

Real and Nominal Puzzles of the Uncovered Interest Parity

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Abstract

Examining cross-country data, Bansal and Dahlquist (2000) found that the puzzling correlation between the exchange rate changes and the interest rate differentials of two countries appears less puzzling among developing countries than among the developed countries. Several economists come up with a new type of theoretical models that can explain the above new findings [e.g. Alvarez and Atkeson (2005), Bacchetta and Wincoop (2005, 2009)]. According to these models, when inflation is low, the exchange rate adjustment tends to be slow because adjustment is costly. This is why we observe the UIP puzzle in many developed countries where inflation rates are low.

In this paper we cast doubt in these claims of the models by empirically examining the cross-country data. In essence, we argue that these models appear to solve the “nominal puzzle” but cannot solve the “real puzzle” of the UIP relation. After taking account of the relative PPP effect, we observe the same degree of the real UIP puzzle in both groups of countries.

Key Words: Forward premium puzzle, Relative PPP, Fisher equation.

JEL Classification: F31, G15, G12.

1. Introduction

It has long been known that, unlike the covered interest parity, the uncovered interest parity (UIP) relation rarely holds empirically.¹ If one runs the regression of exchange rate changes on interest rate differentials between two countries (which is called the “UIP regression” hereafter), one tends to find the slope coefficient not only far from the unity (which is consistent with the UIP) but often negative! In other words, the future exchange rate change is not just far from what is predicted from the current nominal interest rate differential between two countries. But predicting in the opposite direction from the UIP is often better than otherwise. This disastrous empirical failure of the most fundamental theoretical relation in international finance prompts many papers which claim to have found either new theoretical models able to explain the apparent inconsistencies, or new empirical procedures able to find what is consistent with the conventional theory. Unfortunately, none of those attempts can yet solve the so-called “forward premium puzzle” successfully.

One of the most interesting empirical findings in the literature which attracts a great deal of attention recently is Bansal and Dahlquist (2000). Examining cross-country data, they found that the puzzling correlation between the exchange rate change and the interest rate differentials of two countries appears less puzzling among developing countries than among the developed countries.²

Several economists come up with a new type of models that can explain the above new findings [e.g. Alvarez and Atkeson (2005), Bacchetta and Wincoop (2005, 2009)].

According to these models, when inflation is low, the exchange rate adjustment tends to be

¹ Engle (1996) provides a comprehensive survey of the literature.

² In particular, they found the coefficient of the UIP regression is slightly positive in developing countries. It is not that the UIP holds in developing countries, but that the puzzle is not as extreme as in the developed countries. More specifically, they found coefficients of the UIP regression are -0.32 and 0.19 in developed and developing countries, respectively.

slow because adjustment is costly. This is why we observe the UIP puzzle in many developed countries where inflation rates are low.³

In this paper we cast doubt in these claims of the models by empirically examining the cross-country data. In essence, we argue that these models appear to solve the “nominal puzzle” but cannot solve the “real puzzle” of the UIP relation. After taking account of the relative PPP effect, we observe the same degree of the real UIP puzzle in both groups of countries.

The organization of the rest of the paper is as follows. In the next section, we develop the distinction between nominal and real UIP puzzles, and formulate a way to examine each component. In section 3, we report our empirical findings. A brief conclusion is given in section 4.

³ To explain a deviation from UIP, Alvarez and Atkeson (2005) attributed the failure of UIP to time-varying risk premia occurred in segmented asset markets in which investors have limited participation due to fixed costs. When inflation is low, the markets are segmented. But when inflation is high, most investors choose to pay the fixed costs, so that the markets are less segmented leading to constant risk premia, thus less deviation from UIP. Bacchetta and Wincoop (2005) argued that a deviation from UIP can be explained by expectation errors about future exchange rates. They claim that the inattentiveness of investors in portfolio decisions is the cause of these errors. Bacchetta and Wincoop (2009) attributed the deviation from UIP to infrequent revisions of portfolios due to fixed costs. Their model predicts that persistent high inflation will raise the depreciation rate and interest rate differentials by the same amount causing high coefficient in UIP regression.

