Counter-cyclical Currency Risk Premia

- Supplementary Appendix -

A Robustness Checks

In this section, we consider several robustness checks. First, we investigate the out-of-sample predictability of industrial production growth on exchange rates. Second, we consider alternative currency baskets and time periods. Third, we investigate the ability of average forward discounts to forecast individual currency excess returns and exchange rate changes.

A.1 Out-of-Sample

We compare the out-of-sample predictability properties of our best predictor to a simple random walk with drift. We focus in this section on changes in exchanges rates, not currency excess returns, in order to make contact with the literature. As mentioned earlier, Meese and Rogoff (1983) find that the out-of-sample predictions of exchange rates based on a random walk dominate those of all macro-founded models they consider for up to 12-month ahead forecasts. Beating the random walk has become the benchmark, and most subsequent papers fail to achieve it. We show in this section that changes in industrial production predict six-month changes in exchange rates better than a random walk with drift.

Experiment In out-of-sample tests, two trade-offs occur: the length of the in-sample versus out-of-sample periods, and the horizon. The in-sample period corresponds to the first set observations used to estimate the model. A longer in-sample period might provide better estimates for the model, but leaves less observations to test it. Likewise, changes in exchange rates over longer horizons are easier to forecast, but longer horizons entail less non-overlapping periods. Here, we divide the total sample of length T in two parts of equal length. We consider either one-, three-, six- and twelve-month changes in exchange rates. For horizons above one-month, we focus on samples of non-overlapping observations.

We use the first part (of length R) to obtain an initial estimation of the model. We use the second part (of length P) to generate out-of-sample tests. The model is estimated recursively. For $t = R, ..., T-1$, we use the first t observations to estimate two linear models:

$$\begin{aligned}
\Delta s_{t+1} &= x'_{1,t}\beta_1 + u_{1,t+1}, \\
\Delta s_{t+1} &= x'_{2,t}\beta_2 + u_{2,t+1},
\end{aligned}$$

where Δs_{t+1} denotes the one-period ahead change in exchange rates, and $x'_{i,t}$ the predictor. Since we focus on non-overlapping samples, the h-month ahead change in exchange rates correspond always to a one-period ahead change in s. In the first case, when the model is a random walk with drift, $x_{1,t}$ is simply a constant. In the second case, $x_{2,t}$ contains a constant and the twelve-month changes in industrial production index. Under the null hypothesis of equal forecast accuracy, model 2 nests model 1, e.g $\beta_2 = (\beta'_1, 0')'$ and $u_{1,t+1} = u_{2,t+1}$. We compute the one-step ahead forecast error for both models: $\hat{u}_{1,t+1} = \Delta s_{t+1} - x'_{1,t}\widehat{\beta_{1,t}}$ and $\hat{u}_{2,t+1} = \Delta s_{t+1} - x'_{2,t}\widehat{\beta_{2,t}}$. Note that the one-step ahead forecast is computed using only information available at date t. The estimation is recursive, and thus $\beta_{1,t}$ and $\beta_{2,t}$ vary with time.

Test Statistics We report the square root of the two mean squared errors $RMSE_{RW}$ (for the random walk) and $RMSE$ (for the whole model), as well as their ratio ($Ratio = RMSE_{RW}/RMSE$). A ratio above 1 indicates that the model beats the random walk with drift. We also report two additional test statistics: the Diebold and Mariano (1995)'s and the Clark and McCracken (2001)'s statistics. We rapidly review them here.

Let $\overline{d}$ be the difference between the two mean-squared errors ($\overline{d} = MSE_2 - MSE_1$) based upon the sequence of loss differentials $\hat{d}_{t+1} = \hat{u}^2_{1,t+1} - \hat{u}^2_{2,t+1}$. Denote the estimated spectral density matrix by $\hat{S}_{dd}$. Diebold and Mariano (1995) propose the following test statistic (denoted MSE_t):

$$MSE_t = \sqrt{P}\frac{\overline{d}}{\sqrt{\hat{S}_{dd}}}.$$

Following Clark and McCracken (2001), we use the covariance matrix instead of the spectral density matrix. Under the null that the mean squared error associated with model 1 is the same as that for model 2, the expected difference between $\hat{u}^2_{1,t+1}$ and $\hat{u}^2_{2,t+1}$ is zero. Under the alternative, the mean squared error associated with model 2 is smaller than that for model 1, and the test statistic is positive.

The second test statistic is based on the covariance between $\hat{u}_{1,t+1}$ and $\hat{u}_{1,t+1} - \hat{u}_{2,t+1}$. Under the null that model 1 encompasses model 2, the covariance between $\hat{u}_{1,t+1}$ and $\hat{u}_{1,t+1} - \hat{u}_{2,t+1}$ will be less than or equal to 0. Under the alternative that model 2 contains additional information, the covariance should be positive. Let us define $\hat{c}_{t+1} = \hat{u}_{1,t+1}(\hat{u}_{1,t+1} - \hat{u}_{2,t+1})$ and $\overline{c} = P^{-1}\sum_{t=R}^{T-1}\hat{c}_{1,t+1}$. Then, the second test statistics (denoted ENC) is:

$$ENC = P\frac{\overline{c}}{MSE_2}.$$

The limiting distributions of these different statistics are non-standard.[10] We bootstrap their

[10]Diebold and Mariano (1995) highlight the asymptotic normal distribution of their statistic but their results apply only to non-nested models.

computation to assess their significance. The bootstrap approach is the following: first, we compute a one-lag VAR including the changes in exchange rates and the predictor. Drawing randomly (with replacement) among the estimated residuals, we construct two new series. Then, for each set of series, we perform the same out-of-sample tests as described above and construct the above *Ratio*, $MSE - t$ and ENC statistics.

Results Table XIV reports our results, focusing on the developed-markets basket (the results are similar for other baskets). At shorter horizons, Meese and Rogoff (1983)'s result stands. A simple random walk leads to more accurate forecasts than changes in industrial production. The ratio of the two mean squared errors is at best equal to one, and often below one. At the twelve-month horizon, however, changes in industrial production predict changes in exchange rates much better than a simple constant (the ratio of the two mean squared errors is 1.06). The Diebold and Mariano (1995)'s and Clark and McCracken (2001)'s statistics are positive at almost all horizons, but mostly not statistically significant. While random walk is hard to beat as the best predictor of these changes in exchange rates, our results indicate that using business-cycle variables such as industrial production allows for some improvement in the forecasting power.

A.2 Other Baskets

Longer Sample

AFD and Trade-Weighted Indices As an additional test of the predictive ability of the average forward discount for exchange rate changes, we use the Trade-Weighted U.S. Dollar Indices from the Federal Reserve.[11] There are three indices: Broad Index, which includes countries that

[11] For detailed description of the Indices see `http://www.federalreserve.gov/pubs/bulletin/2005/winter05_index.pdf`

represent the most important trade partners of the U.S., the Major Countries Index, which includes the Euro area, Canada, Japan, UK, Switzerland, Australia and Sweden, and Other Important Trading Partners (OITP) Index that includes all of the other countries in the Broad index (in descending order of trade weight, these are China, Mexico, Korea, Taiwan, Hong Kong, Malaysia, Singapore, Brazil, Thailand, India, Philippines, Israel, Indonesia, Russia, Saudi Arabia, Chile, Argentina, Colombia and Venezuela).

For each index I_t^I that represents a geometrically weighted average of exchange rates (in units of foreign currencies per U.S. dollar) we run regressions

$$-\Delta \log I^I_{t\to t+k} = \zeta^I_0 + \zeta^I_{\mathbf{f}}(\overline{f}^j_{t\to t+k} - \overline{s}^j_t) + \eta^I_{t+k}, \tag{A.1}$$

where $j = 1$ represents the developed countries' basket. The results of these regressions in table XVI show that the ability of the AFD to forecast currency fluctuations is heterogeneous. For the Major Countries Index the results are quite similar to those for the average spot rate changes across the developed countries in our forward contract sample: coefficients are positive, between 1 and 1.5, and fairly robustly statistically significant, with R^2 up to 9% at longer horizon. For Other Trading Partners, however, the slope coefficients are actually negative, and also significant, with higher R^2 at short horizon than for Broad index, but somewhat lower at the long horizons. Since most of the countries included in the construction of the Other Trading Partners index are not in the basket that was used to construct the average forward discount used as the predictor variable, this result is unlikely due to the influence of expected inflation in the foreign currencies. The negative slope coefficients then suggest that currencies that dominate the Other Trading Partners basket (e.g. China, Mexico) are hedges against risks that are important to U.S. investors. Given the opposite sign of the coefficients for Major and OITP indices, it is not surprising that there is little evidence of predictability for the Broad index, which combines the two.

