Five Facts about the UIP Premium

Şebnem Kalemli-Özcan Liliana Varela*

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Abstract

We document five novel facts about Uncovered Interest Parity (UIP) deviations vis-à-vis the U.S. dollar for 34 currencies, during 1996-2018. 1) The UIP premium co-moves with global risk perception (VIX) for *all* currencies, whereas *only* for emerging market currencies there is a negative comovement between the UIP premium and capital inflows. 2) The comovement of the UIP premium and the VIX is explained by changes in interest rate differentials in emerging markets, and by changes in exchange rates in advanced countries. 3) Time-varying country risk measured by the degree of policy uncertainty can explain both the negative comovement of the UIP premium with capital inflows and the positive comovement of the UIP premium with the interest rate differentials in emerging markets. 4) While we find no overshooting and predictability reversal puzzles for any currency and no Fama puzzle in advanced economies, in emerging markets UIP never holds, on average or over time. 5) Measuring the exchange rate movements with realized vs. expected changes from survey data only matters for results on advanced countries and not for emerging markets. This is because UIP risk premium and deviations from full information rational expectations are linked to each other in emerging markets. Global investors charge an "excess risk" premium that is endogenous to policy uncertainty that affects the formation of investors' expectations of exchange rate fluctuations.

JEL: F21, F32, F41.

Keywords: Fama regression, excess return, risk premia, expectations, policy credibility.

*Şebnem Kalemli-Özcan: University of Maryland, NBER and CEPR, email: kalemli@umd.edu. Liliana Varela: London School of Economics and CEPR, email: l.v.varela@lse.ac.uk. The paper has been circulated before with the following title: "The Exchange Rate and Interest Rate Disconnect: The Role of Capital Flows and Risk Premia." We thank Pablo Becker, Javier Bianchi, Menzi Chinn, Charles Engel, Jeffrey Frankel, Ian Martin, Emi Nakamura, Alessandro Rebucci, Hélène Rey, Vania Stavrakeva, Jenny Tang, Adrien Verdelhan, as well as participants of several seminars and conferences for helpful comments. We are grateful to Jun Hee Kwak and Alvaro Silva for their excellent research assistance.

1 Introduction

A central concept in international macroeconomics and finance is the Uncovered Interest Parity (UIP) condition that links interest rates to expected changes in the exchange rate. Under the UIP condition, the home currency is expected to depreciate if the home interest rate is higher than the foreign interest rate, offsetting this interest rate differential. Starting with the influential work of Fama (1984), a large literature, focusing on advanced economies, uses *realized* exchange rates and documents the opposite pattern: high interest rate currencies do not depreciate but appreciate in the near future, implying –on average– excess returns from investing in these currencies.[1] A subsequent literature, also focusing on advanced economies and using *realized* exchange rates, documented puzzling dynamics. The delayed overshooting puzzle, as first documented by Eichenbaum and Evans (1995), shows that the exchange rate appreciates first as a response to a positive shock to interest rate differentials, and only starts depreciating after some time. The predictability reversal puzzle, as documented by Bacchetta and van Wincoop (2010), Engel (2016) and Valchev (2020), shows that UIP deviations switch direction, that is high interest rate currencies have positive excess returns in the near future due to the initial appreciation but, after some time, they start having negative excess returns due to too much depreciation.[2]

We undertake an empirical investigation for the determinants of UIP deviations in a large panel of monthly observations. Our sample consists of 34 currencies — 12 advanced economies and 22 emerging markets – over 1996m11-2018m12. Following Froot and Frankel (1989), we use *expectations* of exchange rates from survey data instead of realized exchange rates to be able to measure the exact counterpart of the textbook theoretical UIP condition in the data. Specifically, textbook UIP condition is $E_t(S_{t+h})(1 + i_t^{US}) = S_t(1 + i_t)$, where, we measure i_t and i_t^{US} as the local and the U.S. short-term (12 month) deposit and/or money market interest rates, and h is a 12-month horizon. E denotes expectations over the same horizon and S is the exchange rate in units of local currency per USD. Denoting logs with lower case letters, and using superscript "e" for expectations, we can write the UIP premium –λ_{t+h}^e– in logs as follows:

$$\lambda_{t+h}^e = \underbrace{(i_t - i_t^{US})}_{\text{IR Differential}} + \underbrace{(s_t - s_{t+h}^e)}_{\text{ER Adjustment}}. \tag{1}$$

When $\lambda_{t+h}^e = 0$, the UIP condition holds, as the interest rate differential and expected exchange

[1]The empirical Fama literature measures the UIP condition using realized exchange rates on the assumption of full information rational expectations (FIRE). In addition, this literature assumes that Covered Interest Parity (CIP) holds by equating the difference between forward rates and spot rates to interest rate differentials. This is why the Fama puzzle is also known as the forward premium/discount puzzle, as forward premium is associated with appreciations instead of depreciations. An excellent review of this literature can be found in Engel (2014).

[2]Froot and Frankel (1989) showed that forecast errors in exchange rate can account for the classic UIP puzzle, whereas Candian and De Leo (2021) argue that forecast errors can also account for predictability reversal puzzle and can explain the entire path of excess currency returns. Both papers use only advanced country currencies (G7 or G10) and argue that puzzles stem from deviations from FIRE. Stavrakeva and Tang (2018) also use expectations of exchange rates from survey data for advanced countries, at the forecaster level, and provide evidence on the specific form of the deviation from FIRE.

rate changes offset each other. Expected excess returns are zero. When $\lambda^e_{t+h} > 0$, the UIP condition does not hold and there are positive expected excess returns from investing in the domestic currency.

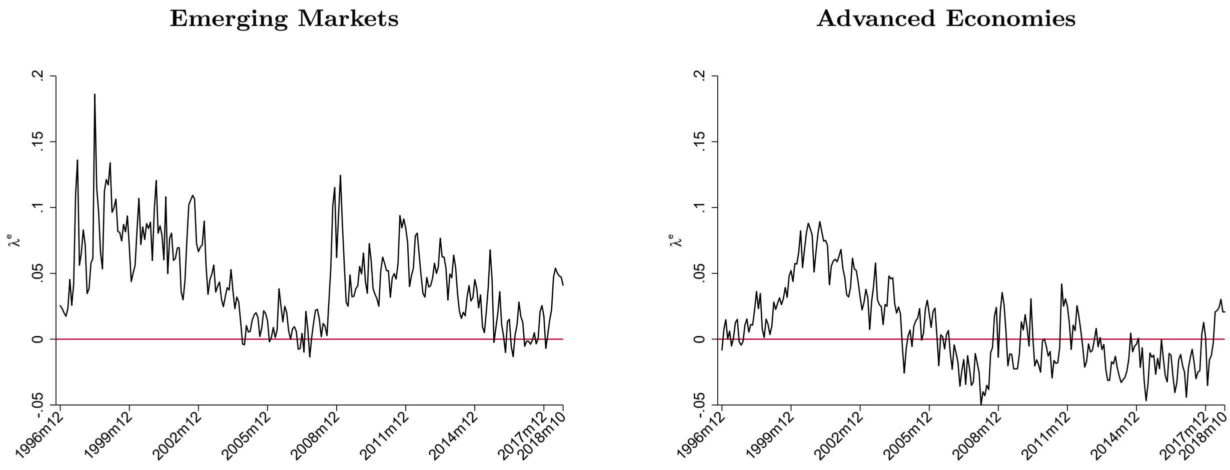
The top panel of Figure 1 plots the expected excess returns over our sample period, separating advanced economies from emerging markets. If we do eye-ball econometrics, the first observation to notice is that UIP holds *on average* in advanced countries, as λ^e_{t+h} fluctuates around zero (especially since early 2000s), but it does not hold in emerging markets where λ^e_{t+h} is consistently above zero. We confirm these observations also with Fama regressions at various horizons. This fact that UIP holds in expectations but not with realized exchange rates in advanced countries started a large debate on whether UIP deviations are due to deviations from full information rational expectations (FIRE) or they are risk premia charged by risk-averse investors.[3] By focusing on emerging markets in this paper, we can shed light on this debate as for emerging market currencies UIP does not hold regardless of the measurement of exchange rate changes, i.e., with expected or realized movements. It is noteworthy that, for these currencies, we never get the "wrong sign" Fama coefficient. That is, high interest rate emerging markets' currencies are not expected to appreciate, but to depreciate as predicted by the UIP, and in reality they also depreciate. UIP does not hold, as neither expected or actual depreciation is enough to offset the interest rate differential, regardless of the horizon.

The UIP premium shows high volatility across time. To assess this *dynamics*, we zoom in on the exchange rate adjustment and interest rate differential components, defined in equation (1). As the bottom panel of Figure 1 shows, these two components have a contrasting role on the dynamics of their UIP premium across countries. In advanced economies, the UIP premium and the exchange rate adjustment term overlap most of the time, with a correlation over 90 percent, while movements in the interest rate differential term are negligible. In contrast, in emerging markets, interest rate differentials almost perfectly co-move with the UIP premium, a 70 percent correlation, whereas the exchange rate adjustment term barely correlates with the UIP premium. These interest rate differentials are systematic and highly correlated with the expected excess returns, specially during periods of high uncertainty, related to emerging markets' crises as in 1990s or to global shocks, as in late 2000s. We show below that high inflation in emerging markets cannot explain these patterns.

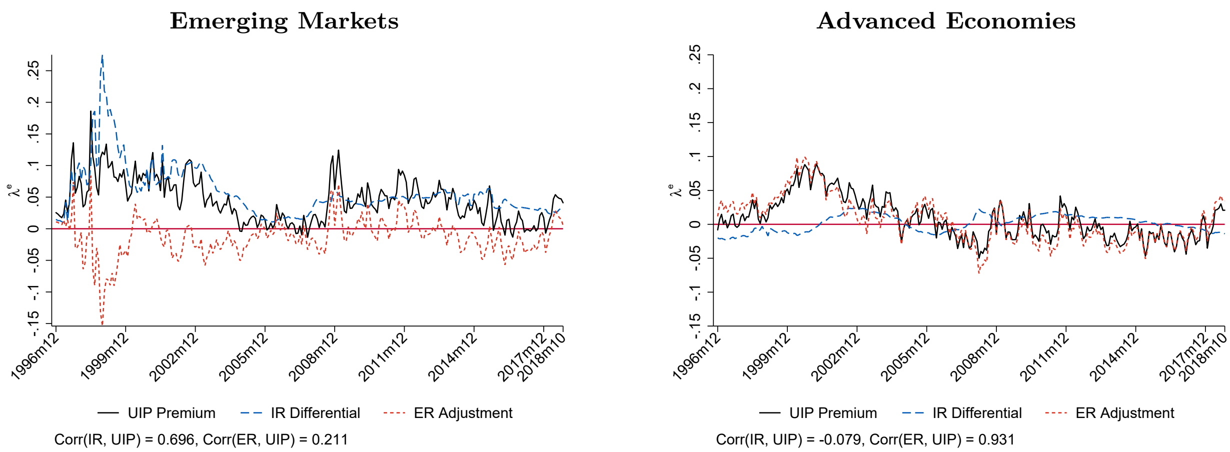
To illustrate the correlation between global shocks/uncertainty and the UIP premium visually, we show in Panel A of Figure 2, a strong correlation between the VIX and the UIP premium in both advanced economies and emerging markets.[4] In Panel B, we break down the UIP premium in its two components and show that shocks to global investors' risk sentiments correlate with the UIP premium in these two set of economies through different channels. In emerging markets, the

[3] Engel (2016) argues that high interest rate currencies cannot be "risky currencies" if they deliver negative returns most of the time, the so-called "Engel puzzle." Several other papers argue that realized excess returns are risk premia paid to "risky currencies," depreciating bad times, e.g., Lustig and Verdelhan (2007). Froot and Frankel (1989) use survey data on exchange rate and find that expectational errors can explain the bias of de Fama coefficient in advanced economies.

[4] di Giovanni, Kalemli-Özcan, Ulu, and Baskaya (2021) documents a positive comovement between UIP premium and the VIX, but only for a single emerging market, Turkey. There is a parallel literature on the correlation between the VIX and the CIP deviations, where Du, Tepper, and Verdelhan (2018), Jiang, Krishnamurthy, and Lustig (2021) and Avdjiev, Du, Koch, and Shin (2019) all show a systematic relationship between the US dollar exchange rate, the VIX and the CIP deviations.



A) UIP Premium



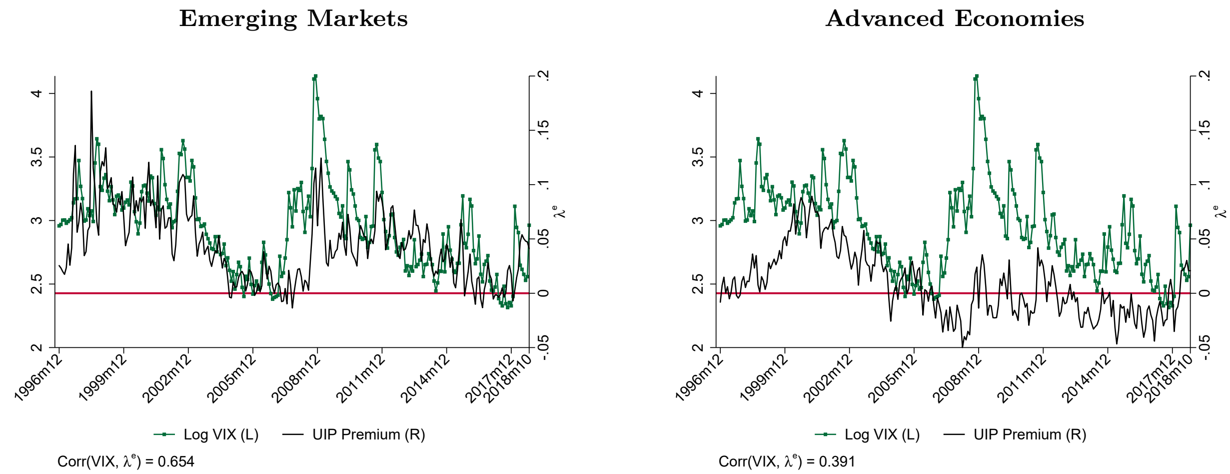
B) Interest Rate Differential and Exchange Rate Adjustment Terms

Figure 1: UIP Premium in Advanced Economies and Emerging Markets

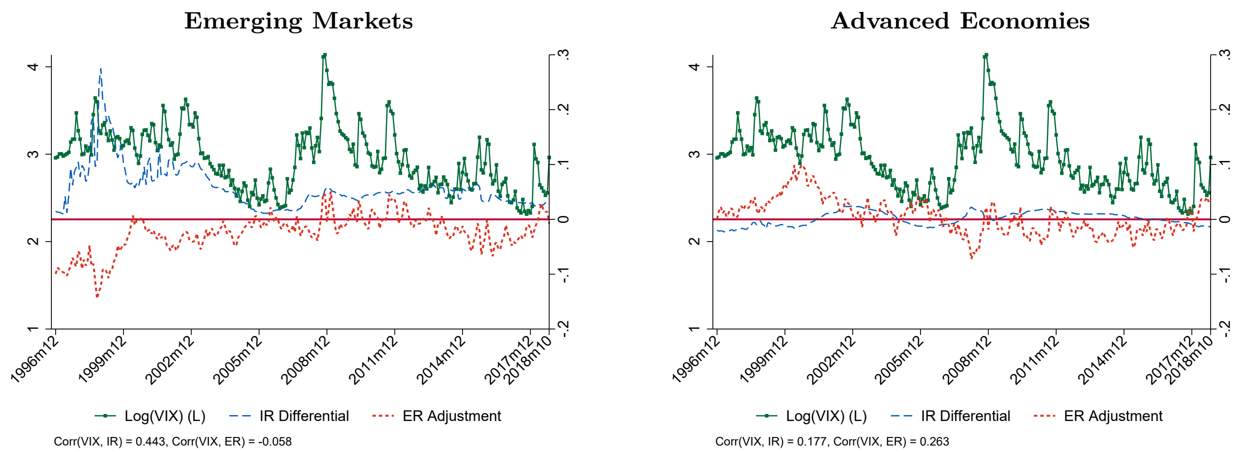
Note: This figure shows the UIP premium and its decomposition between the interest rate differential and exchange rate adjustment terms at 12 month horizon for 34 currencies –22 emerging markets and 12 advanced economies– over 1996m11:2018m12. The UIP premium and the exchange rate adjustment term are measured using expected exchange rate changes from Consensus Forecast.

VIX and the interest rate differential track each other closely. Indeed, the VIX has a much higher correlation with the interest rate differential than with the exchange rate adjustment term. In contrast, in advanced economies, the VIX co-moves more closely with the exchange rate adjustment term than with the interest rate differential.

Global uncertainty cannot alone explain the heterogeneous dynamics of the UIP premium in emerging markets. We argue that the UIP premium in these economies is an investment risk premium linked to country idiosyncratic and time-varying policy uncertainty. Investors ask for an "excess" compensation that goes over and above their expectations of emerging markets' currency



a) VIX and the UIP Premium



b) VIX and UIP Premium Decomposition

Figure 2: VIX and UIP Premium in Advanced Economies and Emerging Markets

Note: This figure shows the VIX, the UIP premium and its decomposition between the interest rate differential and exchange rate adjustment terms at 12 month horizon for 34 currencies –22 emerging markets and 12 advanced economies– over 1996m11:2018m12. The UIP premium and the exchange rate adjustment term are measured using using expected exchange rate changes from Consensus Forecast.

depreciations, given the country-specific risks they face. Such risks include sovereign default (credit) risk, currency risk and policy risk, where all of these lead to uncertain returns to foreign investors. To show the importance of policy risk for the high frequency movements of the UIP premium, we extend the economic policy uncertainty (EPU) index of Baker, Bloom, and Davis (2016) for our large set of countries, and document that policy uncertainty linked to credibility of emerging markets' policies is key to explain fluctuations in the UIP premium in these economies at monthly frequency. We show that, in emerging markets, an increase in a country's policy uncertainty associates with a higher UIP premium, and the same policy uncertainty lowers capital inflows, accounting for the negative relation between the UIP premium and capital flows. Global investors' risk sentiment about a country's idiosyncratic policy risk is priced in the interest rate differentials and, by this means, entails a UIP premium. These results are conditional on global uncertainty and are in line with the literature that shows that VIX is a key correlate of risky interest rates, policy rate differentials and capital flows (e.g. Rey 2013, Bruno and Shin 2015, Kalemli-Özcan 2019).

To further check that our results are capturing investors' risk sentiments about overall policy uncertainty and go beyond the usual high sovereign default risk of emerging markets (see for example Alvarez, Atkeson, and Kehoe 2009), we undertake several analysis. First, by using data from the International Country Risk Guide (ICRG), we take a granular approach to our "news" based policy uncertainty (EPU) index. Examples of granular policy risks are expropriation risk of foreign investors, risks of profits repatriation, government accountability affecting market confidence, and credibility of monetary policy. We show that these more narrowly-defined policy risks are associated with increases in the interest rate differential and the UIP premium in emerging markets. These results confirm that the UIP premium and the risk priced in the interest rate differential capture the risk sentiment of foreign investors about country-specific policy uncertainty affecting their returns. Consistently, when we control for default risk via other spreads such as CDS and EMBI, and we drop serial defaulters and default episodes from the sample, our results remain intact.

Documenting significant differences across advanced countries' and emerging markets' excess currency returns, where the same set of global investors invest in both currencies entails several challenges that the current literature cannot provide a solution for. The existing UIP literature (theoretical and empirical), focusing mostly on advanced countries, has several interpretations for the result that even if expected returns are zero, actual realized returns are often not zero and are persistent and volatile. One strand of the literature argues that there are deviations from FIRE that can come both from information frictions and/or subjective beliefs.[5] Another strand associates predictable excess returns and UIP deviations with risk averse investors participating in efficient FX markets.[6] The theory literature is extensive with models rationalizing the failure of the UIP using deviations from FIRE à la information frictions, behavioral biases, and distorted beliefs, and adopting a financial frictions approach to limit the arbitrage.[7]

What constitutes our key contribution to this vast literature is our documentation of the fact that a single explanation cannot account for the different behavior of the *same* investor in advanced country and emerging market currencies. In advanced countries, we confirm the results in the

[5]See Froot and Frankel (1989), Ito (1990), Chinn and Frankel (1994), Bacchetta, Mertens, and van Wincoop (2009), Stavrakeva and Tang (2018), Bussiere, Chinn, Ferrara, and Heipertz (2018), and Candian and De Leo (2021). An additional issue is that, the explanations based on deviation from FIRE should be short lived as lower frequency data shows UIP holds for advanced countries in long horizons both in expectations and with realized exchange rates; there are no excess returns for long-term bonds (Chinn 2006, Lustig, Stathopoulos, and Verdelhan 2019).

[6]See Burnside, Eichenbaum, and Rebelo (2007), Burnside, Eichenbaum, and Rebelo (2008), Sarno, Schneider, and Wagner (2012), Sarno and Schmeling (2014), Lustig and Verdelhan (2007), Lustig, Roussanov, and Verdelhan (2011), Colacito and Croce (2013), Backus, Foresi, and Telmer (2001), Hassan and Mano (2019), Kremens and Martin (2019), and Salomao and Varela (2021).

[7]Burnside, Eichenbaum, Kleshchelski, and Rebelo (2011), Gourinchas and Tornell (2002), Bacchetta and Wincoop (2006), Evans and Lyons (2008), Gabaix and Maggiori (2015), Gopinath and Stein (2018), Akinci and Queralto (2018), Basu, Boz, Gopinath, Roch, and Unsal (2020), Itskhoki and Mukhin (2021), and Bianchi and Lorenzoni (2021).

literature and show predictable excess returns that are driven by a systematic negative relation between the interest rate differentials and forecast errors. That is, investors' expectations over-react to interest rate differential changes when we use average consensus forecast. However, we also show that the dynamic response is quite different, where forecast errors flip sign over time and investors over-react first – expecting a depreciation and realizing an appreciation– but under-react later –expecting a depreciation that is less than the actual depreciation. These dynamics mimic what is shown by Angeletos, Huo, and Sastry (2020) for inflation expectations. With the term "over-reaction" we refer to expectations being higher than realized, and hence "over-reaction" is an “under-valued” currency. The emerging markets' currencies are quite different. There is no predictability of forecast errors by the interest rate differentials based on average consensus forecast. Since the same set of global investors invest in both currencies, this is a puzzling result.

To shed more light on this issue, we follow Coibion and Gorodnichenko (2015), Bordalo, Gennaioli, Ma, and Shleifer (2020), Stavrakeva and Tang (2018), and run forecast error predictability regressions using data from individual forecasters. We show that, for all currencies, forecast errors are predictable at the forecaster level and investors' expectations over-react to interest rate shocks on average. The *predictability* of forecast errors at the individual level, but *non-predictability* at the average consensus level that we find in emerging markets is in line with Bordalo, Gennaioli, Ma, and Shleifer (2020), who show that average consensus data can be problematic if there is noise stemming from informational frictions. To assess this issue for emerging market currencies, we investigate investors' exchange rate expectation response to policy uncertainty shocks and find that policy uncertainty affects the expectations, however since the shock is noisy by its very nature of being driven by policy uncertainty, average exchange rate consensus forecast cannot pick this up.

Overall, as policy uncertainty drives the interest rate differentials in emerging markets, the UIP premium is a risk premium that compensates for this policy uncertainty and such uncertainty also affects the formation of expectations, making investors to form pessimist expectations. Our findings indicate a significant effect of investors' risk sentiments that co-move with policy uncertainty in pricing the risk of investing in emerging markets over and above the actual currency risk. Although in spirit our findings resonate with the classical "peso problem" they are quite different. The peso problem is about the credibility of a fixed exchange regime, established during the peg of Mexican peso to the U.S. dollar in the 1970s. During this period investors expected a depreciation of peso that did not materialize and, hence, created a gap between the U.S. and the Mexican interest rates. Our results are on the contrary about floating exchange rate regimes and how uncertainty surrounding non-exchange rate policies (which include –but not limited to– expropriation risk, government accountability, risk of profit repatriation, as well as monetary policy) affect the formation of exchange rate expectations in emerging markets leading to a UIP risk premium.

The paper is structured as follows. Section 2 describes the data. Section 3 assesses the dynamics of the UIP premium, and the overshooting and predictability reversal puzzles. Section 4 reports the Fama regressions. Section 5 undertakes a granular analysis of country risk related to policy uncertainty. Section 6 discusses alternative mechanisms and robustness. Section 7 concludes.

