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Carry trades and economic policy uncertainty: measuring the political dimension of the forward rate bias in emerging countries

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Abstract

This paper investigates the political dimension underlying the phenomenon of carry trade excess returns in emerging economies. Excess carry trade returns are underpinned by an anomaly called the "forward rate bias". Several authors have argued that this anomaly can be partly explained by country-related risk factors. To investigate this claim, we utilize a new measure of political risk, the Economic Policy Uncertainty Index (EPU). We compare the magnitude of the local and global EPU indices, including country-level and international control variables, in seven emerging countries: Brazil, Chile, Colombia, India, Mexico, Russia and South Korea. Our findings indicate a significant negative relationship between carry trade excess returns and the country's EPU index.

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1. Introduction

A currency carry trade is a popular strategy of borrowing in low interest rate currencies and investing in high interest rate currencies (Bhansali, 2007; Burnside, Eichenbaum, Kleshchelski, & Rebelo, 2010; Menkhoff, Sarno, Schmeling, & Schrimpf, 2012). According to the uncovered interest rate parity (UIP) condition, the expected returns of such a strategy should be zero. However, carry trades have been shown to systematically yield excess returns, an anomaly that is underpinned by the "forward premium puzzle" — i.e., the finding that the forward rate is inefficient in forecasting the future spot rate (Backus, 2001; Bansal, 1997; Fama, 1984; Meredith & Ma, 2002).

The findings concerning the forward premium puzzle (or anomaly) show that it is more pronounced in emerging economies and in the short term (Dimic, Orlov & Piljak, 2016; Hoffmann, 2012). Popular explanations for this occurrence are generally based on risk premium hypotheses; i.e., that the excess returns are a compensation for exposure to country-related risk factors, including uncertainty regarding political, economic or monetary policies (Burnside, Eichenbaum & Rebelo, 2009; Engel, 1996; Meredith & Ma, 2002; Tai, 2003).

This work, then, aims to test the relationship of the forward premium (operationalized as monthly carry trade excess returns) in emerging countries and a novel measure of political-related risk: the economic policy uncertainty index – EPU (Baker, Bloom, & Davis, 2016). The study's justification is twofold. First, very few studies sought to examine empirically the relationship between forward premium puzzle and measures of political risk. Bachman (1992) presented a model in which changes in the forward bias occurs when the governing party changes in Canada, France, the United Kingdom and the United States. Bernhard and Leblang (2002) found that risk premia exist more often during important political events in developed countries. Dimic, Orlov & Piljak (2016) utilized a four-component political risk measure and found a negative relationship between carry trade excess returns and political risk, which was more pronounced in emerging economies. In this list, only Dimic et al.'s (2016) work involves both political risk and emerging economies, even though emerging countries are not the focus of their study. Second, most of the empirical wisdom regarding the forward premium anomaly is based on the evidence obtained from developed economies (Bansal, & Dahlquist, 2000). Thus, more studies with a focus on emerging economies are necessary.

Our empirical strategy involves utilizing very recently available data (e.g. Ortiz, 2018) to assess the magnitude of economic policy uncertainty as a contributor of the forward premium in seven emerging countries: Brazil, Chile, Colombia, India, Mexico, Russia and South Korea. Our main variable of interest, the EPU index, is constructed from three types of underlying components. The first component quantifies newspaper coverage of policy-related economic uncertainty. The second reflects the number of federal tax code provisions set to expire in future years. The third uses disagreement among economic forecasters as a proxy for uncertainty. EPU has been recently utilized to predict future market returns (F. Adjei & M. Adjei, 2017), to predict future US recessions (Karnizova & Li, 2014), and to test whether EPU in China, Japan, Europe, and the United States is associated to contagion risk effects in the global stock market (Tsai, 2017). To the best of our knowledge, our study is the first to use EPU as a predictor of the forward premium in emerging markets.

In addition, we highlight that our empirical strategy focuses on the examination of each emerging economy individually, instead of using a basket of currencies (e.g., Dimic, Orlov & Piljak, 2016). By doing so, we expect to arrive at a more precise characterization of the influence of the local EPU vis-à-vis other variables, being them country-specific (e.g., GDP, inflation, interests rates), global (e.g., the VIX, the MSCI World Index, global EPU), or regional (the MSCI Emerging Markets Index).