We obtain similar results for forecasting changes in the Trade-Weighted Dollar Index with the IP changes and AFD. Tables XVII and XVIII present the results for the raw IP series and for the U.S.-specific IP residuals, respectively, for the three types of trade-weighted baskets (Broad, Major Countries, and Other Important Trading Partners). Despite the fact that these baskets differ in their sensitivity to the AFD, they all show consistently large and negative coefficients for the IP measures, consistent with the notion that these capture the price of dollar-specific risk, which should be the same for all currencies as demonstrated in section 2. The R^2 for these index changes are in the range between just above 15 and up to almost 30 percent for annual horizons.

We conclude that expected excess returns in foreign exchange markets are strongly countercyclical, consistent with the expected returns in bond and equity markets. The strong response of currency excess returns to industrial production resembles results reported by Cooper and Priestley (2009) on stock market excess returns. Cooper and Priestley (2009) show that the output gap, defined using the deviation of industrial production from a trend, is a very robust predictor of excess returns on the stock market in all G-7 countries. This variable is highly correlated with the growth rate of industrial production in our sample.

A.3 The Dollar Forward Discounts and Bilateral Exchange Rates

For individual currency pairs there is more predictability in excess returns and exchange rate changes than the standard UIP regressions reveal. We consider the ability of the *average* forward discount to predict the excess returns and spot changes of the bilateral exchange rates while confronted by the well-know relationship relationship the *currency-specific* forward discount (or interest rate differential) and exchange rates.

For each currency i, we run the following regression of twelve-month log excess returns on the average forward discount of basket j and the currency-specific forward discount:

$$\overline{rx}^i_{t\to t+k} = \kappa^i_0 + \kappa^i_{\mathbf{f}}(\overline{f}^j_{t\to t+k} - \overline{s}^j_t) + \kappa^i_f(f^i_t - s^i_t) + \eta^i_{t+k},$$

as well as regressions of spot exchange rate changes on the currency-specific forward discount:

$$-\Delta s^i_{t\to t+k} = \zeta^i_0 + \zeta^i_{\mathbf{f}}(\overline{f}^j_{t\to t+k} - \overline{s}^j_t) + \zeta^i_f(f^i_t - s^i_t) + \tilde{\eta}^i_{t+k},$$

for $k = 1$.

Given the results above indicating that only the average forward discount for the developed countries' basket has robust predictive power for currency returns, we only use this basket ($j = 1$). We only include currencies for which we have at least 100 monthly observations of data, which leaves 26 countries out of the original sample of 35. These currencies can be split in four groups: those of developed countries that joined the Euro area (plus the Euro itself), those of developed countries outside the Euro zone, emerging countries in East and South-East Asia, and other emerging countries. Tables XIX-XXII report the results for each of the four groups of currencies. For each currency we report the slope coefficients on the average and currency-specific forward discounts and on the currency-specific forward discount, as well as the R^2, both for the excess returns and the spot changes regressions; we also report the number of months the currency is in the sample.

The results in these tables indicate that a number of countries' exchange rates are predictable, with the average forward discount often driving out the currency-specific one as the predictive variable. In particular, among the developed countries, pre-Euro currencies of France, Germany, and Netherlands all exhibit significantly positive coefficients on the average forward discount between 2 and 4.5 for both returns and spot changes (the coefficients are identical since we are controlling for the individual forward discount), with R^2 between 10 and 20 percent (Table XIX). Note that the coefficients on country-specific forward discounts are negative in these cases as predicted by the UIP, suggesting that all of the information relevant for capturing the risk premium is contained in the average forward discount. The results are similar for the Italian lira albeit weaker, with coefficients not statistically significant using most metrics and the R^2 of only 4 percent.

For the non-Euro developed countries (Table **??**) the strong predictability result holds for both the Danish krone and the Swiss franc, and is weaker for the Norwegian krone, Swedish krona,. There is statistically significant evidence of predictability for the Euro, however, the individual forward discount appears to be driving out the average discount as a predictor (with a negative coefficient for the latter). Similar result holds for Canada. For the other developed countries' currencies in the subsample the evidence is mixed, with some exhibiting strong predictability but with the individual discount as the dominant predictor (as in the cases of Japan and New Zealand) and others only weakly predictable with neither right-hand side variable coming in significantly, as in the case of the UK.

As for the emerging countries currencies, there is much less predictability using the average forward discount for individual pairs than there is for the group as a whole, which is not surprising since one would expect greater idiosyncratic volatility in their exchange rates. All of the the Asian currencies - Malaysia, Philippines, Singapore, Taiwan and Thailand - have sizable positive coefficients on the average forward discount, but none are robustly statistically significant, at least in the presence of the country-specific ones.

Among non-Asian emerging countries (Table XXII, the Czech, Hungarian and South African currencies have sizable positive coefficients on the average forward discount, but only the last one is robustly statistically significant (perhaps due to the longer sample period) and exhibiting a high R^2 of 21 precent. The coefficients for Mexico and Kuwait are negative, consistent with the results for the Other Trading Partners Index above, not strongly statistically significant. Their own forward discounts are strongly positive predictors of excess returns (but not exchange rate changes).

In order to analyze whether the average forward discount simply captures the effect of the U.S. interest rate and is thus redundant relative to the individual forward discount, we examine the forecasting power of the two separately. In addition, we regress the residuals from the forecasting regressions of individual currency returns (or spot changes) on the average forward discount, on the individual forward discount in order to determine whether it contributes any additional information. Thus, we follow a three-step procedure. First, we regress the regress the currency excess return on the individual forward discount:

$$rx^j_{t\to t+k} = \kappa^j_0 + \kappa^j_f(f^j_{t\to t+k} - s^j_t) + \eta^{j,1}_{t+k}.$$

Then for each currency j we regress in on the average of log forward discounts across all developed countries:

$$rx^j_{t\to t+k} = \kappa^j_0 + \kappa^j_{\mathbf{f}}(\overline{f}_{t\to t+k} - \overline{s}_t) + \eta^{j,2}_{t+k}.$$

Finally, we regress the residual of the above regression on the individual forward discount:

$$\eta^{j,2}_{t+k} = \kappa^j_0 + \kappa^j_f(f_{t\to t+k} - s^k_t) + \epsilon^j_{t+k}.$$

The same procedure is followed for the spot rate changes.

Tables (XXIII) - (XXVI) present the results for the four groups of currencies. There are a few instances in which the individual forward discount contains substantial information above and beyond that in the average forward discount. Among developed countries only New Zealand has predictable residuals, and only for excess returns, not spot rate changes (Table XXIV). Among Asian countries ((Table XXV), Singapore, Taiwan and Thailand have statistically significant coefficients for the residuals of excess returns and R^2 between 6 and 14 percent, but also no predictability for the residuals, suggesting that some part of the bilateral interest rate differentials may capture sovereign default risk. Of the other emerging countries (Table XXVI), Kuwait, Mexico and South Africa display similar positive effect of individual forward discount on the residuals, where as the Czech Republic and Hungary have no predictability for residuals of excess returns but strong negative predictability for residuals of spot rate changes, consistent with the view that individual forward discounts capture country-specific inflation expectations. Overall, to the extent the effect of individual forward discount on expected returns survives, it suggests that the country-specific forward discount captures the time-varying exposure of these countries to the global shocks.

Table XIII: Out-of-Sample Exchange Rate Predictability: Comparison with a Random Walk

Panel A. Industrial Production as Predictor

k	$RMSE_{RW}$	$RMSE$	$Ratio$	MSE_t	ENC
1	2.37	2.37	1.00	0.12	0.89
			(0.13)	(0.14)	(0.14)
2	3.62	3.57	1.01	0.69	2.05
			(0.01)	(0.05)	(0.01)
3	4.52	4.41	1.02	0.74	2.42
			(0.00)	(0.04)	(0.01)
6	6.94	6.73	1.03	0.54	3.21
			(0.00)	(0.05)	(0.00)
12	9.74	8.89	1.10	1.46	5.31
			(0.00)	(0.01)	(0.00)

Panel B. Industrial Production and Average Forward Discount as Predictors

k	$RMSE_{RW}$	$RMSE$	$Ratio$	MSE_t	ENC
1	2.37	2.38	1.00	-0.19	0.68
			(0.28)	(0.22)	(0.17)
2	3.62	3.59	1.01	0.42	1.84
			(0.03)	(0.10)	(0.02)
3	4.52	4.43	1.02	0.76	2.65
			(0.00)	(0.04)	(0.00)
6	6.94	6.68	1.04	0.73	3.22
			(0.00)	(0.03)	(0.00)
12	9.74	9.05	1.08	1.28	4.72
			(0.00)	(0.01)	(0.00)

Panel C. Average Forward Discount as Predictor

k	$RMSE_{RW}$	$RMSE$	$Ratio$	MSE_t	ENC
1	2.37	2.37	1.00	0.16	1.08
			(0.15)	(0.19)	(0.09)
2	3.62	3.62	1.00	-0.07	1.34
			(0.30)	(0.23)	(0.04)
3	4.52	4.51	1.00	0.14	2.05
			(0.10)	(0.17)	(0.01)
6	6.94	6.93	1.00	0.09	2.68
			(0.13)	(0.21)	(0.00)
12	9.74	9.38	1.04	1.30	4.08
			(0.00)	(0.02)	(0.00)

