.000)
Model 10Y	100.15	100.65	100.90	101.27	102.18	102.15	101.53	102.62	115.75	110.41	86.91	89.75
p (CW)	(0.494)	(0.582)	(0.518)	(0.466)	(0.447)	(0.364)	(0.253)	(0.255)	(0.924)	(0.758)	(0.002)	(0.000)
Combined	99.98	100.14	99.88	99.42	98.59	96.48	94.35	93.91	112.33	103.85	84.73	80.99
p (CW)	(0.358)	(0.426)	(0.339)	(0.261)	(0.167)	(0.061)	(0.024)	(0.032)	(0.890)	(0.515)	(0.003)	(0.000)
Correct sign prediction compared to the spot rate, %												
Forward	50.8	47.2	48.2	47.9	51.0	50.8	49.5	54.5	63.1	36.9	56.3	49.1
p	(0.084)	(0.757)	(0.824)	(0.821)	(0.394)	(0.909)	(1.000)	(0.964)	n.a.	n.a.	n.a.	(0.761)
Model 3Y	51.7	52.2	55.7	59.5	64.6	68.5	71.1	65.0	52.4	60.7	85.4	80.0
p	(0.426)	(0.265)	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.694)	(0.000)	(0.000)
Model 5Y	51.4	52.8	54.6	55.8	58.1	66.1	70.2	62.7	44.0	59.5	83.3	80.9
p	(0.417)	(0.184)	(0.033)	(0.012)	(0.001)	(0.000)	(0.000)	(0.000)	(0.065)	(0.913)	(0.000)	(0.000)
Model 10Y	49.2	48.9	50.7	51.9	53.4	62.4	69.5	62.0	41.7	59.5	77.1	74.5
p	(0.737)	(0.727)	(0.380)	(0.241)	(0.085)	(0.000)	(0.000)	(0.000)	(0.142)	(0.913)	(0.000)	(0.000)
Combined	49.7	51.1	53.2	53.8	55.2	64.5	70.2	65.0	44.0	60.7	77.1	78.2
p	(0.676)	(0.405)	(0.098)	(0.070)	(0.019)	(0.000)	(0.000)	(0.000)	(0.065)	(0.865)	(0.000)	(0.000)
Correct sign prediction compared to the forward rate, %												
Model 3Y	57.7	60.3	61.1	65.0	59.0	61.8	64.4	68.3	51.2	65.5	45.8	74.5
p	(0.052)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.080)	n.a.	n.a.	(0.000)
Model 5Y	55.8	59.2	59.1	63.0	56.3	59.6	63.8	67.3	51.2	65.5	45.8	68.2
p	(0.175)	(0.002)	(0.001)	(0.000)	(0.018)	(0.000)	(0.000)	(0.000)	(0.080)	n.a.	n.a.	(0.000)
Model 10Y	54.1	56.9	58.0	61.5	55.2	58.1	64.4	66.0	50.0	65.5	45.8	64.5
p	(0.400)	(0.030)	(0.005)	(0.000)	(0.063)	(0.000)	(0.000)	(0.000)	(0.162)	n.a.	n.a.	(0.001)
Combined	55.2	58.1	58.8	62.4	56.0	59.0	64.1	67.3	50.0	65.5	45.8	67.3
p	(0.237)	(0.009)	(0.001)	(0.000)	(0.026)	(0.000)	(0.000)	(0.000)	(0.162)	n.a.	n.a.	(0.000)
Mean annualized profit, % per year												
Carry trade	-0.6	0.0	0.0	-0.3	0.9	1.2	1.8	1.9	-0.1	4.1	1.1	0.1
p (=0)	(0.597)	(0.504)	(0.502)	(0.580)	(0.213)	(0.094)	(0.009)	(0.001)	(0.534)	(0.009)	(0.282)	(0.458)
Model 3Y	3.3	2.4	1.9	2.3	2.0	2.0	1.9	2.0	0.4	4.1	1.1	1.9
p (=0)	(0.078)	(0.119)	(0.147)	(0.057)	(0.034)	(0.015)	(0.005)	(0.000)	(0.385)	(0.009)	(0.282)	(0.050)
p (=CT)	(0.010)	(0.047)	(0.069)	(0.010)	(0.021)	(0.004)	(0.024)	(0.033)	(0.137)	n.a.	n.a.	(0.004)
Model 5Y	2.1	1.6	1.4	1.7	1.8	1.9	1.8	2.0	0.4	4.1	1.1	1.8
p (=0)	(0.182)	(0.220)	(0.214)	(0.121)	(0.055)	(0.017)	(0.007)	(0.000)	(0.385)	(0.009)	(0.282)	(0.062)
p (=CT)	(0.042)	(0.095)	(0.115)	(0.025)	(0.046)	(0.006)	(0.066)	(0.051)	(0.137)	n.a.	n.a.	(0.007)
Model 10Y	0.6	0.8	0.9	1.2	1.6	1.7	1.9	2.0	0.1	4.1	1.1	1.5
p (=0)	(0.393)	(0.349)	(0.303)	(0.208)	(0.079)	(0.027)	(0.006)	(0.001)	(0.469)	(0.009)	(0.282)	(0.095)
p (=CT)	(0.075)	(0.191)	(0.177)	(0.047)	(0.065)	(0.016)	(0.043)	(0.168)	(0.154)	n.a.	n.a.	(0.017)
Combined	2.0	1.2	1.4	1.5	1.7	1.8	1.9	2.0	0.1	4.1	1.1	1.8
p (=0)	(0.198)	(0.277)	(0.226)	(0.144)	(0.060)	(0.022)	(0.005)	(0.000)	(0.469)	(0.009)	(0.282)	(0.067)
p (=CT)	(0.050)	(0.150)	(0.125)	(0.034)	(0.053)	(0.010)	(0.028)	(0.051)	(0.154)	n.a.	n.a.	(0.008)