2 Data and Measurement: Expectations, Risk Sentiments and News

We employ monthly data from International Monetary Fund (IMF), Bloomberg and Consensus Economics to construct the UIP condition. We obtain the deposit interest rates, money market rates and government bond rates from Bloomberg, the spot exchange rate from International Financial Statistics (IFS) from the IMF, and the exchange rate forecasts data comes from Consensus Economics. This survey provides information on expected exchange rate at 12-month horizon that we use to construct the UIP at this maturity. We additionally conduct robustness tests for UIP at 3 months maturity. We employ the VIX index to proxy for global risk perception, which we obtain from the Federal Reserve Economic Data (FRED). We use standard capital flows data from IMF, IFS. Following Miranda-Agrippino and Rey (2020), we interpolate all capital flow series to monthly frequency (see Appendix A.1 for details). For the Euro Area, we proceed as follows. We employ individual series of interest rates, exchange rates and capital inflows for countries before they join the Euro. After they join, we use Euro interest and exchange rates and consolidate inflows for the Euro by adding individual country flows and weighting them by the GDP of each country ourselves or using the Euro Area flows from IMF, IFS.

To proxy for domestic policy uncertainty for each country, we employ two different methodologies. We first compute the EPU index for our sample following Baker, Bloom, and Davis (2016). This index is constructed by counting the number of journal articles containing words reflecting economic policy uncertainty and, as such, is a good proxy for global investors' risk on government and central bank policies. To narrow down the factors more relevant creating policy uncertainty, we then complement our analysis with the ICRG, which –as detailed below– reports detailed information of the components of policy risk for each country over time. We investigate monetary policy uncertainty by studying inflation forecast errors using inflation expectations and realized inflation.

Our panel is for 34 currencies, 12 advanced economies and 22 emerging markets, over the period 1996m11–2018m12, for which we have information for all variables to construct the UIP condition and information about our policy risk variables. Our sample excludes country-month observations when there is a fixed exchange rate regime based on the classification of Ilzetzki, Reinhart, and Rogoff (2017), as in these cases the exchange rate does not move or covary with the interest rate by construction. Appendix A discusses in detail the construction of the series and sample of countries.

We next discuss the Consensus Economics, EPU and ICRG Risk Guide datasets and present main descriptive statistics of the UIP premium.

Survey Data on Exchange Rate Expectations

Consensus Forecast conducts a monthly survey about expectations on future exchange rates at 1, 3, 12 and 24 months horizons of major participants in the foreign exchange rate market. Appendix A.2 discusses thoroughly the details of this dataset. The coverage is extensive and includes 55 forecasters on average for advanced economies' currencies. Some currencies –as the Euro, Japanese Yen and UK Pound– include more than a hundred of forecasters in several periods. Albeit with a lower number of forecasters, the survey is also comprehensive in emerging markets and includes on average 17 forecasters per currency.

The forecasters interviewed are typically global banks and investors that actively participate in the FX market. Notably, these global agents are present in both advanced economies and emerging markets and, hence, provide together their forecasts for both sets of economies. Having the same set of agents surveyed for both set of economies is important because it implies that different results between advanced economies and emerging markets should not arise from heterogeneity in the type of forecasters among these economies. To provide an example of the forecasters surveyed, in September 2012, for the Japanese Yen (96 forecasters) these included: Goldman Sachs, HSBC, JP Morgan, Citigroup, Bank of Tokio Mitsubishi, IHS Global Insight, General Motors, ING Financial Markets, Barclays Capital, and Morgan Stanley. These ten forecasters were also surveyed for the Euro and the UK pound, which included a total of 103 and 81 forecasters that month. Forecasters of emerging market currencies also included these group of global banks. For example, the main forecasters of the Korean Won (22 forecasters) were: Goldman Sachs, HSBC, JP Morgan, Citigroup, Bank of Tokio Mitsubishi, IHS Global Insight, General Motors, ING Financial Markets. Similarly, the Turkish Lira (28 forecasters) included the same list of forecasters. Other emerging market currencies (as the Argentinean Peso, Brazilian Real, Chilean Peso, Colombian Peso, Hungarian Forint, Indian Rupee, Malaysian Ringgit, Mexican Peso, Polish Zloty and Russian Rouble) also included these forecasters, as well as other global investors like Barclays Capital, BNP Paribas, ABN Amro, Allianz, Royal Bank of Canada, UBS and Royal Bank of Scotland.

Economic Policy Uncertainty and Policy Risk Variables

We construct the EPU index following the methodology of Baker, Bloom, and Davis (2016). In particular, we use the online platform Factiva, which reports journal articles of main international newspapers. Our list of words follows Baker, Bloom, and Davis (2016) to which we add four new words to capture additional policy uncertainty characteristic of emerging markers (i.e. capital controls, expropriation, nationalization and corruption). Because we are interested in the perspective of the U.S. international investor, we focus on news reported in international newspapers (such as Financial Times, Reuters and the Wall Street Journal, among others). We construct the EPU index for each currency and month as follows, $EPU_{it} = X_{it}/\frac{1}{12}\sum_{j=1}^{12} Y_{t-j}$, where X_{it} is the number of articles referring to EPU episodes in country i at month t, $Y_t = \sum_i Y_{it}$ is the total number of articles written at month t (i.e. the sum of articles across countries), and Y_{it} is total number of articles referring to country i at month t. We then normalize the index to 100 by estimating $EPU^N_{it} = \frac{EPU_{it}}{\overline{EPU}_i} \times 100$, where $\overline{EPU}_i = \frac{1}{T}\sum_{t=1}^{T} EPU_{it}$ is the average of EPU news for each country across time. Appendix A.3 reports a detailed description of the methodology to create this index.[8]

To narrow down our analysis of a country's policy risk, we employ data from the ICRG. This dataset breaks down a country's policy risk into several components. We use *composite country risk* using the composite risk index, which includes political, economic and financial risks. Political risk contributes 50% to the composite index, and financial and economic risks contribute to the remaining 50%. To pin down the main elements entailing policy risk, we focus on two key elements of the political risk component that capture investors' sentiments: *government policy risk* and *confidence risk*. Government policy risk captures expropriation risk, risk of not being able to repatriate profits and government accountability, where this later evaluates different types of democratic systems and the degree of freedom that a government has to impose policies to its own advantage.[9] Confidence risk assesses consumer confidence and unemployment (see Appendix A.4 for more details).[10]

Main Summary Statistics on the UIP Premium

We present main summary statistics of the UIP premium and its components of equation (1). Confirming the eye-balling econometrics observation of Figure 1, columns 1 and 4 in Table 1 show that there is a striking contrasts between advanced economies and emerging markets. While in emerging markets there is a positive UIP premium that reaches – on average – 4 percentage points, the UIP premium in advance economies is small and lower than 1 percentage point.

The decomposition between the interest rate differential and the exchange rate adjustment terms also confirms our previous finding of Figure 1. Columns 2 and 3 show that, in emerging markets, the mean interest rate differential accounts for the bulk of the UIP premium, while the exchange rate adjustment term is negligible. Instead, in advanced economies, the mean interest rate differential and exchange rate adjustment terms are closed to each other, which is consistent with a UIP premium being on average close to zero in these economies. In line with these figures, the table also shows that the larger volatility of the UIP premium in emerging markets is principally explained by the higher volatility of the interest rate differential. In contrast, in advanced economies, the volatility of the UIP premium is more related with exchange rate adjustments.[11]

[8]Our methodology to construct the index follows Barrett, Appendino, Nguyen, and de Leon Miranda (2020) and is an adaptation of Baker, Bloom, and Davis (2016) for studies based on international newspapers, i.e. where there is less availability of local newspapers. In particular, the difference with Baker, Bloom, and Davis (2016) is that their index includes a non-minor proportion of local newspapers, which allows them to first compute the share of news for each individual newspaper within a country and then add up the total sum for each country. Instead, Barrett, Appendino, Nguyen, and de Leon Miranda (2020) methodology adds the total number of articles in a country and pools all the newspapers together for each country.

[9]In recent work, Azzimonti and Mitra (2022) also relate government accountability with a country's default probability.

[10]These two indexes come directly from the ICRG data. Our measure of government policy risk is the average of the variables investment profile and democratic accountability, and our measure of confidence risk is the socioeconomic risk variable. We pool investment profile and democratic accountability together as, despite both variables capture different types of risk, they are highly correlated in data and, hence, collinear if used together econometrically.

[11]Table A3 reports additional summary statistics of the main variables employed in the paper.

Table 1: Summary Statistics on the UIP Premium

	Emerging Markets			Advanced Economies		
	UIP Premium (1)	IR Differential (2)	ER Adjustment (3)	UIP Premium (4)	IR Differential (5)	ER Adjustment (6)
Mean	0.040	0.051	-0.011	0.009	0.003	0.007
Median	0.034	0.036	-0.006	0.006	0.001	0.003
Std. Dev.	0.060	0.077	0.063	0.046	0.022	0.049
p25	0.004	0.014	-0.036	-0.022	-0.009	-0.027
p75	0.068	0.065	0.025	0.034	0.015	0.036
Observations	3,577	3,577	3,577	2,285	2,285	2,285

Notes: 34 currencies, 22 emerging markets, 12 advanced economies. Period 1996m11:2018m12. The UIP premium and the exchange rate adjustment term are measured using expected exchange rate changes from Consensus Forecast. All variables are in logs.

3 The Dynamics of the UIP Premium: The Role of Global and Local Uncertainty

In this section, we assess how changes in global investors' sentiment affect the UIP premium. Figure 2 above showed that the UIP premium varies substantially across time and that these fluctuations are highly correlated with global uncertainty, captured by the VIX index. We now test this hypothesis econometrically and, additionally, study whether the UIP premium correlates with local economic policy uncertainty across countries and time. Finally, we present two event studies of increases in economic policy uncertainty – the nationalisation of pension funds in Argentina in October 2008 and the Brexit referendum in the United Kingdom in June 2016 – to illustrate how EPU affects the UIP premium and its components.

3.1 Local Economic Policy Uncertainty

Do local risk factors affect global investors' sentiments and, by this means, the UIP premium? Which component of the UIP premium do they affect more? Is there any difference between currencies of advanced economies and emerging markets? We approach these questions by comparing the EPU index with the UIP premium across time and countries. Figure 3 shows that the co-movement between EPU index and the UIP premium is rather small in advanced economies' currencies (2%). In contrast, this correlation is high in emerging market currencies, reaching 50%. This suggests that changes in global investors' sentiments due to a country's policy risk associate with the UIP preimum in emerging markets. Yet these correlations pool all currencies together and, thus, can hinder heterogeneity across emerging market currencies. To control for this heterogeneity, in the next section, we assess these correlations econometrically by estimating panel regressions with currency (=country)-fixed effects.

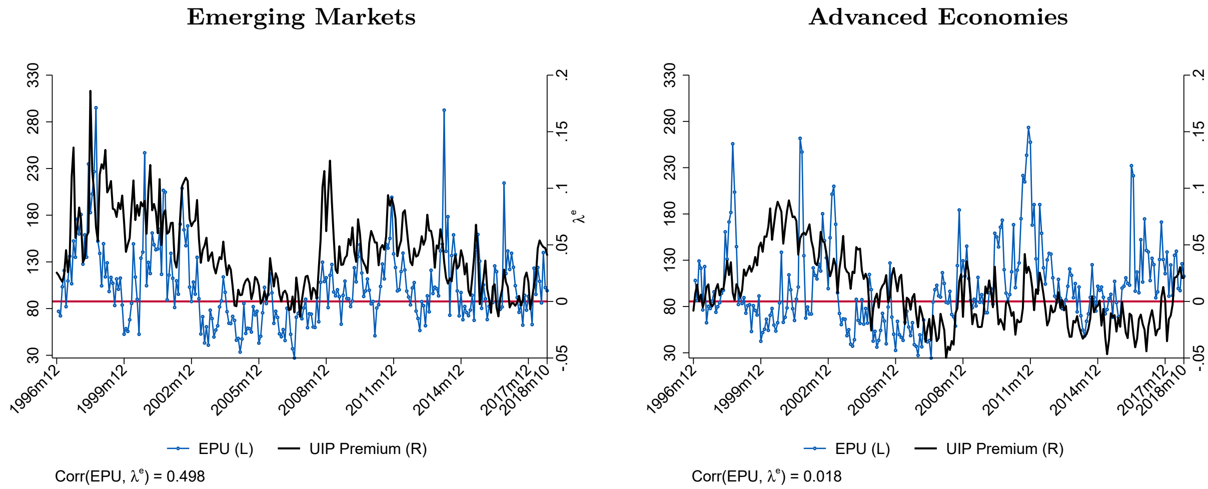


Figure 3: Economic Policy Uncertainty and UIP Premium

Note: This figure shows the EPU and the UIP premium at 12 month horizon for 33 currencies –21 emerging markets and 12 advanced economies– over 1996m11:2018m12. The UIP premium is measured using deposit and money market interest rates from Bloomberg and expectations of exchange rates from Consensus Forecast.

3.2 UIP Premium Panel Regressions: Interest Rate and Exchange Rate Disconnect

To assess the sources of the fluctuations of the UIP premium, we estimate panel regressions with currency/country-fixed effects. Note that currency and country is the same as we treat Euro area countries as a group. We study the effect of a global risk factor (VIX) and two local risk factors, country-specific EPU and capital inflows. We then analyze how these risk factors/channels affect each component of the UIP premium. More precisely, we estimate the following panel regression:

$$Y_{it} = \gamma_1 \log(\text{Capital Inflows/GDP}_{it-1}) + \gamma_2 \log(VIX_{t-1}) + \gamma_3 \, \text{EPU}_{it-1} + \mu_i + \varepsilon_{it}, \tag{2}$$

where i is currency/country, t is month, Y_{it} is the UIP premium, the interest rate differential term or the exchange rate adjustment term, i.e. $Y_{it} = \{\lambda^e_{it+h}, \text{IR Diff}_{it}, \text{ER Adj}_{it+h}\}$, and the independent variables are lagged one month. μ_i are currency fixed effects that allow assessing the UIP condition within currencies across time. We double cluster the standard errors across time and country/currency. For expositional purposes, we introduce the independent variables sequentially.[12]

Table 2 reports the results. Panel A shows the estimated coefficients of regression (2) in which only capital inflows is included as a regressor. Capital inflows associate with decreases in the UIP premium in emerging markets (column 1). As columns 2 and 3 show, this reduction is channeled through a decrease in the interest rate differential. Capital inflows lower the local interest rate and lead to an expected currency appreciation. Yet, the expected appreciation is not enough to

[12]We have to drop Colombia, going down to 21 EM as EPU index is not available for Colombia.

compensate for the lower interest rate differential and the UIP premium drops. The estimated coefficient implies that one percentage point increase in capital inflows over GDP leads to a 0.5 percentage points decrease in the UIP premium. By the same token, a decrease in capital inflows (or capital outflows by foreign investors) will lead to an increase in UIP premium. As the average UIP premium is 4 percent in emerging markets, a change of 0.5 percentage points is an economically significant effect. For comparison, we also show results for advanced countries, where capital inflows do not significantly affect the UIP premium nor its components.

In Panel B, we include the VIX as independent variable to assess the role of global risk perception. Both in advanced and emerging economies, the estimated coefficient on the VIX variable is positive and highly statistically significant, suggesting that higher global risk associates with higher UIP premia in both set of countries (columns 1 and 4). The coefficient for emerging economies implies that an increase in the VIX from p25 to p75 leads to 3 percentage points higher UIP premium. Another way to look at this coefficient is considering the increase during the Global Financial Crisis. If the VIX increases as it did after the collapse of Lehman Brothers (2008m8-2008m12) by 150%, the UIP premium in emerging markets would increase by 9 percentage points. The increase in the UIP premium is slightly lower for advanced economies: a rise from p25 to p75 associates with a 2.4 percentage points increase in the premium. Lastly, it is worth remarking that global uncertainty has high explanatory power to account for changes in the UIP premium, as the R^2 increases significantly when including the VIX as a co-variate in both set of economies.

-Fact 1*: The UIP premium co-moves with global risk perception (VIX) for all currencies, whereas only for emerging market currencies there is a negative comovement between the UIP premium and capital inflows.*

We then assess the channels of transmission of global uncertainty. The VIX shock raises both the interest rate differential and the exchange rate adjustment terms. Yet, there is an interesting difference between emerging markets and advanced economies. In the former, increases in global uncertainty affect the interest rate differential relatively more. It is then this larger expansion of the domestic interest rate what accounts for the bulk of the increase in the UIP premium following VIX shocks in emerging markets (columns 2 and 3 in Panel B). Instead, in advanced economies, the VIX leads to larger expected changes in the exchange rate, which are the main source raising the UIP premium upon these shocks (columns 4 and 5 in Panel B). Notably, these results are in line with our observation of Figure 2, where we showed that, in emerging markets, the main channel driving the dynamics of the UIP premium was the interest rate differential and, in advanced economies, this dynamics was mainly driven by exchange rate adjustments.

-Fact 2*: Decomposing the UIP premium into two components—interest rate differentials and expected exchange rate adjustment—reveals that the channel of transmission of global risk perception differs in emerging markets and advanced economies. In emerging markets, the comovement of* *the UIP premium and the VIX is explained by the co-movement of the VIX with the interest rate differentials. In advanced economies, this comovement is explained by the co-movement of the VIX with expected exchange rate changes.*

Table 2: Dynamics of the UIP Premium: Panel Regressions

	Emerging Markets			**Advanced Economies**		
	UIP Premium (1)	IR Differential (2)	ER Adjustment (3)	UIP Premium (4)	IR Differential (5)	ER Adjustment (6)
				Panel A- Capital Inflows		
Inflows/GDP$_{it-1}$	-0.005***	-0.005**	-0.000	0.019	-0.008	0.027
	(0.001)	(0.002)	(0.001)	(0.032)	(0.009)	(0.039)
R^2	0.0016	0.0012	0.0000	0.0020	0.0025	0.0033
				Panel B- Global Risk		
Inflows/GDP$_{it-1}$	-0.002***	-0.003**	0.001	0.035	-0.003	0.038
	(0.001)	(0.001)	(0.001)	(0.027)	(0.010)	(0.035)
Log(VIX)$_{t-1}$	0.059***	0.038***	0.021**	0.035***	0.011***	0.024*
	(0.009)	(0.013)	(0.010)	(0.013)	(0.004)	(0.013)
R^2	0.1496	0.0525	0.0199	0.0837	0.0590	0.0364
				Panel C- Country-Specific EPU		
Inflows/GDP$_{it-1}$	-0.001*	-0.002**	0.001	0.034	-0.003	0.036
	(0.001)	(0.001)	(0.001)	(0.027)	(0.010)	(0.034)
Log(VIX)$_{t-1}$	0.054***	0.035***	0.019**	0.037***	0.010**	0.027**
	(0.008)	(0.013)	(0.009)	(0.013)	(0.004)	(0.013)
EPU$_{it-1}$	0.011**	0.007***	0.004	-0.004	0.002	-0.005**
	(0.004)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)
R^2	0.1750	0.0618	0.0230	0.0871	0.0633	0.0422
Observations	3287	3287	3287	2209	2209	2209
Number of Currencies	21	21	21	12	12	12
Currency FE	yes	yes	yes	yes	yes	yes

Notes: * p < 0.10 ** p < 0.05 *** p < 0.01. Currency-time two-way clustered standard errors in parentheses. 33 currencies, 21 emerging markets, 12 advanced economies. Period 1996m11:2018m12. Capital inflows are measured as changes in gross debt liabilities. The UIP premium and the exchange rate adjustment term are measured using expected exchange rate changes from Consensus Forecast.

Panel C adds EPU as independent variable. Confirming our earlier findings for emerging markets, the coefficient for the EPU variable is positive and highly statistically significant, indicating that increases in a country's policy uncertainty associate with higher a UIP premium (column 1). Importantly, once we include EPU variable into the regression, capital inflows lose explanatory power to account for changes in the UIP premium. Interestingly, the inclusion of the EPU index does not overpower the VIX coefficient – which remains similar in magnitude and highly statistically significant – suggesting that both a country's policy risk and global risk generate UIP violations and expected excess returns in emerging economies. The coefficient for emerging markets implies that if EPU risk increases from the p25 to p75 (for example, from China to South Korea in the 2016m10), the UIP premium increases by 1 percentage point. Columns 2 and 3 break down the implied mechanism. As expected, an increase in a country's policy uncertainty raises the UIP premium mainly through the interest rate differential channel. Local policy uncertainty leads to expected depreciations, but this effect is smaller in size than the interest rate differential and is not statistically different from zero. In line with the patterns presented in Figure 3, local economic uncertainty does not affect the UIP premium in advanced economies.

-Fact 3*: Country risk measured by the degree of policy uncertainty can explain the comovement of the UIP premium with interest rate differentials and with country-specific capital inflows in emerging markets. This is not the case in advanced economies.*

Our results on the impact of global uncertainty are consistent with the existing literature showing that VIX shocks lead to a retrenchment of capital inflows by foreigners, increases in the domestic interest rates and lead to currency depreciations (e.g. Rey 2013, di Giovanni, Kalemli-Özcan, Ulu, and Baskaya 2021 and Miranda-Agrippino and Rey 2020). Kalemli-Özcan (2019) shows that the increase in the short-term domestic interest rate comes from the higher risk premium in emerging markets due to an increase in global investors' risk sentiments that also affects the UIP premium and playing a key role in the international transmission.[13] Our contribution is not only to show that the channel of such international transmission of VIX shocks differs between advanced economies and emerging markets, but also to explain why this is the case by documenting a direct link between interest rate differentials and local economic policy uncertainty. Such uncertainty increases the UIP premium in emerging markets, explaining the correlation between capital flows and the UIP premium. As such, emerging markets different responses to global risk factors can be explained by the local economic policy uncertainty that generates an "excessive" UIP premium in these economies.[14] Hence, the correlation between the UIP premium and capital flows in emerging markets –absent in advanced economies– suggests that the UIP premium in emerging markets are "inefficient" as modeled by Basu, Boz, Gopinath, Roch, and Unsal (2020) and Bianchi and Lorenzoni (2021).

[13] The exchange rate disconnect literature in terms of the correlation between *realized* changes in exchange rates and the VIX (or predictive power of VIX) delivers mixed results, where some papers find a strong relation (e.g. Sarno, Schneider, and Wagner 2012 and Lilley, Maggiori, Neiman, and Schreger 2019), others do not find much (e.g. Bussiere, Chinn, Ferrara, and Heipertz 2018 and Engel and Wu 2020). This literature shows a weak correlation between *realized* changes in exchange rates and capital flows (e.g. Kouri 1981, Hau and Rey 2005, Lilley, Maggiori, Neiman, and Schreger 2019). Using *expected* exchange rate changes, Stavrakeva and Tang (2018) find a stronger correlation with capital flows.

[14] These results are consistent with Hassan, Schreger, Schwedeler, and Tahoun (2021) who using textual analysis show that global investors' sentiments associate with capital outflows, and heterogeneous currency loadings on global risk help explain the cross-country pattern of interest rates and currency risk premia.

3.3 Event Studies: Nationalization of Pension Funds in Argentina and Brexit Referendum in the UK

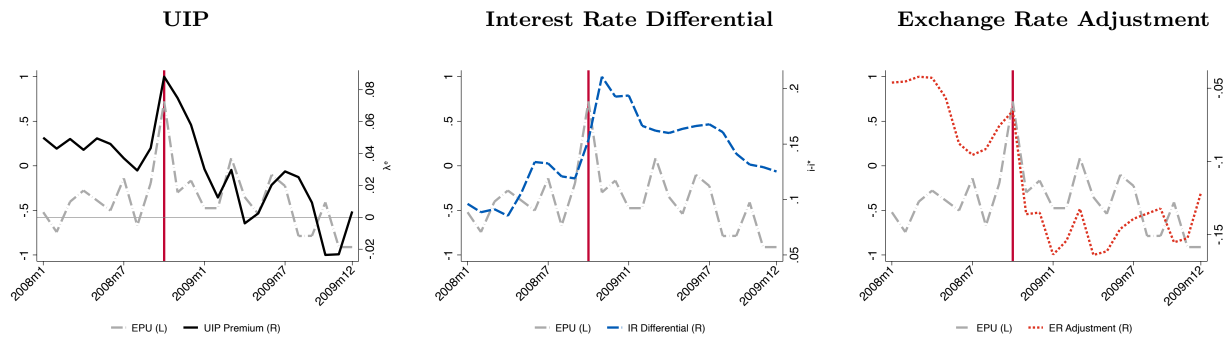
To illustrate how economic policy uncertainty affects the UIP and its components in emerging markets and advanced economies, we present two events: the nationalization of pension funds in Argentina in October 2008 and the Brexit referendum in the United Kingdom in June 2016. By no means policy uncertainty is only a problem for emerging markets as depicted by Brexit, however, in our panel, the frequency and volatility of policy uncertainty is more powerful in emerging markets as events such as Brexit are rare in advanced economies.