Robust regression analysis showed a significant negative relationship between carry trade excess returns and local EPU in all countries (α = .10), both before and after the addition of country-level controls (Table 3). We also tested for the set of variables that could best predict carry trade excess returns in each country. The VIX was the only variable to show a significant (negative) coefficient across the whole sample. Interestingly, while in Mexico, Brazil, India and Korea, the country's stock market was one of the most significant (positive) predictors, in Chile, Colombia and Russia, it was much less significant or had a smaller coefficient than another positive predictor: the MSCI Emerging Markets Index (Table 4). Finally, our final models showed an adjusted R^2 ranging from 21% (Russia) to 44% (Mexico).

2. Data

Our data cover the period from March 2004 to May 2017. Spot and forward foreign exchange rates were obtained from WM/Reuters. EPU data were obtained from the website maintained by index authors (Baker, Bloom, & Davis, 2016). Furthermore, we utilized four country-level controls (the country's main stock market index, national interest rates, inflation, and a monthly proxy or index of the GDP), as well as four international controls (the VIX, the Global EPU, and the MSCI World and MSCI Emerging Markets Indices).

3. Method

We obtained monthly carry trade excess returns (i.e., the forward premium) for each country by calculating the difference between 1-month forward (NDF) rates and spot rates of the following month (Dimic, Orlov & Piljak, 2016; Lustig, Roussanov & Verdelhan, 2011), as follows:

$$rx^{i}_{t+1} = f^{b}_{t} - s^{a}_{t+1} \quad (1)$$

where rx^{i}_{t+1} are monthly carry trade excess returns for country *i* at time *t+1*; f^{b}_{t} is the log 1-month forward rate of the bid price in units of the emerging country's currency at time *t*; and s^{a}_{t+1} is the log spot rate of the ask (offered) price at time *t+1*.

With the aim to estimate the relationship between carry trade excess returns and the explanatory variables involved in our study, we tested five models based on variations of equation (2) below:

$$rx_t^i = a_0 + \beta_1 EPU_t^i + \beta_2 EPUG_t + \beta_3 MKF_t^i + \beta_4 GDP_t^i + \beta_5 INF_t^i + \beta_6 INT_t^i + \beta_7 MSCI_t + \beta_8 MSCIEM_t + \beta_9 VIX_t + e_t^i \quad (2)$$

where rx_t^i is the carry trade excess return for country *i* at time *t* ; a_0 is the intercept; EPU is the Economic Policy Uncertainty Index for country *i* at time *t*; EPUG is the Global Economic Policy Uncertainty Index; MKF is the stock market index for country *i*; GDP is the gross domestic product represented by a monthly index; INF is the inflation; INT is the interest rate; MSCI represents the monthly change in the MSCI World Index; MSCIEM represents the monthly change in the MSCI Emerging Markets Index; and VIX represents the monthly change in the VIX index.

In order to minimize the contribution of potential outliers and control for heteroscedasticity and serial correlation in the error term, we used robust regression applying the Newey-West estimator.

4. Results and Discussion

Although the literature would predict a forward premium (e.g., Brunnermeier, Nagel & Pedersen, 2008; Fama, 1984; Hoffmann, 2011) for all countries, Mexico, Russia and Korea contradicted the prediction demonstrating a negative (albeit very small) mean in our sample (Table 1). Nonetheless, all carry trade excess returns presented negative skew, which is in line with the literature and consonant with the hypothesis of the forward premium as a compensation for risk. Brazil, Russia and Colombia displayed slightly higher levels of volatility than the other countries. Furthermore, Brazil, India and Colombia, which were the countries with higher excess returns, also displayed less kurtosis, highlighting the impact of the negative outliers on carry trade excess returns. Finally, it should be noted that Russia had stricter policies regarding the control of its exchange rate during the first years of our sample.

Table 1

Descriptive Statistics of Carry Trade Excess Returns

Country	Mean	S.D.	Min.	Max.	Skewness	Kurtosis
Brazil	0.0068	0.0444	-0.1541	0.1197	-0.6140	1.4261
India	0.0014	0.0249	-0.0847	0.0811	-0.1622	1.3607
Colombia	0.0006	0.0411	-0.1162	0.1050	-0.2520	0.2617
Chile	0.0004	0.0346	-0.1782	0.0737	-1.2432	4.4111
Mexico	-0.0002	0.0324	-0.1526	0.1044	-0.9685	4.6234
Russia	-0.0003	0.0424	-0.1653	0.1127	-0.9026	2.7343
Korea	-0.0010	0.0352	-0.1442	0.1258	-0.6558	3.8851

S.D. = Standard deviation. Min = minimum value. Max = maximum value.