2. Nominal and Real Puzzles

To entangle the puzzles underlying the UIP relation, we consider the following empirical framework. We introduce five simple regressions, discuss their relationship and then distinguish the real puzzle from the nominal puzzle of the UIP. First, to make distinction between the real and nominal components, we use the Fisher equation to write the nominal interest differential as

$$i_t - i_t^* = (r_t - r_t^*) + (\pi_{t+1}^e - \pi_{t+1}^{*e})$$

where $r_t = i_t - \pi_{t+1}^e$ and $r_t^* = i_t^* - \pi_{t+1}^{*e}$ are the real interest rates in the home and foreign countries, respectively, with $\pi_{t+1}^e = E_t(\pi_{t+1})$ and $\pi_{t+1}^{*e} = E_t(\pi_{t+1}^*)$ ⁴. Then, we can express the UIP as

$$E_t(\Delta s_{t+1}) = i_t - i_t^* \tag{1}$$

$$= (r_t - r_t^*) + (\pi_{t+1}^e - \pi_{t+1}^{*e}) \tag{2}$$

where $\Delta = 1 - L$, $s_t = \log S_t$ and S_t is the home currency price of the foreign currency.

Extending the UIP regression

$$\Delta s_{t+1} = \beta_0 + \beta(i_t - i_t^*) + u_{t+1} \tag{3}$$

based on the decomposed form of the UIP relation (2), we find the decomposed version of UIP regression

$$\Delta s_{t+1} = \tilde{\beta}_0 + \beta_1(r_t - r_t^*) + \beta_2(\pi_{t+1}^e - \pi_{t+1}^{*e}) + \tilde{u}_{t+1} . \tag{4}$$

⁴ π_t^e and π_t^{*e} are unobservable. We discuss in the next section how to estimate them.

The regression (3) is simply a restricted case of (4) with constraint $\beta_1 = \beta_2$. But (4) provides the information about which component is more important between the real interest differentials and the inflation differentials than the other.

Second, to make a link between the regression (4) and the relative purchasing power parity (PPP) relation, we consider the relative PPP in the form as

$$\Delta s_{t+1}^+ = \pi_{t+1} - \pi_{t+1}^* \quad (5)$$

where $\Delta s_{t+1}^+ = s_{t+1}^+ - s_t$ and s_{t+1}^+ is the long-run equilibrium value of the exchange rate at $t + 1$. The actual exchange rate at $t + 1$ can then be thought of as the partial adjustment outcome between the current rate s_t and the equilibrium rate s_{t+1}^+

$$s_{t+1} = \alpha s_{t+1}^+ + (1 - \alpha)s_t \quad (6)$$

where α measures the adjustment speed. Taking the conditional expectation of (6) given the information up to time t and using (5) yields

$$\begin{aligned} E_t(s_{t+1}) &= \alpha E_t(s_{t+1}^+) + (1 - \alpha)s_t \\ &= \alpha[s_t + E_t(\pi_{t+1} - \pi_{t+1}^*)] + (1 - \alpha)s_t \end{aligned}$$

which implies

$$E_t(\Delta s_{t+1}) = \alpha(\pi_{t+1}^e - \pi_{t+1}^{*e}),$$

or

$$\Delta s_{t+1} = \alpha(\pi_{t+1}^e - \pi_{t+1}^{*e}) + \varepsilon_t \quad (7)$$

where $\varepsilon_t = \Delta s_{t+1} - E_t(\Delta s_{t+1})$. We call (7) the “relative PPP regression.” If β_1 is very small compared to β_2 , regression (4) becomes close to regression (7), or in other words, the UIP

regression reduces to the relative PPP regression. Lastly, subtracting $\pi_{t+1}^e - \pi_{t+1}^{*e}$ from both sides of the UIP equation (2), we obtain

$$E_t(\Delta q_{t+1}) = r_t - r_t^* \quad (8)$$

where $q_t = \log Q_t = \log\left(\frac{S_t P_t^*}{P_t}\right)$ is the real exchange rate⁵. (8) defines the real UIP relation.