In October 2008, the Argentinean government decided to nationalize the pension system and soon converted this project into law a month later. This decision was an unexpected attempt to obtain funds to service the following year's debt requirement. It was taken as a surprise by investors and general public, which entailed a generalized mistrust about the government's future economic policies. As Webber (2008) in the *Financial Times* writes *"the sudden way in which the president announced the nationalisation plan, and its speedy course through Congress, have done nothing to calm fears among investors that the government will flout property rights (...).* In similar manner, senator Sanz said *"We have no doubt that here the right to private property is being violated. Not just for us but for society and the world, this is a clear confiscation".* This event is well captured by our EPU index, as shown in the top-left panel of Figure 4. The UIP premium spikes parallel to the increase in the EPU and rises by more than 4 percentage points. In line with our econometric findings, the rise in the UIP premium is principally driven by an increase in the interest rate differential (top-middle panel), which –by the time of the approval of the bill in Congress, in November 2008– had risen by more than 10 percentage points. In a smaller amount, the exchange rate adjustment term also increases in the very short term, as the announcement led to a sudden depreciation (top-right panel).

As comparison we now consider the Brexit referendum in June 2016. As it is well known, this referendum asked the electorate whether the U.K. should *remain* a member of, or *leave*, the European Union (EU). While most polls predicted that the remain option would win, the leave option won with a 52% of votes. This unexpected result led an increase in uncertainty about U.K. government's future economic policies, which captured by our EPU index. The bottom-left panel of Figure 4 shows the spike in the EPU index as well as a parallel increase in the UIP premium by 2 percentage points. In line with our econometric results, the channel of transmission of the EPU shock differs from the Argentinean case, as post- Brexit vote the adjustment mainly took place through the exchange rate. Following the vote, the GBP depreciated leading to an increase in the exchange rate adjustment term that trigger the UIP premium. Instead, the interest rate differential did not rise, but rather it kept decreasing over time.

These two case events are good examples of how local economic policy uncertainty triggers the UIP premium both in advanced economies and emerging markets. Interestingly, while in the former the premium arises from a short term depreciation that excess the expected future depreciation, in emerging markets it mainly arises from a long-lasting increase in the interest rate differential.

Argentina: Nationalization of Pension Funds, 2008



United Kingdom: Brexit, June 2016

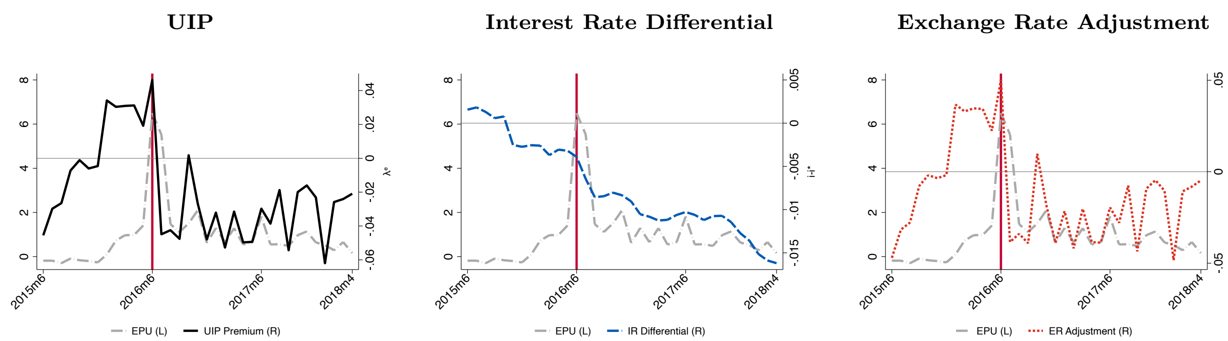


Figure 4: Economic Policy Uncertainty and UIP Premium

Note: This figure shows the EPU and the UIP premium at 12 month horizon for Argentina and the United Kingdom. The UIP premium is measured as before.

3.4 The UIP Premium and Exchange Rates: The Role Policy Uncertainty Shocks

We now turn to analyze the dynamic response of the UIP premium and expected changes in exchange rate to a positive shock to interest rate differential. We will follow the overshooting/delayed overshooting literatures and assess impulse responses obtained through Jorda-style local projections in dynamic panel regressions.

We first assess the well-known U-shaped dynamics of the exchange rates upon domestic interest rate shocks (see Dornbusch 1976, Eichenbaum and Evans 1995, and Bacchetta and van Wincoop 2010 among others). Known as the overshooting/delayed overshooting puzzle, previous research has found that a positive shock to domestic interest rate, increases the interest rate differentials and leads to an initial appreciation and then a delayed depreciation, producing a U-shaped dynamics for the *realized* exchange rates. Consistent with this pattern, Engel (2016) shows that high interest rate currencies are not weak (risky), but strong (not risky) as sum of all future excess returns are negative as a result of delayed but strong depreciations.

Notice that this literature only focuses on advanced economies and uses realized exchange rates. Differently than this literature, we will use *expectations* of the exchange rate, both for advanced countries and emerging markets. We run OLS dynamic panel regressions (local projections), where we regress expected exchange rate changes (ER) and UIP premium (λ), separately, on interest rate differential (IR) shocks. The literature undertakes a VAR analysis assuming a global structure for the endogenous variables. The advantage of local projections is to identify the responses without assuming such a structure.[15] We also run an IV regression, instrumenting the shock to domestic interest rate with a rise in EPU.

To identify the response of expected changes in the exchange rate to a one percentage point shock to interest rate differential at time t in currency i, conditional on lagged values, we estimate

$$s^e_{it+h+k} - s_{it+k} = \beta_k(i_{it} - i^{US}_t) + \gamma_k(s^e_{it+h+k-1} - s_{it+k-1}) + \delta_k(i_{it-1} - i^{US}_{t-1}) + \mu_i + \epsilon_{it+h+k}, \quad (3)$$

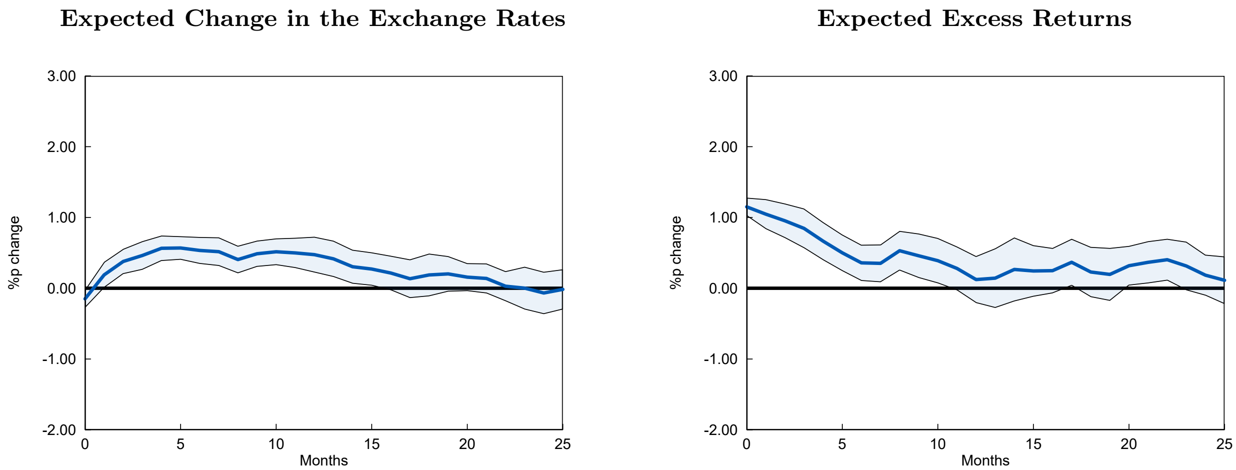
where the coefficient of interest is β_k and reports the response of expected exchange rate change to interest rate differential shocks at k month ahead over a horizon of h. Similarly for the UIP premium/expected excess returns, we run the following with a similar interpretation for β_k:

$$\lambda^e_{it+h+k} = \beta_k(i_{it} - i^{US}_t) + \gamma_k\lambda^e_{it+h+k-1} + \delta_k(i_{it-1} - i^{US}_{t-1}) + \mu_i + \epsilon_{it+h+k}. \quad (4)$$

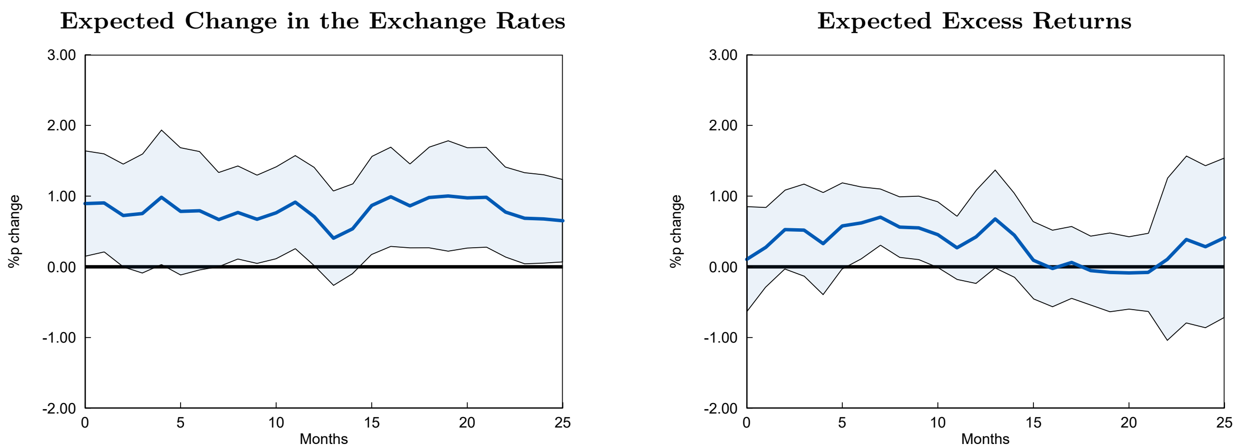
Figure 5 shows these impulse responses for emerging markets in Panel A and advanced economies in Panel B. We plot the response of expected change in the exchange rate to one percentage point interest rate differential shock on the left panel and the response of the UIP premium to the same shock on the right panel. In contrast to the overshooting literature, we do not observe a U-shaped dynamic, but rather an inverted-U-shaped one for emerging markets and no dynamics at all for advanced countries. The exchange rate is expected to depreciate as a result of a positive shock to the domestic interest rate in both set of countries. Since the extent of expected depreciation is less than the one percentage point shock to IR, UIP fails in emerging markets, leading to expected excess returns as shown in top right panel. Interestingly, expected excess returns is persistently positive during the entire time, being still significant at month 20. Hence, even if the shock is transitory, UIP deviations are persistent in emerging markets. In advanced countries, in contrast, one percentage point shock to interest rate differentials is offset with a permanent expected depreciation in the exchange rate of the same size as shown in Panel B of Figure 5. The right panel shows the resulting zero expected excess returns in advanced countries.

Why is there an inverted-U shaped response of expected change in the exchange rate and persistent UIP deviations in emerging markets? Figure 6 answers this question. With an IR shock, investors always expect a depreciation in emerging markets. This implies that the expectations in the ER term above ($s^e_{it+h+k} - s_{it+k}$) increases on impact relative to current spot rate. As actual spot exchange rate starts depreciating later, we have the ER term increasing first and then decreasing, delivering the inverted-U shape dynamics. Similarly, UIP deviations/expected excess returns starts positive and high and then goes down, as expected change in the exchange rate goes down with actual depreciation. Since neither expected or actual depreciation can offset the IR shock, UIP

[15] See recent work by Plagborg-Møller and Wolf (2021) that shows that both methods produce equivalent results.



(A) Emerging Markets: Response of ER and UIP Premium to an IR Shock (OLS)



(B) Advanced Countries: Response of ER and UIP Premium to an IR Shock (OLS)

Figure 5: Local Projections

Note: This figure shows the response of expected exchange rate changes and the UIP premium to an interest rate differential shock at 12 month horizon for 34 currencies –22 emerging markets and 12 advanced economies– over 1996m11:2018m12. Expected exchange rate changes and expected returns are measured using expected exchange rate changes from Consensus Forecast. The shaded area shows 95 percent confidence intervals, calculated using Driskoll-Kraay standard errors with a bandwidth lag $h+1$ for horizon h.

deviations stay positive and persistent over the entire horizon.

To dig deeper, Figure 7 reports results of an IV regression, where we regress interest rate differentials on policy uncertainty shocks first and then use residuals from this first stage in the second stage for impulse responses of expected exchange rate changes and the UIP premium. As we showed before, EPU index captures the changes in risk sentiments of foreign investors in emerging markets. We confirm here with a strong first stage regression shown in Figure 8 that, only for emerging markets, shocks to policy uncertainty captured by increases in the EPU index are positively correlated with the interest rate differentials. This result suggests that domestic interest

Emerging Markets

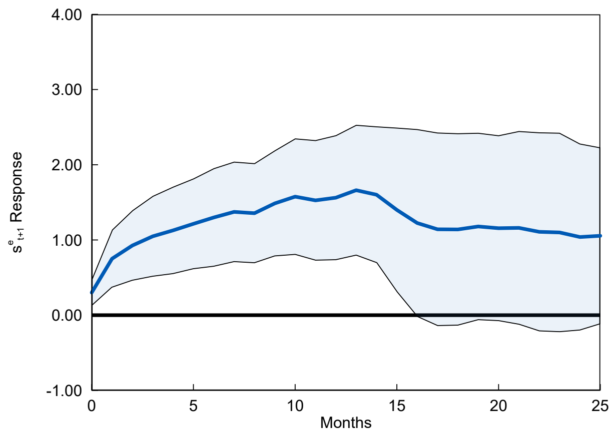


Figure 6: Response of Emerging Market Investors' Exchange Rate Expectations to an IR Shock

Note: This figure shows the response of expected exchange rate to an interest rate differential shock at 12 month horizon for 22 emerging markets' currencies over 1996m11:2018m12. Expected exchange rate is measured using Consensus Forecast. The shaded area shows 95 percent confidence intervals, calculated using Driskoll-Kraay standard errors with a bandwidth lag $h+1$ for horizon h.

rates respond to risk appetite of foreign investors that increases with higher policy uncertainty. This can be due to two channels: domestic interest rates are higher due to increased risk premium as a result of higher policy uncertainty and/or monetary authority raises the policy rate as a result of lower risk appetite of foreign investors with higher policy uncertainty.[16]

IV regressions of Figure 7 show that, as a result of a shock to policy uncertainty (that will lead to one percentage point IR shock), we still have the inverted-U shape response of expected changes in the exchange rate and positive expected excess returns (UIP premium). The responses are both dampened as the curves shift down. This is probably because a one-time exogenous policy uncertainty shock will not have persistent effects without the endogenous response of interest rate differentials to such a shock. As shown in the first stage regressions, the endogenous response of interest rate differentials to the EPU shock is very significant and persistent for emerging markets, creating the persistent excess returns and UIP deviations in the OLS regressions. The right panel of 8 shows that there is no such response of interest rate differentials to shocks to policy uncertainty in advanced economies, which is why we do not report the second stage regression for these countries.

-Fact 4*: There are no overshooting and predictability reversal puzzles—for any currency—when using exchange rate expectations to calculate the UIP premium. In emerging markets, a transitory increase in interest rate differentials caused by a policy uncertainty shock leads to lower than required expected depreciations, which creates persistent expected excess returns. In advanced economies, a positive shock to interest rate differentials leads to a permanent expected depreciation that offsets*

[16]Kalemli-Özcan (2019) shows that higher domestic interest rates as a result of uncertainty shocks/lower risk appetite of foreign investors are due to higher risk premium on emerging markets.

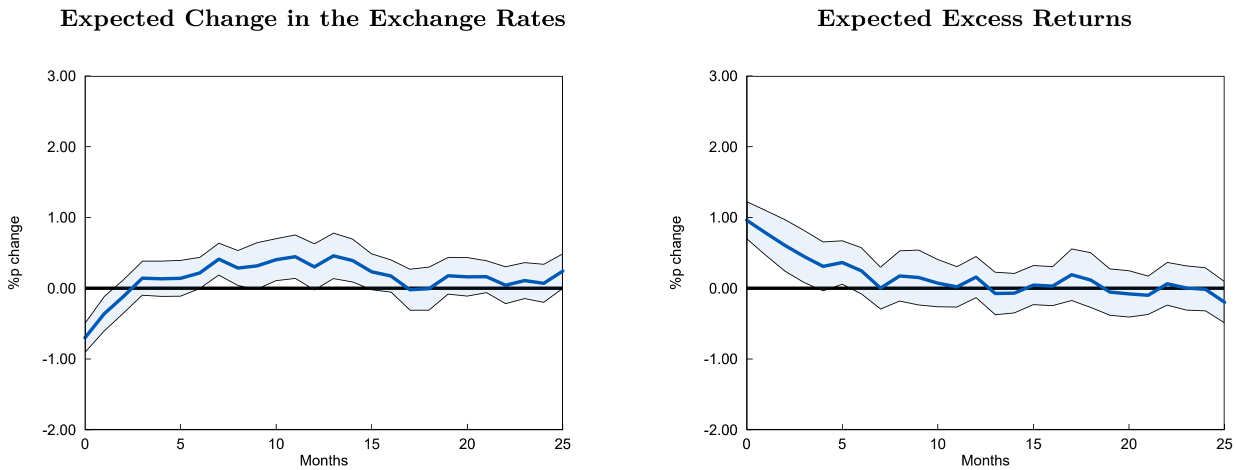


Figure 7: Emerging Markets: Response of ER and UIP Premium to an IR Shock (IV)
Note: This figure shows the response of expected exchange rate changes to an interest rate differential shock instrumented by EPU at 12 month horizon for 21 emerging markets currencies' over 1996m11:2018m12. Expected exchange rate changes and expected returns are measured using expected exchange rate changes from Consensus Forecast. The shaded area shows 95 percent confidence intervals, calculated using Driskoll-Kraay standard errors with a bandwidth lag $h + 1$ for horizon h.

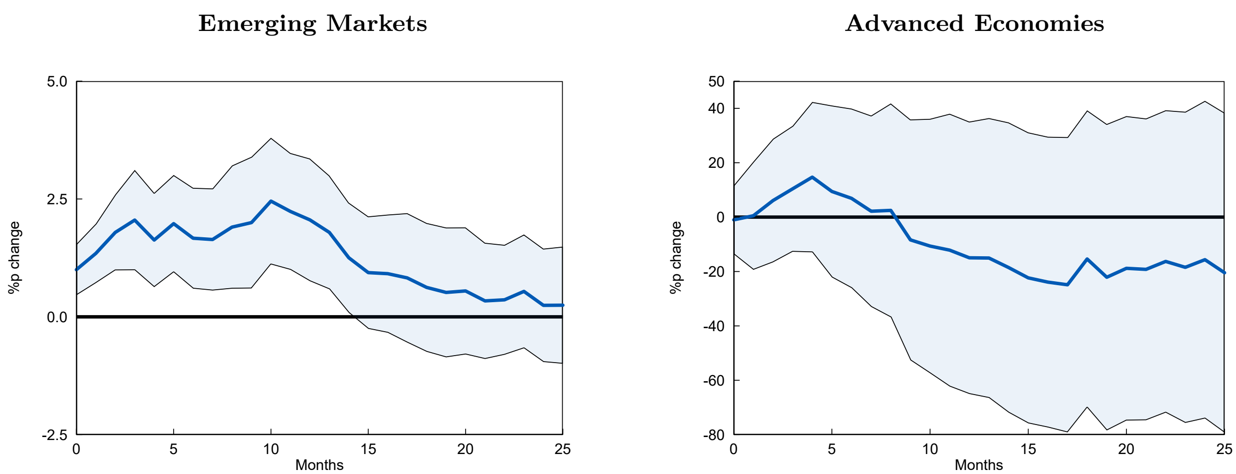


Figure 8: First Stage: IR Response to EPU Shocks
Note: This figure shows the response of interest rate differentials at 12 month horizon to an EPU shock at 12 month horizon for 33 currencies –21 emerging markets and 12 advanced economies– over 1996m11:2018m12. The shaded area shows 95 percent confidence intervals, calculated using Driskoll-Kraay standard errors with a bandwidth lag $h + 1$ for horizon h.

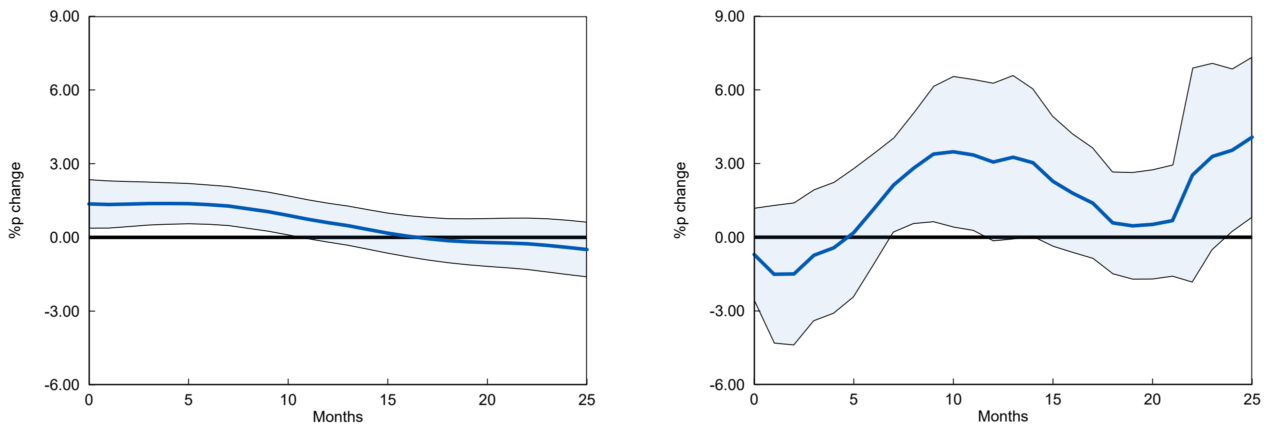
the shock.

Impulse Responses Using Realized Excess Returns

What about realized excess returns? We know that realized excess returns turn from positive to negative for advanced countries (predictability reversal puzzle) and sum of them is negative (Engel puzzle). As we show below in Figure 9, Panel A, we replicate these puzzles for advanced economies with realized exchange rates. However, these puzzles do not exist for emerging markets with realized exchange rates (Panel B), similar to their non-existence with expected exchange rates. Realized excess returns are always positive in emerging markets regardless of the econometric specification with or without lags as shown in Panels (i) and (ii).[17] Again this is due to actual depreciation that is never enough to offset the IR shock.

(i) $\lambda_{t+k} = \alpha + \beta_k(i_t - i_t^{US}) + \epsilon_{t+k}$

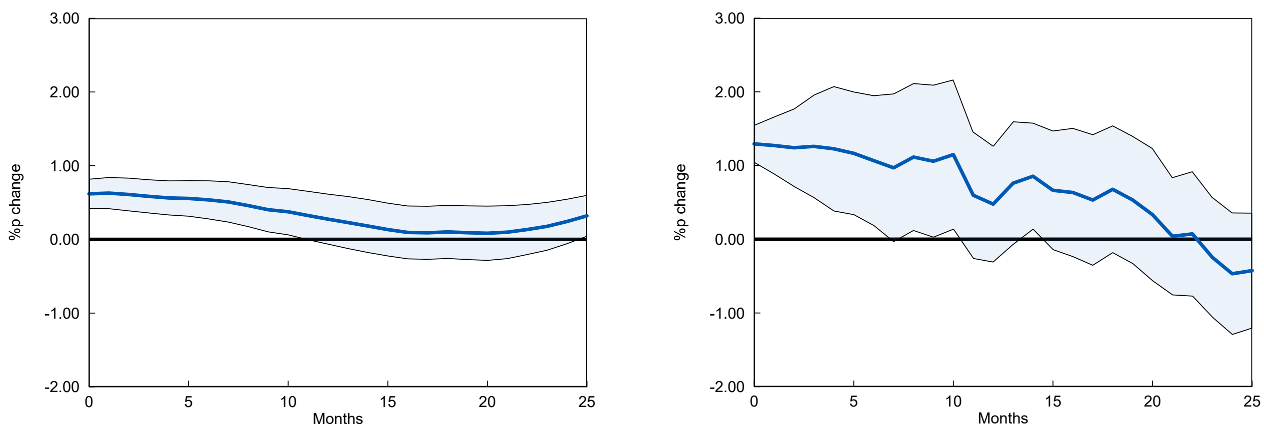
(ii) $\lambda_{t+k} = \alpha + \beta_k(i_t - i_t^{US}) + \delta_k(i_{t-1} - i_{t-1}^{US}) + \gamma_k \lambda_{t-1} + \epsilon_{t+k}$



(A) Advanced Countries: Ex-Post Excess Return Responses to an IR Shock

(i) $\lambda_{t+k} = \alpha + \beta_k(i_t - i_t^{US}) + \epsilon_{t+k}$

(ii) $\lambda_{t+k} = \alpha + \beta_k(i_t - i_t^{US}) + \delta_k(i_{t-1} - i_{t-1}^{US}) + \gamma_k \lambda_{t-1} + \epsilon_{t+k}$



(B) Emerging Markets: Ex-Post Excess Return Responses to an IR Shock

Figure 9: Local Projections: Realized Excess Return Responses to an IR Shock

Note: This figure shows the response of ex-post excess returns to interest rate differential shocks at 12 month horizon for 34 currencies –22 emerging markets and 12 advanced economies– over 1996m11:2018m12. The shaded area shows 95 percent confidence intervals, calculated using Driskoll-Kraay standard errors with a bandwidth lag $h+1$ for horizon h.