Table 2 shows the Pearson correlations. Excess returns of all countries were positively correlated with each other, with the local stock market indices, and with both MSCI World and Emerging Market indices. In contrast, excess returns were negatively correlated with the VIX and

with both local and global EPU measures. This result is in line with the expectations informed by the literature.

Table 2
Pearson Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1 rx Brazil	1.00																								
2 rx Chile	0.58	1.00																							
3 rx India	0.57	0.48	1.00																						
4 rx Russia	0.47	0.47	0.39	1.00																					
5 rx Mexico	0.65	0.60	0.63	0.57	1.00																				
6 rx Korea	0.57	0.44	0.54	0.47	0.59	1.00																			
7 rx Colombia	0.63	0.50	0.46	0.58	0.55	0.52	1.00																		
8 EPU Brazil	-0.22	-0.11	-0.15	-0.13	-0.20	-0.20	-0.18	1.00																	
9 EPU Chile	-0.33	-0.24	-0.27	-0.28	-0.33	-0.29	-0.36	0.56	1.00																
10 EPU India	-0.28	-0.19	-0.35	-0.19	-0.22	-0.23	-0.18	0.06	0.28	1.00															
11 EPU Russia	-0.18	-0.06	-0.03	-0.18	-0.15	-0.06	-0.17	0.45	0.48	0.19	1.00														
12 EPU Mexico	-0.02	0.02	-0.06	-0.04	-0.15	-0.17	-0.09	0.00	-0.08	0.12	-0.19	1.00													
13 EPU Korea	-0.16	-0.10	-0.17	-0.12	-0.25	-0.20	-0.19	0.38	0.40	0.44	0.35	0.33	1.00												
14 EPU Colomb.	-0.14	-0.08	-0.20	-0.11	-0.20	-0.18	-0.19	0.18	0.09	0.38	-0.04	0.45	0.37	1.00											
15 Mkt Brazil	0.64	0.53	0.49	0.49	0.59	0.59	0.54	-0.16	-0.29	-0.31	-0.01	-0.11	-0.21	-0.16	1.00										
16 Mkt Chile	0.19	0.08	0.19	0.10	0.11	0.19	0.27	-0.10	-0.20	-0.19	-0.07	-0.12	-0.07	-0.15	0.32	1.00									
17 Mkt India	0.45	0.33	0.42	0.19	0.36	0.37	0.38	-0.19	-0.27	-0.34	-0.12	-0.18	-0.23	-0.21	0.48	0.41	1.00								
18 Mkt Russia	0.52	0.39	0.44	0.30	0.47	0.45	0.29	-0.18	-0.29	-0.25	-0.05	-0.11	-0.16	-0.19	0.62	0.19	0.45	1.00							
19 Mkt Mexico	0.48	0.45	0.45	0.39	0.55	0.59	0.43	-0.25	-0.30	-0.23	-0.06	-0.15	-0.13	-0.16	0.67	0.26	0.45	0.60	1.00						
20 Mkt Korea	0.46	0.40	0.43	0.32	0.52	0.53	0.39	-0.17	-0.25	-0.20	-0.07	-0.05	-0.23	-0.13	0.62	0.29	0.41	0.55	0.61	1.00					
21 Mkt Colomb.	0.19	0.15	0.16	0.12	0.17	0.08	0.20	-0.15	-0.28	-0.24	-0.21	-0.03	-0.16	-0.19	0.09	0.38	0.46	0.13	0.20	0.22	1.00				
22 EPU Global	-0.15	-0.06	-0.15	-0.08	-0.20	-0.17	-0.16	0.59	0.61	0.48	0.53	0.14	0.82	0.29	-0.17	-0.11	-0.21	-0.19	-0.20	-0.19	-0.20	1.00			
23 MSCI World	0.39	0.32	0.37	0.30	0.41	0.44	0.44	-0.20	-0.31	-0.28	-0.03	-0.34	-0.20	-0.41	0.46	0.44	0.74	0.43	0.51	0.43	0.45	-0.20	1.00		
24 MSCI EM	0.47	0.41	0.41	0.36	0.39	0.41	0.47	-0.22	-0.38	-0.34	-0.09	-0.23	-0.25	-0.30	0.55	0.53	0.82	0.44	0.51	0.47	0.55	-0.22	0.88	1.00	
25 VIX	-0.47	-0.45	-0.49	-0.42	-0.60	-0.46	-0.41	0.15	0.13	0.14	0.02	0.13	0.09	0.22	-0.54	-0.12	-0.33	-0.45	-0.52	-0.48	-0.14	0.09	-0.47	-0.41	1.00