Based on this relation, we specify the real version of regression (3) and (4) as

$$\Delta q_{t+1} = b_0 + b(r_t - r_t^*) + v_{t+1} \quad (9)$$

and

$$\Delta q_{t+1} = \tilde{b}_0 + b_1(r_t - r_t^*) + b_2(\pi_{t+1}^e - \pi_{t+1}^{*e}) + \tilde{v}_{t+1} \quad (10)$$

We refer to (9) and (10) as the real UIP regression and the real decomposed UIP regression, analogous to the nominal version of such regressions introduced previously. In this context, we say there exists a “real UIP puzzle” when the null hypothesis that $b = 1.0$ in the real UIP regression (9) is rejected by data. This is in contrast with the conventional “UIP puzzle”, which corresponds to the rejection of the null hypothesis that $\beta = 1.0$ in the UIP regression (3). Even when the “real UIP puzzle” does not exist, we still could have the UIP puzzle. An opposite case is also possible. The UIP puzzle is caused entirely by the real puzzle so that there does not exist the nominal UIP puzzle.

What is called the UIP puzzle is essentially the observation that the estimated coefficient β in regression (3) is almost always significantly different from unity. This estimate is often found even negative and significantly different from zero. We call this latter

⁵ (8) can be obtained by noticing $\Delta q_{t+1} = \log\left(\frac{S_{t+1} P_{t+1}^*}{P_{t+1}}\right) - \log\left(\frac{S_t P_t^*}{P_t}\right) = \log\left(\frac{S_{t+1}}{S_t}\right) - \log\left(\frac{P_{t+1}}{P_t}\right) + \log\left(\frac{P_{t+1}^*}{P_t^*}\right) = \Delta S_{t+1} - (\pi_{t+1} - \pi_{t+1}^*)$.

case the “extreme version of the UIP puzzle.” What Bansal and Dahlquist (2000) found is that the extreme version of the UIP puzzle is not observed in developing countries.

In the next section, we try to find out what are the main sources for making the deviations from the UIP so different between the developed country group and the emerging market country group by comparing the empirical results of the five regressions.

3. Empirical Results

3.1 Data

The data we use in our empirical investigation are quarterly data on exchange rates, interest rates, inflation rates, unemployment rates and real GDP in 43 countries over the first quarter of 1994 through the first quarter of 2009. The exchange rate in each country is the price of each currency in terms of US dollars. The interest rate is the 3-month interbank interest rate in the London market. The inflation rate is based on the CPI⁶.

3.2 Expected inflation rate

Since real interest rates and real exchange rates are unobservable, it is necessary to estimate expected inflation rates. We calculate a one-step-ahead (out of sample) inflation forecast at each quarter for each country based on the forecasting model suggest by Stock and Watson (1999). More specifically, we first fit the Phillips curve model

$$\pi_t = \alpha_0 + \sum_{i=1}^p \alpha_{1i} \pi_{t-i} + \sum_{i=1}^q \alpha_{2i} x_{t-i} + u_t,$$

⁶ The data on daily spot exchange rates are from the Datastream of the WM Company/Reuters, except the euro, which is from Barclay’s Bank International. The interbank Eurocurrency interest rates data are from the Datastream for the middle rates and from the British Bankers’ Association for the offered rates; the U.S. interbank daily middle and offered rates are used as a reference to calculate interest rate differentials. Due to the lack of availability of data on the interbank Eurocurrency interest rates, the domestic interbank interest rates from the Datastream and the Global Financial Data are used for some countries. All CPI and GDP data are from the IMF. The data on unemployment rates are from the IMF and OECD. Data sources for each country are shown in Table A1. The daily data is converted into quarterly data using the first working day for each quarter with the U.S. as the home country. We exclude Argentina in 2002Q2 and 2002Q4, Russia in 1998Q4, Romania in 1999Q2 and Turkey in 2003Q2 from our sample because the irregularity in the data.

using only the past observations, where x_{t-i} stands for the lagged unemployment rate. The lag length p and q are determined according to Schwarz's Bayesian information criterion. Then we estimate π_{t+1}^e by calculating the one-quarter-ahead forecast based on the estimated coefficients in each step⁷.