Table A3 continued: Out-of-sample forecast evaluation, baseline results

CHF/DEM	Full sample, different forecast horizons								Different samples, 36M forecast horizon			
	1M	3M	6M	12M	24M	36M	48M	60M	1993-99	2000-06	2007-10	2011-20
Mean squared forecast error (MSFE), random walk without drift = 100												
Forward	100.27	100.23	100.87	100.18	94.93	86.23	76.75	72.65	113.67	123.93	84.58	78.48
p	(0.674)	(0.550)	(0.619)	(0.518)	(0.224)	(0.068)	(0.015)	(0.007)	(0.649)	(0.754)	(0.230)	(0.003)
Model 3Y	102.31	107.36	112.48	119.37	122.90	122.56	121.09	118.58	50.94	131.33	83.14	140.00
p (CW)	(0.725)	(0.751)	(0.763)	(0.819)	(0.873)	(0.865)	(0.816)	(0.821)	(0.004)	(0.214)	(0.003)	(1.000)
Model 5Y	102.06	106.91	111.12	114.67	111.90	109.19	107.41	104.87	42.95	101.24	76.57	126.44
p (CW)	(0.737)	(0.789)	(0.775)	(0.750)	(0.607)	(0.496)	(0.436)	(0.388)	(0.003)	(0.093)	(0.007)	(1.000)
Model 10Y	100.09	100.47	100.49	98.77	92.52	86.52	79.80	76.26	87.76	85.95	88.12	86.04
p (CW)	(0.393)	(0.431)	(0.339)	(0.092)	(0.003)	(0.000)	(0.000)	(0.000)	(0.021)	(0.035)	(0.081)	(0.001)
Combined	101.12	103.76	105.99	107.83	105.25	101.86	98.17	95.49	51.08	85.64	80.45	115.46
p (CW)	(0.702)	(0.749)	(0.739)	(0.717)	(0.502)	(0.262)	(0.100)	(0.034)	(0.003)	(0.011)	(0.012)	(0.999)
Correct sign prediction compared to the spot rate, %												
Forward	50.6	51.9	48.7	56.4	55.2	63.3	78.4	87.1	60.7	52.4	56.3	76.4
p	(0.942)	(0.932)	(0.956)	(0.660)	(0.860)	(0.776)	n.o.	n.o.	n.a.	n.a.	n.a.	(1.000)
Model 3Y	49.4	48.6	47.1	44.7	47.5	44.3	41.0	35.0	70.2	51.2	70.8	7.3
p	(0.449)	(0.481)	(0.549)	(0.531)	(0.454)	(0.451)	(0.009)	(0.001)	(0.000)	(0.045)	(0.000)	(1.000)
Model 5Y	48.3	46.1	45.7	45.6	52.8	50.2	49.8	45.9	71.4	58.3	81.3	13.6
p	(0.631)	(0.845)	(0.783)	(0.481)	(0.018)	(0.036)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(1.000)
Model 10Y	50.0	47.8	48.7	53.6	56.0	62.4	78.1	87.1	60.7	52.4	56.3	73.6
p	(0.646)	(0.956)	(0.975)	(0.963)	(0.324)	(0.936)	(0.701)	n.a.	n.a.	n.a.	n.a.	(0.995)
Combined	49.2	46.4	44.5	42.7	46.9	53.8	60.3	66.7	67.9	71.4	87.5	14.5
p	(0.512)	(0.837)	(0.921)	(0.946)	(0.778)	(0.038)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(1.000)
Correct sign prediction compared to the forward rate, %												
Model 3Y	50.8	51.9	48.5	45.6	48.7	49.5	49.5	55.8	85.7	66.7	56.3	6.4
p	(0.583)	(0.472)	(0.766)	(0.932)	(0.970)	(0.991)	(0.942)	(0.155)	(0.000)	n.a.	n.a.	(1.000)
Model 5Y	52.8	51.9	50.4	45.3	53.4	54.7	53.3	56.8	88.1	66.7	56.3	19.1
p	(0.225)	(0.532)	(0.435)	(0.954)	(0.328)	(0.353)	(0.132)	(0.035)	(0.000)	n.a.	n.a.	(1.000)
Model 10Y	52.8	56.7	50.7	50.4	57.8	62.7	61.6	64.7	76.2	67.9	56.3	50.9
p	(0.226)	(0.005)	(0.395)	(0.266)	(0.003)	(0.000)	(0.000)	(0.000)	(0.008)	(0.076)	n.a.	(0.123)
Combined	52.5	51.4	51.0	44.2	51.0	52.9	53.3	56.4	83.3	66.7	56.3	17.3
p	(0.276)	(0.665)	(0.334)	(0.989)	(0.803)	(0.787)	(0.132)	(0.060)	(0.000)	n.a.	n.a.	(1.000)
Mean annualized profit, % per year												
Carry trade	0.1	-0.1	0.8	0.0	-0.1	-0.3	-0.3	-0.3	0.9	1.1	0.1	-2.3
p (=0)	(0.461)	(0.525)	(0.164)	(0.483)	(0.599)	(0.740)	(0.815)	(0.833)	(0.006)	(0.003)	(0.435)	(1.000)
Model 3Y	-1.6	-1.0	-1.1	-0.9	-0.6	-0.5	-0.4	-0.3	1.4	1.1	0.1	-3.3
p (=0)	(0.924)	(0.876)	(0.924)	(0.935)	(0.909)	(0.890)	(0.885)	(0.822)	(0.000)	(0.003)	(0.435)	(1.000)
p (=CT)	(0.973)	(0.912)	(0.979)	(0.974)	(0.973)	(0.888)	(0.882)	(0.216)	(0.003)	n.a.	n.a.	(1.000)
Model 5Y	-0.5	-0.6	-0.9	-0.8	-0.4	-0.4	-0.4	-0.3	1.4	1.1	0.1	-3.0
p (=0)	(0.672)	(0.746)	(0.876)	(0.904)	(0.766)	(0.819)	(0.855)	(0.813)	(0.000)	(0.003)	(0.435)	(1.000)
p (=CT)	(0.824)	(0.821)	(0.958)	(0.944)	(0.867)	(0.735)	(0.735)	(0.153)	(0.001)	n.a.	n.a.	(1.000)
Model 10Y	0.7	0.7	0.2	0.3	0.5	0.3	0.0	-0.1	1.0	1.1	0.1	-0.9
p (=0)	(0.220)	(0.192)	(0.394)	(0.272)	(0.155)	(0.234)	(0.488)	(0.577)	(0.003)	(0.002)	(0.435)	(0.878)
p (=CT)	(0.271)	(0.200)	(0.858)	(0.307)	(0.038)	(0.027)	(0.033)	(0.005)	(0.057)	(0.078)	n.a.	(0.006)
Combined	-0.5	-0.8	-0.5	-0.9	-0.5	-0.4	-0.3	-0.3	1.2	1.1	0.1	-3.0
p (=0)	(0.690)	(0.828)	(0.779)	(0.935)	(0.832)	(0.849)	(0.848)	(0.800)	(0.000)	(0.003)	(0.435)	(1.000)
p (=CT)	(0.852)	(0.927)	(0.974)	(0.978)	(0.954)	(0.831)	(0.693)	(0.073)	(0.013)	n.a.	n.a.	(1.000)