Notes: This table reports one-step-ahead out-of-sample predictability test statistics. We first assume that the average changes in exchange rates against the U.S. dollar for the developed markets basket follow a random walk with drift. $RMSE_{RW}$ denotes the corresponding square root of the mean squared error (in percentages). We then use the twelve-month change in the industrial production index (IP) and/or average forward discount for the same basket (AFD) to predict changes in exchange rates $RMSE$ denotes the corresponding square root of the mean squared error (in percentages). We add three test statistics: the ratio of the two square root mean squared errors ($Ratio = RMSE_{RW}/RMSE$), the Diebold-Mariano (MSE_t) and the Clark-McCraken (ENC) statistics. Each model is estimated recursively. Using information up to date t, we use the model to predict the changes in exchange rates between t and $t+1$. We use at least half of the sample to estimate the model. P-values for the test statistics reported in the parentheses are computed via bootstrap under the null hypothesis of no predictability. They are obtained from bootstrapping the whole procedure assuming a VAR with the number of lags equal to the horizon of forward discount for the predictor variable. Panel A uses the industrial production as predictor, Panel B uses both IP and the average forward discount across developed countries currencies, and Panel C uses only the AFD. Data are monthly, obtained from Datastream. The sample period is 11/1983 - 06/2010.

Table XIV: Out-of-Sample Exchange Rate Predictability: Comparison with a Random Walk, No Overlap

Panel A. Industrial Production as Predictor

k	$RMSE_{RW}$	$RMSE$	$Ratio$	MSE_t	ENC
1	2.37	2.37	1.00	0.12	0.89
			(0.11)	(0.13)	(0.12)
2	3.51	3.46	1.01	0.60	1.57
			(0.03)	(0.07)	(0.04)
3	4.83	4.83	1.00	0.01	0.96
			(0.18)	(0.18)	(0.12)
6	7.56	7.75	0.98	-0.27	0.64
			(0.54)	(0.32)	(0.24)
12	11.73	11.05	1.06	0.87	1.02
			(0.08)	(0.16)	(0.19)

Panel B. Industrial Production and Average Forward Discount as Predictors

k	$RMSE_{RW}$	$RMSE$	$Ratio$	MSE_t	ENC
1	2.37	2.38	1.00	-0.19	0.68
			(0.27)	(0.22)	(0.16)
2	3.51	3.50	1.00	0.03	1.01
			(0.16)	(0.17)	(0.11)
3	4.83	4.93	0.98	-0.66	0.58
			(0.66)	(0.40)	(0.22)
6	7.56	7.61	0.99	-0.08	0.81
			(0.31)	(0.26)	(0.19)
12	11.73	11.50	1.02	0.32	0.63
			(0.21)	(0.25)	(0.29)

Panel C. Average Forward Discount as Predictor

k	$RMSE_{RW}$	$RMSE$	$Ratio$	MSE_t	ENC
1	2.37	2.37	1.00	0.16	1.08
			(0.17)	(0.20)	(0.10)
2	3.51	3.51	1.00	-0.05	0.97
			(0.26)	(0.24)	(0.11)
3	4.83	4.88	0.99	-0.41	0.88
			(0.66)	(0.38)	(0.13)
6	7.56	7.32	1.03	0.82	2.16
			(0.04)	(0.08)	(0.01)
12	11.73	11.62	1.01	0.31	0.62
			(0.24)	(0.22)	(0.25)

Notes: This table reports one-step-ahead out-of-sample predictability test statistics for non-overlapping series. We first assume that the average changes in exchange rates against the U.S. dollar for the developed markets basket follow a random walk with drift. $RMSE_{RW}$ denotes the corresponding square root of the mean squared error (in percentages). We then use the twelve-month change in the industrial production index (IP) and/or average forward discount for the same basket (AFD) to predict changes in exchange rates $RMSE$ denotes the corresponding square root of the mean squared error (in percentages). We add three test statistics: the ratio of the two square root mean squared errors ($Ratio = RMSE_{RW}/RMSE$), the Diebold-Mariano (MSE_t) and the Clark-McCraken (ENC) statistics. Each model is estimated recursively. Using information up to date t, we use the model to predict the changes in exchange rates between t and $t+1$. We use at least half of the sample to estimate the model. P-values for the test statistics reported in the parentheses are computed via bootstrap under the null hypothesis of no predictability. They are obtained from bootstrapping the whole procedure assuming a one-lag VAR for the predictor variable. Panel A uses the industrial production as predictor, Panel B uses both IP and the average forward discount across developed countries currencies, and Panel C uses only the AFD. Data are monthly, obtained from Datastream. The sample period is 11/1983 - 06/2010.

Table XV: Forecasting Returns and Exchange Rates with the Developed AFD

Horizon	$\kappa_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2	$\kappa_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2	$\kappa_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2
	Developed Countries				Emerging Countries				All Countries			
1	1.76	2.05	0.71	0.38	1.69	1.91	0.83	0.49	1.73	1.97	0.71	0.38
HH	[2.08]		[0.92]		[2.67]		[1.34]		[2.34]		[1.04]	
NW	[1.96]		[0.86]		[2.65]		[1.33]		[2.19]		[0.97]	
VAR	[2.82]		[1.21]		[2.69]		[1.36]		[2.71]		[1.21]	
Over - NW	[1.96]		[0.86]		[2.65]		[1.33]		[2.19]		[0.97]	
3	1.81	4.60	0.79	1.03	1.81	4.66	0.92	1.31	1.79	4.35	0.78	0.95
HH	[2.37]		[1.14]		[2.58]		[1.33]		[2.55]		[1.20]	
NW	[2.19]		[1.02]		[2.01]		[1.03]		[2.24]		[1.02]	
VAR	[3.98]		[1.90]		[3.95]		[2.12]		[3.84]		[1.84]	
Over - NW	[2.77]		[1.43]		[1.91]		[0.92]		[2.30]		[1.12]	

Notes: This table reports results of forecasting regressions for average excess returns and average exchange rate changes for baskets of currencies at horizons of one, two, three, six and twelve months. For each basket we report the R^2, and the slope coefficient in the time-series regression of the log currency excess return of a given basket on the average log forward discount for developed countries ($\kappa_{\mathbf{f}}$), and similarly the slope coefficient $\zeta_{\mathbf{f}}$ and the R^2 for the regressions of average exchange rate changes. The t-statistics for the slope coefficients in brackets are computed using the following methods. The *HH* use Hansen and Hodrick (1980) standard errors computed with the number of lags equal to the length of overlap plus one lag. The *NW* use Newey and West (1987) standard errors computed with the optimal number of lags following Andrews (1991). The *VAR*-based statistics are adjusted for the small sample bias using the bootstrap distributions of slope coefficients under the null hypothesis of no predictability, estimated by drawing from the residuals of a VAR with the number of lags equal to the length of overlap plus one lag. *Over/NW* t-statistics are for the regression coefficients estimated using non-overlapping observations only, computed using Newey-West methods. Data are monthly, from Barclays and Reuters (available via Datastream). The returns do not take into account bid-ask spreads. The sample period is 01/1976–6/2010.

Table XVI: Forecasting Changes in Trade-Weighted US Dollar Indices with AFD

Horizon	$\zeta_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2
	Broad Index		Major Countries		Other Trade Partners	
1	0.26	0.13	1.23	1.59	-1.85	5.86
HH	[0.55]		[1.94]		[-3.93]	
NW	[0.42]		[1.84]		[-2.16]	
VAR	[0.60]		[2.04]		[-3.88]	
Over/NW	[0.42]		[1.84]		[-2.16]	
Over/VAR	[0.59]		[2.04]		[-3.99]	
2	0.24	0.15	1.29	2.42	-2.04	8.29
HH	[0.48]		[1.91]		[-3.66]	
NW	[0.34]		[1.57]		[-2.16]	
VAR	[0.46]		[1.94]		[-3.72]	
Over/NW	[0.51]		[1.81]		[-2.26]	
Over/VAR	[0.60]		[1.66]		[-2.68]	
3	0.32	0.34	1.43	3.87	-2.08	9.52
HH	[0.60]		[2.09]		[-3.37]	
NW	[0.41]		[1.55]		[-2.15]	
VAR	[0.72]		[2.58]		[-4.12]	
Over/NW	[0.55]		[2.03]		[-2.01]	
Over/VAR	[0.68]		[1.73]		[-2.26]	
6	0.36	0.64	1.52	7.02	-2.08	11.22
HH	[0.61]		[2.25]		[-2.75]	
NW	[0.40]		[1.49]		[-2.01]	
VAR	[1.17]		[3.83]		[-4.87]	
Over/NW	[0.59]		[1.91]		[-1.92]	
Over/VAR	[0.54]		[1.48]		[-1.70]	
12	0.26	0.54	1.31	9.04	-1.80	9.18
HH	[0.40]		[1.91]		[-1.75]	
NW	[0.28]		[1.37]		[-1.51]	
VAR	[1.04]		[4.26]		[-4.38]	
Over/NW	[0.45]		[1.28]		[-1.67]	
Over/VAR	[0.33]		[0.82]		[-0.67]	