3.3 High and low inflation countries

Bansal and Dahlquist (2000) contrast the UIP regression results for developed countries with those for developing and emerging economy countries. Other authors find this contrast can be alternatively characterized as the low and high inflation contrast. In this paper, we define a low-inflation- country as one with its average annual inflation rate lower than 3.0%. All countries having average inflation higher than 3.0% are classified into high-inflation-countries. This classification criteria guarantee that the high-low inflation grouping coincide with the developing-developed grouping. All developed countries in our sample have the average inflation rates less than 3.0%. All developing and emerging economy countries in our sample have the average inflation rate higher than 3.0% except Hong Kong and Singapore. Since the latter two countries' per capita GDPs are higher than some of developed countries, it is not much inappropriate to classify them into "almost" developed countries. Under this classification, there are 22 low inflation countries and 21 high inflation countries in our sample (see Table A1).

3.4 Variations of real and nominal exchange rate changes

Table 1 displays the unconditional variance of changes in nominal exchange rates, real exchange rates and inflation rate differentials for low and high inflation countries. It reveals the fact that the variation in nominal exchange rate changes largely comes from the variation in real exchange rate changes. This provides the ground for comparing the real and nominal UIP regressions to investigate the UIP relation.

⁷ For simplicity, we set the lag length $p = q$. We use a change in real GDP in place of unemployment rate for Argentina, Denmark, Netherlands, South Africa and Thailand because the latter data are not available. We use only lagged inflation for Croatia, Egypt, Greece, Iceland, India, Indonesia, Pakistan, Romania, Russia and Singapore since neither unemployment nor GDP are available.

3.5 Nominal UIP regressions

Figure 1A presents the plots of the pairs of the exchange rate change-interest rate differential for all countries. The regression line appears to have a slightly positive slope. Figures 1B and 1C show the same plots for the groups of low and high inflation countries separately. Now the regression lines for two groups are strikingly different; a negative slope for the low inflation group and a clearly positive slope for the high inflation group. This contrast can be seen more clearly in Table 2. The first two columns of the table report the estimates of the slope coefficient in regression model (3) for low and high inflation countries groups. The estimated coefficient is negative but not significantly so for the low inflation countries group, which we usually find the UIP puzzle. The coefficient for the high inflation group is estimated to be significantly positive but still far from satisfying the UIP relation (see Table 2B). It is not correct to say that the UIP puzzle is absent in high inflation countries. The points mentioned so far have been already known since Bansal and Dahlquist (2000).

Figure 2 further illuminates the relation between the UIP regression coefficients and the expected inflation differentials. It is constructed by first running the UIP regression country by country and then plotting the pair of estimated coefficient and the expected inflation differential of each country. We see a striking contrast here. Among the countries with the average inflation rate lower than 3.0%, the negative slope dominates. Twenty countries out of twenty two members in the low inflation group have the slope coefficients estimated negatively. In contrast, the signs of the slope estimates are divided evenly among the countries with the average inflation rate higher than 3.0%; positive in eleven countries and negative in ten countries.

The above observation motivates us to investigate further the UIP relation and the expected inflation differential. We run two additional regressions. First, the nominal interest

differential is split into the real interest differential and the expected inflation differential, and the decomposed UIP regression (4) is run. Second, we drop the real interest differential from the regression (4) and run the relative PPP regression (5).

The third and fourth columns of Table 2 report the result of the decomposed UIP regression. We find a striking difference again between the two groups of countries. In the low inflation group, the real interest differential has negatively significant but the expected inflation differential has insignificant impact. The opposite is true for the high inflation group; the impact of the expected inflation differential overwhelms that of the real interest differential, and the latter is insignificant. We have an impression now that the source of the highly significant positive estimate for the high inflation group in the original UIP regression appears to be expected inflation differential rather than interest differential itself. In fact, the effects of real interest rate differentials on the depreciation rate are not significantly different from each other in two groups.

Table 4 reports the result of the relative PPP regression (7). Dropping the real interest differential as a regressor turns out to have a critical impact on the coefficient on the inflation differential in the low inflation group but almost no impact in the high inflation group. In other words, if the nominal interest differentials are split into the expected inflation differentials and the real interest differentials, the UIP regression effectively reduces to the relative PPP regression.