[17]There are papers both using lags and not in the literature.

4 The Fama Puzzle: Average UIP Premium

In this section, we first assess whether the UIP condition holds *on average* by estimating the so-called Fama and excess returns regressions using both ex-post realized and expectational data on exchange rates (Section 4.1). We next evaluate the source of the bias in the Fama regression (Section 4.2). Finally, we assess forecast errors and whether they relate to UIP deviations (Section 4.3).

4.1 Fama and Excess Return Regressions

(i) Fama and Excess Return Regressions under FIRE

From the pioneering works of Fama (1984) and Hansen and Hodrick (1980), the empirical international macro and finance literature usually assumes that agents have FIRE and tests the UIP condition using ex-post exchange rate.[18] We start by revisiting this literature and estimate the following OLS panel regression

$$s_{it+h} - s_{it} = \beta^F (i_{it} - i_t^{US}) + \mu_i + \varepsilon^F_{it+h}, \tag{5}$$

where the superscript F denotes that equation (5) is computed using ex-post exchange rate (s_{it+h}). If $\beta^F = 1$, interest rate differentials and exchange rate changes offset each other and the UIP condition holds on average under FIRE. If $\beta^F < 1$, the depreciation is lower than implied by the interest rate differential and there are ex-post excess returns. To test whether excess returns are predictable, we estimate

$$\lambda^F_{it+h} = \beta^F_1 (i_{it} - i_t^{US}) + \mu_i + \varepsilon^F_{1it+h}, \tag{6}$$

where λ^F_{it+h} denotes excess returns estimated using the realized exchange rate. $\beta^F_1 = 0$ implies the absence of predictable excess returns. If β^F_1 is statistically different from zero, there are predictable excess returns.[19] In both equations, we cluster the standard errors by currency and time.

Panel A in Table 3 reports the results. For advanced economies, the Fama coefficient is negative –albeit non-statistically significant– indicating that high interest rate currencies tend to appreciate, instead of depreciate as implied by the UIP condition (column 1). In line with this result, realized excess returns positively and significantly associate with interest rate differentials in these economies (column 3). Columns 2 and 4 report the results for emerging markets and indicate that, similarly, there are ex-post excess returns from investing in their currencies. Although the coefficient of the Fama regression has the right sign (0.374) –indicating that emerging market currencies tend to depreciate as implied by the UIP–, it is statistically different from one. Yet the extent of depreciation is not enough, and there are predictable excess returns (column 4).

[18]Under the FIRE assumption, the expected exchange rate can be approximated with the ex-post exchange rate. There can still be an error such that expected exchange rate is equal to the realized rate plus an error term $s^e_{t+1} = s_{t+1} + \epsilon_{t+1}$. Importantly, the assumption is that, under FIRE, this error ϵ is i.i.d. and uncorrelated with the interest rate differential.

[19]Note that equations (5) and (6) are equivalent and that $\beta^F_1 = 1 - \beta^F$ (see Appendix C for more details).

(ii) Fama and Excess Return Regressions using Expectational Data

As mentioned above, an important implication of the regressions estimated using realized exchange rate is that they jointly test the UIP condition and FIRE. To disentangle these two, we now employ expectational data on exchange rates to assess the UIP condition without imposing assumptions on rationality and full information. More precisely, we replace the right hand sides of regressions (5) and (6) with $s^e_{it+h} - s_{it}$ and λ^e_{it+h}, respectively.

Panel B in Table 3 reports the results. Importantly, results change substantially for advanced economies. The Fama coefficient is positive and not statistically different from one, which implies that expected exchange rate changes tend to offset changes in the interest rate differential, as the UIP condition implies (column 1). Along these lines, the coefficient of the expected excess return regression is not statistically differently from zero, indicating interest rate differentials do not longer predict expected excess returns (column 3). Interestingly, the R^2 also increases to 27% suggesting that interest rate differentials have a higher explanatory power to account for expected exchange rate changes. Columns 2 and 4 present the results for emerging markets. Remarkably, the UIP condition does not hold in these economies, as the Fama coefficient has the right-positive sign, but it is statistically different from one. Consistently, expected excess returns are predictable in these economies. It is interesting to note that the coefficient of the Fama regression estimated with realized and survey data are close to each other, which suggests that UIP violations cannot be entirely associated with failures to FIRE in emerging markets (column 2 in Panels A and B).

Table 3: Fama and Excess Return Regressions

	Fama Regression		Excess Return Regression	
	Advanced Economies	Emerging Markets	Advanced Economies	Emerging Markets
	(1)	(2)	(3)	(4)
	Panel A: Realized values			
β^F	-0.399	0.374***	1.399***	0.626***
	(0.361)	(0.115)	(0.361)	(0.115)
P-value ($H_0 : \beta^F = 1$)	0.0027	0.0000		
R^2	0.0034	0.0255	0.0408	0.0682
	Panel B: Expected values			
β	1.220***	0.480***	-0.220	0.520***
	(0.269)	(0.073)	(0.269)	(0.073)
P-value ($H_0 : \beta = 1$)	0.4290	0.0000		
R^2	0.1724	0.2749	0.0068	0.3076
Currency FE	yes	yes	yes	yes
Observations	2,285	3,577	2,285	3,577
Number of Currencies	12	22	12	22

Notes: * p < 0.10 ** p < 0.05 *** p < 0.01. Currency-time two-way clustered standard errors in parentheses. 34 currencies, 22 emerging markets, 12 advanced economies. Period 1996m11:2018m12. Expected exchange rate changes and expected returns –in Panel B– are measured using Consensus Forecast.

This section presents two striking results regarding the UIP condition that we summarized visually in Figure 10, where we plot the expected (Panel A) and realized (Panel B) rate of depreciation on the interest rate differentials for advanced economies and emerging markets.[20] Importantly, these two results indicate fundamental differences between advanced economies and emerging markets.

The first result relates to advanced economies and shows that there is substantial difference between imposing that agents have FIRE and allowing for subjective expectations. As shown in Panel A of Figure 10, our group of forecasters expects that exchange rate changes offset interest rate differentials, as the UIP condition implies. Yet, as shown in Panel B, these forecasts were systematically wrong because advanced economies' currencies appreciated on average by 19%.

Our second result relates to the failure of the UIP condition in emerging markets. Given our results for advanced economies, it is not surprising that the UIP condition also fails when assuming FIRE in emerging markets. Yet, it is remarkable that, even when we allow for subjective expectations, expected exchange rate changes do not offset changes in the interest rate differentials. In fact, the slope of the expected and actual rate of depreciation on the interest rate differential is very similar in emerging markets. This result indicates that if failures to FIRE account for the violations of the UIP conditions in emerging markets—as it is the case for advanced economies—, it is either not picked up by average consensus forecast or there is something else going on.[21] These results are puzzling since same set of investors cannot deviate from FIRE in certain countries and not in others? To dig deeper, in the next sections, we decompose the source of the bias of the Fama regression and study the nature of forecast errors in both set of economies, using both average forecast and individual forecasts.

4.2 Decomposing the Bias in the Fama Regression

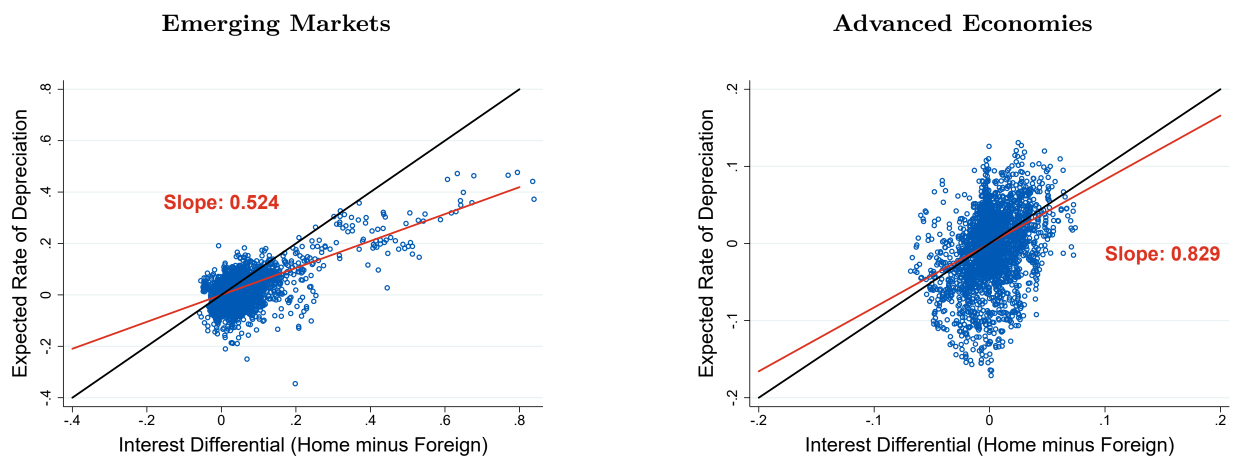
To understand the source of the downward bias of the coefficient of the Fama regression, we follow Froot and Frankel (1989) and decompose the bias arising from forecast errors and from a risk premium. To assess this, note that the probability limit of the coefficient β^F in equation (5) is

$$plim\hat{\beta}^F = \frac{cov(\Delta s_{it+h} - \Delta \overline{s}_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \overline{IR}_i)}, \tag{7}$$

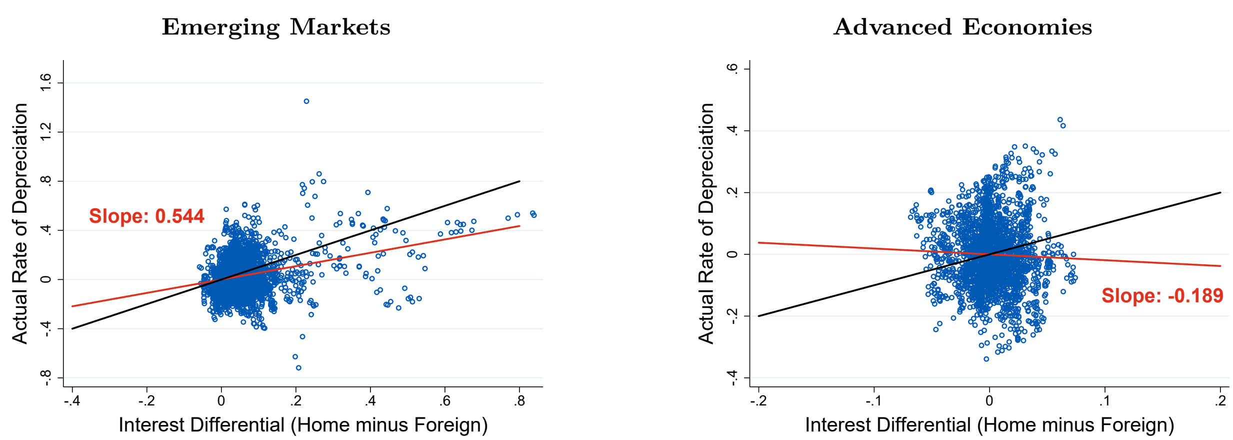
where $IR_{it} = i_{it} - i_t^{US}$ denotes the interest rate differential, and the over-line denotes the average of the variable for each currency across months – $\overline{X}_i = \frac{1}{T}\sum_{t=1}^{T} X_{it}$ – and corresponds to the currency fixed effects included in regression (5). We can define the forecast errors as $\eta^e_{it+h} = \Delta s_{it+h} - \Delta s^e_{it+h}$,

[20] Note that the slope of these regressions are equivalent to UIP regressions without currency fixed effects.

[21] An alternative interpretation of why the UIP condition tends to hold when using survey data relies on surveys implying risk-neutral expectations. This explanation could account for the different results that we obtain when using realized and survey data in advanced economies, but they could not explain why the UIP condition tends to not hold in emerging markets. If surveys imply risk neutral expectations, then the UIP condition –using expectations– should hold for both advanced and emerging economies. As we show below, the different responses in advanced economies and emerging markets can be related to policy uncertainty prevalent in these later.



a) Test of UIP Using Survey Data on Expectations



b) Test of UIP Using Ex-Post Exchange Rates

Figure 10: UIP with Realized and Expected Exchange Rates in Emerging Markets and Advanced Economies

Note: This figure shows the expected and ex-post rate of depreciation at 12 month horizon and the interest rate differential for 34 currencies –22 emerging markets and 12 advanced economies– over 1996m11:2018m12. The expected rate of depreciation is measured using Consensus Forecast.

we rewrite $plim\beta^F$ as[22]

$$plim\hat{\beta}^F = 1 - b_{RE} - b_{RP}, \quad \text{where} \tag{8}$$

$$b_{RE} = -\frac{cov(\eta^e_{it+h} - \overline{\eta}^e_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \overline{IR}_i)} \quad \text{and} \quad b_{RP} = \frac{var(\lambda^e_{it+h} - \overline{\lambda}^e_i) + cov(\Delta s^e_{it+h} - \Delta\overline{s}^e_i, \lambda^e_{it+h} - \bar{\lambda}^e_i)}{var(IR_{it} - \overline{IR}_i)}.$$

[22] Appendix D presents the full derivation of Froot and Frankel (1989) decomposition.

Equation (8) shows the bias of the Fama coefficient can be broken down into two terms: b_{RE} and b_{RP}. The first term b_{RE} represents the covariance between the forecast errors and the interest rate differential, and captures whether agents make systematic errors in expectations. The Fama coefficient would be biased downward if higher interest rate differentials lead agents to expect a larger depreciation then observed ex-post in data (i.e. $b_{RE} > 0$). The second term b_{RP} represents a risk premium and is determined by the volatility of the expected excess return and its covariance with the expected exchange rate change. The Fama coefficient would be downward biased – $b_{RP} > 0$ – if there is a time-varying expected excess return and the volatility of the excess return is higher than the comovement between the expected excess return and the expected exchange rate change.

We employ the survey data to compute b_{RE} and b_{RP} and quantify the two forces. Table 4 shows that the source of the bias differs significantly between advanced and emerging economies' currencies. Column 1 in Panel A reports the results for the former and shows that the b_{RE} term is more than an order of magnitude higher than the b_{RP} (1.619 vs -0.220). The larger b_{RE} indicates that systematic errors in expectations are the main source of downward bias of the Fama coefficient in advanced economies. In contrast, in emerging markets, the b_{RP} term is substantially larger than the b_{RE} term (0.520 vs 0.106), pointing that a time-varying risk premium is key in biasing downwards the Fama coefficient (column 2).

Table 4: Decomposition of Bias in Fama Regression

	Advanced Economies	Emerging Markets
	(1)	(2)
(i) b_{RE}	1.619	0.106
(ii) b_{RP}	-0.220	0.520
implied β^F from (i) and (ii)	-0.399	0.374

Notes: 34 currencies, 22 emerging markets, 12 advanced economies. The UIP premium, expected exchange rate changes, expected returns and forecast errors are measured using Consensus Forecast. Period 1996m11:2018m12.

In the next sections, we assess econometrically these two different sources of UIP violations: systematic forecast errors critically affecting advanced economies and a time-varying risk premium predominant in emerging markets.

4.3 Forecast Errors

The last sections provided suggestive evidence that systematic errors in expectations were the main source of UIP deviations in advanced economies, but they played a less important role in emerging markets. This result raises the –paradoxical– question of whether the failure of the full information and rational expectation assumption is more important in advanced economies than in emerging markets. To understand this puzzling result, in this section we conduct several exercises using average consensus data and individual forecast data on exchange rates.

-Average Forecast Errors

As shown by Froot and Frankel (1989), the term b_{RE} in equation (8) can be computed by estimating a regression of the forecast errors on the interest rate differential. This regression allows us to assess whether the term b_{RE} is statistically significantly different from zero and forecast errors are systematically related to interest rate differentials, on average. We estimate

$$\Delta s_{it+h} - \Delta s^e_{it+h} = \gamma(i_{it} - i^{US}_t) + \mu_i + \varepsilon_{2it+h}, \quad (9)$$

where γ is the negative of the term b_{RE} in equation (8). Column 1 in Table 5 shows that the coefficient for advanced economies is negative and highly statistically significant, confirming that b_{RE} can explain the bias of the Fama coefficient β^F in these economies. Remarkably, the coefficient for emerging markets –reported in column 2– is small and non-statistically different from zero.

Table 5: Forecast Error Regression

	Advanced Economies	Emerging Markets
	(1)	(2)
γ_1 $(i_{it} - i^{US}_t)$	-1.619***	-0.106
	(0.525)	(0.140)
R^2	0.0538	0.0021
Observations	2,285	3,577
Number of Currencies	12	22
Currency FE	yes	yes

Notes: * p < 0.10 ** p < 0.05 *** p < 0.01. Currency-time two-way clustered standard errors in parentheses. 34 currencies, 22 emerging markets, 12 advanced economies. Forecast errors are measured using Consensus Forecast survey.

The difference between both set of economies is striking: does it suggest that global investors make systematic errors in expectations in advanced economies, but they do not in emerging markets? Furthermore, what does this result imply in terms of investors' over-/under- reactions to interest rate differential shocks? To assess these questions, we turn now to analyze the evolution of forecast errors across time.

-Evolution of Forecast Errors

To assess the above questions, we estimate

$$\Delta s_{it+h+k} - \Delta s^e_{it+h+k} = \beta_k(i_{it} - i^{US}_t) + \mu_i + \epsilon_{it+h+k}, \quad (10)$$

where Δs_{it+h+k} denotes realized exchange rate.[23] Figure 11 plots the evolution of forecast errors following increases in the interest rate differential (blue line) for advanced economies and emerging

[23]To facilitate comparison with the literature, we estimate this regressions in a static setting, instead of local projections as we did above in Section 3.4. The dynamic responses are available upon request.

markets (left and right panels, respectively). To dissect its determinants, we also plot the evolution of the realized exchange rate change (green line) and the expected exchange rate change (red line).

In advanced economies, forecast errors are negative in short term (before 30 months), but they become positive in the medium term. This non-linear pattern implies that investors' expectations over-react in the short-term and under-react in the medium term. More precisely, in the short-term, investors expect a depreciation (as shown by the red line and implied by the UIP condition), but the exchange rate appreciates ex-post (green line). Thus, investors' expectations over-react relative to the ex-post realization of the exchange rate. In the medium term and, in line with the delayed overshooting literature, the realized exchange rate depreciates and, importantly, this depreciation exceeds investors' expected depreciation. A higher realized depreciation implies that forecast errors flip sign (becoming positive) and investors' expectations under-react with respect to the observed realization. Put it differently, as highlighted by Candian and De Leo (2021), the negative forecast errors first and positive errors later imply that investors expect that, in the short term, the currency loses more value than what actually happens ex-post (undervaluation) and, in the medium term, gains more value (overvaluation). It is worth remarking that this change in sign of expectations has also been reported for other macro variables like unemployment and inflation (see Angeletos, Huo, and Sastry 2020).

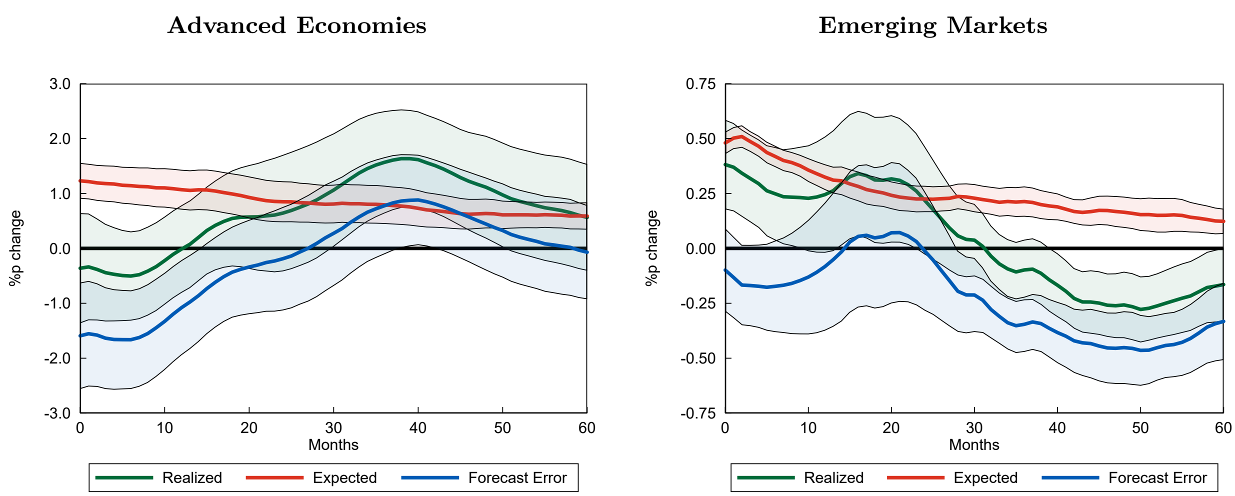


Figure 11: Forecast Error Responses to an Interest Rate Differential Shock (OLS)
Note: This figure shows the response of realized exchange rate changes, expected exchange rate changes and forecast errors to an interest rate differential shock for 34 currencies –22 emerging markets and 12 advanced economies– over 1996m11:2018m12. Forecast errors and expected exchange rate changes are measured using Consensus Forecast.

Remarkably, in emerging markets, forecast errors are negative both in the short and medium term. This negative sign implies that global investors over-react to increases in the interest rate differential and always expect a depreciation higher than its ex-post realization. In particular, in the short term, increases in the interest rate differential lead to ex-post depreciations but, since investors expect a higher depreciation, forecast errors are negative. In the medium term, the exchange rate appreciates ex-post, but investors still expect a depreciation. In other words, in emerging markets, investors over-react to increases in the interest rate differential and expect that the local currency always losses more value than what occurs ex-post in data.

A natural question to ask is: why global investors always over-react in emerging markets? As argued in Section 3.4, this pattern relates to policy uncertainty shocks prevalent in these economies. As shown before, global investors' expected depreciation following interest rate differential shocks is driven by increases in policy risk. Policy uncertainty increases global investors' investment risk, which translates into an increase in the interest rate differential and, in turn, into an expected depreciation. More uncertain returns of foreign investment induce investors to over-react to the initial shock and expect a larger depreciation than otherwise observed in data. This means that formation of investors' expectations is endogenous to the policy uncertainty: emerging market investors also deviate from FIRE but maybe unwillingly given their expectations are formed based on noisy signals due to volatile policies.

To check this narrative, we follow the work of Coibion and Gorodnichenko (2015) and Bordalo, Gennaioli, Ma, and Shleifer (2020) and run the forecast error predictability regressions using data on individual forecasts. As Table 6 shows, we now obtain similar results for advanced economies and emerging markets because in both individual forecast errors are predictable with the interest rate differentials. Hence, in emerging markets, forecast errors are systematically and negatively correlated with interest rate differentials at the individual forecast level, but there is not predictability at the average consensus level. This contrasting result is in line with Bordalo, Gennaioli, Ma, and Shleifer (2020), who find over-reaction using individual forecaster data, but under-reaction using average consensus data, where informational frictions explain the difference. In our setting, policy uncertainty creates noise that affects agents' expectation formation. As we have shown in Figures 6 and 7, investors expect a depreciation to both interest rate and policy uncertainty shocks, and it is that uncertainty affecting the expectation formation (by always expecting depreciations) that makes average forecast errors smaller and non-significant in emerging markets.

Table 6: Forecast Error Regression: Individual Forecast Data

	Advanced Economies		Emerging Markets	
	(1)	(2)	(3)	(4)
$(i_t - i_t^{US})$	-0.796*	-0.780*	-0.434**	-0.394**
	(0.438)	(0.438)	(0.177)	(0.165)
R^2	0.007	0.007	0.027	0.022
Observations	11,985	11,985	5,185	5,185
Number of Forecasters	48	48	67	67
Number of Currencies	9	9	20	20
Currency FE	Yes	Yes	Yes	Yes
Forecaster FE		Yes		Yes

Notes: * p < 0.10 ** p < 0.05 *** p < 0.01. Currency-time two-way clustered standard errors in parentheses. 29 currencies, 20 emerging markets, 9 advanced economies. Forecast errors are measured using Consensus Forecast survey.

