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The Forward Rate Biasedness in Developing and Developed Country Currencies

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Abstract

After a consensus emerged about the biasedness of the forward rate in predicting the future spot rate, the focus of relevant analysis has turned to whether the forward exchange rate biasedness is more pronounced for emerging market currencies than for the developed countries, or vice versa. The most referenced study of Frankel and Poonawala (2010) resulted with the surprising finding that the unbiasedness in the forward rates of the developing country currencies is more severe. Contrarily, the findings of Lorey and Lucey (2012) is that forward rate biasedness is less pronounced for the developed country currencies than for developing country currencies and they attributed this conflict to the period-specific factors.

In this study, the similar tests are realized on the data set consisting of the daily forward quotations of both of the group of currencies in a broader time period beginning in 2000 ending in November 2012. The results of the study are not supportive for both of the previous studies and revealed the fact that there exist no considerable differences between the biasedness of the forward rates of the currencies of the developing and developed countries.

JEL classification numbers: G14, G15.
Keywords: the forward foreign exchange rate, the spot foreign exchange rate, rational expectations, forward discount bias.

1 Introduction

The reason for the existence of a typical forward transaction is to manage the risk inherent in currency markets by predetermining the rate and date on which the required currency is to be purchased or sold. The foreign exchange rate on a forward transaction is theoretically determined with reference to either the difference between the interest rates

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of the two countries involved, or to the interest rate differential as it is formally known. This does not mean that the forward rate is a prediction of where the spot foreign exchange rate is likely to be on that future date, but in practice, there is an expectation that the forward rate for a specific future date and the spot rate will coincide.

In fact, the predictive capability of the forward rate on the future spot rate by using data sets from many different currencies during various periods of time is one of the most frequently studied topics in financial literature. The studies have generally resulted in the finding that the forward premium (discount) is a biased predictor of future change in spot exchange rates. As such, the forward rate is said to over- (in the case of forward premium) or under- (in the case of forward discount) estimate the future spot rate. Statistically, there exist three identified sources of bias, unrepresentativeness of the sample, measurement error and sampling error.

Since a consensus about this bias has emerged, the focus of relevant analysis has turned to whether forward exchange rate biasedness is more pronounced among emerging market currencies than among those of developed countries. The new era of forward bias studies was initiated by Frankel and Poonawala, whose study dated 2006 examines forward markets among nine economically emerging countries and six industrialized countries, including in the Eurozone, using a data set of 31 December 1996 to 30 April 2004 (Frankel and Poonawala, 2006). In 2009 they enlarged their data set to the currencies of 14 emerging market countries and 21 industrialized countries, and finalized their analysis in 2010 (Frankel and Poonawala, 2010). Using regression analysis, they reached the conclusion that the forward discount bias for emerging market economies is smaller than for advanced economies. Earlier, Bansal and Dahlquist (2000) and Lee (2006) had also dealt with the different currency structures of developed and developing countries, but both had explored interest rate parity as point of concern.

Lorey and Lucey reached a conflicting conclusion to the findings of Frankel and Poonawala in 2012 through their analysis of a data set of forward rates during the period from 31 May 2004 to 30 September 2011 among 10 developed and 10 emerging currencies. Lorey and Lucey also used regression analysis but concluded that indicators of forward rate biasedness were not more pronounced for the currencies of developed countries than for those of developing countries, especially in the period of 31 May 2004 to 30 September 2011.

The simple purpose of this paper is to realize another test for forward market biasedness among emerging market currencies, and to see how the results compare to those of major currencies. The motivation to revisit this arena is to employ a different data set structure, one that more broadly examines the period from 2000 to mid-October 2012. The earlier studies by Frankel and Poonawala and by Lorey and Lucey both limited their analyses to one-month forward quotations. This project will contribute to the literature on forward discount bias by also including six-month and one-year forward quotations in addition to one-month quotations. Additionally, rather than monthly quotations, as in the other two studies, this study will use the daily quotations for spot and forward rates for each currency used in the regression analysis. Also, the effects of the financial crisis from mid-2008 until the first quarter of 2009 are addressed in order to capture their effects on forward rate biasedness in predicting future spot rates.