3.6 Real UIP regression

We now step further to the real UIP regression where the real-exchange rate change is regressed on the real-interest rate differential. Table 3 reports the results. The slope coefficients for both low and high-inflation countries are different from unity. This is the “real puzzle” of the UIP relationship. We also find the slope coefficient for low and high-

inflation countries are not significantly different from each other (Table 3B). Unlike in the nominal UIP regression, the two groups of countries behave similarly in the context of real UIP.

Figure 2B displays the relation between the UIP regression coefficient and the expected inflation differentials in the nominal and real terms. Now there appears little difference in the real UIP regression coefficient between the two inflation groups. However, in both groups the coefficients are still different from the theoretical parity value of unity.

4. Conclusion

Our empirical investigation suggests that the “real UIP puzzle” remains at a similar degree in both low and high-inflation countries. It appears that the inflation plays a role of a noise rather than a key to unlock the puzzle underlying the UIP relation. If it is the case, we need to focus our investigation on the real relation between the exchange rate changes and the interest rate differentials.

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Table 1: Volatilities Statistics

	$V(\Delta s_{t+1})$	$V(\Delta q_{t+1})$	$V(\pi_{t+1} - \pi_{t+1}^*)$	$\frac{V(\Delta q_{t+1})}{V(\Delta s_{t+1})}$	$\frac{V(\pi_{t+1} - \pi_{t+1}^*)}{V(\Delta s_{t+1})}$
Low Inflation Countries	0.00237	0.00242	0.00005	1.02109	0.02110
High Inflation Countries	0.00471	0.00469	0.00051	0.99575	0.10828

Notes: $V(\cdot)$ stands for the unconditional variance.

Table 2: Nominal UIP Regressions

Independent Variable	Low Inflation	High Inflation	Low Inflation	High Inflation
	Δs_{t+1} (1)	Δs_{t+1} (2)	Δs_{t+1} (3)	Δs_{t+1} (4)
A. OLS Regression				
$i_t - i_t^*$	-0.567 (0.320)	0.320** (0.122)		
$r_t - r_t^*$			-0.664* (0.328)	-0.117 (0.150)
$\pi_{t+1}^e - \pi_{t+1}^{*e}$			-0.449 (0.386)	0.480** (0.125)
R^2	0.005	0.020	0.006	0.050
N	855	821	855	821

B. Hypothesis Testing

Null Hypothesis	t -statistic	p -value
$\beta_L = 1$	4.90**	0.000
$\beta_H = 1$	5.57**	0.000
$\beta_L = \beta_H$	2.59**	0.010
$\beta_{1L} = \beta_{1H}$	1.52	0.129

Notes: 1. Nominal UIP is given in regression (3): $\Delta s_{t+1} = \beta_{0i} + \beta_i(i_t - i_t^*) + u_{t+1}$, and the decomposed version of nominal UIP is given in regression (4): $\Delta s_{t+1} = \tilde{\beta}_i + \beta_{1i}(r_t - r_t^*) + \beta_{2i}(\pi_{t+1}^e - \pi_{t+1}^{*e}) + \tilde{u}_{t+1}$, where $i = L$ for low inflation countries and $i = H$ for high inflation countries.

2. The alternative hypothesis is in the form of inequality “ \neq ”.

3. Numbers in parentheses are robust standard errors. * indicates significance at 5-percent level. ** indicates significance at 1-percent level.

Table 3: Real UIP Regressions

Independent Variable	Low Inflation	High Inflation	Low Inflation	High Inflation
	Δq_{t+1} (1)	Δq_{t+1} (2)	Δq_{t+1} (3)	Δq_{t+1} (4)
A. OLS Regression				
$r_t - r_t^*$	0.215 (0.253)	0.133 (0.151)	-0.664* (0.328)	-0.117 (0.150)
$\pi_{t+1}^e - \pi_{t+1}^{*e}$			-1.449** (0.386)	-0.520** (0.125)
R^2	0.001	0.002	0.025	0.047
N	855	821	855	821