We note that correlation between both MSCI indices was very high (0.88), which could bring preoccupations regarding collinearity. Nevertheless, we argue that collinearity did not hamper the overall efficiency of our fitted models. Two typical effects were observed: (1) larger standard errors of the coefficients and (2) a switch in signal of the MSCI World index (the less powerful predictor). However, these two variables were used concurrently as relevant predictors only for Chile in model 5, with both variables maintaining their significance despite the increase in noise and displayed a VIF (variance inflation factor) in the acceptable range (less than five).

In Table 3, the results of the first three models based on equation (2) are presented. Model 1 regresses carry trade excess returns on local EPU only, without controls. EPU had a significant negative relationship with carry trade excess returns in all countries ($\alpha = .10$). Adjusted R^2 ranged from 1,6% (Mexico) to 11.6% in India. Model 2 includes the Global EPU with the aim of comparing the effect of the local and global EPU indices. Nonetheless, the addition of Global EPU increased the adjusted R^2 only for Chile, Colombia and Mexico, and was significant ($\alpha = .05$) only for Mexico. Model 3 regresses carry trade excess returns on local EPU with the addition of the local-level controls. Although EPU maintains its significance, it is obfuscated by the greater magnitude of the local stock market indices, except for Chile and Colombia. The other controls

are only significant in the cases of Mexico (inflation and interest rates), India (the monthly proxy for GDP) and Korea (interest rates).

Table 3

Carry Trades Excess Returns and Economic Policy Uncertainty

Model 01 - EPU Country

	Mexico	Brazil	India	Korea	Chile	Colombia	Russia
EPU Country	-0.096 *	-0.243 ***	-0.359 ***	-0.178 **	-0.267 ***	-0.144 **	-0.137 **
Adj. R-Squared	0.016	0.041	0.116	0.034	0.069	0.031	0.025
BIC	452.68	452.43	439.51	453.44	447.95	454.24	455.27

Model 02 - EPU Country and EPU World

	Mexico	Brazil	India	Korea	Chile	Colombia	Russia
EPU Country	-0.081 *	-0.211 ***	-0.364 ***	-0.223 **	-0.348 ***	-0.116 **	-0.173 **
EPU World	-0.140 **	-0.056	0.010	0.057	0.157	-0.079	0.064
Adj. R-Squared	0.043	0.036	0.111	0.028	0.078	0.038	0.019
BIC	456.74	457.41	444.51	458.78	450.73	457.50	460.68

Model 03 - EPU Country and Country-Level Controls

	Mexico	Brazil	India	Korea	Chile	Colombia	Russia
EPU Country	-0.130 *	-0.101 *	-0.287 ***	-0.150 **	-0.312 ***	-0.144 **	-0.196 **
Stock Market	0.422 ***	0.582 ***	0.321 ***	0.341 ***	0.064	0.127 *	0.275 ***
GDP	-0.365	-0.035	0.317 **	0.276	0.137	-0.053	-0.046
Inflation	0.507 *	0.019	-0.164	-0.333	0.019	0.028	0.209
Interest Rates	0.265 **	0.043	-0.015	-0.208 **	0.006	0.137	-0.056
Adj. R-Squared	0.307	0.408	0.227	0.287	0.061	0.044	0.106
BIC	420.25	393.41	435.04	425.79	467.67	469.31	459.13

The coefficients were obtained via robust regression with Newey-West standard error correction.
Significance codes: *** significant at 1%. ** significant at 5%. * significant at 10%.

The greater magnitude of the local stock market index in comparison with the local EPU can be expected if the former is more proximate cause of the forward premium than the latter (even though their effects can be intrinsically connected). Carry trade strategies are based on the expectancy that the future spot exchange rates in the location of investment remain favorable. Thus, the local stock market index is a more proximate signal of either entrance of foreign investment in the country, which helps appreciate a local currency, or capital flight, which depreciates the local currency. The forward premium keeps positive (the currency appreciates more than what was expected by the rate of the future contract negotiated in the previous month) as long as the factors that augment currency risk in the country of investment are not present. As investors are always sensitive of any risks, when any risk of either local economic policy or of global nature begins to rise, the local stock market may quickly respond with investors leaving the emerging countries, leading to a rapid depreciation of their domestic currencies (which can be

much greater than that foreseen by the non-deliverable forward contract, hence the minimum values, the negative skewness and the excess kurtosis showed in Table 1). It also explains why the VIX has a significant negative relationship for all the countries in the study (Table 4).