2 Methodology

The forward rate unbiasedness hypothesis states that under the conditions of risk neutrality and when financial agents behave according to rational expectations, the forward rate is an unbiased predictor of the corresponding future spot rate. The mathematical expression of this statement is the following:

$$E_t (S_{t+k}) = f_{t+k} \quad (1)$$

where f_{t+k} is the log forward rate at time t for delivery k periods later, S_{t+k} is the corresponding log spot rate at time t + k, and $E_t (S_{t+k})$ is the mathematical expectations operator conditioned on the information set available at time t. With reference to the assumption that financial agents form their expectations rationally, the following equation also holds:

$$S_{t+k} = E_t (S_{t+k}) + u_{t+k} \quad (2)$$

where u_{t+k} is the rational expectations realized forecast error and must have a conditional expected value of zero and be uncorrelated with any information available at time t. Substituting (1) into (2) yields Equation (3):

$$S_{t+k} = f_t (S_{t+k}) + u_{t+k} \quad (3)$$

Under the framework set out by Equation (3), the forward exchange rate unbiasedness hypothesis (FRUH) is generally tested by running the following regression:

$$\Delta S_{t+1} = \alpha + \beta fdt + \varepsilon_{t+1} \quad (4)$$

where ΔS_{t+1} is ex post future percentage depreciation, defined as $s_{t+1} - s_t$, fd_t is the forward discount defined as $f_t - s_t$, s_t is the log of the spot exchange rate at time t and f_t is the log of the forward exchange rate at time t. The equation indicates the notion of rational expectations with no risk premium on the assumption that market participants are risk neutral and form their expectations in a rational manner, and also that all relevant information for predicting future spot exchange rates is fully reflected in the current forward exchange rate. Within this framework, testing the hypothesis of forward market efficiency is equivalent to testing the hypothesis of β=1. Failure to reject this hypothesis implies that the forward rate determined at time 't' is an unbiased predictor of the spot rate for time t+k. The statistical rejection indicates that the market is inefficient or that the specification of the model is incorrect, or both.

3 Literature Review

A more conceptual explanation of the null hypothesis states that it tests for a non-time-varying component to the prediction errors. It is also specified as a joint hypothesis comprised of two distinct conditions: that of rational expectations and that of non-time-varying premium. (Frankel and Poonawala, 2010, 3). The null hypothesis has been tested by many researchers and, as summarized below, it has almost always been

statistically rejected statistically. Even the calculated β's have generally been less than zero.

The results of these numerous studies have resulted in a consensus of forward rate biasedness in predicting the future spot rate, but explanations for this differ. The first researchers attributed the failure to reject the null hypothesis to the failure of the risk neutrality assumption. Hansen and Hodrick firstly indicated that a risk premium is embedded in forward rates (Hansen and Hodrick 1983); thereafter Fama broke down the forward rate into the expected future spot rate and the time-varying risk premium (Fama 1984). Specifically, Fama explained the negative nature of β by the variance of the risk premium being greater than the variance of the expectations error (Hodrick and Srivastava, 1985). Cumby (1988), Hodrick (1989), Bekaert, and Hodrick, and Marshall (1997) also studied Fama's regression and risk aversion of the market participants, and later Lustig and Verdelhan (2007) addressed consumption risk. However, the empirical research on risk premium has not been able to fully clarify the forward discount.