B. Hypothesis Testing

Null Hypothesis	t -statistic	p -value
$b_L = 1$	3.10**	0.002
$b_H = 1$	5.76**	0.000
$b_L = b_H$	0.279	0.780
$b_{1L} = b_{1H}$	1.52	0.129

Notes: 1. Real UIP regression is given in regression (9): $\Delta q_{t+1} = b_{0i} + b_i(r_t - r_t^*) + v_{t+1}$, and the real decomposed version is given in regression (10): $\Delta q_{t+1} = \tilde{b}_0 + b_{1i}(r_t - r_t^*) + b_{2i}(\pi_{t+1}^e - \pi_{t+1}^{*e}) + \tilde{v}_{t+1}$, $i = L$ for low inflation countries and $i = H$ for high inflation countries.

2. The alternative hypothesis is in the form of inequality “ $\cdot \neq \cdot$ ”.

3. Numbers in parentheses are robust standard errors. ** indicates significance at 1-percent level.

Table 4: Relative PPP Regressions

Independent Variable	Low Inflation	High Inflation	All
	Δs_{t+1} (1)	Δs_{t+1} (2)	Δs_{t+1} (3)
$\pi_{t+1}^e - \pi_{t+1}^{*e}$	0.003 (0.284)	0.486** (0.107)	0.344* (0.140)
$(\pi_{t+1}^e - \pi_{t+1}^{*e})^2$			0.311 (2.324)
$(\pi_{t+1}^e - \pi_{t+1}^{*e})^3$			2.786 (8.086)
R^2	0.000	0.059	0.041
N	855	821	1428

Notes: 1. Relative PPP is given in regression (7).

2. Numbers in parentheses are robust standard errors. * indicates significance at 5-percent level. ** indicates significance at 1-percent level.