Notes: This table reports results of forecasting regressions for changes in the U.S. Dollar Trade-Weighted Indices at horizons of one, two, three, six and twelve months using the average forward discount across developed countries in our sample. For each type of index (Broad, Major Countries, and Other Trading Partners) we report the R^2, and the slope coefficient in the time-series regression of the log currency index changes on the average log forward discount $\zeta_{\mathbf{f}}$ and the R^2 for the regressions of average exchange rate changes. The t-statistics for the slope coefficients in brackets are computed using the following methods. The *HH* use Hansen and Hodrick (1980) standard errors computed with the number of lags equal to the length of overlap plus one lag. The *NW* use Newey and West (1987) standard errors computed with the optimal number of lags following Andrews (1991). The *VAR*-based statistics are adjusted for the small sample bias using the bootstrap distributions of slope coefficients under the null hypothesis of no predictability, estimated by drawing from the residuals of a VAR with the number of lags equal to the length of overlap plus one lag. *Over/NW* and *Over/VAR* t-statistics are for the regression coefficients estimated using non-overlapping observations only, computed using Newey-West and bootstrap methods, respectively. Data are monthly, from Barclays and Reuters (available via Datastream). The returns do not take into account bid-ask spreads. The sample period is 11/1983–6/2010.

Table XVII: Forecasting Changes in Trade-Weighted U.S. Dollar Indices with Industrial Production and AFD

k	ζ_{IP}	$\zeta_{\mathbf{f}}$	R^2	κ_{IP}	$\zeta_{\mathbf{f}}$	R^2	ζ_{IP}	$\zeta_{\mathbf{f}}$	R^2
	Broad Index			Major Countries			OITP		
1	-0.58	-0.06	2.13	-0.30	1.07	1.90	-1.22	-2.52	13.76
HH	[-2.01]	[-0.12]		[-0.80]	[1.59]		[-4.53]	[-6.25]	
NW	[-1.95]	[-0.12]		[-0.78]	[1.67]		[-4.09]	[-3.78]	
VAR	[-2.04]	[-0.18]		[-0.65]	[1.71]		[-4.19]	[-5.02]	
Over/NW	[-1.95]	[-0.12]		[-0.78]	[1.67]		[-4.09]	[-3.78]	
Over/VAR	[-1.87]	[-0.11]		[-0.77]	[1.72]		[-3.96]	[-5.01]	
2	-0.68	-0.16	4.21	-0.44	1.04	3.35	-1.31	-2.81	19.73
HH	[-2.71]	[-0.33]		[-1.25]	[1.48]		[-5.30]	[-6.08]	
NW	[-3.65]	[-0.29]		[-2.09]	[1.34]		[-4.14]	[-3.86]	
VAR	[-2.86]	[-0.40]		[-1.37]	[1.54]		[-4.96]	[-4.69]	
Over/NW	[-2.86]	[-0.02]		[-1.13]	[1.56]		[-3.83]	[-3.87]	
Over/VAR	[-1.92]	[-0.04]		[-0.85]	[1.27]		[-3.56]	[-3.63]	
3	-0.72	-0.12	6.38	-0.49	1.14	5.42	-1.34	-2.90	23.41
HH	[-3.13]	[-0.24]		[-1.47]	[1.62]		[-5.71]	[-5.81]	
NW	[-4.88]	[-0.19]		[-3.79]	[1.31]		[-4.17]	[-3.98]	
VAR	[-3.70]	[-0.33]		[-1.88]	[1.89]		[-5.67]	[-5.38]	
Over/NW	[-4.68]	[0.05]		[-1.09]	[1.64]		[-4.25]	[-3.76]	
Over/VAR	[-2.00]	[0.03]		[-0.90]	[1.34]		[-2.97]	[-3.10]	
6	-0.79	-0.16	12.68	-0.56	1.15	10.72	-1.36	-2.98	29.57
HH	[-4.01]	[-0.34]		[-2.06]	[1.75]		[-5.67]	[-5.17]	
NW	[-4.49]	[-0.22]		[-5.55]	[1.18]		[-4.15]	[-4.02]	
VAR	[-5.26]	[-0.50]		[-2.97]	[2.68]		[-6.64]	[-6.52]	
Over/NW	[-3.18]	[-0.03]		[-1.42]	[1.53]		[-4.12]	[-3.99]	
Over/VAR	[-1.82]	[-0.04]		[-0.68]	[1.29]		[-2.59]	[-2.46]	
12	-0.81	-0.36	20.68	-0.58	0.86	15.91	-1.37	-2.85	29.45
HH	[-4.06]	[-0.67]		[-2.98]	[1.28]		[-4.35]	[-4.00]	
NW	[-3.83]	[-0.47]		[-3.20]	[0.95]		[-3.90]	[-3.50]	
VAR	[-8.50]	[-1.48]		[-4.81]	[2.70]		[-8.34]	[-6.77]	
Over/NW	[-3.91]	[-0.33]		[-4.00]	[0.77]		[-3.95]	[-4.10]	
Over/VAR	[-1.31]	[-0.18]		[-0.75]	[0.50]		[-1.29]	[-1.04]	

Notes: This table reports results of forecasting regressions for changes in U.S. Dollar Trade-Weighted Indices at horizons of one, two, three, six and twelve months using the average forward discount across developed countries in our sample. For each type of index (Broad, Major Countries, and Other Trading Partners) we report the R^2, and the slope coefficients in the time-series regression of the log currency excess return on the 12-month change in the U.S. Industrial Production Index (ζ_{IP}) and on the average log forward discount ($\zeta_{\mathbf{f}}$). The t-statistics for the slope coefficients in brackets are computed using the following methods. The *HH* use Hansen and Hodrick (1980) standard errors computed with the number of lags equal to the length of overlap plus one lag. The *NW* use Newey and West (1987) standard errors computed with the optimal number of lags following Andrews (1991). The *VAR*-based statistics are adjusted for the small sample bias using the bootstrap distributions of slope coefficients under the null hypothesis of no predictability, estimated by drawing from the residuals of a VAR with the number of lags equal to the length of overlap plus one lag. *Over/NW* and *Over/VAR* t-statistics are for the regression coefficients estimated using non-overlapping observations only, computed using Newey-West and bootstrap methods, respectively. Data are monthly, from Barclays and Reuters (available via Datastream). The returns do not take into account bid-ask spreads. The sample period is 11/1983–6/2010.

Table XVIII: Forecasting Changes in Trade-Weighted U.S. Dollar Indices with Industrial Production Residuals and AFD

k	ζ_{IP}	$\zeta_{\mathbf{f}}$	R^2	κ_{IP}	$\zeta_{\mathbf{f}}$	R^2	ζ_{IP}	$\zeta_{\mathbf{f}}$	R^2
	Broad Index			Major Countries			OITP		
1	-0.76	0.13	1.45	-0.71	1.11	2.22	-1.02	-2.03	7.95
HH	[-1.91]	[0.28]		[-1.33]	[1.74]		[-2.39]	[-4.78]	
NW	[-1.51]	[0.26]		[-1.36]	[1.96]		[-1.32]	[-2.82]	
VAR	[-1.98]	[0.28]		[-1.35]	[1.86]		[-2.47]	[-4.26]	
Over/NW	[-1.51]	[0.26]		[-1.36]	[1.96]		[-1.32]	[-2.82]	
Over/VAR	[-1.96]	[0.29]		[-1.39]	[1.83]		[-2.52]	[-4.21]	
2	-0.81	0.08	2.32	-0.70	1.16	3.33	-1.15	-2.27	11.67
HH	[-2.15]	[0.17]		[-1.43]	[1.73]		[-2.53]	[-4.64]	
NW	[-1.67]	[0.15]		[-1.34]	[1.61]		[-1.50]	[-2.92]	
VAR	[-2.48]	[0.14]		[-1.63]	[1.81]		[-3.06]	[-4.38]	
Over/NW	[-1.67]	[0.38]		[-0.95]	[1.79]		[-1.83]	[-3.16]	
Over/VAR	[-1.80]	[0.31]		[-0.88]	[1.56]		[-2.64]	[-3.17]	
3	-0.76	0.16	2.88	-0.63	1.30	4.85	-1.15	-2.32	13.38
HH	[-2.05]	[0.32]		[-1.37]	[1.94]		[-2.29]	[-4.38]	
NW	[-1.59]	[0.25]		[-1.25]	[1.55]		[-1.49]	[-2.98]	
VAR	[-2.50]	[0.33]		[-1.57]	[2.38]		[-3.14]	[-4.70]	
Over/NW	[-1.23]	[0.42]		[-0.97]	[1.88]		[-1.29]	[-2.73]	
Over/VAR	[-1.32]	[0.40]		[-0.93]	[1.57]		[-1.36]	[-2.64]	
6	-1.11	0.08	9.64	-1.01	1.26	11.57	-1.39	-2.43	18.53
HH	[-3.11]	[0.17]		[-2.65]	[2.09]		[-2.43]	[-4.01]	
NW	[-2.52]	[0.12]		[-2.28]	[1.45]		[-1.93]	[-3.09]	
VAR	[-4.79]	[0.23]		[-3.34]	[3.11]		[-4.27]	[-5.60]	
Over/NW	[-2.35]	[0.13]		[-1.72]	[1.64]		[-3.09]	[-3.25]	
Over/VAR	[-1.73]	[0.07]		[-1.10]	[1.16]		[-1.82]	[-2.19]	
12	-1.23	-0.14	20.40	-1.03	0.98	18.30	-1.69	-2.35	22.49
HH	[-4.48]	[-0.29]		[-3.89]	[1.60]		[-3.02]	[-3.27]	
NW	[-4.19]	[-0.20]		[-5.24]	[1.19]		[-2.75]	[-2.92]	
VAR	[-7.09]	[-0.57]		[-4.68]	[3.05]		[-5.81]	[-5.62]	
Over/NW	[-2.88]	[0.15]		[-2.61]	[1.06]		[-2.35]	[-1.79]	
Over/VAR	[-1.23]	[0.08]		[-0.88]	[0.64]		[-0.84]	[-0.80]	