Notes: The sample period includes monthly data from January 1979 to February 2020 (with a few data-driven exceptions). For the Japanese yen, we show two versions: one for the baseline 1979-2020 period and one for a shortened 1985-2020 period. Using the recursive estimation window, out-of-sample evaluation of forecasts was performed in the 1990-2020 period except in the last four

data columns, for which the evaluation period is indicated in the heading. For MSFE, p (CW) is the p value of testing the null hypothesis that the model MSFE is the same as that of the random walk against the one-sided alternative hypothesis that the model is better, using the test of Clark and West (2006, 2007). The p value for the sign predictions are based on the test of Pesaran and Timmermann (1992). This test assumes that both the predictor and the outcome change sign in the forecast evaluation period, which assumption is not satisfied for some of the sub-periods we consider. For the mean annualized profit, p (=0) is the p value of the null hypothesis that the Sharpe-ratio is zero against the one-sided alterative that it is positive, while p (=CT) the p value of the null hypothesis that the Sharpe-ratio of our model-based forecast is the same as the Sharpe-ratio of the carry trade strategy, against the one-sided alterative that the Sharpe-ratio based on our model is larger.

The following table corresponds to Table 6 of the paper by showing the results for all other currency pairs beyond the DEM/USD rate, which included in Table 6.

Table A4: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk = 100)