-Fact 5*: The classical Fama puzzle disappears in advanced economies in expectations, but it remains in emerging markets. In particular, while global investors do not expect excess returns in advanced country currencies, the same global investors expect –and earn– positive excess returns in emerging market currencies. Using individual forecaster data on exchange rate, we show that forecast errors are predictable in both advanced country and emerging market currencies, as they are negatively correlated with interest rate differentials. This result indicate that investors' expectations over-react to interest rate differential changes. Importantly, average consensus forecast error is only predictable in advanced economies. In emerging markets, average consensus forecast errors are not systematically correlated with interest rate differentials, reflecting the presence of noise. Investors' expectations are formed endogenously to policy uncertainty in emerging markets and volatile policies lead to expected and actual excess returns. These returns are compensations that comove with the investors' risk sentiments.*

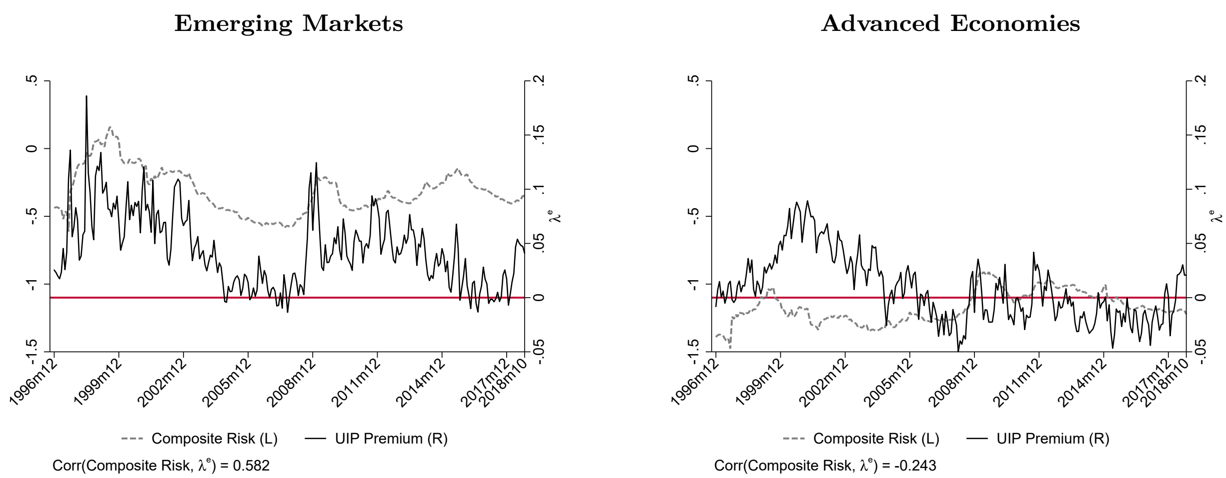
5 UIP Premium in Emerging Markets: The Role of Policy Risk

Results in the previous sections indicate that the failure of the UIP condition for emerging market currencies relates to the presence of a time-varying risk premium that associates with global risk perception and country-specific policy uncertainty. Such uncertainty also affects the formation of investors' expectations. In this section, we go deeper in our analysis of local policy uncertainty and ask about its main determinants. With this end, we employ three additional variables reflecting policy uncertainty: *composite country risk*, *government policy risk* and *confidence risk*.[24] We then employ these variables to revisit our main findings above. We start by presenting the correlation of these variables with the UIP premium. We then reassess their relevance in our panel regressions. Finally, we revisit the UIP puzzle and evaluate whether they can help explaining the risk-premium in emerging market currencies.

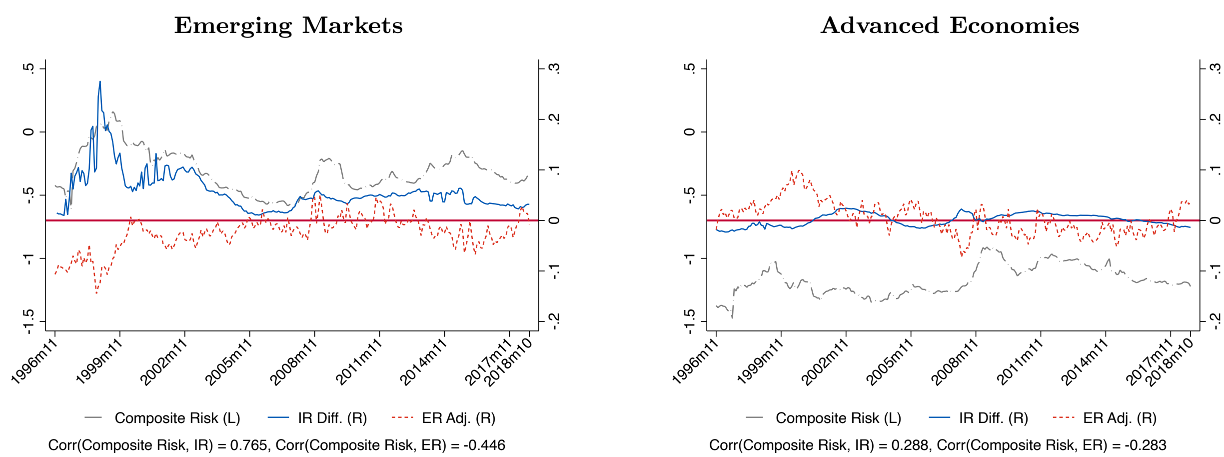
5.1 Comovement of UIP Premium and Policy Risk Variables

A first glance at the data confirms that the UIP premium highly comoves with the composite risk in emerging markets. The left graph of Panel A in Figure 12 plots the average composite risk index (gray-dashed line) and UIP premium (black line) for emerging markets. Notably, these two lines track each other very closely and their comovement reaches 58%. The higher is the country's composite risk, the higher is the UIP premium on its currency. Interestingly, the correlation has the opposite sign and is smaller for advanced economies (-24%) (right graph).

[24]See Section 2 and Appendix A.4 for further details. The ICRG further decompose political risk into other sub-components, such as corruption, law and order, bureaucracy quality, internal and external conflicts, among others. These sub-components capture elements of political risk that are not significantly related to foreign investors' risk sentiments about unexpected changes in government policies that can affect their investment returns. In Appendix A.4, we detail thoroughly all these sub-components and show that the correlation with the UIP premium in emerging markets has usually the wrong (negative) sign and is low (likely due to their low time-series variation).



A) Composite Risk and UIP Premium



B) Composite risk and UIP Decomposition

Figure 12: Composite Risk and the UIP Decomposition in Advanced Economies and Emerging Markets

Note: This figure shows the correlation of composite risk with the UIP premium and UIP decomposition at 12 month horizon for 34 currencies –22 emerging markets and 12 advanced economies– over 1996m11:2018m12. The UIP premium and expected exchange rate changes are measured using Consensus Forecast.

In Panel B, we plot the correlation of the composite risk index with the two components of the UIP premium, namely the interest rate differential and exchange rate adjustment. Confirming our previous findings, in emerging markets, the composite risk highly correlates with the interest rate differential (76%) and this correlation is much higher than the negative correlation with the exchange rate adjustment (-45%). This higher correlation with the interest rate differential is interesting because –in line with our earlier findings–, it suggests the presence of excess returns associated with a country-specific composite risk for emerging market currencies. As expected, these correlations for advanced economies are much smaller and the comovement of the two components of the UIP premium and the composite risk offset each other.

To unpack the elements implied in the composite risk and affecting foreign investors' sentiments on emerging market currencies, we plot in Figure 13 the comovement of the UIP premium with the two main components of policy risk. The left graph plots the correlation with the government policy risk and shows that uncertainty about government policies highly and positively correlates the UIP premium (28%). Similarly, low confidence highly associates with increases in the UIP premium on emerging markets (62%).

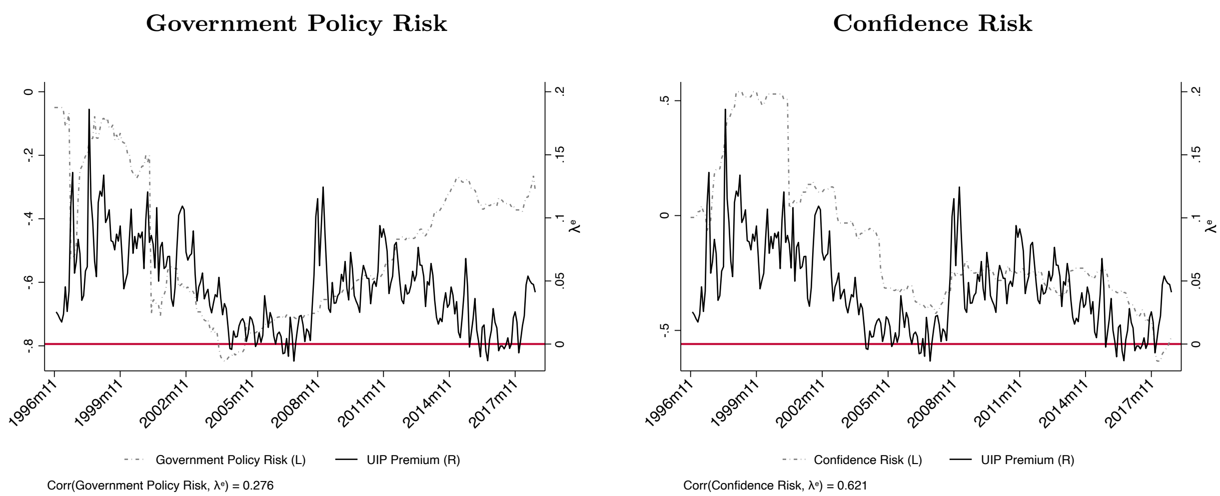


Figure 13: Government Policy and Confidence Risks in Emerging Markets
Note: This figure shows the correlation of between the Government Policy and Confidence Risks with the UIP premium at 12 month horizon for 22 emerging markets' currencies over 1996m11:2018m12. The UIP premium is measured using Consensus Forecast.

These patterns in data provide suggestive evidence that country-idiosyncratic policy uncertainty could be at the origin of the UIP premium and excess returns on emerging markets' currencies. We turn now to test this econometrically.

5.2 Panel Regressions

We assess the correlation of policy risk and the UIP premium in emerging markets by replacing the EPU in equation (2) with the composite, government policy and confidence risk indexes and present the results in Table 7. Coefficient for the composite risk index is positive and highly statistically significant indicating that increases in a country-specific risk associates with a higher UIP premium on its currency (column 1). The size of the coefficient is economically important: if composite risk increases from the p25 to p75 (from Chile to Russia in the 2016m6), the UIP premium increases by 4 percentage points. As above, the channel of transmission of a composite risk shock is the increase in the interest rate differential (columns 2 and 3). It is worth noting that the composite risk does not overpower the VIX coefficient – which remains similar in magnitude and highly statistically significant –, but it overpowers capital inflows.

Columns 4-6 presents the results for the two components of political risk. Column 4 shows

Table 7: UIP Deviations in Emerging Markets: Composite, Government Policy and Confidence Risks

	Composite Risk			Unpacking Composite Risk		
	UIP Premium	IR Differential	ER Adjustment	UIP Premium		
	(1)	(2)	(3)	(4)	(5)	(6)
Inflows/GDP$_{it-1}$	-0.001	-0.001*	0.000	-0.002*	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log(VIX)$_{t-1}$	0.051***	0.027***	0.024***	0.054***	0.057***	0.054***
	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)
Composite Risk$_{it-1}$	0.052***	0.089**	-0.037			
	(0.015)	(0.037)	(0.030)			
Government Policy Risk$_{it-1}$				0.020***		0.014***
				(0.005)		(0.005)
Confidence Risk$_{it-1}$					0.023***	0.020***
					(0.004)	(0.004)
R^2	0.1948	0.1872	0.0468	0.1540	0.1641	0.1691
Observations	3427	3427	3427	3427	3427	3427
Number of Currencies	22	22	22	22	22	22
Currency FE	yes	yes	yes	yes	yes	yes

Notes: * p < 0.10 ** p < 0.05 *** p < 0.01. Time clustered standard errors in parentheses. Note that given low clusters due to data availability, we cannot double cluster in this regression. The UIP premium and expected exchange rate changes are measured using Consensus Forecast.

that increases in government policy risk associates higher UIP premium and column 5 confirms a similar correlation for confidence risk. Importantly, column 6 includes both variables together and shows that both variables remain positive and highly statistically significant. Furthermore, both coefficients remain similar in size as those estimated in columns 4 and 5, which indicates that both variables are capturing different policy risks. Finally, it is worth remarking on the R^2 of these regressions, which reaches almost 17% and is close in size to the 19% observed for the composite index (column 1) and 17% captured in the EPU index (column 1, Panel C in Table 2). This similar value of the R^2 indicates that the policy uncertainty captured by the EPU and the composite indexes is highly related to these two narrowly-defined measures of policy risk that capture the confidence on in emerging markets' government policies.

These results indicate that both sources of policy risk for foreign investors' returns are key to explain the times-series variation of the UIP premium on emerging markets' currencies. As before, when these variables are included in the regression, capital inflows lose significance, showing that the impact of capital inflows on the UIP premium in emerging markets is actually capturing the risk perceived by foreign investors of investing in these currencies.

5.3 The Fama Puzzle Revisited

Section 4.2 showed that the downward bias of the Fama coefficient in emerging markets was related to the presence of a risk premium. In this section, we evaluate whether this risk premium associates with country-specific policy uncertainty.

To evaluate the impact of policy risk on the downward bias of the Fama coefficient, we need to evaluate how a country's policy risk affects the risk premium term (b_{RP}) and Fama coefficient across time. This implies obtaining a currency-specific and time-varying risk premium and Fama coefficient, and assessing their correlation with a country's policy risk. With this end, we estimate the Fama regression for each currency in non-overlapping 18-months rolling windows, and obtain a currency i- and window j-specific Fama coefficient, β_{ij}. More precisely, we estimate

$$\Delta s^e_{ijt+h} = \alpha_{ij} + \beta_{ij}(i_{ijt} - i^{US}_{jt}) + \varepsilon_{ijt+h} \qquad \forall i, j, \tag{11}$$

where j denotes a non-ovelapping rolling window and t is the monthly variation within this window with a 12-month horizon expectation denoted with h. Under subjective expectations, the risk premium has a one-to-one mapping with the Fama coefficient. More precisely,

$$plim\hat{\beta}_{ij} = 1 - b_{ij,RP} \qquad \text{and} \qquad b_{ij,RP} = \frac{var(\lambda^e_{ij}) + cov(\Delta s^e_{ij}, \lambda^e_{ij})}{var(IR_{ij})}, \tag{12}$$

where $var(\lambda^e_{ij})$, $cov(\Delta s^e_{ij}, \lambda^e_{ij})$ and $var(IR_{ij})$ are calculated across months within window j for each currency i.[25,26] To assess the relationship between policy risk and the Fama coefficient, we estimate the following pooled OLS regression:

$$\hat{\beta}_{ij} = \gamma_2 + \gamma_3 \text{ policy risk}_{ij} + \varepsilon_{ij}, \tag{13}$$

where $\hat{\beta}_{ij}$ is the Fama coefficient estimated in regression (11) and policy risk$_{ij}$ is the mean of policy risk in currency i and window j for each of our policy risk variables. The coefficient γ_3 captures the change in the Fama coefficient associated with a change in the policy risk. In both regressions (11) and (13), we cluster the standard errors by country.[27]

Table 8 presents the results for the Fama coefficient. The coefficient for composite risk is negative and indicates that an increase in a country's composite risk associates with a contemporaneous decrease in the Fama coefficient (column 1). The estimated coefficient implies that if the composite risk increases from the p25 to p75 (from Poland to India in the window 2001m5 to 2002m10) the Fama coefficient would decrease 0.31 percentage points. In columns 2 and 3, we unpack the composite risk in its two components: government policy risk and confidence risk. Both risks are negatively correlated with the Fama coefficient, but only government policy risk is significant.

In columns 4 and 5, we go one step further and break down government policy risk in its two sub-components: anti-democratic risk and expropriation risk. Anti-democratic risk captures the level of autocracy of the government and, thus, the degree of freedom that a government has to

[25]For expositional simplicity, we removed the time horizon subscript h and note that all our estimates are considered at 12-month horizon.

[26]Using survey data to estimate equation (11) eliminates the term b_{RE}, as the regression already considers subjective expectations. See Appendix D for a derivation of this relationship.

[27]We only cluster the standard errors by country, because there is not enough observations across windows to cluster by time. Note that there are only 13 windows in the sample.

impose policies to its own advantage. Expropriation risk captures the risk of expropriation, the risk of limiting or banning foreign investors' profits repatriation and payment delays.[28] Interestingly, both anti-democratic risk and expropriation risk are negative and statistically significant, pointing to a downward bias in the Fama coefficient.[29]

Table 8: The Fama Coefficient in Emerging Markets: Composite and Government Policy Risks

	Bias of Fama Coefficient ($\hat{\beta}_{ij}$): Risk Premium				
	Composite Risk	Unpacking Composite Risk		Decomposing Government Policy Risk	
		Government Policy Risk	Confidence Risk	Anti-Democratic Risk	Expropriation Risk
	(1)	(2)	(3)	(4)	(5)
Policy risk$_{i,j}$	-0.592*	-0.764***	-0.139	-0.624***	-0.489*
	(0.328)	(0.253)	(0.186)	(0.180)	(0.256)
R^2	0.0134	0.0414	0.0020	0.0415	0.0205
Observations	180	180	180	180	180

Notes: * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. Currency-clustered standard errors in parentheses. Expected exchange rate changes are measured using Consensus Forecast. All regressions include a constant term.

For completeness, we replace the right hand side of equation (13) with $b_{ij,RP}$ and evaluate the correlation between risk premium term and policy risk. As we show in Table B.1 in Appendix B, the coefficients for composite, government policy, anti-democratic and expropriation risks are all positive and statistically significant, indicating that higher uncertainty on emerging markets' government policies associate with increases in the risk premium which –in turn– downward bias the Fama coefficient. Lastly, in Appendix E, we conduct a decomposition exercise to assess the channels through which policy risk creates a downward bias the Fama coefficient. In line with the analysis of the previous sections, we find that increases in country-specific policy risk are channelled through higher interest rate differential and, hence, policy risk is priced-in the interest rate term.

5.4 Monetary Policy Credibility

The previous sections showed that the UIP premium in emerging markets associates with uncertainty about governments' economic policies. One key policy that affects investors' perceptions on emerging markets' risk is monetary policy, as unexpected monetary shocks can reduced their expected investment returns. Our EPU index captures a broad set of government economic policies, including as well monetary policy uncertainty. To assess the overlap between our EPU index and

[28]More precisely, the anti-democratic risk corresponds to the "democratic accountability" variable and expropriation risk corresponds to the "investment profile" in the ICRG dataset.

[29]In Figure B.1, we come back to the dynamics of the UIP premium and show that anti-democratic risk and expropriation risk are substantially correlated with the UIP in emerging markets.

monetary policy uncertainty, we consider global investors' inflation-forecast errors and test whether our EPU index remains statistically significant after adding this control.

To measure inflation-forecast errors, we resort to Consensus Forecasts data which provides information on one year ahead inflation expectations. We define inflation forecast errors as the difference between the realized (ex-post) inflation in country i at time t and the expected (ex-ante) inflation expectation, that is $\pi_{it} - \pi^e_{it}$. We then add inflation-forecast errors as a control in equation (2), and assess whether unexpected monetary shocks affect the UIP premium. This allows us to test simultaneously testing whether (and how) monetary shocks affect the UIP premium, and checking also whether our EPU index remains statistically significant after adding this control.

Table 9: Monetary Policy Uncertainty

	Emerging Markets	
	UIP Premium	
	(1)	(2)
Inflows/GDP$_{it-1}$	-0.038	-0.018
	(0.041)	(0.037)
$\log(VIX_{t-1})$	0.060***	0.055***
	(0.008)	(0.008)
Inflation Forecast Errors$_{it}$ $(\pi_{it} - \pi^e_{it})$	0.190**	0.162*
	(0.093)	(0.084)
EPU_{it-1}		0.011**
		(0.005)
Observations	2349	2349
Number of Countries	17	17
R^2	0.1958	0.2274
Currency FE	Yes	Yes

Notes: Two-way currency-time clustered standard errors in parenthesis. *,**,*** denotes statistical significance at the 10, 5, and 1 percent respectively. The UIP premium and expected exchange rate changes are measured using Consensus Forecast.

Table 9 show that inflation forecast errors affect the UIP premium, even when including the EPU index as a covariate (column 2). These result are important in two senses. First, they show that, in emerging markets, uncertainty about monetary policy translates into a higher UIP premium. Second, they confirm that our EPU index captures a broader set of government economic policies that goes beyond uncertainty about monetary policy and affect global investors' expected investment returns in emerging markets.

6 Alternative Mechanisms and General Robustness

In this section, we explore alternative mechanisms and test whether EPU associates with the UIP premium even when these additional channels are considered. In particular, we focus on sovereign default risk, differences between forward and expected exchange rate and different set of forecasters between advanced economies and emerging markets.

6.1 Sovereign Default Risk

A potential concern about our results for emerging markets is that the UIP premium could be capturing sovereign default risk, instead of general economic policy uncertainty. The economic literature associated sovereign default to bad fundamentals. Longstaff, Pan, Pedersen, and Singleton (2011) and Gilchrist, Wei, Yue, and Zakrajšek (2021) show that the pricing of sovereign risk has also a close relationship with global financial conditions, on top of country fundamentals, and, hence, tighter global conditions could translate into higher sovereign spread. Therefore, both global financial conditions and local bad fundamentals could affect the UIP premium and confound the effect of policy uncertainty. Yet we argue that our EPU index goes beyond the pricing of sovereign risk and covers investors' risk perceptions on a wider set of government policies. We conduct two exercises to illustrate this. First, we assess the correlation of credit default swaps (CDS) – capturing global investors' pricing of sovereign default risk– with our EPU index and the UIP premium. This exercise allows us to check whether at high (month) frequency these measures –and the UIP premium in particular– correlate with the market pricing of the sovereign default probability. Second, we reestimate our regressions by controlling for sovereign default crises and countries that defaulted on their external debt. This exercise focuses on default episodes and, thus, tests the extend in which the UIP premium prices these less frequent events.

-*CDS.* We start by showing the correlation of the CDS and the EPU. As the left panel of Figure 14 shows, both series are correlated by only 22.6%, which confirms that our EPU index captures a broader set of government economic policies that go beyond the pricing of sovereign bonds.[30] The right panel of Figure 14 plots the correlation of the CDS and the UIP premium. Although this correlation reaches 40.3%, it is lower than the correlation of the EPU with the UIP premium: 49.8% (Figure 3). This indicates that our EPU index is a much closer measure of the UIP premium than sovereign default risk and, hence, the UIP premium is an investment risk premium that compensates investors for uncertain returns arising from unexpected swifts in government policies.[31]

-*Sovereign default crises.* To control for sovereign default episodes, we reestimate our panel regressions and conduct two exercises. Our first exercise is the most demanding and assesses whether EPU still correlates with the UIP premium for countries that did not default on their sovereign debt recently. In particular, we drop countries that defaulted "at some moment" over the last 50 years (that is, if a country defaulted one or more times, we drop it from the sample), and exclude Argentina, Brazil, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, Turkey and Ukraine. Although our sample of emerging markets shrinks to 8 countries, this exercise is illustrative because it focuses on countries that investors do not necessarily perceive as high-risk

[30] This correlation is computed for 18 emerging markets (Argentina, Brazil, Chile, China, Hungary, Indonesia, Korea, Malaysia. Mexico, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, Turkey and Ukraine) for the period 2003m1-2018m10 due to lower data availability of the CDS.

[31] As a robustness of CDS, we consider another proxy for sovereign default risk: the EMBI from JPMorgan. Figure B.2 in Appendix B shows that both series track each other closely, with a correlation above 60%.