Notes: This table reports results of forecasting regressions for changes in U.S. Dollar Trade-Weighted Indices at horizons of one, two, three, six and twelve months using the average forward discount across developed countries in our sample. For each type of index (Broad, Major Countries, and Other Trading Partners) we report the R^2, and the slope coefficients in the time-series regression of the log currency excess return on the 12-month change in the U.S. Industrial Production Index orthogonalized with respect to the world average Industrial Production (ζ_{IP}) and on the average log forward discount ($\zeta_{\mathbf{f}}$). The t-statistics for the slope coefficients in brackets are computed using the following methods. The *HH* use Hansen and Hodrick (1980) standard errors computed with the number of lags equal to the length of overlap plus one lag. The *NW* use Newey and West (1987) standard errors computed with the optimal number of lags following Andrews (1991). The *VAR*-based statistics are adjusted for the small sample bias using the bootstrap distributions of slope coefficients under the null hypothesis of no predictability, estimated by drawing from the residuals of a VAR with the number of lags equal to the length of overlap plus one lag. *Over/NW* and *Over/VAR* t-statistics are for the regression coefficients estimated using non-overlapping observations only, computed using Newey-West and bootstrap methods, respectively. Data are monthly, from Barclays and Reuters (available via Datastream). The returns do not take into account bid-ask spreads. The sample period is 11/1983–6/2010.

Table XIX: Predictability using Average Forward Discount and Individual Forward Discount, Developed Countries, Euro Area - Twelve-Month Horizon

Country	# obs.	$\kappa_{\mathbf{f}}$	κ_f	R^2	$\zeta_{\mathbf{f}}$	ζ_f	R^2
FRANCE	170.00	2.03	-0.01	9.99	2.03	-1.01	5.89
HH		[2.24]	[-0.01]		[2.24]	[-1.11]	
NW		[2.42]	[-0.01]		[2.42]	[-0.81]	
VAR		[1.82]	[-0.10]		[1.78]	[-1.09]	
Over/NW		[0.87]	[0.23]		[0.87]	[-0.43]	
Over/VAR		[0.28]	[0.21]		[0.31]	[-0.07]	
GERMANY	169.00	3.94	-1.26	19.23	3.94	-2.26	18.09
HH		[3.81]	[-1.52]		[3.81]	[-2.73]	
NW		[2.21]	[-0.85]		[2.21]	[-1.53]	
VAR		[3.46]	[-1.23]		[3.36]	[-2.25]	
Over/NW		[1.70]	[-0.56]		[1.70]	[-1.19]	
Over/VAR		[0.99]	[-0.24]		[1.02]	[-0.68]	
ITALY	163.00	1.91	-1.68	3.89	1.91	-2.68	8.37
HH		[1.89]	[-1.35]		[1.89]	[-2.15]	
NW		[1.79]	[-0.99]		[1.79]	[-1.58]	
VAR		[1.61]	[-1.92]		[1.59]	[-3.12]	
Over/NW		[3.00]	[-0.79]		[3.00]	[-1.29]	
Over/VAR		[0.84]	[-0.38]		[0.89]	[-0.71]	
NETHERLANDS	170.00	4.30	-1.52	19.25	4.30	-2.52	16.29
HH		[3.52]	[-1.49]		[3.52]	[-2.48]	
NW		[2.03]	[-0.84]		[2.03]	[-1.39]	
VAR		[3.64]	[-1.34]		[3.54]	[-2.31]	
Over/NW		[1.78]	[-0.66]		[1.78]	[-1.21]	
Over/VAR		[0.99]	[-0.23]		[1.06]	[-0.66]	

Notes: This table reports results of forecasting regressions for excess returns and spot exchange rate changes for individual currencies on average and individual forward discounts at the twelve-month horizon. For each currency we report the R^2, and the slope coefficients of the time-series regression of the log currency excess return on a given currency on the average log forward discount for developed countries ($\kappa_{\mathbf{f}}$), as well as the currency-specific forward discount (κ_f), and similarly the slope coefficient $\zeta_{\mathbf{f}}$ and ζ_f and the R^2 for the regressions of spot exchange rate changes. The t-statistics for the slope coefficients in brackets are computed using the following methods. The *HH* use (Hansen and Hodrick 1980) standard errors computed with the number of lags equal to the length of overlap plus one lag. The *NW* use (Newey and West 1987) standard errors computed with the optimal number of lags following (Andrews 1991). The *VAR*-based statistics are adjusted for the small sample bias using the bootstrap distributions of slope coefficients under the null hypothesis of no predictability, estimated by drawing from the residuals of a VAR with the number of lags equal to the length of overlap plus one lag. *Over/NW* and *Over/VAR* t-statistics are for the regression coefficients estimated using non-overlapping observations only, computed using Newey-West and bootstrap methods, respectively. Data are monthly, from Barclays and Reuters (available via Datastream). The returns do not take into account bid-ask spreads. The sample period is 11/1983–6/2010.

Table XX: Developed Countries, non-Euro area - US Investor Average Forward Discount, Twelve-Month Horizon