GBP/USD estimation method	rolling estimation months	Forecast horizon							
		1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	106.5	114.5	123.5	143.3	214.4	500.8	1543.6	6358.2
		(0.834)	(0.767)	(0.762)	(0.779)	(0.571)	(0.588)	(0.613)	(0.761)
	80	103.2	105.1	104.2	106.5	104.1	101.2	93.7	101.1
		(0.600)	(0.407)	(0.206)	(0.135)	(0.056)	(0.019)	(0.003)	(0.006)
	100	101.0	101.0	98.5	98.8	95.8	94.0	90.4	103.6
		(0.150)	(0.073)	(0.020)	(0.005)	(0.002)	(0.001)	(0.001)	(0.007)
	120	99.3	98.0	95.2	96.1	91.8	92.5	94.6	107.3
		(0.020)	(0.020)	(0.010)	(0.005)	(0.002)	(0.001)	(0.007)	(0.051)
	140	99.5	98.1	95.7	97.4	96.1	97.3	98.1	103.9
		(0.022)	(0.013)	(0.010)	(0.017)	(0.010)	(0.012)	(0.023)	(0.047)
	160	100.2	100.6	99.7	102.5	98.3	96.4	92.9	91.3
		(0.101)	(0.088)	(0.053)	(0.090)	(0.026)	(0.014)	(0.007)	(0.003)
	180	100.6	100.9	99.4	102.2	96.9	92.1	85.3	84.9
		(0.111)	(0.068)	(0.027)	(0.044)	(0.009)	(0.002)	(0.001)	(0.000)
	200	100.6	100.7	99.1	100.5	92.9	85.7	79.5	81.6
		(0.075)	(0.043)	(0.018)	(0.021)	(0.005)	(0.001)	(0.000)	(0.000)
	220	100.6	100.6	99.0	100.1	88.8	82.5	78.3	79.2
		(0.108)	(0.066)	(0.029)	(0.032)	(0.004)	(0.001)	(0.000)	(0.000)
	240	100.6	100.2	97.6	97.9	88.3	83.3	76.9	76.9
		(0.133)	(0.063)	(0.027)	(0.034)	(0.005)	(0.001)	(0.000)	(0.000)
recursive		99.5	97.4	93.2	90.9	80.2	75.4	70.1	71.1
		(0.030)	(0.011)	(0.005)	(0.009)	(0.001)	(0.000)	(0.000)	(0.000)

Table A4 continued: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk = 100)

JPY/USD estimation method	rolling estimation months	Forecast horizon							
		1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	103.7	109.9	114.5	133.6	155.2	192.8	289.0	360.6
		(0.415)	(0.482)	(0.353)	(0.526)	(0.627)	(0.628)	(0.612)	(0.292)
	80	103.2	108.5	114.5	124.1	114.1	112.9	117.6	118.0
		(0.769)	(0.822)	(0.824)	(0.815)	(0.310)	(0.169)	(0.103)	(0.038)
	100	101.3	103.4	104.5	103.0	86.6	83.0	81.5	88.3
		(0.444)	(0.460)	(0.353)	(0.169)	(0.000)	(0.000)	(0.000)	(0.000)
	120	99.5	98.5	96.6	92.9	83.6	83.4	90.5	100.7
		(0.121)	(0.086)	(0.051)	(0.020)	(0.002)	(0.003)	(0.004)	(0.005)
	140	100.0	100.0	99.5	98.6	91.9	94.6	96.6	99.0
		(0.208)	(0.177)	(0.116)	(0.083)	(0.005)	(0.001)	(0.000)	(0.002)
	160	100.6	101.3	102.1	101.6	94.9	94.8	92.9	94.5
		(0.319)	(0.295)	(0.262)	(0.166)	(0.019)	(0.004)	(0.002)	(0.002)
	180	101.0	102.3	102.6	101.1	92.7	92.0	92.5	94.8
		(0.413)	(0.406)	(0.272)	(0.122)	(0.008)	(0.002)	(0.007)	(0.008)
	200	100.7	101.5	102.1	99.7	94.1	94.4	93.6	94.1
		(0.332)	(0.312)	(0.258)	(0.109)	(0.025)	(0.036)	(0.026)	(0.018)
	220	100.5	101.3	102.1	101.5	96.5	95.8	93.5	93.9
		(0.344)	(0.338)	(0.310)	(0.184)	(0.050)	(0.053)	(0.033)	(0.024)
	240	100.5	101.2	101.6	100.6	98.0	97.8	95.6	95.2
		(0.384)	(0.364)	(0.316)	(0.187)	(0.088)	(0.096)	(0.053)	(0.037)
recursive		100.1	100.7	101.3	101.5	102.8	106.2	106.8	108.3
		(0.494)	(0.664)	(0.658)	(0.557)	(0.598)	(0.766)	(0.700)	(0.660)

Table A4 continued: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk = 100)

CHF/USD		Forecast horizon							
estimation method	rolling estimation months	1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	103.1	112.3	118.6	130.4	107.9	80.7	90.6	105.9
		(0.228)	(0.510)	(0.503)	(0.602)	(0.020)	(0.000)	(0.000)	(0.000)
	80	103.7	111.8	119.5	124.9	102.1	81.4	88.7	105.4
		(0.444)	(0.603)	(0.611)	(0.421)	(0.006)	(0.000)	(0.001)	(0.005)
	100	101.3	104.4	107.1	106.5	89.8	82.1	96.5	108.5
		(0.196)	(0.263)	(0.208)	(0.057)	(0.001)	(0.000)	(0.002)	(0.017)
	120	99.7	100.5	101.6	100.3	89.8	80.9	87.4	100.8
		(0.034)	(0.056)	(0.052)	(0.019)	(0.005)	(0.001)	(0.003)	(0.023)
	140	100.1	101.6	103.8	106.1	94.0	85.6	95.9	106.4
		(0.092)	(0.151)	(0.156)	(0.093)	(0.010)	(0.005)	(0.019)	(0.039)
	160	100.2	101.7	104.2	107.3	100.3	91.6	99.4	110.0
		(0.090)	(0.139)	(0.147)	(0.107)	(0.034)	(0.014)	(0.024)	(0.050)
	180	101.1	103.9	107.7	111.3	99.1	88.5	95.5	105.3
		(0.198)	(0.244)	(0.232)	(0.141)	(0.024)	(0.009)	(0.016)	(0.029)
	200	100.3	101.3	102.6	103.2	94.4	87.1	94.3	103.1
		(0.099)	(0.117)	(0.101)	(0.060)	(0.016)	(0.008)	(0.011)	(0.017)
	220	100.2	101.4	103.2	105.2	98.3	90.9	95.8	102.5
		(0.115)	(0.151)	(0.141)	(0.091)	(0.023)	(0.008)	(0.009)	(0.013)
	240	100.3	101.8	103.7	106.9	101.9	95.9	98.9	104.4
		(0.139)	(0.175)	(0.160)	(0.106)	(0.027)	(0.011)	(0.011)	(0.015)
recursive		100.7	103.0	105.9	111.0	108.2	103.6	106.7	111.8
		(0.128)	(0.170)	(0.139)	(0.078)	(0.015)	(0.005)	(0.005)	(0.008)