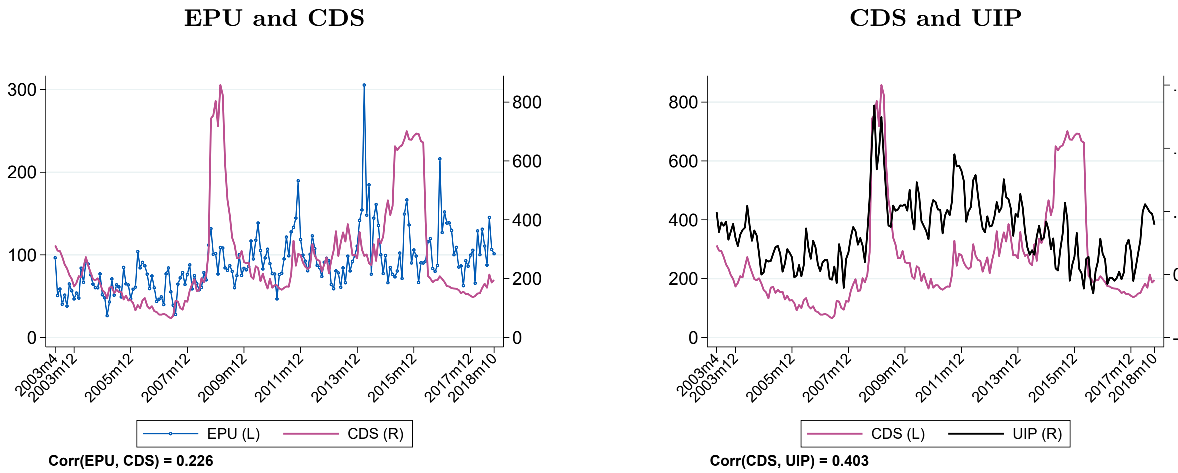


Figure 14: Economic Policy Uncertainty and Default in Emerging Markets

Note: This figure shows the UIP premium, Credit Default Swaps, and Economic Policy Uncertainty for 18 emerging markets over 1996m11:2018m12. The UIP premium and the exchange rate adjustment term are measured using expected exchange rate changes from Consensus Forecast.

defaulter countries. Column 1 of Table 10 presents the results and shows that the EPU is still highly significant and similar in magnitude than our previous estimate, confirming that even for non-defaulters higher EPU associates with increases in the UIP premium. In our second exercise, in column (2), we employ data from Reinhart, Rogoff, Trebesch, and Reinhart (2021) on monthly episodes of sovereign debt crises and create a dummy indicating whether a country did not have a sovereign default in the month. We then include this variable in our regressions together with the EPU index. Importantly, the sovereign default variable is not statistically significant and does not overpower the EPU, which remains highly statistically significant. We did a similar exercise for currency and sovereign crises combined, obtaining similar results.

Overall, results present in this section confirm that that, in emerging markets, the UIP premium corresponds to a premium capturing local economic policy uncertainty affecting global investors' returns; uncertainty that goes beyond and above the default risk of government bonds.

6.2 Comparing CIP and UIP Deviations

An influential recent literature, mostly focusing on advanced countries, documented a link between CIP deviations, global risk perception, financial frictions and USD exchange rates (e.g Du, Tepper, and Verdelhan 2018, Jiang, Krishnamurthy, and Lustig 2021 and Avdjiev, Du, Koch, and Shin 2019). In this section, we document that UIP deviations are much larger than CIP deviations and also have a low correlation with each other over time. Calculating CIP deviations for emerging markets is much harder given the limited data on hedging, swaps and forwards.

Going back to our UIP deviation in equation (1), CIP deviation can be written as:

Table 10: UIP Premium: Panel Regressions: Controlling for Sovereign Default Risk

	Emerging Markets	
	UIP Premium	
	(1)	(2)
Inflows/GDP$_{it-1}$	-0.001	0.017
	(0.001)	(0.027)
$\log(VIX_{t-1})$	0.042***	0.051***
	(0.005)	(0.005)
EPU_{it-1}	0.007***	0.013***
	(0.002)	(0.003)
No Sovereign Default Crises		-0.009
		(0.010)
Observations	1347	2854
Number of Currencies	8	18
R^2	0.1241	0.1694
Currency FE	Yes	Yes

Notes: Two-way currency-time clustered standard errors in parenthesis. *,**,*** denotes statistical significance at the 10, 5, and 1 percent respectively. Column 1 removes countries in which the sovereign defaulted in the last 50 years. The UIP premium and expected exchange rate changes are measured using Consensus Forecast.

$$\lambda_{t+h}^{CIP} = (i_t - i_t^{US}) + (s_t - f_{t+h}), \tag{14}$$

where f_{t+h} denotes the forward rate. We measure i_t and i_t^{US} using either interbank rates (IBOR) or deposit rates depending on the specification. Both rates come from Bloomberg to follow closely Du, Tepper, and Verdelhan (2018). To measure s_t we resort to the International Financial Statistics (IFS) database and use monthly average spot exchange rates. Finally, to measure f_{t+h} we use forward rates also available at Bloomberg.

We start following Du and Schreger (2021) (DS) analysis and use their data to plot their CIP deviations against ours in their sample of 15 emerging markets and 11 advanced countries.[32] Figure 15 shows that both series are very highly correlated. It is interesting to note that CIP deviations in emerging markets are 10 times larger than the ones in advanced countries. Next, we plot –in the same restricted DS sample– their CIP deviations (DS) against our UIP deviations (KOV) in Figure 16, showing how small CIP deviations are compared to UIP deviations.

Finally, we plot our CIP and UIP deviations in our larger sample in Figure 17, though we calculate CIP deviations using interbank rates, following Du and Schreger (2021), and then we plot both deviations in our larger sample using deposit rates for both in Figure 18. These figures show that, regardless of the interest rates used, UIP and CIP deviations have a very low correlation with each other over time and sometimes with the wrong sign. Even they might both capture similar time varying risk premium in interest rate differentials, the difference between forward and spot rates is much larger than the difference between expected exchange rates and spot rates, hence those

[32]We would like to thank Wenxin Du and Jesse Schreger for sharing their CIP deviations data.

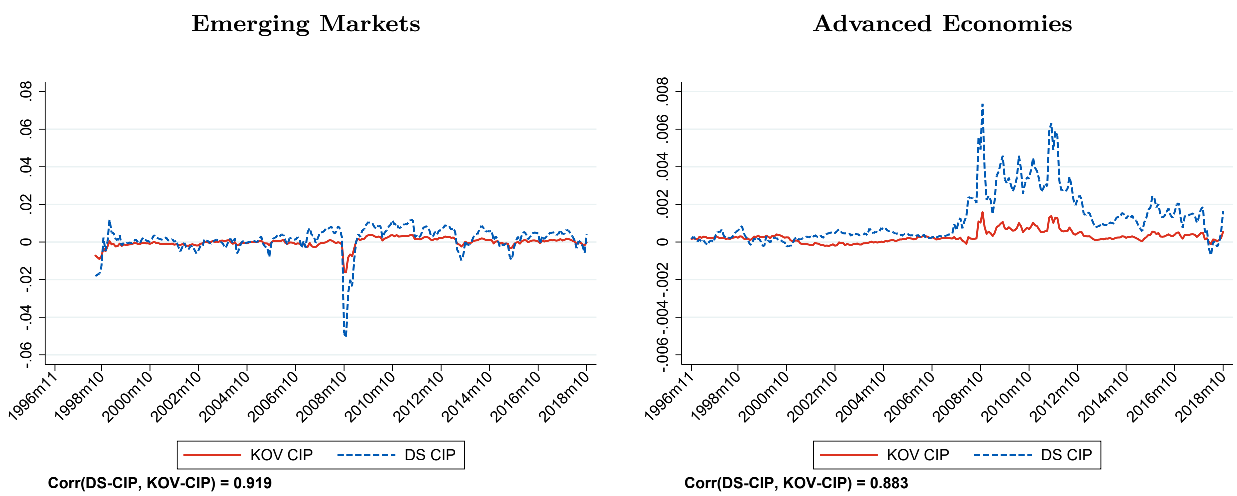


Figure 15: CIP Comparison: Kalemli-Ozcan and Varela (KOV) vs. Du and Schreger (DS)

Note: This figure shows CIP comparison in a sample that restrict observations to be the same at date-country pairs in DS and our data. Both series use money market interbank rates.

interest rate differentials are mostly offset in CIP deviations, rendering these deviations small. Notice that the correlation between UIP and CIP deviations is at best around 30 percent (highest) in emerging markets even when we used same deposit rates to calculate interest rate differentials.

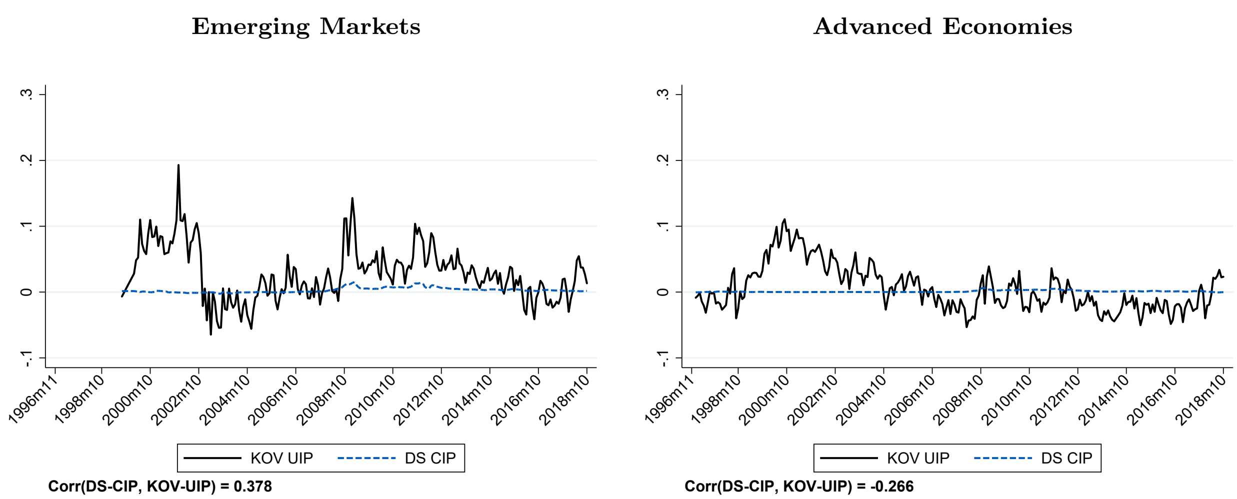


Figure 16: CIP from Du and Schreger (2021) and UIP from Kalemli-Ozcan and Varela (12 Months Horizon)

Note: This figure shows CIP deviations and UIP deviations in a sample that restricts observations to be the same at date-country pairs in DS and our data. UIP deviations use deposit rates. UIP deviations is measured using Consensus Forecast.

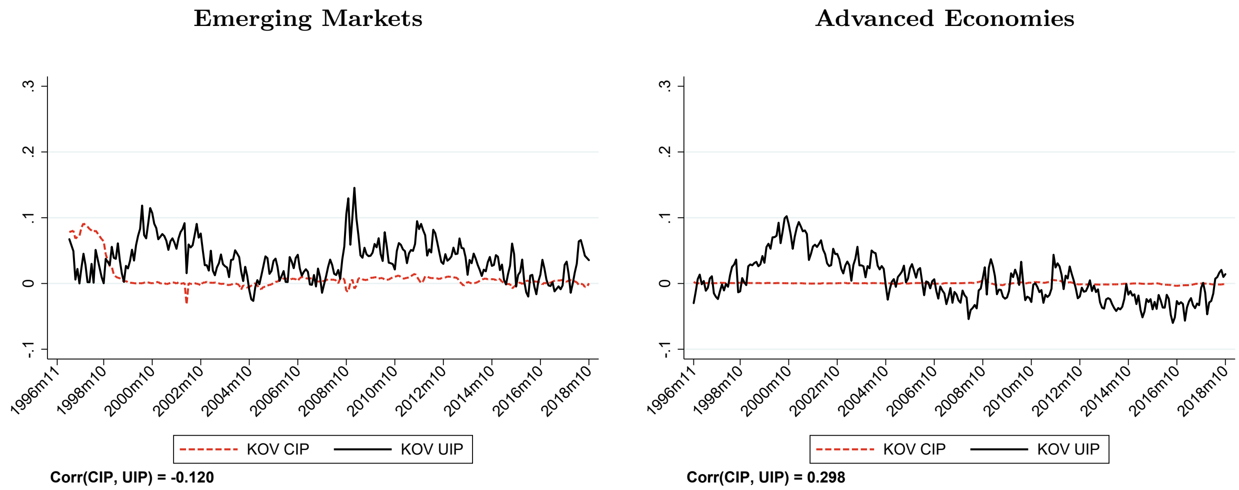


Figure 17: UIP and CIP (12 Months Horizon)
Note: This figure shows CIP and UIP deviations using our data. We use money market interbank rates to construct CIP, while we use deposit rates to construct UIP.

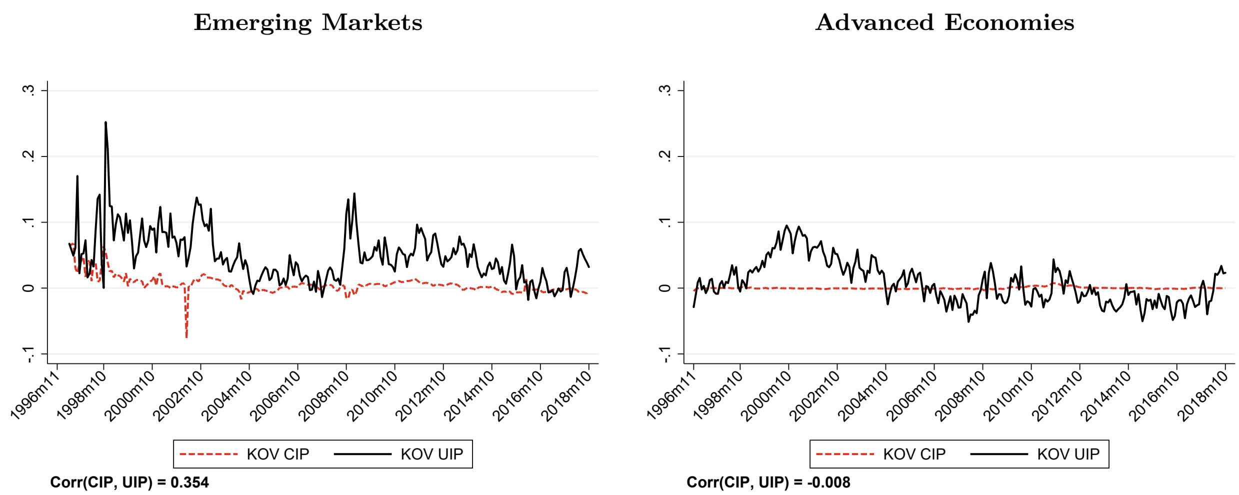


Figure 18: UIP and CIP (12 Months)
Note: This figure shows UIP and CIP deviations using our sample. Both series use deposit rates. UIP deviations is measured using Consensus Forecast.

6.3 Forecasters: Individual Forecaster Data

As discussed in Section 2, a concern about the empirical analysis is that our results could be driven by different set of forecasters between advanced economies and emerging markets. To address this concern, we employ data of individual forecasters reported by Consensus Forecast. In particular, we select the five major forecasters in our sample – HSBC, JP Morgan, Morgan Stanley, UBS and Citigroup– reporting exchange rate forecasts for 20 emerging markets and 10 advanced economies between 2001m2 to 2018m10, and check how they correlate with the UIP premium.[33]

Figure 19 shows the correlation of the UIP premium computed for these five forecasters and for

[33]Unfortunately, the data about individual forecasters is only reported since February 2001.

the average forecaster reported by Consensus Forecast. Importantly, the correlation with our UIP premium variable is high, reaching 76% for advanced economies and 62% for emerging markets. In Figure 20, we break down the components of the UIP premium between the interest rate differential and the exchange rate adjustment terms, and confirm our earlier finding that in advanced economies the UIP premium mainly associates with exchange rate adjustments, whilst in emerging markets it associates with interest rate differential. Overall, individual forecaster data confirms our earlier findings and shows that our results cannot be attributed to differences in the sample of forecasters between advanced economies and emerging markets.

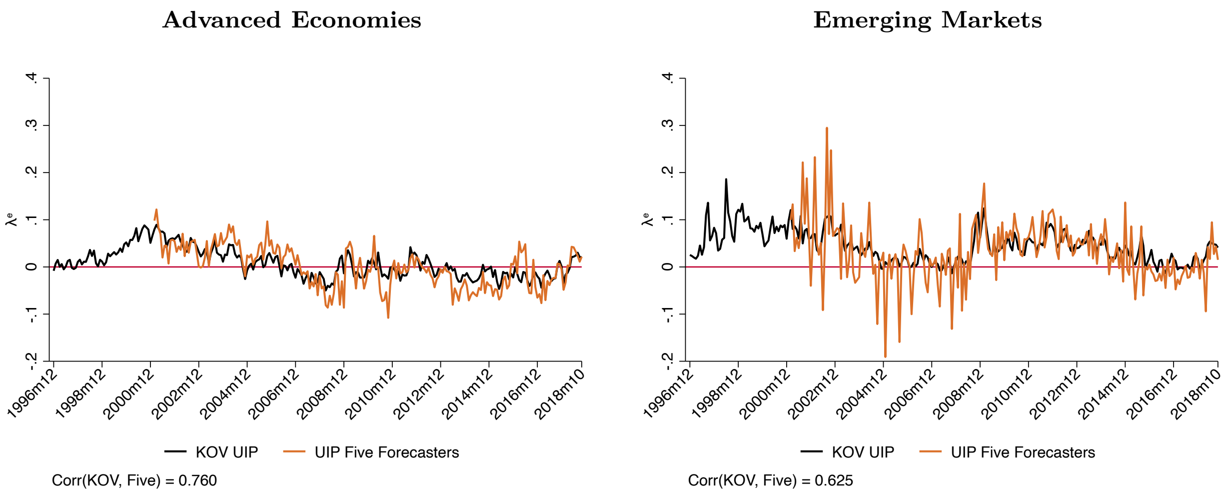


Figure 19: Five Forecasters UIP versus Average Forecast UIP
Note: This figure shows the average UIP premium of all sample and the average UIP premium of five mayor forcasters. UIP deviations is measured using Consensus Forecast.

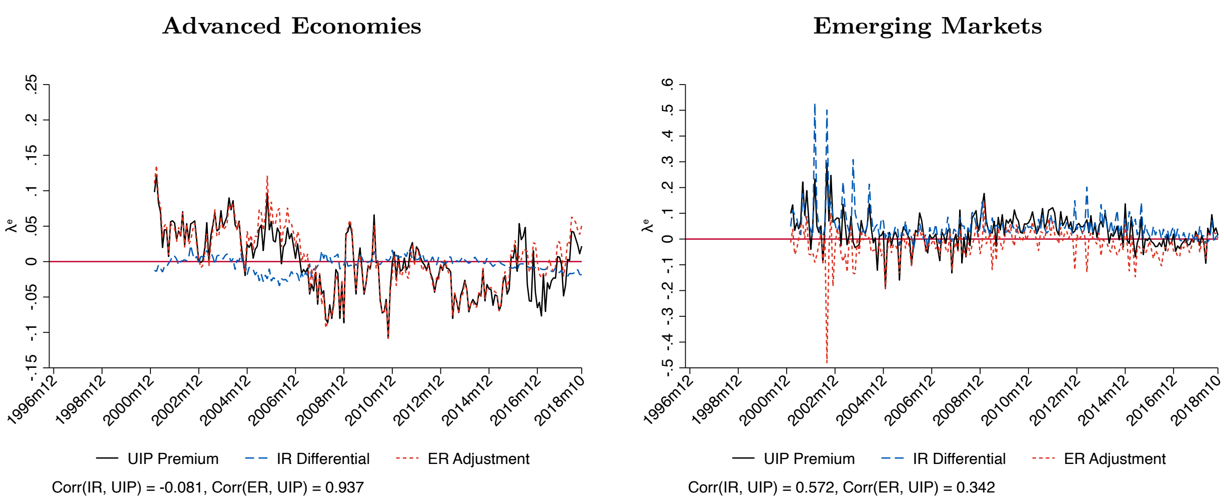


Figure 20: Five Forecasters UIP versus Average Forecast UIP: UIP Decomposition
Note: This figure shows the average UIP premium and its decomposition of all sample and the average UIP premium of five mayor forecasters. UIP deviations is measured using Consensus Forecast.

6.4 Other Robustness Tests

In this section, we present several robustness tests, such as controlling for inflation rates, differences between investing and funding currencies, changes around the Global Financial Crisis, re-estimating the Fama regressions with an unbalanced panel, and computing the rolling windows of Section 3.1 with different lengths.

-Controlling for inflation differentials. A main concern of the analysis is that high interest rate currencies might correlate with high inflation rates and, thus, the UIP premium observed in nominal term might vanished in real terms. To assess this, we re-estimate our panel regressions in equation (2) and add inflation differentials as a control. As Table 11, shows, all our results hold true when including inflation differential as a control. Importantly, the size of the estimated coefficients is very similar to our main estimation in Table 2, indicating that inflation differentials do not significantly affect the importance of the EPU driving the UIP premium. Several other robustness including doing the dynamic UIP figures with real UIP deliver the same conclusion.

Table 11: INFLATION DIFFERENTIAL

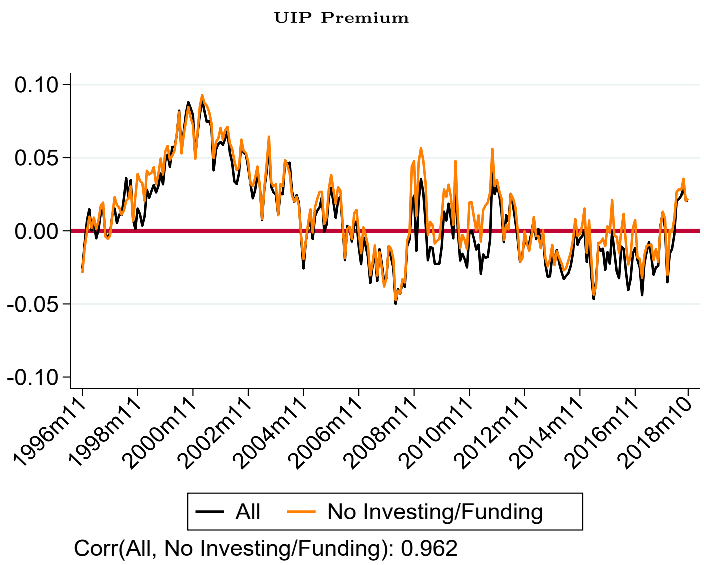
	Emerging Markets			**Advanced Economies**		
	UIP Premium (1)	IR Differential (2)	ER Adjustment (3)	UIP Premium (4)	IR Differential (5)	ER Adjustment (6)
Inflows/GDP$_{it-1}$	-0.001	-0.002**	0.001	0.039	-0.008	0.047
	(0.001)	(0.001)	(0.001)	(0.027)	(0.007)	(0.033)
Log(VIX)$_{t-1}$	0.049***	0.028***	0.021***	0.024*	0.012**	0.012
	(0.008)	(0.008)	(0.008)	(0.012)	(0.005)	(0.011)
EPU$_{t-1}$	0.010***	0.006***	0.004	-0.002	0.002**	-0.005*
	(0.004)	(0.002)	(0.003)	(0.002)	(0.001)	(0.003)
Inflation Differential$_{t-1}$	1.836***	2.507	-0.671	0.022	0.026	-0.003
	(0.448)	(1.556)	(1.186)	(0.359)	(0.148)	(0.420)
R^2	0.2359	0.1510	0.0319	0.0514	0.1027	0.0255
Observations	3203	3203	3203	1751	1751	1751
Number of Currencies	20	20	20	10	10	10
Currency FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: * p < 0.10 ** p < 0.05 *** p < 0.01. Currency-time two-way clustered standard errors in parentheses. Capital inflows are measured as changes in gross debt liabilities. 30 countries, 20 Emerging Markets, 10 Advanced Economies. Period 1996m11:2018m12. The UIP premium is measured using Consensus Forecast.

-Investing and Funding Currencies. An interesting insight for advanced economies is whether there could be differences between funding and investing currencies. As it is well known in the international finance literature, the Japanese Yen and the Swiss Franc are funding currencies, while the Australian and the New Zealand dollars are investing currencies. To check that our results are not driven by funding or investing currencies, we remove these currencies from the sample and reestimate the UIP premium. In Figure 21, we plot the UIP premium for all advanced economies and the UIP premium excluding investing and funding currencies. As shown in the figure, the two

series track each other very closely and their correlation is very high (96.2%), which indicates that the UIP premium is not confounding the effect of investing or funding currencies.

Figure 21: UIP Premium Decomposition Advanced Economies



Note: This graph plots the UIP premium for Advanced Economies separating between All Advanced Economies in our sample and the subsample that removes both investing and funding currencies. Investing currencies: Australia and New Zealand. Funding currencies: Japan and Switzerland. Others: Canada, Denmark, Euro Area, Germany, Isreal, Norway, Sweden and United Kingdom.