Another group of researchers has focused on deviations from the rational expectations theory when explaining forward discount. Frankel and Froot (1986) broke down the forward rate into future spot rate expectations and risk premium components while configuring negative β through expectations surveys with traders. Other researchers who used the expectational error approach were Frankel and Chinn (1993), Cavaglia, Verschoor, and Wolff (1994), Chinn and Frankel (2002), Bacchetta, Mertens, and van Wincoop (2008), Moon and Velasco (2011), and Yu (2012). Some of these attributed systematic expectational errors to specific investor behavioral irrationalities. Burnside, Han, et al. 2010 has isolated investor overreaction as the reason for the failure of the FRUH. Chakraborty (2009) indicated that there exists a deviation from rationality in the fact that agents lack complete information about the underlying market parameters but that, over time they use a natural econometric procedure and make forecasts using their estimated model. Bacchetta and van Wincoop (2005) referred to rational inattention as the source of irrationality. Another group of researchers drew attention to transaction-related irrationalities; Payne (2003), Bjønnes and Rime (2005), Danielsson and Love (2006), Killeen, Lyons, and Moore (2006) provided evidence that order flow has a significant large and persistent impact on exchange rate returns. Also, Evans and Lyons (2005), Froot and Ramadorai (2005) and Rime, Sarno, and Sojli (2009) showed how order flow movements affect exchange rate fundamentals. Carry trade, which is mostly based on current and expected interest rate differentials has been regarded as another transaction-related source of failure by Darvas 2009, Galati, Heath, and McGuire (2007), Burnside, Eichenbaum, and Rebelo (2009, 2007), Jylha and Suominen (2009), and Lustig, Roussanov, and Verdelhan (2009). On the other hand, Burnside, Eichenbaum, and Rebelo (2007) proposed that forward bias was sourced by adverse selection mechanisms; Eichenbaum, and Rebelo (2009) addressed the relevant transaction costs causing the irregularity; Ranaldo and Sarkar (2008) referred to illiquidity and volatility in explaining the forward puzzle; and Bacchetta and van Wincoop (2009) suggested that infrequent portfolio adjustment could indeed generate forward bias.

4 Data

The data set used in the analysis consists of daily spot and forward foreign exchange quotations for the period January 2000 through October 2012, provided by Thompson

Reuters Datastream. The currencies have been analysed in two categories, currencies of developing and developed countries, using the World Bank classification. Among developed county currencies, the Australian dollar, Canadian dollar, Danish krone, Euro, Hong Kong dollar, Japanese yen, Norwegian krone, Singapore dollar, Swedish krona, Swiss franc, Taiwan dollar and UK's Pound have been selected for analysis. Among developing country currencies are the Hungarian forint, Indian rupee, Indonesian rupiah, Kuwaiti dinar, Mexican peso, Philippine peso, Polish zloty, Saudi riyal, South African rand, Thai baht and Turkish lira.

In order to gain insight about the characteristics of the time series data, the standard deviations of the logs for the rates of spot, as well as of 1 month, 6 months and 1 year forward were first calculated and laid out in Table 1. As daily quotations are used for spot and forward rates, the number of observation is 3312 for 1 month quotations, 3205 for 6 months and 3073 for 1 year quotations. Interestingly, Table 1 reveals that the average standard deviation for developed country currencies does not change considerably between spot rate and 1 year maturity. Another notable point is that for spot rates and 1-month forward rates the average standard deviation is higher among developed country currencies than among developing country currencies. For 6-month and 1-year maturity the situation is reversed as, while variation stays relatively stable among developed country currencies it nearly doubles for developing country currencies.

Table 1: Standard Deviations of Spot, 1 Month, 6 Months and 1 Year Forward Rates

	Developed Country Currencies	**Spot**	**1 Month Forward**	**6 Months Forward**	**1 Year Forward**
1	Australian dollar	0.1161	0.1343	0.1267	0.1271
2	Canadian dollar	0.0723	0.0724	0.0724	0.0723
3	Danish krone	0.0729	0.0729	0.0731	0.0730
4	Euro	0.0730	0.0730	0.0729	0.0726
5	Hong Kong dollar	0.0011	0.0011	0.0014	0.0021
6	Japanese yen	0.0653	0.0649	0.0629	0.0609
7	Norwegian krone	0.0716	0.0718	0.0726	0.0733
8	Singapore dollar	0.0536	0.0534	0.0526	0.0517
9	Swedish krona	0.0673	0.0673	0.0672	0.0672
10	Swiss franc	0.0870	0.0868	0.0861	0.0838
11	Taiwan dollar	0.0227	0.0228	0.0231	0.0249
12	UK pound	0.0470	0.0469	0.0465	0.0462
	GROUP AVERAGE	**0.0625**	**0.0640**	**0.0631**	**0.0629**