Table A4 continued: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk = 100)

CAD/USD estimation method	rolling estimation months	Forecast horizon							
		1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	102.8 (0.447)	108.0 (0.556)	109.3 (0.441)	110.5 (0.341)	111.0 (0.177)	123.3 (0.274)	133.4 (0.312)	118.0 (0.202)
	80	102.7 (0.692)	107.5 (0.697)	111.9 (0.681)	120.9 (0.765)	112.3 (0.302)	119.0 (0.432)	116.6 (0.183)	125.9 (0.383)
	100	102.8 (0.725)	108.6 (0.775)	116.3 (0.843)	126.1 (0.855)	121.8 (0.598)	123.7 (0.577)	125.2 (0.533)	136.8 (0.809)
	120	103.2 (0.812)	109.4 (0.828)	117.1 (0.871)	126.7 (0.888)	122.6 (0.687)	126.5 (0.764)	129.7 (0.907)	141.5 (0.990)
	140	102.7 (0.736)	108.0 (0.772)	116.5 (0.904)	129.1 (0.956)	130.0 (0.916)	133.0 (0.938)	131.4 (0.988)	138.4 (0.997)
	160	102.6 (0.784)	108.2 (0.853)	117.7 (0.963)	131.2 (0.985)	134.8 (0.974)	132.2 (0.959)	130.6 (0.994)	133.5 (0.993)
	180	102.3 (0.861)	106.6 (0.874)	114.5 (0.969)	126.0 (0.988)	124.2 (0.913)	121.1 (0.847)	121.2 (0.913)	123.7 (0.916)
	200	101.3 (0.667)	103.7 (0.673)	108.2 (0.836)	114.4 (0.905)	111.2 (0.642)	109.5 (0.548)	109.5 (0.563)	109.3 (0.549)
	220	100.9 (0.608)	102.6 (0.611)	106.4 (0.792)	111.1 (0.850)	107.0 (0.509)	104.7 (0.379)	102.7 (0.255)	100.7 (0.196)
	240	100.9 (0.607)	102.7 (0.621)	106.5 (0.804)	111.0 (0.845)	105.7 (0.433)	101.1 (0.212)	97.7 (0.079)	95.9 (0.068)
recursive		100.5 (0.317)	101.5 (0.331)	103.5 (0.400)	105.1 (0.367)	99.4 (0.107)	95.3 (0.038)	92.5 (0.015)	90.7 (0.012)

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Table A4 continued: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk = 100)

AUD/USD estimation method	rolling estimation months	Forecast horizon							
		1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	102.3 (0.396)	103.0 (0.199)	99.4 (0.065)	93.5 (0.012)	83.0 (0.000)	77.5 (0.001)	72.5 (0.000)	74.3 (0.000)
	80	101.9 (0.211)	102.3 (0.084)	100.7 (0.041)	97.9 (0.020)	85.4 (0.000)	75.8 (0.000)	71.5 (0.000)	72.7 (0.000)
	100	100.5 (0.075)	100.3 (0.040)	99.8 (0.029)	96.5 (0.008)	87.4 (0.001)	77.8 (0.000)	76.9 (0.000)	84.8 (0.003)
	120	100.5 (0.115)	100.5 (0.067)	99.9 (0.049)	94.4 (0.009)	85.4 (0.001)	85.6 (0.001)	89.0 (0.004)	96.3 (0.041)
	140	100.0 (0.111)	99.1 (0.056)	97.7 (0.040)	94.1 (0.017)	88.6 (0.004)	89.4 (0.003)	90.2 (0.009)	94.3 (0.032)
	160	100.1 (0.138)	99.7 (0.086)	98.6 (0.064)	94.8 (0.023)	88.8 (0.004)	87.6 (0.003)	86.8 (0.004)	88.3 (0.007)
	180	99.8 (0.069)	98.6 (0.034)	96.3 (0.022)	91.8 (0.009)	85.0 (0.001)	84.1 (0.001)	82.7 (0.002)	86.1 (0.004)
	200	99.6 (0.067)	98.4 (0.045)	96.1 (0.029)	92.3 (0.010)	84.1 (0.001)	81.8 (0.001)	83.1 (0.002)	87.3 (0.005)
	220	99.6 (0.092)	98.6 (0.067)	96.6 (0.045)	93.0 (0.016)	84.7 (0.001)	83.4 (0.002)	83.3 (0.002)	84.1 (0.002)
	240	99.6 (0.096)	98.7 (0.074)	96.6 (0.043)	93.7 (0.017)	87.8 (0.002)	86.6 (0.003)	84.5 (0.002)	84.7 (0.002)
recursive		99.0 (0.024)	97.3 (0.024)	94.9 (0.014)	91.2 (0.003)	86.5 (0.000)	85.1 (0.001)	83.4 (0.001)	84.1 (0.001)