-*Global Financial Crisis.* As shown by Du, Tepper, and Verdelhan (2018) and Du and Schreger (2021), the GFC and changes in the institutional context around it affected the functioning of the foreign exchange rate market in advanced economies. To test whether these changes impact the behaviour of the UIP premium, we re-estimate our regressions for the periods before and after the financial crisis. Table 12 shows that, although the coefficient for the VIX after the GFC is smaller in size, the VIX is still highly statistically significant and a good predictor of the UIP premium in advanced economies.[34]

In addition to this, we also test for our results not to be driven by other time-varying global factors not captured by the VIX, by using time fixed effects and obtaining similar results.

[34]Our results are closed to Bussiere, Chinn, Ferrara, and Heipertz (2018) who, focusing on eight advanced economies currencies, do not find significant breaks in the Fama regressions estimated using survey data before and after the GFC.

Table 12: BEFORE AND AFTER THE GLOBAL FINANCIAL CRISIS: ADVANCED ECONOMIES

	Advanced Economies					
	Before GFC			After GFC		
	(1) UIP Premium	(2) IR Diff.	(3) ER Diff.	(4) UIP Premium	(5) IR Diff.	(6) ER Diff.
Inflows/GDP$_{it-1}$	0.000	-0.010**	0.010	0.000	0.021*	-0.021
	(0.031)	(0.005)	(0.035)	(0.017)	(0.012)	(0.017)
$\log(VIX_{t-1})$	0.048**	0.015***	0.033	0.028***	0.004	0.024***
	(0.022)	(0.005)	(0.023)	(0.008)	(0.003)	(0.007)
EPU_{it-1}	-0.006	0.003**	-0.009**	0.002	0.001	0.002
	(0.004)	(0.001)	(0.004)	(0.003)	(0.001)	(0.002)
Observations	1242	1242	1242	967	967	967
Number of Countries	12	12	12	10	10	10
R^2	0.1012	0.1431	0.0414	0.1410	0.0505	0.1147
Currency FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Two-way currency-time clustered standard errors in parenthesis. *,**,*** denotes statistical significance at the 10, 5, and 1 percent respectively. The UIP premium and expected exchange rate changes are measured using Consensus Forecast.

-Fama Regression. To make sure that results are not driven by sample selection, we re-estimate the Fama and excess return regressions for an unbalanced panel of 34 advanced and emerging economies.[35] Results reported – in Table B.3 in Appendix B – confirm the failure of the UIP condition for both advanced and emerging economies when using realized exchange rates, and its failure for emerging markets when using survey data. Additionally, to assess whether our analysis on the channel creating a downward bias in the Fama coefficient in Section 3.1 is not driven by the length of the window with which we estimate the β coefficient and b_{RP} term, we re-compute these variables for 12-months and 24-months rolling windows and show in Tables B.4 and B.5 in Appendix B that our results hold true for these different windows.

7 Conclusion

We document five novel facts about Uncovered Interest Parity (UIP) deviations vis-à-vis the U.S. dollar for 34 currencies of advanced economies and emerging markets. We use exchange rate expectations from survey data to calculate the empirical counterpart of the theoretical UIP condition.

The UIP premium co-moves with global risk perception (VIX) for *all* currencies, whereas *only* for emerging market currencies there is a negative comovement between the UIP premium and capital inflows. Remarkably, upon conditioning on policy uncertainty, the UIP premium in emerging markets becomes entirely explained by the VIX and policy uncertainty with no role for capital inflows. There are no overshooting and predictability reversal puzzles, neither for emerging markets or advanced countries, when using exchange rate expectations to calculate the UIP premium. In emerging markets, a transitory increase in interest rate differentials caused by a policy uncertainty shock leads to lower than required expected depreciations that creates persistent expected excess

[35] Recall that our balanced sample consists on countries for which we have observations for all variables to compute the Fama and excess return regressions and the composite risk. In the unbalanced panel, we still exclude fixed pegs.

returns. In advanced economies, a shock to interest rate differentials leads to a permanent expected depreciation that exactly offsets the shock. Consistent with these dynamic facts, the classical Fama puzzle disappears in advanced economies in expectations, but it remains for emerging markets.

Our results show that, while global investors expect zero excess returns by investing in advanced country currencies, the same global investors expect positive excess returns from emerging market currencies. Using individual and average consensus forecast data, we show that there are deviations from FIRE in both set of economics, but in emerging markets these deviations arise endogenously from policy uncertainty effecting the formation of expectations. As such, the same global investors charge an "excess" risk premium for emerging markets to compensate for policy uncertainty —a premium that is over and above the expected and actual depreciation of these currencies.

Our results have important policy implications. UIP premia constitute the cost of local currency financing relative to foreign currency financing for emerging markets. The fact that such financing costs are high on average and they increase even more during crisis times represents an important new avenue for emerging market monetary and financial policies. There is a recent theory literature suggesting the importance of UIP premium for policy making. Basu, Boz, Gopinath, Roch, and Unsal (2020), in particular, show a key role in smoothing out the UIP premium in the face of risk-on/risk-off shocks to maximize welfare in emerging markets. Drenik, Perez, and Kirpalani (2021) develop a model, where policy risk determines the domestic interest rate and, in turn, the endogenous currency choice of borrowing. Itskhoki and Mukhin (2022) develop a theoretical framework where UIP premium is endogenous to monetary policy and closing this premium using FX intervention is optimal. Our results can be interpreted from the lens of this model where uncertainty in monetary policy making drives the fluctuations in the UIP risk premium that are channeled in the interest rate differential term. The message coming out of this theoretical literature is that understanding the response of UIP premium to shocks and country-specific risks and policies seems to be first order in understanding capital flows related spillovers to emerging markets and designing policies to deal with such spillovers.

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Appendix A Data

In this section, we first present in detail the source of the data used in this paper and the construction of the individual series. We then provide further details about the Consensus Forecast data on exchange rate expectations.

Appendix A.1 Source of Data and Construction of Individual Series

Table A1 lists variables that we employ in this paper. We obtain spot exchange rate from IMF International Financial Statistics (IFS). IFS provides both period end and period average of daily exchange rates for monthly, quarterly, and yearly frequency.

We collect market interest rates (treasury bill, money market, and deposit rate) from the Bloomberg terminal. We choose interbank offered rate as a money market rate. For a given country and an interest rate, there are various tickers in Bloomberg. We choose the most reliable and long-spanning ticker after checking whether interest rates are in annual percentage rate with the same maturity and denominated in local currency. Interest rates are with maturities of 1, 3, and 12 months in the dataset. As Bloomberg provides daily values for most series, we can get both period end and period average for monthly, quarterly, and yearly frequency. When interest rates are missing from Bloomberg, we obtain data from IMF IFS. Though IFS usually gives interest rates with mixed maturities, some series are with fixed maturity. We refer to country notes of IFS database to check whether the interest rate is of the same maturity, denominated in local currency and calculated as period end or average of daily values. If the series has the same characteristics in all these criteria, we add that series to our database. For some interest rate series, only period end of period average data is available.

Exchange rate forecasts are available only at the end of period. Consensus forecast (mean average) at 1 month, 3 months, 12 months, and 24 months from the survey date. More precisely, the survey form which is usually received on the Survey Date (often the second Monday of the survey month), requests forecasts at the end of the month at 1 month, 3 months, 12 months and 24 months. Thus the forecast periods may be slightly longer than these monthly horizons.

Capital inflows by sector (banks, sovereigns, and corporates) are obtained directly from Avdjiev, Hardy, Kalemli-Özcan, and Servén (forthcoming). Capital inflows are available at quarterly and yearly frequency. Aggregate variables including GDP and current account are downloaded from IMF IFS. For real and nominal GDP and industrial production, we get both non-seasonally-adjusted and seasonally-adjusted data.

Forward rates come from Bloomberg. After downloading forward rates, we convert data into unit of local currency per US dollar. Daily forward rates are available. We download monthly, quarterly, and yearly data for both period end and average of daily values . We get exchange rate forecasts from Consensus Economics. We convert forecasts into local currency per US dollar forecasts using appropriate currency forecasts. We get Emerging Markets Bond Index (EMBI global) from J.P. Morgan. We employ the exchange rate regime classification by Ilzetzki, Reinhart, and Rogoff (2017) to exclude countries with fixed exchange rate regimes.

We proxy global risk with the VIX, which is obtained from Federal Reserve Economic Data (FRED). We obtain detailed information about policy risk from the International Country Risk Guide (ICRG). The International Country Risk Guide (ICRG) rating comprises 22 variables in three subcategories of risk: political, financial, and economic. We normalize these risk indices x using the following formula: $-(x-\mu_x)/\sigma_x$ where μ_x is the mean and σ_x is the standard deviation of a variable x in a full sample. We add the minus sign so that higher normalized indices mean higher risk.

Our sample consists of 12 currencies of advanced economies and 22 of emerging markets over the period 1996m11 and 2018m12. Table A2 presents the sample of countries and Table A3 the summary statistics of the main variables used in this paper.

Table A1: List of Variables

Variable	Description	Frequency	Source
Spot exchange rate	local currency/US dollar, period end and average	month / quarter / year	IMF IFS
Interest rates:			
Treasury bill rate	annual percentage rate, denominated in local currency,		
Money market rate	maturity: 1, 3, 12 month, period end and average	month / quarter / year	Bloomberg, IMF IFS
Deposit rate			
Capital inflows	capital inflows by sector	quarter / year	Avdjiev, Hardy, Kalemli-Özcan, and Servén (forthcoming)
Aggregate variables:			
GDP	local currency (million), real and nominal, non-seasonally-adjusted and seasonally-adjusted series	quarter / year	
Industrial production	index 2010=100, non- and seasonally-adjusted series	month / quarter / year	
Consumer price index	2010=100	month / quarter / year	
Producer price index	2010=100	month / quarter / year	IMF IFS
GDP deflator	2010=100, non- and seasonally-adjusted series	quarter / year	
Current account	million US dollars	quarter / year	
Capital account	million US dollars	quarter / year	
Forward Rates	local currency/US dollar, maturity: 1, 3, 12 month, period end and average	month / quarter / year	Bloomberg
Exchange rate forecasts	local currency/US dollar, period end, forecast horizon: 1, 3, 12, 24 month	month / quarter / year	Consensus Economics
VIX	Chicago Board Options Exchange volatility index	month / quarter / year	FRED
EMBI	Emerging Markets Bond Index (EMBI global)	month	J.P. Morgan
Country Risk	22 variables in three subcategories of risk: political, financial, and economic.	month / year	ICRG
Exchange Rate Regime	Exchange Rate Regime Coarse Classification (1–6)	month / year	Ilzetzki, Reinhart, and Rogoff (2017)

Table A2: List of Currencies

Advanced Economies (1)	Emerging Markets (2)
Australia	Argentina
Canada	Brazil
Denmark	Chile
Euro	China, P.R.: Mainland
Germany	Colombia
Israel	Czech Republic
Japan	Hungary
New Zealand	India
Norway	Indonesia
Sweden	Republic of Korea
Switzerland	Malaysia
United Kingdom	Mexico
	Peru
	Philippines
	Poland
	Romania
	Russian Federation
	Slovak Republic
	South Africa
	Thailand
	Turkey
	Ukraine

Notes: 34 currencies, 12 Advanced Economies and 22 Emerging Markets. Period 1996m11-2018m12.

Table A3: Summary Statistics: All Countries

	Mean	Median	Std. Dev.	p25	p75
Log(VIX)	2.934	2.892	0.356	2.653	3.173
EPU	99.074	76.681	86.299	47.049	124.603
Composite Risk	-0.689	-0.694	0.583	-1.104	-0.265
Government Policy Risk	-0.640	-0.667	0.706	-1.266	-0.167
Confidence Risk	-0.674	-0.772	0.873	-1.411	0.080
Capital Inflows/GDP	0.065	0.023	0.431	-0.002	0.062

Notes: 34 currencies, 22 Emerging Markets, 12 Advanced Economies. Period 1996m11:2018m12. Source: Consensus Forecast, Bloomberg, FRED, IMF, ICRG.

Interest Rates for UIP Calculation

We obtain interest rates to calculate the UIP deviations as follows. First, we replace deposit rates with money market rates of the same maturity if the data coverage for deposit rates is shorter than 5 years in a given country. If the data coverage for market rates is shorter than 5 years in a given country, we replace deposit rates with government bond rates of the same maturity in a given country. Table A4 shows country-year observations of deposit rates that are replaced with money market rates or government bond rates.

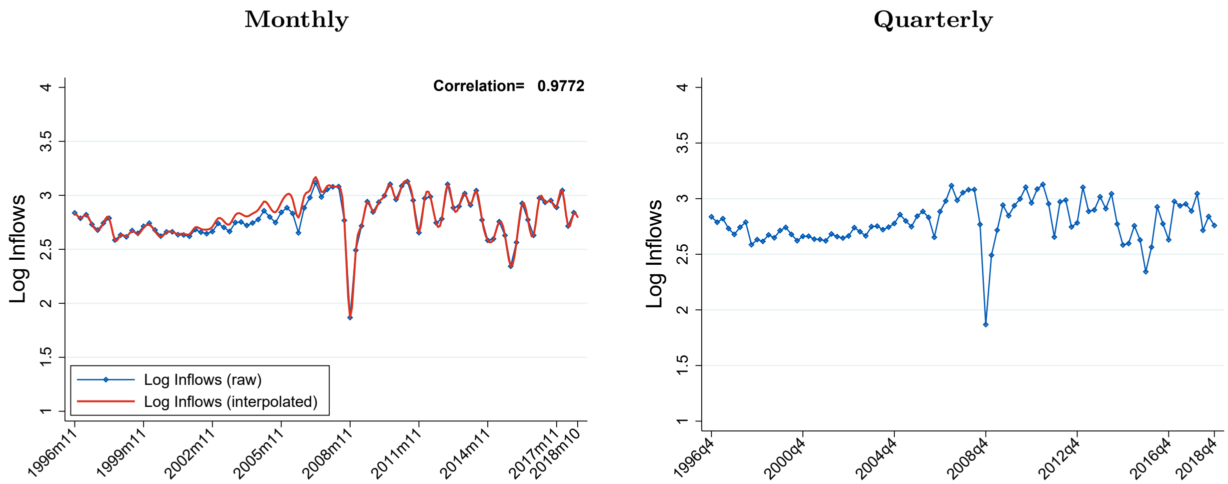
Table A4: Replaced Deposit Rates: Country-year Observations (1996-2018)

Country	Year	Country	Year
Austria	2008-14	Ireland	1999-2016
Canada	1996-2005, 2007-18	Italy	1996, 2014-16
Chile	2001-18	South Korea	2004-18
Colombia	2001-18	Netherlands	2001-14
Finland	1999, 2005-14	Portugal	2002-16
France	1996, 2000-16	Spain	1996-2015
Germany	1996, 2000-14		

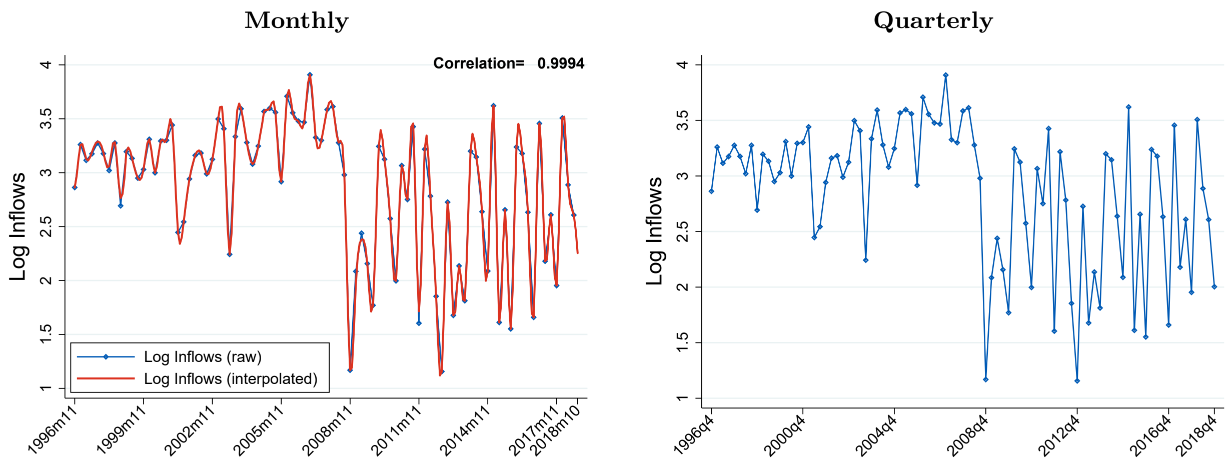
Interpolation of Quarterly Capital Flows

We interpolate quarterly capital flows to get monthly flows using a cubic spline built in Stata. More precisely, we use the following Stata command: `by id: mipolate ‘var’ date , gen(‘var’i) spline`, where `id` is country group, `‘var’` is flows data, and `date` is a variable denoting months. The interpolated flows are generated with a variable name `‘var’i`. This Stata module can be installed by using the command `ssc install mipolate`. Before running this command, quarterly flows are imported into the median month of each quarter. For example, the first quarter flows are imported into February, which is the median month of the first quarter. Then, the command fills remaining empty months with a cubic spline interpolation.

We plot averages of raw data and interpolated data across advanced economies and emerging markets in Figure A1. We plot both raw quarterly flows (blue solid line with diamond labels) and monthly flows interpolated using raw quarterly flows (red solid line). We find that interpolated monthly flows closely track raw quarterly flows with small deviations (the correlation between these two series is 0.99).



(a) Emerging Markets



(b) Advanced Economies

Figure A1: Average Capital Inflows: Raw vs. Interpolated Data

Note: This figure present the interpolation of capital inflows at monthly frequency for advanced economies and emerging markets.

Appendix A.2 Consensus Forecasts

This section provides additional descriptive statistics about the Consensus Forecasts database. Table A5 presents the average number of forecasters per year for currencies of advanced economies and emerging markets, separately. As shown in this table, the number of forecasters surveyed is vast in both set of economies, albeit it is smaller in emerging markets. Table A6 reports the average number of forecasters for each country across time.

Table A5: Number of Forecasters in Consensus Forecasts (all years)

	Advanced Economies (1)	**Emerging Markets** (2)
1996	62	26
1997	63	21
1998	54	14
1999	58	13
2000	57	15
2001	53	14
2002	55	13
2003	58	15
2004	59	16
2005	62	16
2006	61	16
2007	58	15
2008	57	16
2009	50	15
2010	50	17
2011	52	17
2012	56	17
2013	54	16
2014	53	16
2015	54	17
2016	43	19
2017	43	18
Mean	55	17

Notes: 34 currencies, 22 Emerging Markets, 12 Advanced Economies.
Source: Consensus Forecast.

Table A7 presents examples of the main forecasters for the Euro, Yen, UK Pound, Korean Won, Turkish Lira and other emerging markets in September 2012. This table shows that the forecasters surveyed for emerging markets' currencies were also top forecasters in advanced economies. It is worth mentioning that our database does not provide information on individual forecast series and does not indicate which forecasters were surveyed. We collect this information from printed monthly reports created by Consensus Forecasts. These reports provide some examples of forecasters for main currencies, but they do not provide a complete list of forecasters for each currency. As such, the information about individual foresters in Table A7 is only illustrative. For this reason, the empty cells in Table A7 indicate the absence of information about whether the forecaster was surveyed for that currency and, hence, they do *not* indicate that the forecaster was *not* surveyed for that currency. It could easily be the case that the forecaster was also surveyed, but we do not know it.

Table A6: Number of Forecasters By Currency

Average Number of Forecasters			
Advanced Economies		**Emerging Markets**	
Australia	37	Argentina	11
Canada	77	Brazil	13
Denmark	25	Chile	12
Euro Area	101	China, P.R.: Mainland	26
Germany	107	Colombia	10
Israel	11	Czech Republic	12
Japan	98	Hungary	11
New Zealand	31	India	20
Norway	24	Indonesia	23
Sweden	30	Republic of Korea	23
Switzerland	27	Malaysia	24
United Kingdom	84	Mexico	12
		Peru	9
		Philippines	17
		Poland	11
		Romania	8
		Russian Federation	11
		Slovak Republic	9
		South Africa	22
		Thailand	24
		Turkey	23
		Ukraine	4
Average 1996-2018	55		17

Notes: 34 currencies, 22 Emerging Markets, 12 Advanced Economies. Source: Consensus Forecast.

Table A7: Example: Main Forecasters in Advanced Economies and Emerging Markets, September 2012

Advanced Economies			**Emerging Markets**		
Euro	**Yen**	**UK Pound**	**Korean Won**	**Turkish Lira**	**Other EMs***
(1)	(2)	(3)	(4)	(5)	(6)
Goldman Sachs	Goldman Sachs	Goldman Sachs	Goldman Sachs	Goldman Sachs	Goldman Sachs
HSBC	HSBC	HSBC	HSBC	HSBC	HSBC
General Motors	General Motors	General Motors	General Motors	General Motors	General Motors
ING Financial Markets	ING Financial Markets	ING Financial Markets	ING Financial Markets		ING Financial Markets
BNP Paribas	BNP Paribas	BNP Paribas		BNP Paribas	BNP Paribas
JP Morgan	JP Morgan	JP Morgan	JP Morgan	JP Morgan	JP Morgan
Allianz	Allianz	Allianz			Allianz
Oxford Economics	Oxford Economics	Oxford Economics		Oxford Economics	Oxford Economics
Morgan Stanley	Morgan Stanley	Morgan Stanley		Morgan Stanley	Morgan Stanley
Bank of Tokio Mitsubishi	Bank of Tokio Mitsubishi	Bank of Tokio Mitsubishi	Bank of Tokio Mitsubishi	Bank of Tokio Mitsubishi	Bank of Tokio Mitsubishi
Credit Suisse	Credit Suisse	Credit Suisse		Credit Suisse	
Citigroup	Citigroup	Citigroup	Citigroup	Citigroup	Citigroup
Societe Generale	Societe Generale	Societe Generale		Societe Generale	Societe Generale
Royal Bank of Canada	Royal Bank of Canada	Royal Bank of Canada			Royal Bank of Canada
Royal Bank of Scotland	Royal Bank of Scotland	Royal Bank of Scotland			Royal Bank of Scotland
ABN Amro	ABN Amro	ABN Amro			ABN Amro
Barclays Capital	Barclays Capital	Barclays Capital		Barclays Capital	Barclays Capital
Commerzbank	Commerzbank	Commerzbank			Commerzbank
UBS	UBS	UBS	UBS	UBS	UBS
IHS Global Insight	IHS Global Insight	IHS Global Insight	IHS Global Insight	IHS Global Insight	IHS Global Insight
Nomura Securities	Nomura Securities	Nomura Securities	Nomura Economics	Nomura Securities	Nomura Securities
			Macquarie Capital		Macquarie Capital
			ANZ Bank		ANZ Bank

Notes: *Other emerging market currencies' include: Argentinean Peso, Brazilian Real, Chilean Peso, Chinese Renminbi, Colombian Peso, Czech Koruna, Hungarian Forint, Indian Rupee, Indonesian Rupiah, Malaysian Ringgit, Mexican Peso, Peruvian Sol, Polish Zloty, Romanian Leu, Russian Rouble, South African Rand, Ukrainian HRYVNIA. Note that non-filled cells indicate the absence of information about whether the forecaster was surveyed for that currency (i.e. they do *not* indicate that the forecaster was not surveyed for that currency). Source: Consensus Forecast.

Appendix A.3 Economic Policy Uncertainty Index

We construct the EPU index following the methodology of Baker, Bloom, and Davis (2016). In particular, we use the online platform Factiva, which reports journal articles of main international newspapers. We employ the same search procedure as Baker, Bloom, and Davis (2016). Our list of words contains 218 words and follows closely theirs. Since Baker, Bloom, and Davis (2016) list of words is mostly conceived for advanced economies, we include four additional words to better capture policy uncertainty characteristics in emerging markers (i.e. capital controls, expropriation, nationalization and corruption). We report below the list of words used in this paper.