Country	# obs.	$\kappa_{\mathbf{f}}$	κ_f	R^2	$\zeta_{\mathbf{f}}$	ζ_f	R^2
AUSTRALIA	295.00	0.57	1.28	9.67	0.57	0.28	1.68
HH		[0.71]	[2.55]		[0.71]	[0.56]	
NW		[0.37]	[1.55]		[0.37]	[0.34]	
VAR		[0.65]	[2.43]		[0.70]	[0.64]	
Over/NW		[0.70]	[0.67]		[0.70]	[-0.17]	
Over/VAR		[0.60]	[0.46]		[0.55]	[-0.10]	
CANADA	295.00	-1.17	2.26	5.91	-1.17	1.26	2.22
HH		[-1.85]	[2.99]		[-1.85]	[1.67]	
NW		[-1.18]	[2.46]		[-1.18]	[1.37]	
VAR		[-2.16]	[3.61]		[-2.25]	[2.09]	
Over/NW		[0.09]	[0.49]		[0.09]	[-0.11]	
Over/VAR		[0.10]	[0.22]		[0.06]	[-0.08]	
DENMARK	295.00	5.56	-2.76	16.17	5.56	-3.76	11.00
HH		[3.85]	[-2.28]		[3.85]	[-3.11]	
NW		[2.35]	[-1.51]		[2.35]	[-2.05]	
VAR		[4.48]	[-2.82]		[4.71]	[-3.98]	
Over/NW		[2.23]	[-1.24]		[2.23]	[-1.84]	
Over/VAR		[1.28]	[-0.61]		[1.38]	[-1.02]	
JAPAN	308.00	1.79	2.37	32.60	1.79	1.37	21.60
HH		[1.66]	[2.32]		[1.66]	[1.34]	
NW		[1.07]	[1.35]		[1.07]	[0.78]	
VAR		[1.79]	[2.69]		[1.92]	[1.63]	
Over/NW		[0.05]	[1.91]		[0.05]	[1.39]	
Over/VAR		[0.11]	[1.31]		[0.08]	[1.02]	
NEW ZEALAND	295.00	1.78	1.14	16.76	1.78	0.14	6.23
HH		[2.42]	[2.64]		[2.42]	[0.32]	
NW		[1.26]	[2.07]		[1.26]	[0.25]	
VAR		[2.04]	[2.79]		[2.12]	[0.47]	
Over/NW		[1.07]	[1.75]		[1.07]	[0.51]	
Over/VAR		[0.77]	[0.86]		[0.72]	[0.34]	
NORWAY	295.00	0.24	1.06	7.46	0.24	0.06	0.25
HH		[0.23]	[1.75]		[0.23]	[0.10]	
NW		[0.14]	[1.08]		[0.14]	[0.06]	
VAR		[0.36]	[1.68]		[0.41]	[0.02]	
Over/NW		[-0.21]	[1.40]		[-0.21]	[0.57]	
Over/VAR		[0.00]	[0.73]		[-0.04]	[0.25]	
SWEDEN	295.00	2.50	-0.77	3.97	2.50	-1.77	1.54
HH		[1.35]	[-0.53]		[1.35]	[-1.21]	
NW		[0.87]	[-0.35]		[0.87]	[-0.79]	
VAR		[1.79]	[-0.77]		[1.91]	[-2.03]	
Over/NW		[0.49]	[-0.00]		[0.49]	[-0.42]	
Over/VAR		[0.32]	[0.13]		[0.30]	[-0.20]	
SWITZERLAND	308.00	2.51	0.20	14.59	2.51	-0.80	7.79
HH		[2.30]	[0.20]		[2.30]	[-0.82]	
NW		[1.21]	[0.11]		[1.21]	[-0.43]	
VAR		[3.08]	[0.34]		[3.12]	[-1.22]	
Over/NW		[1.38]	[0.23]		[1.38]	[-0.41]	
Over/VAR		[1.00]	[0.24]		[1.11]	[-0.26]	
UNITED KINGDOM	308.00	0.97	0.18	3.51	0.97	-0.82	0.72
HH		[1.24]	[0.18]		[1.24]	[-0.83]	
NW		[0.91]	[0.16]		[0.91]	[-0.72]	
VAR		[1.28]	[0.21]		[1.25]	[-1.07]	
Over/NW		[0.69]	[0.75]		[0.69]	[-0.15]	
Over/VAR		[0.51]	[0.20]		[0.37]	[-0.06]	

Notes: See table XIX for details

Table XXI: Emerging Countries, Asia - US Investor Average Forward Discount, One Month Horizon

Country	# obs.	$\kappa_{\mathbf{f}}$	κ_f	R^2	$\zeta_{\mathbf{f}}$	ζ_f	R^2
MALAYSIA	213.00	2.33	-0.01	12.12	2.33	-1.01	14.76
HH		[2.35]	[-0.02]		[2.35]	[-1.80]	
NW		[1.29]	[-0.02]		[1.29]	[-1.70]	
VAR		[3.28]	[0.02]		[3.25]	[-2.79]	
Over/NW		[1.72]	[-0.99]		[1.72]	[-1.55]	
Over/VAR		[1.59]	[-0.96]		[1.53]	[-1.50]	
PHILIPPINE	150.00	1.36	0.64	4.75	1.36	-0.36	2.71
HH		[1.00]	[1.28]		[1.00]	[-0.71]	
NW		[0.60]	[0.89]		[0.60]	[-0.50]	
VAR		[0.84]	[1.53]		[0.81]	[-1.02]	
Over/NW		[0.45]	[1.12]		[0.45]	[0.39]	
Over/VAR		[0.13]	[1.45]		[0.14]	[0.54]	
SINGAPORE	295.00	1.01	1.17	20.28	1.01	0.17	11.40
HH		[2.91]	[3.52]		[2.91]	[0.51]	
NW		[1.50]	[2.18]		[1.50]	[0.31]	
VAR		[3.32]	[3.54]		[3.70]	[0.54]	
Over/NW		[1.39]	[4.20]		[1.39]	[1.93]	
Over/VAR		[1.23]	[1.49]		[1.28]	[0.69]	
TAIWAN	150.00	1.32	1.19	15.11	1.32	0.19	6.65
HH		[1.93]	[2.84]		[1.93]	[0.46]	
NW		[1.24]	[1.94]		[1.24]	[0.32]	
VAR		[1.50]	[3.41]		[1.60]	[0.59]	
Over/NW		[1.43]	[0.75]		[1.43]	[-0.15]	
Over/VAR		[0.97]	[0.90]		[1.25]	[0.08]	
THAILAND	150.00	2.28	1.22	10.76	2.28	0.22	4.79
HH		[1.76]	[1.84]		[1.76]	[0.33]	
NW		[1.09]	[1.72]		[1.09]	[0.31]	
VAR		[1.50]	[3.35]		[1.56]	[0.60]	
Over/NW		[1.18]	[2.23]		[1.18]	[1.58]	
Over/VAR		[1.01]	[2.91]		[1.21]	[2.39]	

Notes: See table XIX for details

Table XXII: Emerging Countries, Other - US Investor Average Forward Discount, Twelve-month Horizon

Country	# obs.	$\kappa_{\mathbf{f}}$	κ_f	R^2	$\zeta_{\mathbf{f}}$	ζ_f	R^2
CZECH REPUBLIC	150.00	1.35	0.00	2.02	1.35	-1.00	8.70
HH		[0.93]	[0.00]		[0.93]	[-2.14]	
NW		[0.54]	[0.00]		[0.54]	[-1.76]	
VAR		[0.84]	[0.19]		[0.79]	[-1.39]	
Over/NW		[0.64]	[-0.10]		[0.64]	[-1.19]	
Over/VAR		[0.14]	[0.27]		[0.20]	[-0.15]	
HUNGARY	141.00	2.30	-0.42	5.19	2.30	-1.42	11.55
HH		[1.30]	[-0.94]		[1.30]	[-3.18]	
NW		[0.75]	[-0.64]		[0.75]	[-2.18]	
VAR		[1.23]	[-0.36]		[1.18]	[-1.96]	
Over/NW		[2.37]	[-0.56]		[2.37]	[-1.90]	
Over/VAR		[0.73]	[0.10]		[0.69]	[-0.28]	
KUWAIT	150.00	-0.40	1.18	17.15	-0.40	0.18	3.51
HH		[-1.18]	[1.83]		[-1.18]	[0.28]	
NW		[-0.63]	[2.82]		[-0.63]	[0.44]	
VAR		[-0.94]	[3.93]		[-0.89]	[0.50]	
Over/NW		[-0.36]	[4.61]		[-0.36]	[1.41]	
Over/VAR		[-0.46]	[1.91]		[-0.41]	[0.73]	
MEXICO	150.00	-2.71	0.84	35.26	-2.71	-0.16	11.22
HH		[-2.84]	[3.89]		[-2.84]	[-0.74]	
NW		[-1.70]	[3.23]		[-1.70]	[-0.62]	
VAR		[-2.04]	[2.76]		[-2.21]	[-0.57]	
Over/NW		[-1.47]	[3.20]		[-1.47]	[-0.40]	
Over/VAR		[-1.11]	[0.79]		[-1.30]	[0.14]	
SOUTH AFRICA	307.00	3.23	1.77	20.98	3.23	0.77	15.02
HH		[4.00]	[3.37]		[4.00]	[1.46]	
NW		[2.14]	[1.82]		[2.14]	[0.79]	
VAR		[3.84]	[4.09]		[4.13]	[1.81]	
Over/NW		[2.11]	[1.44]		[2.11]	[0.61]	
Over/VAR		[1.86]	[1.07]		[1.93]	[0.43]	

Notes: See table XIX for details

Table XXIII: Predictability Using Bilateral Forward Discount and US Investor Average Forward Discount, Euro-Area Countries, Twelve-month horizon