Table A4 continued: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk

= 100)

NZD/USD estimation method	rolling estimation months	Forecast horizon							
		1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	105.3	113.3	114.2	118.6	141.0	185.3	237.8	288.1
		(0.765)	(0.805)	(0.657)	(0.624)	(0.924)	(0.992)	(0.998)	(0.995)
	80	101.9	107.2	109.4	121.3	145.1	174.9	206.9	243.2
		(0.282)	(0.430)	(0.370)	(0.695)	(0.949)	(0.981)	(0.983)	(0.973)
	100	100.9	104.2	106.9	114.0	123.6	131.4	140.0	149.1
		(0.174)	(0.327)	(0.352)	(0.575)	(0.743)	(0.790)	(0.858)	(0.869)
	120	100.4	102.7	104.0	105.7	110.2	119.5	127.1	135.5
		(0.094)	(0.194)	(0.166)	(0.156)	(0.204)	(0.412)	(0.531)	(0.571)
	140	99.8	100.7	100.5	101.6	106.2	114.6	118.4	121.4
		(0.054)	(0.104)	(0.078)	(0.093)	(0.156)	(0.350)	(0.396)	(0.349)
	160	100.4	102.3	103.3	105.0	106.4	107.7	107.0	106.4
		(0.152)	(0.256)	(0.232)	(0.219)	(0.166)	(0.161)	(0.122)	(0.071)
	180	100.5	102.0	102.1	102.0	98.1	95.3	94.1	95.6
		(0.143)	(0.189)	(0.127)	(0.090)	(0.027)	(0.013)	(0.008)	(0.006)
	200	100.4	101.5	101.8	100.0	92.5	89.4	88.3	91.2
		(0.118)	(0.137)	(0.105)	(0.050)	(0.008)	(0.005)	(0.003)	(0.002)
	220	100.5	101.6	101.7	100.1	93.9	90.9	90.3	92.7
		(0.127)	(0.142)	(0.105)	(0.055)	(0.011)	(0.006)	(0.004)	(0.003)
	240	100.7	102.2	102.5	100.9	94.9	93.4	92.6	95.4
		(0.164)	(0.174)	(0.125)	(0.059)	(0.012)	(0.008)	(0.006)	(0.005)
recursive		100.7	102.4	102.4	101.4	97.2	96.1	95.6	98.4
		(0.126)	(0.143)	(0.093)	(0.045)	(0.009)	(0.006)	(0.004)	(0.003)

Table A4 continued: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk = 100)

NOK/USD estimation method	rolling estimation months	Forecast horizon							
		1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	106.2	113.4	117.9	124.5	128.2	124.1	135.2	132.4
		(0.864)	(0.918)	(0.924)	(0.907)	(0.676)	(0.161)	(0.199)	(0.236)
	80	103.0	107.6	110.4	113.6	118.1	112.9	114.9	125.9
		(0.764)	(0.825)	(0.722)	(0.629)	(0.534)	(0.182)	(0.122)	(0.276)
	100	102.7	107.2	110.9	117.4	125.1	122.9	122.8	126.3
		(0.656)	(0.731)	(0.675)	(0.718)	(0.723)	(0.451)	(0.381)	(0.444)
	120	103.0	108.0	112.6	118.8	120.2	112.0	106.6	111.4
		(0.792)	(0.861)	(0.855)	(0.860)	(0.643)	(0.167)	(0.032)	(0.114)
	140	102.6	106.7	110.4	113.0	106.7	100.6	95.4	94.8
		(0.792)	(0.827)	(0.789)	(0.616)	(0.099)	(0.014)	(0.005)	(0.004)
	160	101.8	104.9	107.6	109.9	106.5	97.1	89.4	88.0
		(0.554)	(0.621)	(0.545)	(0.358)	(0.094)	(0.008)	(0.002)	(0.001)
	180	100.7	101.9	103.0	102.4	96.1	85.2	77.4	77.9
		(0.237)	(0.223)	(0.182)	(0.070)	(0.008)	(0.000)	(0.000)	(0.000)
	200	100.2	100.6	101.1	98.1	88.6	78.2	72.4	73.5
		(0.150)	(0.161)	(0.143)	(0.051)	(0.005)	(0.001)	(0.000)	(0.000)
	220	100.2	100.5	100.6	97.2	88.3	79.9	73.8	71.4
		(0.196)	(0.180)	(0.150)	(0.050)	(0.006)	(0.001)	(0.000)	(0.000)
	240	100.1	100.2	100.1	98.2	92.2	84.7	77.6	76.2
		(0.183)	(0.167)	(0.141)	(0.063)	(0.010)	(0.001)	(0.000)	(0.000)
recursive		99.6	98.9	97.4	93.7	85.9	76.5	68.6	66.1
		(0.119)	(0.115)	(0.082)	(0.022)	(0.001)	(0.000)	(0.000)	(0.000)