In Table 4, the two last models are presented. Model 4 includes all the variables in the study. As mentioned earlier, VIX had a significant negative relationship for all countries. MSCI Emerging Markets (MSCI EM) was significantly positive for Chile, Colombia and Russia, precisely the countries in which the local stock market index had the lowest magnitudes and significance. It is surprising to note that an index that aggregates data on 23 emerging countries is a more powerful predictor of carry trade excess returns in these countries than their local stock market index. Finally, MSCI World was only significant for Chile, acting as a "counterbalance" of the MSCI EM, with which it correlates at .88, as noted earlier. In model 5, we sought to find the set of explanatory variables that could most efficiently predict carry trade excess returns. The following elimination criteria were utilized: all explanatory variables must be significant at 10%; there must be at least two predictors; and VIF must be less than five. Then we classified the best models according to the Bayesian information criterion (BIC), showing in the Table only the final model with the best overall fit.

Table 4

Predictors of Carry Trade Excess Returns

Model 04 - All Variables Included

	Mexico	Brazil	India	Korea	Chile	Colombia	Russia
EPU Country	-0.056	-0.108 *	-0.270 ***	-0.164	-0.194 **	-0.046	-0.145 **
Stock Market	0.237 ***	0.419 ***	0.226 **	0.214 ***	-0.130 *	-0.100	0.115
GDP	-0.120	-0.030	0.350 *	0.164	0.297 *	-0.002	-0.005
Inflation	0.256	0.028	-0.156	-0.232	-0.318 *	-0.015	0.047
Interest Rates	0.209 *	0.077	0.002	-0.133	-0.033	0.147	-0.054
EPU Global	-0.073	0.052	-0.099	0.096	0.200 *	-0.012	0.127
MSCI World	0.121	-0.086	-0.162	0.033	-0.411 ***	-0.004	-0.208
MSCI EM	-0.086	0.205	0.105	0.137	0.621 ***	0.424 **	0.324 ***
VIX	-0.359 ***	-0.186 **	-0.345 ***	-0.173 ***	-0.325 ***	-0.259 ***	-0.266 ***
Adj. R-Squared	0.435	0.437	0.346	0.340	0.308	0.261	0.224
BIC	405.18	402.46	425.99	432.31	434.92	444.15	455.35

Model 05 - Best Model

	Mexico	Brazil	India	Korea	Chile	Colombia	Russia
EPU Country			-0.262 ***				
Stock Market	0.267 ***	0.518 ***	0.194 ***	0.304 ***			
GDP							
Inflation							
Interest Rates							
EPU Global							
MSCI World					-0.374 ***		
MSCI EM					0.563 ***	0.357 ***	0.170 ***
VIX	-0.386 ***	-0.174 ***	-0.340 ***	-0.239 ***	-0.329 ***	-0.260 ***	-0.280 ***
Adj. R-Squared	0.435	0.422	0.342	0.329	0.280	0.273	0.208
BIC	375.80	377.26	402.18	403.69	416.45	412.75	428.67

The coefficients were obtained via robust regression with Newey-West standard error correction.
Significance codes: *** significant at 1%. ** significant at 5%. * significant at 10%.

5. Conclusion

This article took a detailed look at the variables that can explain carry trades excess returns in emerging markets, helping to elucidate the phenomenon of the forward premium puzzle. Our approach involved using the very recently available data to examine the magnitude of the political risk of each country, vis-à-vis other potentially important variables, including macroeconomic, volatility and risk measures in the global, regional and country levels, to predict carry trade excess returns. Results indicate that political risk as measured by the Economic Policy Uncertainty Index (Baker, Bloom, & Davis, 2016) was indeed a significant negative predictor of carry trade excess returns in our sample. In general, the results corroborate the literature. When risks of either local economic policy or of global nature rise, the forward premium and therefore carry trade excess returns become negative. This study contributes with a fresh analysis on emerging markets and offers some new insights into a long-known market anomaly. In some countries, the stock market index is a strong predictor whereas in others international indices such as the MSCI Emerging Markets Index are more powerful. Finally, although relevant, economic policy risk does not entirely explain the forward premium puzzle. Future studies should include additional countries as well as utilize different measures of risk that aim to capture other dimensions of the political spectrum and its influence in the dynamics of international finance.

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