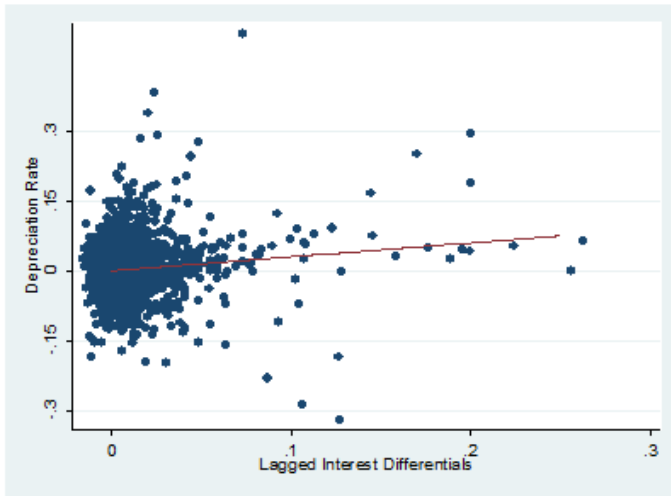
Table A1: Country Information

ID	Country	Start Date	End Date	Inflation Group	Interest Rate Source	Unemployment Rate Source
1	Argentina	1997q4	2008q4	H	DS	-
2	Australia	1997q3	2009q1	L	DS	OECD
3	Austria	1994q1	1998q4	L	DS	OECD
4	Belgium	1994q1	1998q4	L	DS	OECD
5	Brazil	2000q1	2009q1	H	GFD	OECD
6	Canada	1994q1	2009q1	L	DS	OECD
7	Colombia	2001q3	2008q1	H	GFD	IMF
8	Croatia	1997q4	2006q2	H	DS	-
9	Czech Republic	1995q2	2009q1	H	DS	OECD
10	Denmark	1994q1	2009q1	L	DS	-
11	Egypt	2006q2	2008q2	H	GFD	-
12	Eurozone	1999q2	2009q1	L	DS	OECD
13	Finland	1994q1	1998q4	L	DS	OECD
14	France	1994q1	1998q4	L	DS	OECD
15	Germany	1994q1	1998q4	L	DS	OECD
16	Greece	1994q4	2000q4	H	DS	-
17	Hong Kong	1997q3	2009q1	L	DS	IMF
18	Hungary	1996q1	2009q1	H	DS	OECD
19	Iceland	1998q4	2007q4	H	DS	-
20	India	1999q3	2006q3	H	DS	-
21	Indonesia	1997q3	2009q1	H	GFD	-
22	Ireland	1994q1	1998q4	L	DS	OECD
23	Italy	1994q1	1998q4	L	DS	OECD
24	Japan	1994q1	2009q1	L	DS	OECD
25	Mexico	2001q4	2009q1	H	DS	OECD
26	Netherlands	1994q1	1998q4	L	DS	-
27	New Zealand	1997q3	2009q1	L	DS	OECD
28	Norway	1994q1	2009q1	L	DS	OECD
29	Pakistan	1994q2	2009q1	H	DS	-
30	Philippines	1999q4	2006q3	H	DS	IMF
31	Poland	1994q2	2009q1	H	DS	OECD
32	Portugal	1994q1	1998q4	L	DS	IMF
33	Romania	1997q3	2009q1	H	DS	-
34	Russia	1996q3	2009q1	H	DS	-
35	Singapore	1994q1	2009q1	L	DS	-
36	Slovakia	1997q3	2008q4	H	DS	OECD
37	South Africa	1997q3	2009q1	H	DS	-
38	Spain	1994q1	1998q4	L	DS	OECD
39	Sweden	1997q3	2009q1	L	DS	OECD
40	Switzerland	1994q1	2009q1	L	BBA	OECD
41	Thailand	1997q3	2006q3	H	DS	-
42	Turkey	2003q1	2009q1	H	DS	OECD
43	United Kingdom	1994q1	2009q1	L	DS	OECD

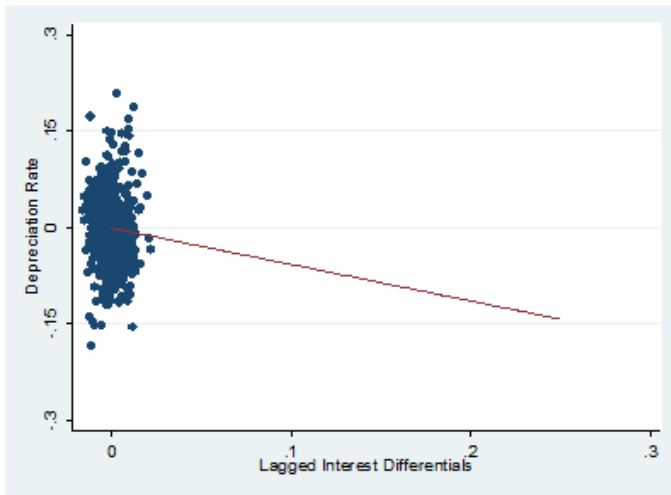
Note: L and H indicate low and high inflation countries, respectively. DS, GFD and BBA stand for the Datastream, the Global Financial Data and the British Bankers' Association, respectively. IMF data was obtained from the International Monetary Fund's International Financial Statistics CD released for June 2009. OECD data was retrieved from <http://stats.oecd.org/>.