Table A4 continued: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk = 100)

SEK/USD		Forecast horizon							
estimation method	rolling estimation months	1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	104.7	106.5	102.5	99.2	93.2	99.4	105.5	114.6
		(0.729)	(0.485)	(0.077)	(0.022)	(0.002)	(0.018)	(0.025)	(0.033)
	80	101.6	101.3	97.6	95.8	90.3	96.8	97.3	108.9
		(0.323)	(0.122)	(0.027)	(0.010)	(0.001)	(0.011)	(0.009)	(0.037)
	100	101.1	101.0	97.8	94.0	88.7	94.8	103.0	110.4
		(0.268)	(0.110)	(0.031)	(0.005)	(0.001)	(0.006)	(0.017)	(0.049)
	120	101.7	101.8	99.4	97.1	96.4	106.8	112.1	118.8
		(0.359)	(0.133)	(0.054)	(0.019)	(0.006)	(0.042)	(0.066)	(0.150)
	140	101.9	102.1	100.0	97.9	98.3	108.5	111.7	114.8
		(0.401)	(0.179)	(0.084)	(0.028)	(0.009)	(0.049)	(0.051)	(0.045)
	160	101.7	102.1	100.4	100.1	99.0	103.8	104.8	104.8
		(0.402)	(0.212)	(0.101)	(0.061)	(0.021)	(0.018)	(0.015)	(0.011)
	180	101.3	101.0	98.6	96.3	93.1	97.5	93.7	93.8
		(0.371)	(0.150)	(0.066)	(0.025)	(0.003)	(0.003)	(0.001)	(0.001)
	200	101.1	100.5	97.4	94.0	88.1	89.9	86.5	86.2
		(0.334)	(0.134)	(0.048)	(0.015)	(0.001)	(0.001)	(0.000)	(0.000)
	220	100.8	99.6	95.7	91.9	86.0	88.0	82.7	81.3
		(0.316)	(0.102)	(0.030)	(0.008)	(0.000)	(0.001)	(0.000)	(0.000)
	240	100.6	99.2	95.0	91.3	85.6	86.7	80.8	80.5
		(0.294)	(0.085)	(0.023)	(0.007)	(0.000)	(0.000)	(0.000)	(0.000)
recursive		100.2	98.4	93.9	89.8	83.7	85.1	80.1	80.0
		(0.265)	(0.061)	(0.015)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)

Table A4 continued: Recursive vs rolling estimation, out-of-sample forecast evaluation, mean squared forecast error (random walk

= 100)

GBP/DEM		Forecast horizon							
estimation method	rolling estimation months	1M	3M	6M	12M	24M	36M	48M	60M
	60	109.8	116.7	135.6	210.1	2179.3	52210.8	########	########
		(0.946)	(0.790)	(0.733)	(0.597)	(0.751)	(0.842)	(0.845)	(0.844)
	80	105.4	108.0	108.7	108.8	122.5	161.9	231.8	431.9
		(0.862)	(0.529)	(0.317)	(0.156)	(0.243)	(0.659)	(0.783)	(0.910)
	100	102.6	104.8	107.0	106.3	111.9	134.4	167.9	248.6
		(0.570)	(0.344)	(0.295)	(0.143)	(0.121)	(0.420)	(0.630)	(0.849)
	120	102.7	104.5	106.0	105.2	108.2	125.7	144.1	191.4
		(0.715)	(0.443)	(0.321)	(0.160)	(0.131)	(0.453)	(0.570)	(0.848)
	140	103.1	106.3	109.9	112.4	114.9	122.8	126.2	140.4
		(0.849)	(0.731)	(0.685)	(0.646)	(0.593)	(0.735)	(0.726)	(0.870)
rolling	160	102.0	104.6	106.3	108.0	108.9	110.1	111.2	113.7
		(0.729)	(0.627)	(0.493)	(0.376)	(0.179)	(0.145)	(0.106)	(0.111)
	180	101.1	102.3	103.2	103.3	102.8	101.3	98.8	102.9
		(0.467)	(0.334)	(0.223)	(0.098)	(0.020)	(0.016)	(0.005)	(0.014)
	200	100.4	100.5	100.2	99.2	96.9	95.5	98.1	101.7
		(0.255)	(0.128)	(0.079)	(0.032)	(0.006)	(0.002)	(0.003)	(0.008)
	220	100.0	99.7	98.4	96.2	95.9	97.0	97.4	99.7
		(0.146)	(0.103)	(0.041)	(0.011)	(0.005)	(0.006)	(0.005)	(0.009)
	240	100.2	100.0	99.5	98.3	95.8	95.0	94.0	95.0
		(0.241)	(0.137)	(0.092)	(0.035)	(0.008)	(0.005)	(0.004)	(0.005)
recursive		99.8	99.0	98.0	96.3	94.2	93.1	93.6	96.5
		(0.131)	(0.063)	(0.032)	(0.008)	(0.002)	(0.004)	(0.008)	(0.033)