Table 1: Standard Deviations of Spot, 1 Month, 6 Months and 1 Year Forward Rates

	Developing Country Currencies	**Spot**	**1 Month Forward**	**6 Months Forward**	**1 Year Forward**
1	Hungarian forint	0.0704	0.0706	0.0717	0.0726
2	Indian rupee	0.0291	0.0256	0.0313	0.0332
3	Indonesian rupiah	0.0349	0.0295	0.0336	0.0376
4	Kuwaiti dinar	0.0172	0.0167	0.0177	0.0184
5	Mexican peso	0.0530	0.0525	0.0500	0.0476
6	Philippine peso	0.0431	0.0436	0.4616	0.5012
7	Polish zloty	0.0781	0.0791	0.0839	0.0887
8	Saudi riyal	0.0003	0.0004	0.0011	0.0023
9	South African rand	0.0672	0.0679	0.0707	0.0734
10	Thai baht	0.0556	0.0575	0.0603	0.0554
11	Turkish lira	0.1161	0.1342	0.1267	0.1270
	GROUP AVERAGE	**0.0514**	**0.0525**	**0.0917**	**0.0961**

5 Emprical Results

For the regression analysis the same well-known regression model is used, which is:

$$\Delta S_{t+1} = \alpha + \beta fdt + \varepsilon_{t+1} \quad (4)$$

where S (spot) is the log of the spot rate of a currency against the US dollar and f (forward) is the forward rate for that currency against the US dollar with 1-month, 6-month and 1-year maturities. The regression was realized under Newey-West robust standard errors. Before formulating the hypothesis, in order to address the unit root problem, the Augmented Dickey-Fuller (ADF) Unit Root Test was conducted for the spot rate and forward rates. The results, as shown in Table 2, support the original finding of each (Meese and Singleton 1982) that the unit root exists in the level form of the spot and forward exchange rates.

However, as can be seen from Table 3, which displays the regression results for developed country currencies together with the ADF test results conducted on the residuals, for the 1 month forward results, the ADF statistics indicate that none of the regression residuals have a unit root at even 1% significance. Among 6 months forward results, the ADF statistics diminish considerably. Even so, with the exception of three currencies none of the regression residuals appear to have a unit root at 1% significance, and of the three exceptions, two indicate unit root rejection at 5% significance, and the third at 10%. For 1-year quotations the calculated ADF statistics diminish further, and it can be said that among those same three currencies there exists a unit root even at the 10% significance level. Referring to Table 4, which supplies the regression results for developing country currencies together with the ADF test results conducted on the residuals, a similar situation has been established. For 1 month forward results, the unit root hypothesis was strongly rejected at even 1% significance level. At 6 months forward,

the ADF results diminish and for one currency the unit root hypothesis cannot be rejected even at 10% significance. For the 1 year forward results, the number of non-rejected currencies increases to three.

Table 2: ADF Tests of Spot, 1 Month, 6 Months and 1 Year Forward Rates

Developed Country Currencies	**Spot**	**1 Month Forward**	**6 Months Forward**	**1 Year Forward**
Australian dollar	-3.326	-2.650	-2.769	-2.840
Canadian dollar	-0.900	0.897	0.820	-0.812
Danish krone	-1.281	-1.275	-1.238	-1.190
Euro	-1.282	-1.276	-1.244	-1.209
Hong Kong dollar	-3.350	-3.733	-3.791	-3.469
Japanese yen	-0.389	-0.378	-0.439	-0.500
Norwegian krone	-1.427	-1.419	-1.377	-1.324
Singapore dollar	0.319	0.321	0.301	0.246
Swedish krona	-1.370	-1.378	-1.366	-1.348
Swiss franc	-0.887	-0.885	-0.861	-0.839
Taiwan dollar	-1.217	-1.091	-1.217	-1.712
UK pound	-1.644	-1.640	-1.640	-1.629