Country	κ_f	R^2	ζ_f	R^2	$\kappa_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2	κ_f	R^2	ζ_f	R^2
	Individual Forward Discount				Average Forward Discount				Forecasting the Residual			
EURO AREA	3.60	18.72	2.60	10.73	3.41	15.41	2.39	8.28	0.38	0.24	0.34	0.20
HH	[2.86]		[2.07]		[2.59]		[1.82]		[0.29]		[0.27]	
NW	[1.55]		[1.12]		[1.38]		[0.97]		[0.16]		[0.15]	
VAR	[2.67]		[1.99]		[2.09]		[1.48]		[0.28]		[0.21]	
Over/NW	[1.37]		[1.04]		[1.08]		[0.78]		[0.22]		[0.21]	
Over/VAR	[1.26]		[0.90]		[1.13]		[0.86]		[0.13]		[0.08]	
FRANCE	1.25	4.54	0.25	0.19	2.02	9.99	1.28	4.21	0.01	0.00	-0.53	0.90
HH	[1.62]		[0.33]		[2.70]		[1.61]		[0.02]		[-0.71]	
NW	[1.01]		[0.20]		[1.92]		[1.14]		[0.01]		[-0.44]	
VAR	[2.30]		[0.49]		[2.83]		[1.87]		[0.15]		[-0.93]	
Over/NW	[0.93]		[0.16]		[1.23]		[0.76]		[0.18]		[-0.33]	
Over/VAR	[0.81]		[0.22]		[1.11]		[0.75]		[0.18]		[-0.11]	
GERMANY	0.66	1.88	-0.34	0.50	2.71	15.67	1.73	6.47	-0.64	2.06	-1.16	6.30
HH	[1.14]		[-0.59]		[3.54]		[2.06]		[-1.13]		[-2.07]	
NW	[0.79]		[-0.40]		[2.64]		[1.39]		[-0.80]		[-1.45]	
VAR	[1.15]		[-0.26]		[3.50]		[2.38]		[-0.80]		[-1.63]	
Over/NW	[0.74]		[-0.28]		[1.77]		[0.93]		[-0.45]		[-0.99]	
Over/VAR	[0.64]		[0.00]		[1.37]		[0.88]		[-0.21]		[-0.58]	
ITALY	-0.39	0.41	-1.39	5.06	0.50	0.55	-0.34	0.25	-0.81	1.85	-1.25	4.18
HH	[-0.38]		[-1.37]		[0.51]		[-0.33]		[-0.81]		[-1.24]	
NW	[-0.23]		[-0.82]		[0.30]		[-0.19]		[-0.49]		[-0.74]	
VAR	[-0.68]		[-2.54]		[0.75]		[-0.26]		[-1.51]		[-2.24]	
Over/NW	[0.38]		[-0.15]		[1.39]		[0.92]		[-0.46]		[-0.76]	
Over/VAR	[0.42]		[-0.02]		[1.12]		[0.85]		[-0.43]		[-0.84]	
NETHERLANDS	0.99	3.53	-0.01	0.00	2.76	15.83	1.74	6.57	-0.60	1.55	-1.01	4.12
HH	[1.59]		[-0.02]		[3.59]		[2.11]		[-1.01]		[-1.68]	
NW	[1.09]		[-0.01]		[2.60]		[1.41]		[-0.72]		[-1.18]	
VAR	[1.59]		[0.19]		[3.51]		[2.32]		[-0.75]		[-1.29]	
Over/NW	[1.00]		[0.03]		[1.86]		[1.02]		[-0.46]		[-0.87]	
Over/VAR	[0.85]		[0.14]		[1.46]		[0.99]		[-0.18]		[-0.43]	

Notes: This table reports results of three sets of forecasting regressions for excess returns and spot exchange rate changes for individual currencies. The first set of regressions uses the country-specific forward discount as the forecasting variable. The first set (denoted "Individual Forward Discount") corresponds to regressions of the log currency excess return on the log forward discount for each currency j: $rx^j_{t\to t+k} = \kappa^j_0 + \kappa^j_f(f^j_{t\to k} - s^j_t) + \eta^{j,1}_{t+k}$. The second set (denoted "Average Forward Discount") corresponds to regressions the log k-period currency excess return for each portfolio j on the average of log forward discounts across all developed countries: $rx^j_{t\to t+k} = \kappa^j_0 + \kappa^j_{\mathbf{f}}(\overline{f}_{t\to t+k} - \overline{s}_t) + \eta^{j,2}_{t+k}$, for each currency j ($k = 12$ months). The third set (denoted "Forecasting the Residual") uses the residual of the second regression as the left-hand side variable: $\eta^{j,2}_{t\to t+k} = \kappa^j_0 + \kappa^j_f(f^{t\to t+k}_t - s_t) + \epsilon^j_{t+k}$, for each j. The same procedure is applied to the spot rate changes. For each currency we report the R^2, and the slope coefficients of the appropriate regression. See table XIX for other details

Table XXIV: Predictability Using Bilateral Forward Discount and US Investor Average Forward Discount, Developed Countries - Non-Euro Area, Twelve-month horizon

Country	κ_f	R^2	ζ_f	R^2	$\kappa_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2	κ_f	R^2	ζ_f	R^2
	Individual Forward Discount				Average Forward Discount				Forecasting the Residual			
AUSTRALIA	1.56	9.35	0.56	1.32	1.82	6.38	0.85	1.50	0.65	1.75	0.13	0.07
HH	[3.89]		[1.40]		[2.58]		[1.33]		[1.67]		[0.33]	
NW	[2.27]		[0.82]		[1.29]		[0.68]		[1.00]		[0.19]	
VAR	[3.95]		[1.60]		[3.19]		[1.52]		[1.86]		[0.32]	
Over/NW	[2.23]		[0.81]		[1.49]		[1.00]		[0.61]		[-0.15]	
Over/VAR	[1.17]		[0.41]		[1.26]		[0.68]		[0.24]		[-0.16]	
CANADA	1.03	3.78	0.03	0.00	0.37	0.74	-0.31	0.55	0.61	1.35	0.33	0.40
HH	[2.36]		[0.07]		[0.95]		[-0.84]		[1.39]		[0.75]	
NW	[1.29]		[0.04]		[0.48]		[-0.42]		[0.75]		[0.41]	
VAR	[2.91]		[0.09]		[1.00]		[-0.97]		[1.85]		[0.98]	
Over/NW	[0.87]		[-0.03]		[0.78]		[0.01]		[0.14]		[-0.03]	
Over/VAR	[0.69]		[-0.04]		[0.61]		[-0.12]		[0.14]		[0.01]	
DENMARK	1.50	6.53	0.50	0.76	2.51	12.74	1.41	4.24	-0.42	0.60	-0.58	1.08
HH	[2.54]		[0.84]		[3.67]		[1.98]		[-0.77]		[-1.02]	
NW	[1.50]		[0.50]		[2.14]		[1.13]		[-0.48]		[-0.62]	
VAR	[3.44]		[1.23]		[4.39]		[2.70]		[-0.98]		[-1.45]	
Over/NW	[1.33]		[0.49]		[1.83]		[0.96]		[-0.30]		[-0.42]	
Over/VAR	[1.42]		[0.54]		[1.89]		[1.20]		[-0.24]		[-0.38]	
JAPAN	3.86	31.09	2.86	19.84	3.93	29.71	3.02	20.48	0.63	1.20	0.38	0.45
HH	[8.61]		[6.38]		[8.48]		[6.49]		[1.36]		[0.84]	
NW	[5.02]		[3.72]		[5.69]		[4.30]		[0.76]		[0.48]	
VAR	[7.43]		[6.28]		[6.71]		[5.70]		[1.52]		[0.96]	
Over/NW	[3.60]		[2.64]		[3.94]		[2.92]		[0.99]		[0.74]	
Over/VAR	[2.62]		[2.26]		[2.22]		[1.82]		[0.89]		[0.67]	
NEW ZEALAND	1.67	13.40	0.67	2.44	2.88	12.35	1.91	6.16	0.80	3.50	0.09	0.05
HH	[4.08]		[1.64]		[3.73]		[2.79]		[2.07]		[0.23]	
NW	[3.05]		[1.23]		[1.90]		[1.50]		[1.60]		[0.18]	
VAR	[5.12]		[2.19]		[4.24]		[2.80]		[2.46]		[0.32]	
Over/NW	[3.56]		[1.86]		[1.83]		[1.58]		[1.55]		[0.46]	
Over/VAR	[1.78]		[1.00]		[1.80]		[1.42]		[0.91]		[0.30]	
NORWAY	1.19	7.42	0.19	0.21	1.58	5.67	0.32	0.25	0.32	0.55	0.01	0.00
HH	[2.98]		[0.49]		[2.33]		[0.47]		[0.76]		[0.03]	
NW	[1.67]		[0.27]		[1.32]		[0.27]		[0.42]		[0.02]	
VAR	[3.44]		[0.62]		[2.88]		[0.68]		[0.85]		[0.06]	
Over/NW	[1.76]		[0.53]		[1.15]		[0.29]		[0.54]		[0.24]	
Over/VAR	[1.49]		[0.43]		[1.20]		[0.35]		[0.41]		[0.15]	
SWEDEN	0.84	2.56	-0.16	0.10	1.46	3.69	0.10	0.02	-0.11	0.04	-0.24	0.22
HH	[1.19]		[-0.23]		[1.53]		[0.10]		[-0.16]		[-0.34]	
NW	[0.69]		[-0.14]		[0.86]		[0.06]		[-0.09]		[-0.20]	
VAR	[2.09]		[-0.36]		[2.27]		[0.23]		[-0.28]		[-0.53]	
Over/NW	[0.79]		[0.06]		[0.87]		[0.16]		[-0.00]		[-0.09]	
Over/VAR	[1.04]		[0.22]		[1.09]		[0.31]		[0.15]		[0.04]	
SWITZERLAND	1.75	9.02	0.75	1.79	2.69	14.54	1.78	6.90	0.09	0.03	-0.35	0.43
HH	[3.05]		[1.30]		[4.34]		[2.73]		[0.15]		[-0.62]	
NW	[1.93]		[0.83]		[2.85]		[1.71]		[0.09]		[-0.39]	
VAR	[3.87]		[1.75]		[4.76]		[3.43]		[0.33]		[-0.65]	
Over/NW	[1.61]		[0.68]		[2.53]		[1.45]		[0.16]		[-0.29]	
Over/VAR	[1.41]		[0.61]		[1.80]		[1.31]		[0.17]		[-0.18]	
UNITED KINGDOM	1.05	2.81	0.05	0.01	1.12	3.49	0.29	0.25	0.01	0.00	-0.26	0.17
HH	[1.41]		[0.06]		[1.68]		[0.44]		[0.02]		[-0.34]	
NW	[0.98]		[0.04]		[1.07]		[0.28]		[0.01]		[-0.24]	
VAR	[2.49]		[0.12]		[2.34]		[0.61]		[0.09]		[-0.55]	
Over/NW	[1.41]		[0.56]		[1.26]		[0.65]		[0.21]		[-0.04]	
Over/VAR	[1.02]		[0.40]		[1.06]		[0.58]		[0.17]		[-0.04]	