JPY/DEM		Forecast horizon							
estimation method	rolling estimation months	1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	106.4 (0.982)	115.9 (0.988)	120.4 (0.969)	121.8 (0.915)	124.3 (0.900)	125.5 (0.802)	139.5 (0.873)	155.4 (0.810)
	80	103.6 (0.809)	109.3 (0.860)	112.4 (0.761)	114.2 (0.566)	117.5 (0.467)	118.2 (0.348)	120.8 (0.225)	120.9 (0.138)
	100	101.6 (0.631)	105.5 (0.788)	108.7 (0.757)	111.7 (0.677)	112.4 (0.445)	108.1 (0.180)	102.9 (0.053)	96.2 (0.021)
	120	101.2 (0.591)	103.1 (0.612)	104.0 (0.469)	103.4 (0.258)	99.6 (0.068)	92.1 (0.004)	87.5 (0.001)	82.3 (0.001)
	140	100.2 (0.253)	101.3 (0.375)	101.4 (0.283)	101.3 (0.203)	101.0 (0.131)	100.3 (0.072)	98.4 (0.028)	95.8 (0.018)
	160	100.9 (0.575)	102.7 (0.637)	103.9 (0.541)	105.5 (0.457)	105.5 (0.279)	100.0 (0.046)	97.6 (0.016)	93.4 (0.011)
	180	100.5 (0.403)	101.7 (0.462)	101.6 (0.311)	100.4 (0.166)	99.6 (0.081)	93.2 (0.014)	91.0 (0.008)	92.7 (0.026)
	200	100.4 (0.411)	101.4 (0.453)	101.3 (0.321)	98.5 (0.109)	94.0 (0.017)	90.8 (0.008)	88.3 (0.005)	86.8 (0.006)
	220	99.6 (0.142)	99.4 (0.190)	99.1 (0.177)	98.4 (0.115)	95.2 (0.029)	91.4 (0.003)	88.7 (0.001)	86.8 (0.002)
	240	100.2 (0.318)	100.6 (0.309)	100.2 (0.204)	98.1 (0.066)	94.1 (0.010)	89.6 (0.002)	86.6 (0.001)	83.4 (0.002)
recursive		100.0 (0.358)	100.1 (0.426)	99.9 (0.339)	99.4 (0.261)	98.6 (0.167)	96.5 (0.061)	94.3 (0.024)	93.9 (0.032)

CHF/DEM		Forecast horizon							
estimation method	rolling estimation months	1M	3M	6M	12M	24M	36M	48M	60M
rolling	60	102.6 (0.258)	106.6 (0.156)	104.5 (0.030)	112.9 (0.022)	154.7 (0.090)	241.3 (0.044)	434.2 (0.010)	927.6 (0.011)
	80	103.7 (0.748)	109.3 (0.653)	110.0 (0.283)	116.7 (0.133)	150.4 (0.167)	231.9 (0.094)	430.1 (0.013)	996.2 (0.008)
	100	102.2 (0.672)	106.9 (0.675)	108.7 (0.485)	112.5 (0.315)	124.0 (0.184)	151.2 (0.067)	214.6 (0.004)	397.7 (0.002)
	120	101.9 (0.711)	105.2 (0.658)	106.7 (0.505)	109.0 (0.332)	114.1 (0.184)	124.4 (0.093)	140.8 (0.004)	195.0 (0.000)
	140	102.1 (0.793)	106.3 (0.793)	109.1 (0.747)	112.9 (0.690)	116.5 (0.445)	122.1 (0.205)	129.0 (0.007)	158.2 (0.000)
	160	102.3 (0.832)	106.9 (0.842)	110.0 (0.811)	113.0 (0.731)	113.0 (0.388)	114.3 (0.124)	117.0 (0.003)	137.8 (0.000)
	180	101.8 (0.759)	105.4 (0.763)	106.9 (0.651)	108.7 (0.548)	107.7 (0.228)	106.9 (0.062)	105.2 (0.001)	116.0 (0.000)
	200	102.0 (0.826)	106.0 (0.830)	108.4 (0.788)	110.4 (0.701)	107.6 (0.291)	105.6 (0.073)	102.3 (0.001)	107.6 (0.000)
	220	101.2 (0.706)	103.1 (0.647)	103.8 (0.521)	104.4 (0.420)	100.7 (0.101)	97.3 (0.041)	93.3 (0.002)	91.3 (0.000)
	240	101.1 (0.668)	103.4 (0.666)	104.5 (0.573)	105.8 (0.492)	105.8 (0.337)	103.9 (0.155)	98.7 (0.005)	98.1 (0.000)
recursive		101.1 (0.702)	103.8 (0.749)	106.0 (0.739)	107.8 (0.717)	105.2 (0.502)	101.9 (0.262)	98.2 (0.100)	95.5 (0.034)

Notes: The results of combined forecasts are reported, whereby three forecasts are combined with equal weights from three models using alternative maturity theoretical forward rates, 3 years, 5 years and 10 years (expect for New Zealand and Sweden, for which the 2-year maturity rate is used instead of the 3-year maturity rate). The model is defined in equation (13). The sample period includes monthly data from January 1979 to February 2020. Using either the recursive or rolling estimation windows, out-of-sample evaluation of forecasts was performed in the 1990-2020 period. p values are reported in parentheses of testing the null hypothesis that the model MSFE is the same as that of the random walk against the one-sided alternative hypothesis that the model is better, based on the test of Clark and West (2006, 2007).

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