Figure 1: Exchange Rate Changes and Interest Rate Differentials

A. All Countries



B. Low Inflation Countries



C. High Inflation Countries

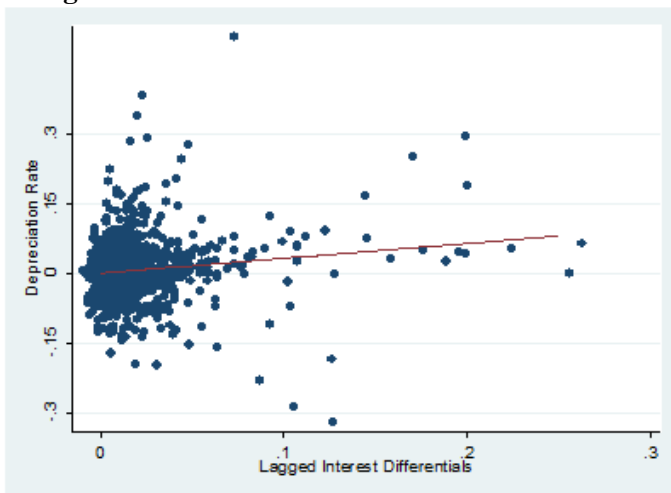
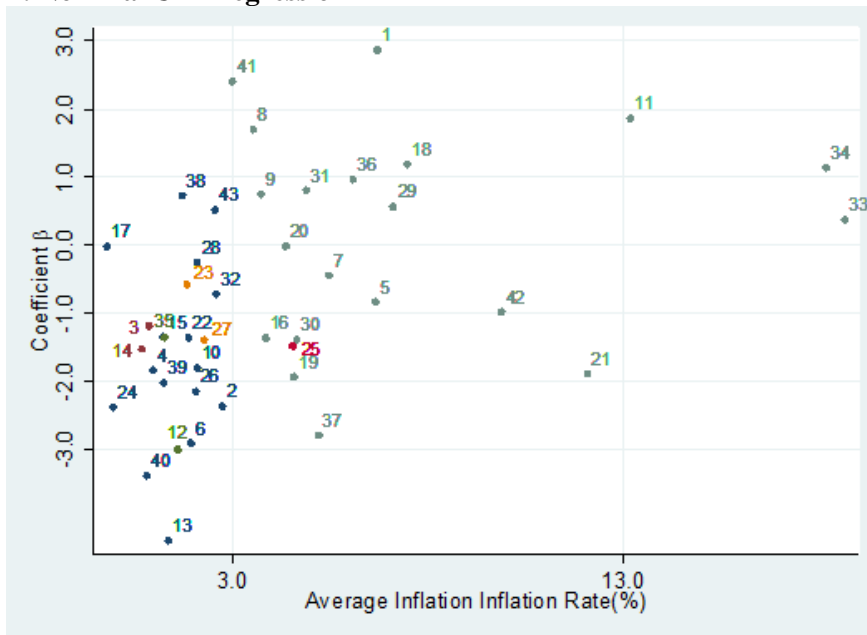
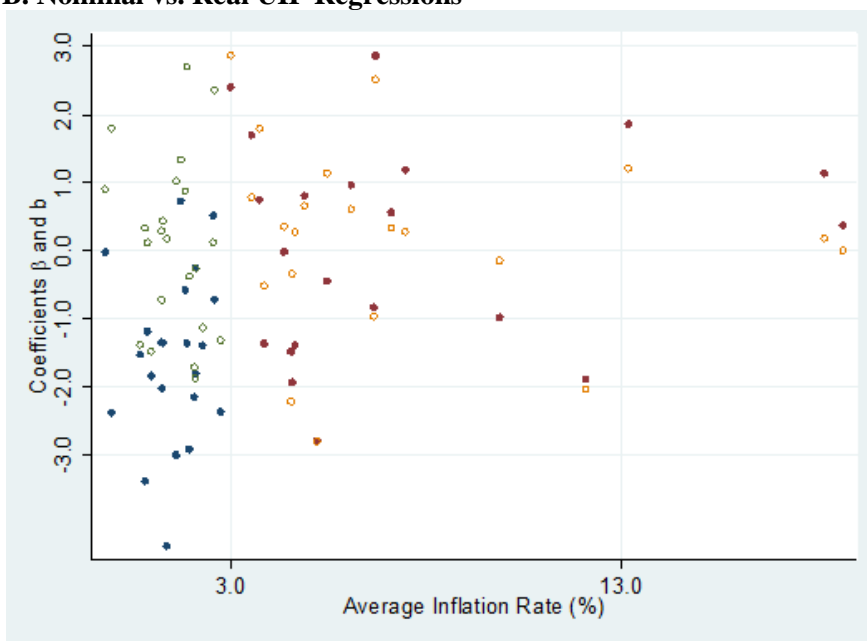


Figure 2: The UIP Regression Coefficients and Average Inflation Differences

A. Nominal UIP Regression



B. Nominal vs. Real UIP Regressions



Notes: 1. Average inflation rates are calculated from quarterly data and then annualized.
 2. Coefficient β is given in regression (3) and shown in black.
 3. Coefficient b is given in regression (9) and shown in white.
 4. Country ID is next to each point in figure A above. See Table A1 to determine the identity of each country.