Notes: See table **??** for details

Table XXV: Predictability Using Bilateral Forward Discount and US Investor Average Forward Discount, Asian Countries, Twelve-month horizon

Country	κ_f	R^2	ζ_f	R^2	$\kappa_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2	κ_f	R^2	ζ_f	R^2
	Individual Forward Discount				Average Forward Discount				Forecasting the Residual			
MALAYSIA	0.22	0.27	-0.78	3.27	2.33	12.12	2.08	9.36	-0.02	0.00	-1.00	5.92
HH	[0.49]		[-1.71]		[2.52]		[2.12]		[-0.05]		[-1.97]	
NW	[0.38]		[-1.33]		[1.34]		[1.08]		[-0.05]		[-1.94]	
VAR	[0.68]		[-2.29]		[3.44]		[2.98]		[-0.07]		[-2.99]	
Over/NW	[-0.38]		[-1.00]		[1.53]		[1.22]		[-1.13]		[-1.76]	
Over/VAR	[-0.42]		[-1.00]		[1.48]		[1.28]		[-1.00]		[-1.57]	
PHILIPPINES	0.66	2.84	-0.34	0.76	1.42	2.07	1.33	1.87	0.64	2.72	-0.36	0.86
HH	[1.37]		[-0.70]		[1.01]		[0.98]		[1.26]		[-0.71]	
NW	[0.99]		[-0.51]		[0.63]		[0.56]		[0.87]		[-0.49]	
VAR	[1.77]		[-1.07]		[0.96]		[0.85]		[1.67]		[-1.10]	
Over/NW	[1.19]		[0.41]		[0.43]		[0.45]		[1.15]		[0.40]	
Over/VAR	[1.21]		[0.35]		[0.29]		[0.41]		[1.09]		[0.27]	
SINGAPORE	1.65	11.84	0.65	2.03	1.27	14.94	1.05	11.28	1.04	5.61	0.15	0.12
HH	[4.30]		[1.69]		[3.92]		[3.24]		[3.49]		[0.49]	
NW	[2.57]		[1.01]		[2.11]		[1.69]		[2.25]		[0.31]	
VAR	[5.19]		[2.19]		[4.67]		[4.08]		[3.63]		[0.53]	
Over/NW	[3.24]		[1.73]		[1.81]		[1.59]		[3.42]		[1.59]	
Over/VAR	[1.82]		[1.01]		[1.54]		[1.52]		[1.66]		[0.71]	
TAIWAN	1.08	9.12	0.08	0.06	1.09	4.19	1.28	6.33	1.17	11.22	0.19	0.33
HH	[2.55]		[0.20]		[1.40]		[1.76]		[2.63]		[0.42]	
NW	[1.87]		[0.14]		[0.92]		[1.15]		[1.81]		[0.29]	
VAR	[3.38]		[0.23]		[1.33]		[1.67]		[3.75]		[0.63]	
Over/NW	[0.87]		[-0.11]		[1.45]		[1.46]		[0.76]		[-0.15]	
Over/VAR	[1.08]		[-0.02]		[1.35]		[1.47]		[0.97]		[-0.09]	
THAILAND	1.03	6.28	0.03	0.01	1.64	2.44	2.16	4.51	1.18	8.42	0.22	0.33
HH	[1.44]		[0.05]		[1.15]		[1.52]		[1.67]		[0.32]	
NW	[1.40]		[0.05]		[0.82]		[1.06]		[1.65]		[0.31]	
VAR	[3.00]		[0.11]		[1.16]		[1.56]		[3.29]		[0.67]	
Over/NW	[2.03]		[1.34]		[1.03]		[1.10]		[2.24]		[1.58]	
Over/VAR	[2.26]		[1.77]		[0.80]		[1.15]		[2.02]		[1.65]	

Notes: See table **??** for details

Table XXVI: Predictability Using Bilateral Forward Discount and US Investor Average Forward Discount, Other Emerging Countries, Twelve-month horizon

Country	κ_f	R^2	ζ_f	R^2	$\kappa_{\mathbf{f}}$	R^2	$\zeta_{\mathbf{f}}$	R^2	κ_f	R^2	ζ_f	R^2
	Individual Forward Discount				Average Forward Discount				Forecasting the Residual			
CZECH REPUBLIC	-0.03	0.00	-1.03	6.82	1.35	2.02	1.48	2.25	0.00	0.00	-0.99	6.56
HH	[-0.06]		[-2.29]		[0.93]		[1.01]		[0.01]		[-2.10]	
NW	[-0.06]		[-2.14]		[0.54]		[0.58]		[0.01]		[-1.76]	
VAR	[0.15]		[-1.74]		[1.03]		[1.04]		[0.15]		[-1.80]	
Over/NW	[-0.18]		[-1.43]		[0.65]		[0.65]		[-0.11]		[-1.24]	
Over/VAR	[0.07]		[-0.55]		[0.70]		[0.73]		[-0.02]		[-0.64]	
HUNGARY	-0.26	0.32	-1.26	7.00	2.16	4.39	1.81	2.89	-0.42	0.89	-1.40	8.90
HH	[-0.57]		[-2.75]		[1.25]		[1.04]		[-0.99]		[-3.25]	
NW	[-0.37]		[-1.78]		[0.71]		[0.58]		[-0.68]		[-2.22]	
VAR	[-0.21]		[-1.72]		[1.41]		[1.19]		[-0.53]		[-2.10]	
Over/NW	[-0.20]		[-1.44]		[2.25]		[1.88]		[-0.58]		[-2.00]	
Over/VAR	[0.17]		[-0.36]		[1.29]		[1.29]		[-0.12]		[-0.65]	
KUWAIT	1.20	14.54	0.20	0.48	-0.43	3.09	-0.40	3.12	1.18	14.37	0.18	0.41
HH	[1.70]		[0.29]		[-0.99]		[-1.13]		[1.81]		[0.28]	
NW	[2.52]		[0.42]		[-0.56]		[-0.61]		[2.75]		[0.43]	
VAR	[4.15]		[0.65]		[-1.20]		[-0.98]		[3.95]		[0.52]	
Over/NW	[3.88]		[1.23]		[-0.42]		[-0.36]		[4.32]		[1.27]	
Over/VAR	[2.25]		[0.91]		[-0.60]		[-0.54]		[2.36]		[0.90]	
MEXICO	1.09	27.28	0.09	0.27	-4.10	21.68	-2.44	10.54	0.70	14.32	-0.14	0.67
HH	[4.98]		[0.43]		[-3.87]		[-2.43]		[2.87]		[-0.61]	
NW	[3.52]		[0.30]		[-2.39]		[-1.46]		[2.25]		[-0.47]	
VAR	[3.82]		[0.39]		[-3.10]		[-2.10]		[2.76]		[-0.59]	
Over/NW	[3.80]		[0.62]		[-2.44]		[-1.34]		[2.01]		[-0.27]	
Over/VAR	[1.07]		[0.31]		[-1.67]		[-1.22]		[0.87]		[0.07]	
SOUTH AFRICA	1.95	9.21	0.95	2.36	3.45	13.51	3.33	13.50	1.75	8.56	0.76	1.73
HH	[3.36]		[1.64]		[4.34]		[4.16]		[3.30]		[1.43]	
NW	[1.74]		[0.85]		[2.40]		[2.25]		[1.77]		[0.76]	
VAR	[4.60]		[2.40]		[4.59]		[4.55]		[4.39]		[2.04]	
Over/NW	[1.37]		[0.62]		[2.37]		[2.22]		[1.41]		[0.60]	
Over/VAR	[1.21]		[0.49]		[1.91]		[2.04]		[1.28]		[0.54]	

Notes: See table **??** for details