Developing Country Currencies	**Spot**	**1 Month Forward**	**6 Months Forward**	**1 Year Forward**
Hungarian forint	-1.838	-1.837	-1.831	-1.827
Indian rupee	-0.951	-0.621	-0.668	-0.484
Indonesian rupiah	-3.647	-4.309	-4.063	-3.890
Kuwaiti dinar	-1.125	-1.712	-1.687	-1.744
Mexican peso	-1.639	-1.653	-1.725	-1.820
Philippine peso	-1.574	-1.562	-1.496	-1.336
Polish zloty	-1.730	-1.758	-1.709	-1.669
Saudi riyal	-10.345	-10.835	-4.906	-3.399
South African rand	-2.280	-2.297	-2.237	-2.201
Thai baht	-0.210	-0.457	-0.299	-0.447
Turkish lira	-3.335	-2.650	-2.776	-2.845

Firstly, the null hypothesis of unbiasedness, β=1, is tested for each of the country. Failure to reject the null hypothesis implies that the forward rate determined at time 't' is an unbiased predictor of the spot rate for time 't+k' so there is no systematic time-varying component to the prediction errors, and statistical rejection means either that the market is inefficient, that the model specification is incorrect, or both.

Regression Results for Forward Rates with 1 Month Maturity

The regression results shown in Table 3 for developed country currencies and in Table 4 for developing country currencies support the usual findings of a strong forward rate bias for 1 month maturity in both groups. In Table 3 all currencies except the Canadian dollar, Norwegian krone and UK pound have statistically different coefficients than unity, as the hypothesis proposed. The situation is not that different among the developing countries; for two currencies, namely the Philippine peso and Polish zloty, regression coefficient β=1 was not rejected. In the analysis of Frankel and Poonawala (2010), the number of non-rejected currencies for developed countries was 2 out of 21 (nearly 10%), as opposed to 6 out of 14 (nearly 43%) for developing countries, which leads to the conclusion that the forward rate of developing country currencies has a greater degree of biasedness. In this study, non-rejected currencies were 25% and 18% for developed and developing country currencies respectively, results that do not support the findings of Frankel and Poonawala (2010).

Another result that conflicted with those of Frankel and Poonawala (2010) relates to their higher negative β coefficients also being higher among developed country currencies (-4.333) than among developing country currencies (0.0033). The average β coefficients in Table 3 and 4 are -0.282 and -0.133 for developed and developing country currencies respectively, not sufficiently different to draw conclusions about differences between the two groups. From another perspective, while 6 out of 12 developed country currencies (50%) resulted in a negative coefficient, the regression of 4 out of 11 developing country currencies (36%) resulted in a negative coefficient.

Another test, the standard regression test, is for β=0. This test determines the predictive capability of the forward rate to estimate the future spot rate. In the case β is less than zero, this has been interpreted as market participants making systematic time-varying forecast errors such that they may not even be able to correctly guess the direction of the future spot rate. The null hypothesis β=0 cannot be rejected for 4 of the 12 developed country currencies. Those currencies are the Canadian dollar, Japanese yen, Singapore dollar and UK pound. Surprisingly, the hypothesis was not rejected for the same currencies except the Singapore dollar, which was not included in the analysis of Frankel and Poonawala (2010). Referring to Table 4 it seems that a very similar situation exists among currencies associated with developing markets; the hypothesis is rejected for 4 currencies out of 11, namely Indian rupee, Mexican peso, Saudi riyal, South African rand and Turkish lira.

For forward rates with 1 month maturity, the positioning of developed and developing country currencies against neither the hypotheses β=0 nor β=1 differs considerably, so Frankel and Poonawala's (2010) contention that the bias in the forward discount is more severe for advanced country currencies is not supported. However, the findings of Lorey and Lucey, who propose the reverse, are also not supported.

Regression Results for Forward Rates with 6 Months Maturity

In Table 3 all currencies except the Norwegian krone and UK pound had coefficients that were statistically different than unity, as the hypothesis proposed. For both of these currencies, the same hypothesis is rejected for forward rates with 1 month maturity as well. The positioning of the non-rejected currencies for neither set of countries changed considerably, so to differentiate in terms of bias based on 6 month forward rate is unjustified. Among developed country currencies, for 7 out of 12 the second hypothesis, β=0, is not rejected.

With reference to Table 4, which displays the regression results for developing country

currencies, the hypothesis β=1 is rejected for three currencies, the Indian rupee, Kuwaiti dinar and Philippine peso. As compared to developed country currencies this does not create a considerable difference either. The second hypothesis is rejected for two currencies, supporting the predictive capability of the 6 months forward rate. Comparing the results on Table 3 and Table 4, it seems that the predictive power of 6 months forward rate is considerably higher for developing country currencies.

For the 6 month bracket, the average beta coefficients of the regressions for developed and developing country currencies is -0.232 and -0.109 respectively, and it is clear that they do not differ significantly. Consequently, a similar situation exists for 6 months forward rates as as does for 1 month forward rates; that is, there is no considerable difference between developed and developing currencies.

Regression Results for Forward Rates with 1 Year Maturity

With a glance at Table 3 it is easily seen that the regression results for the 1 year and 6 month forward rates of developed country currencies resemble each other. All the currencies except two—the UK pound and Japanese yen at 6 months forward, and the Canadian dollar and UK pound at 1 year forward—show coefficients that are statistically less than unity. In addition, the regression results of the β=0 test are nearly the same for both maturity brackets; among half of the currencies the null hypothesis are not rejected.

As for the 1 year forward rates of developing countries, with the exception once again of two currencies, namely the Indian rupee and Philippine peso, all currencies reject the β coefficient equaling unity. This finding does not diverge from the results of the same test on 1 year forward rates among developed country currencies. For the 1 year maturity bracket the predictive capability of the forward rate is greatly weakened; for more than half of the currencies the hypothesis of β=0 was not rejected.

The average beta coefficients calculated for 1 year forward rates are -0.333 and -0.464 for developed and developing countries respectively. In general, although all of the average coefficients calculated for different maturity brackets are negative, they are slightly less than zero and they do not differ considerably.

Table 3: Regression Results for Developed County Currencies for Spot, 1 Month, 6 Months and 1 Year Forward Rates [$\Delta S_{t+1} = \alpha + \beta\, fdt + \varepsilon_{t+1}$]

		1 Month					6 Months					1 Year				
	Currencies	**beta**	**t: β=0**	**t: β=1**	**F prob**	**ADF**	**beta**	**t: β=0**	**t: β=1**	**F prob**	**ADF**	**beta**	**t: β=0**	**t: β=1**	**F prob**	**ADF**
1	Australian dollar	0.006	2.730	3.406	0.006	-9.011	0.046	4.450	92.320	0.000	-3.440	0.087	4.590	47.697	0.000	-2.753
2	Canadian dollar	-0.388	-0.460	1.643	0.646	-9.683	0.524	1.170	2.200	0.240	-3.581	0.218	0.410	1.449	0.685	2.707
3	Danish krone	-1.834	-2.490	3.844	0.013	-8.220	-0.606	-1.000	2.650	0.318	-3.514	-0.226	-0.440	2.387	0.660	-2.637
4	Euro	0.011	4.620	4.217	0.000	-8.142	-0.461	-0.750	2.381	0.453	-3.509	-0.232	-0.420	2.218	0.676	**-2.564**
5	Hong Kong dollar	-0.235	-2.650	13.912	0.008	-9.435	-0.051	-0.860	17.692	0.389	-4.645	0.136	3.160	19.999	0.002	-3.942
6	Japanese yen	0.242	1.340	4.214	0.180	-9.266	-1.994	-8.200	12.311	0.000	-6.494	-2.375	-10.810	15.359	0.000	-5.856
7	Norwegian krone	0.809	5.010	1.179	0.000	-9.091	0.540	1.410	1.196	0.159	-3.585	0.217	0.620	2.223	0.537	-2.810
8	Singapore dollar	-0.134	-0.650	5.485	0.516	-8.673	-1.435	-5.430	9.217	0.000	-3.728	-1.539	-5.860	9.676	0.000	-3.669
9	Swedish krona	0.542	2.870	2.425	0.004	-8.608	-0.034	-0.080	2.328	0.939	**-3.406**	-0.427	-0.860	2.881	0.389	-2.711
10	Swiss franc	-2.311	-3.430	4.914	0.001	-8.615	-0.764	-2.040	4.702	0.042	-4.511	-1.122	-2.450	4.642	0.014	-3.030
11	Taiwan dollar	-0.320	-2.150	8.875	0.031	-7.688	-0.084	-0.380	4.896	0.704	**-2.676**	0.515	2.490	2.349	0.013	**-2.297**
12	UK pound	0.235	0.380	1.241	0.703	-8.744	1.539	2.160	0.755	0.031	**-3.237**	0.750	1.200	0.400	0.231	**-2.428**

Table 3: Regression Results for Developing County Currencies for Spot, 1 Month, 6 Months and 1 Year Forward Rates [$\Delta S_{t+1} = \alpha + \beta\, fdt + \varepsilon_{t+1}$]

		1 Month					6 Months					1 Year				
	Currencies	**beta**	**t: β=0**	**t: β=1**	**F prob**	**ADF**	**beta**	**t: β=0**	**t: β=1**	**F prob**	**ADF**	**beta**	**t: β=0**	**t: β=1**	**F prob**	**ADF**
1	Hungarian forint	-2.623	-6.050	8.361	0.000	-8.592	-1.375	-4.720	8.160	0.000	-3.639	-0.407	-1.200	4.140	0.231	-2.867
2	Indian rupee	0.000	0.000	3.441	0.999	-7.133	1.102	4.550	0.400	0.000	**-2.360**	0.967	2.900	0.032	0.004	**-1.624**
3	Indonesian rupiah	0.112	4.340	34.409	0.000	-7.188	0.203	4.050	15.887	0.000	-3.565	0.146	1.800	9.820	0.094	-2.862
4	Kuwaiti dinar	0.249	3.650	10.941	0.000	-11.099	0.945	3.810	0.224	0.000	-5.363	-0.329	-0.840	3.369	0.403	**-2.245**
5	Mexican peso	-0.469	-1.710	5.348	0.088	-8.792	-0.339	-2.310	9.120	0.021	-3.449	-0.238	-1.370	7.106	0.171	-2.666
6	Philippine peso	0.590	2.220	1.539	0.027	-8.791	1.005	6.030	0.000	0.000	-3.492	0.938	5.910	0.387	0.000	-3.306
7	Polish zloty	0.708	4.040	1.664	0.000	-8.174	0.561	3.140	2.460	0.002	-3.114	0.460	2.740	3.217	0.006	**-2.460**
8	Saudi riyal	-0.127	-0.110	8.577	0.914	-13.963	-0.082	-1.990	9.170	0.047	-12.146	-0.032	-1.380	43.867	0.167	-11.055
9	South African rand	0.014	0.080	5.246	0.940	-8.589	-3.223	-7.810	10.232	0.000	-7.501	-4.408	-11.580	14.203	0.000	-6.921
10	Thai baht	0.099	4.740	43.071	0.000	-8.485	-0.029	-0.350	12.422	0.725	-3.337	-1.391	-4.200	7.219	0.000	-3.293
11	Turkish lira	-0.020	-1.300	83.349	0.103	-9.093	0.038	0.740	18.622	0.461	-3.212	-0.814	-1.050	13.883	0.296	**-2.196**

6 Conclusion

The basic aim of this study as been to realize another analysis of bias in forward rates for developed and developing country currencies by using daily quotations—in contrast to previous studies which have generally employed monthly data—to analyze a data set encompassing a broader time period, from 2000 to mid-October 2012. Regarding the forward rate biasedness of developed and developing country currencies there exist two conflicting studies. One of these was from Frankel and Poonawala, who proposed that the forward rate biasedness of advanced country currencies was more severe. The other study was from Lorey and Lucey, who revealed that for sample currencies and a sample time period forward exchange rate biasedness was more pronounced among developing country currencies. Contrary to both sets of results, this study has shown that there exists no considerable difference in bias between the currencies of developed and developing countries.

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