Because we are interested in the perspective of the U.S. international investor, we focus on news reported in international newspapers (see below the complete list of newspapers). Given the lower availability of international newspapers, we follow the methodology of Barrett, Appendino, Nguyen, and de Leon Miranda (2020) to construct our EPU index. This methodology adds total number of articles in a country and pools all the newspapers together for each country.[36] More precisely, define X_{it} the number of articles referring to EPU episodes in country i at time t, Y_{it} total number of articles referring to country i at time t, and $Y_t = \sum_i Y_{it}$ the total number of articles written at each time t (i.e. the sum of articles across countries). We replicate Barrett, Appendino, Nguyen, and de Leon Miranda (2020) index as follows

$$EPU_{it} = \frac{X_{it}}{\frac{1}{12}\sum\limits_{j=1}^{12} Y_{t-j}}$$

where $X_i = \frac{1}{T}\sum\limits_{t=1}^{T} X_{it}$ and $Y = \frac{1}{T}\sum\limits_{t=1}^{T} Y_t$. We normalize the index to 100 by estimating

$$EPU_{it}^N = \frac{EPU_{it}}{\overline{EPU}_i} \times 100,$$

where $\overline{EPU}_i = \frac{1}{T}\sum\limits_{t=1}^{T} EPU_{it}$ is the average of EPU news for each country across time. We construct the monthly EPU for the Euro area as follows. We use real GDP data for France, Germany, Greece, Italy and Spain. This real GDP is expressed in local currency and it is reported at a quarterly frequency. Prior to 2000, we transform this real GDP measures to US dollars using the observed average exchange rate in the quarter. From 2000 onward, we assume that all countries use the euro as the relevant currency, so that there is no need for us to convert them to a common currency. We linearly interpolate the real GDP of each country to get GDP at a monthly frequency. As a result, we can aggregate GDP across countries in the eurozone to construct a GDP measure for the entire eurozone. We then construct the Euro Area EPU Index as $EPU_t = \sum\limits_{i=1}^{N} \omega_{it} EPU_{it}$, where

[36] The difference with Baker, Bloom, and Davis (2016) is that their index includes a non minor proportion of local newspapers. Higher heterogeneity across newspapers allows them to first compute the share of news for each individual newspaper within a country and then add up the total sum for each country. In other words, they do not pool all articles within a country together.

$\omega_{it} = RGDP_{it} / \sum_{i=1}^{N} RGDP_{it}$ is the share of the eurozone GDP accounted for by country i, EPU_{it} is the EPU index for country i at time t, and N is the number of countries in the eurozone for which we observe a value for EPU_{it} and their GDP.

List of Words

Our list of words from comes from Baker, Bloom, and Davis (2016). In particular, we use the following list of words from their list: tax, taxation, taxes, policy, government spending, federal budget, budget battle, balanced budget, defense spending, defence spending, military spending, entitlement spending, fiscal stimulus, budget deficit, federal debt, national debt, debt ceiling, fiscal footing, government deficit, fiscal policy, federal reserve, the fed, money supply, open market operations, quantitative easing, monetary policy, fed funds rate, overnight lending rate, the fed, Bernanke, Volker, Greenspan, central bank, interest rates, fed chairman, fed chair, lender of last resort, discount window, central bank, monetary policy, health care, health insurance, prescription drugs, drug policy, medical insurance reform, medical liability, , national security, war, military conflict, terrorism, terror, 9/11, armed forces, base closure, military procurement, military embargo, no-fly zone, military invasion, terrorist attack, banking (or bank) supervision, thrift supervision, financial reform, basel, capital requirement, bank stress test, deposit insurance, union rights, card check, collective bargaining law, minimum wage, closed shop, workers compensation, advance notice requirement, affirmative action, overtime requirements, antitrust, competition policy, merger policy, monopoly, patent, copyright, unfair business practice, cartel, competition law, price fixing, healthcare lawsuit, tort reform, tort policy, punitive damages, medical malpractice, energy policy, energy tax, carbon tax, drilling restrictions, offshore drilling, pollution controls, environmental restrictions, immigration policy, illegal immigration, sovereign debt, currency crisis, currency crises, currency crash, crisis, crises, reserves, tariff, trade, devaluation, capital controls, expropriation, nationalization, corruption.

The list of words used in Baker, Bloom, and Davis (2016) is mostly conceived for advanced economies. To better capture that policy uncertainty characteristics of emerging markers, we include five additional words: capital controls, expropriation, nationalization and corruption.

List of Newspapers

We include the following newspapers: ABC Network, Agence France Presse, BBC, The Boston Globe, CBS Network, Chicago Tribune, Financial Times, The Globe and Mail, Houston Chronicle, Los Angeles Times, NBC Network, The New York Times, The San Francisco Chronicle, The Telegraph (U.K), The Wall Street Journal, The Times (U.K), USA Today, Washington Post, Reuters, The Dallas Morning News, The Miami Herald, The Guardian (U.K), and The Economist.

Appendix A.4 ICRG: Composite and Political Risks

Our measures of composite and policy risks come from the International Country Risk Guide (ICRG) dataset which provides data on country's political, economic and financial risks for more than than 140 countries at monthly frequency. We describe below the definition of each variable used in the paper and then present the correlation of the sub-components of political risk with the UIP premium.

A.4.1 Definition of Variables

In our analysis, we employ the composite risk variable to proxy for overall country risk – political, economic and financial risks–, and socioeconomic conditions to capture confidence risk. We pool investment profile and democratic accountability together to measure government policy risk (i.e. the average of both variables). Additionally, we use separately investment profile to proxy for expropriation risk and democratic accountability to capture anti-democratic risk. We describe below all the variables in detail.

-*Composite risk*. It is a composite of political, financial and economic risk. Political risk contributes 50% of the composite rating, while financial and economic risk ratings each contribute 25%. Political risk has 12 components and the assessment is made on the basis of subjective analysis of the available information. Financial and economic risk each have five components and their assessments are made solely on the basis of objective data. The components of political, economic and financial risks are:

-<u>Political risk</u>: government stability*, socioeconomic conditions*, investment profile*, internal conflict*, external conflict*, democratic accountability$^+$, corruption$^+$, military in politics$^+$, religious tensions$^+$, law and order$^+$, ethnic tensions$^+$, and bureaucracy quality. The components with $*$ are given up to 12 points and, hence, have a higher weight, the components with $^+$ are given up to 6 points, and the last component (bureaucracy quality) is given only 4 points.

- Government stability: this index assesses both of the government's ability to carry out its declared programs, and its ability to stay in office. It has three subcomponents that describe government unity, legislative strength and popular support.
- Socioeconomic conditions: this index assesses the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction. It has three subcomponents: unemployment, consumer confidence and poverty.
- Investment profile: this index assesses factors affecting the risk to investment that are not covered by other political, economic and financial risk components. It has three components: contract viability/expropriation, profits repatriation and payment delays.

- Internal conflict: assesses political violence in the country and its actual or potential impact on governance. The subcomponents are: civil war/coup threat, terrorism/political violence and civil disorder.

- External conflict: this index is an assessment both of the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). External conflicts can adversely affect foreign business in many ways, ranging from restrictions on operations to trade and investment sanctions, to distortions in the allocation of economic resources, to violent change in the structure of society. The subcomponents are: war, cross-border conflict and foreign pressures.

- Democratic accountability: it is a measure of how responsive and accountable government is to its people. As such, it captures the degree of freedom that a government has to impose policies to its own advantage. It evaluates several types of government from more to less democratic, considering whether it is alternating democracy, dominated democracy, de facto one-party state, de jure one-party state, and autarchy.

- Corruption: assessment of corruption within the political system. Such corruption is a threat to foreign investment for several reasons: it distorts the economic and financial environment; it reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability; and, last but not least, introduces an inherent instability into the political process. The measure considers financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans. It also considers potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and suspiciously close ties between politics and business.

- Military in politics: considers involvement of militaries in politics,

- Religious tensions: measures the relevance of a single religious group that seeks to replace civil law by religious law and to exclude other religions from the political and/or social process; the desire of a single religious group to dominate governance; the suppression of religious freedom; the desire of a religious group to express its own identity, separate from the country as a whole.

- Law and order: this refers to the strength and impartiality of the legal system and the popular observance of the law.

- Ethnic tensions: refers to the degree of tension within a country attributable to racial, nationality, or language divisions.

- Bureaucracy quality: measures the strength and quality of the bureaucracy. High points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services.

-Economic risk: it includes GDP per capita, real GDP growth, inflation rate, budget balance over GDP, current account over GDP.

-Financial risk: it includes foreign debt over GDP, foreign debt service over exports of goods and services, current account over exports of goods and services, net international liquidity as months of import cover, exchange rate stability.

Eurozone ICRG Risk Variable Construction. We construct a monthly eurozone ICRG risk indexes as follows. We use real GDP data for the 19 countries that compose the eurozone. This real GDP is expressed in local currency and it is reported at a quarterly frequency. Prior to 2000, we transform this real GDP measures to US dollars using the observed average exchange rate in the quarter. From 2000 onward, we assume that all countries in the Eurozone use the Euro as the relevant currency, so that there is no need for us to convert them to a common currency. We linearly interpolate the real GDP of each country to get GDP at a monthly frequency. As a result, we can aggregate GDP across countries in the eurozone to construct a GDP measure for the entire Eurozone. We then construct the Eurozone Composite Risk Index as

$$ECR_t = \sum_{i=1}^{N_t} \omega_{it} CR_{it},$$

where $\omega_{it} = RGDP_{it} / \sum_{i=1}^{N_t} RGDP_{it}$ is the share of the Eurozone GDP accounted for by country i, CR_{it} is the ICRG risk index for country i at time t, and N_t is the number of countries in the eurozone for which we observe a value for CR_{it} and their GDP. This latter number can change over time due to reporting issues. However, starting in 1999 all 19 countries in the eurozone have information on both their GDP and the composite risk index.

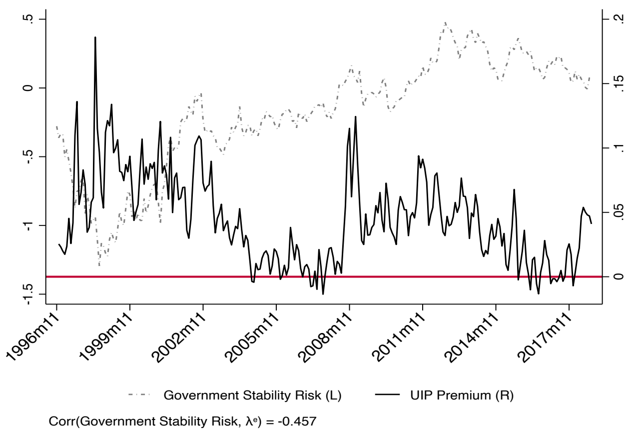
A.4.2 Correlation of Sub-Components of Political Risk and UIP Premium in Emerging Markets

Section 3.1 focused on two main determinants of political risk correlated with the UIP premium in emerging markets, namely government policy risk (composed by anti-democratic and expropriation risks) and confidence risk. In this section, we present the correlation of other sub-components of political risk with the UIP premium (for emerging markets) not directly employed in this paper, and show that these correlations have usually the wrong (negative) sign and are typically small.[37]

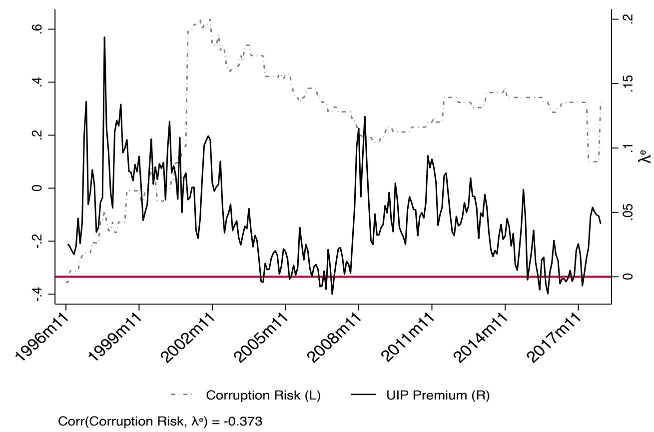
As detailed above, the other sub-components of political risk reported in the ICRG data and not directly used in the paper are: government stability, corruption, external conflict, internal conflict, military in politics, religious tensions, law and order, ethnic tensions and bureaucracy quality. Figure A2 presents the correlation of the UIP premium with each of this components. The correlation with these other subcomponents is usually small and sometimes has the opposite sign. For example, it is interesting to note on the correlation with government stability risk (panel a), which has the wrong sign (negative). This sub-component captures government unity and legislative strength and, hence, is quite different from from our government policy risk variable (which captures expropriation risk). Other examples are sub-components of political risk are: corruption, law and order, religious tensions, bureaucracy quality and ethnic tensions (panels b, c, d, e and f), which have less time-series variation and are negatively correlated with the UIP premium.

Therefore, these figures indicate that these sub-components capture elements of political risk that are not significantly related to foreign investors' risk sentiments, and thus do not significantly correlate with the UIP premium in emerging markets.

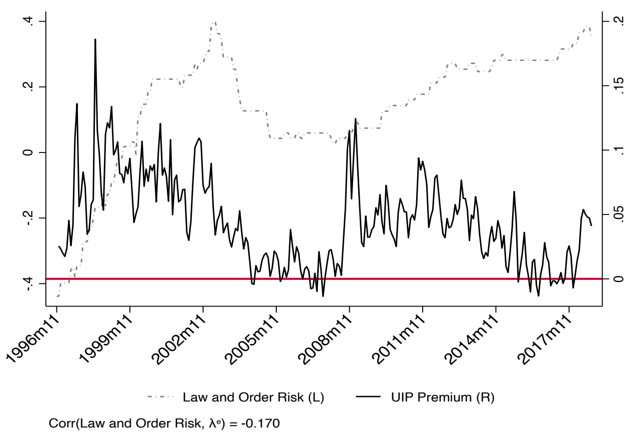
[37] Recall that the correlation of the UIP premium with government policy and confidence risk was presented in Figure 13, and the its correlation with anti-democratic and expropriation risks was reported in Figure B.1.



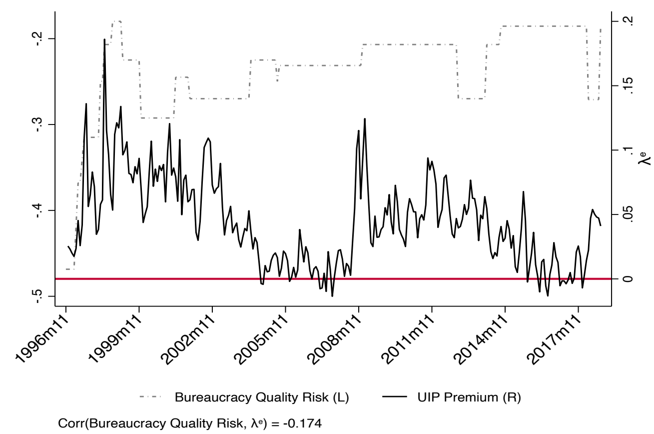
a) Government Stability Risk



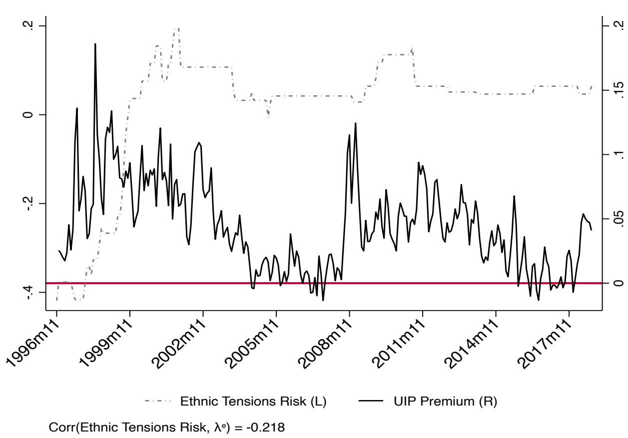
b) Corruption Risk



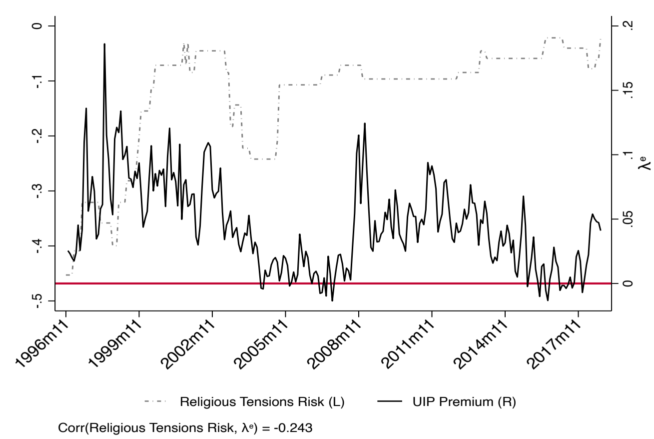
c) Law and Order Risk



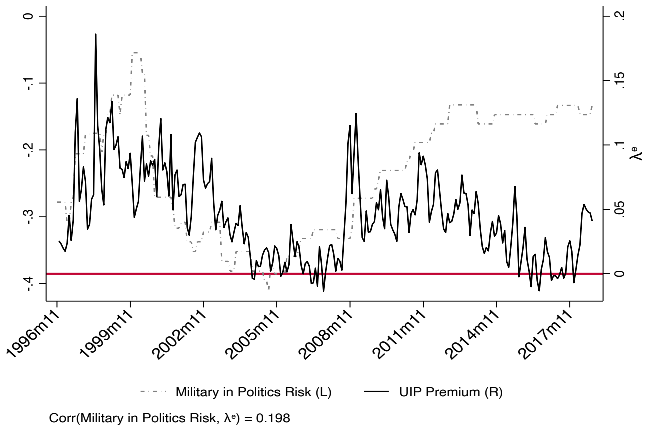
d) Bureaucracy Quality Risk



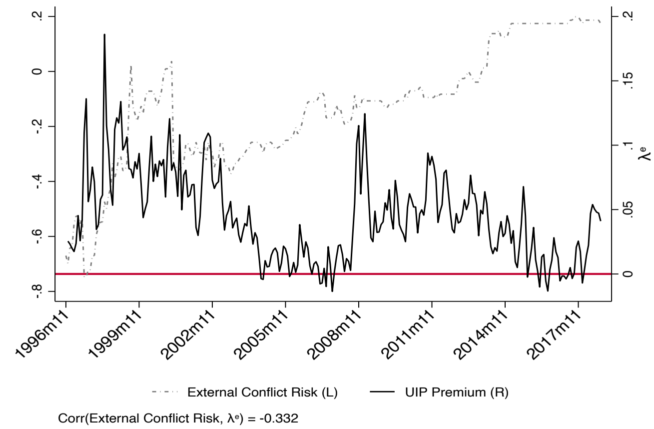
e) Ethnic Tensions Risk



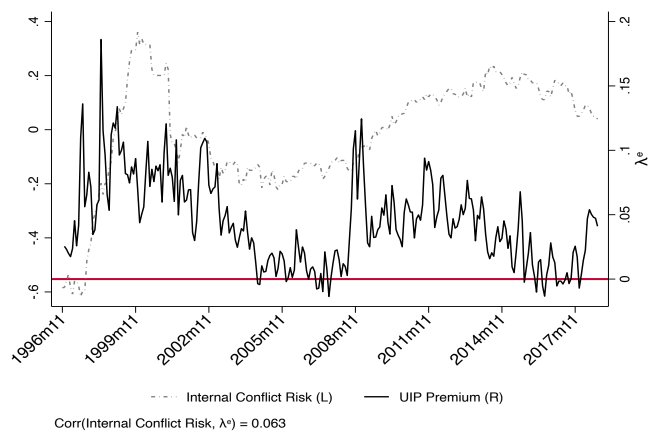
f) Religious Tensions Risk



g) Military in Politics Risk



h) External Conflict Risk



i) Internal Conflict Risk

Figure A2: Correlation of Sub-Components of Political Risk and UIP Premium in Emerging Markets

Note: This figure shows the correlation of other sub-components of political risk (not used in the paper) with the UIP Premium in emerging markets. The UIP premium is measured using Consensus Forecast.

Appendix B Additional Figures and Tables

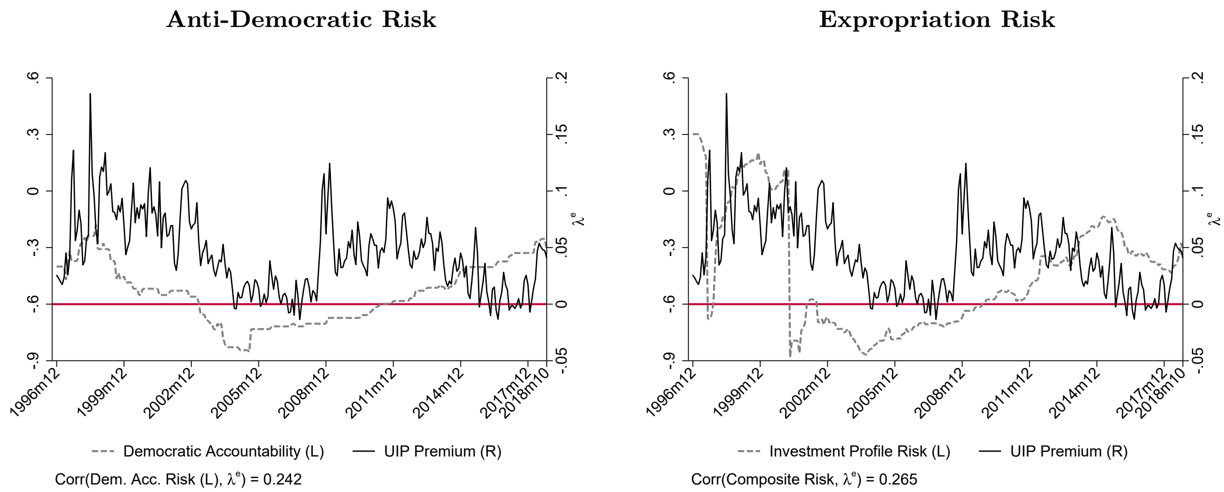


Figure B.1: Decomposing Government Policy Risk in Emerging Markets
Note: This figure shows the correlation of anti-democratic and expropriation risks and the UIP premium 12 month horizon. The UIP premium is measured using Consensus Forecast.

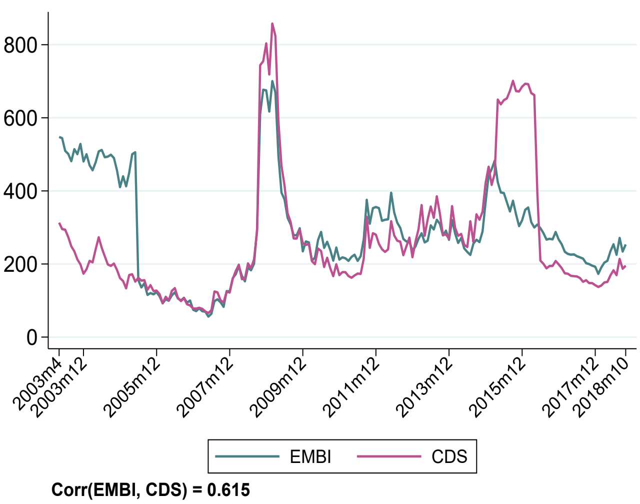


Figure B.2: Evolution of CDS and EMBI
Note: This figure shows evolution of the CDS and EMBI for 18 emerging markets.

Table B.1: THE FAMA COEFFICIENT IN EMERGING MARKETS: COMPOSITE AND GOVERNMENT POLICY RISKS

	Composite Risk	Unpacking Composite Risk		Decomposing Government Policy Risk	
		Government Policy Risk	Confidence Risk	Anti-Democratic Risk	Expropriation Risk
	(1)	(2)	(3)	(4)	(5)
	Bias of Fama Coefficient ($b_{ij,RP}$): Risk Premium				
Policy risk$_{i,j}$	0.592*	0.764***	0.139	0.624***	0.489*
	(0.328)	(0.253)	(0.186)	(0.180)	(0.256)
R^2	0.0134	0.0414	0.0020	0.0415	0.0205
Observations	180	180	180	180	180

Notes: * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. Currency-clustered standard errors in parentheses. Expected exchange rate changes are measured using Consensus Forecast. All regressions include a constant term.

Table B.2: FORECAST ERRORS: SUMMARY STATISTICS

	Advanced Economies (1)	Emerging Markets (2)
Mean	-0.003	-0.010
Median	0.008	0.000
Std. Dev	0.113	0.135
p25	-0.074	-0.078
p75	0.073	0.068
N of Observations	2,286	3,577

Notes: 34 currencies, 22 emerging markets, 12 advanced economies. Period 1996m11:2018m12. Forecast errors are defined as $\Delta s^e_{it+1} - \Delta s_{it+1}$. Forecast errors are measured using Consensus Forecast.

Table B.3: Fama and Excess Return Regressions: Unbalanced Sample

	Fama Regression		Excess Return Regression	
	Advanced Economies	Emerging Markets	Advanced Economies	Emerging Markets
	(1)	(2)	(3)	(4)
	Panel A: Realized Exchange Rate			
β^F	-0.399	0.374***	1.399***	0.626***
	(0.361)	(0.115)	(0.361)	(0.115)
P-value ($H_0 : \beta^F = 1$)	0.0022	0.0000		
R^2	0.0034	0.0255	0.0408	0.0682
	Panel B: Expected Exchange Rate			
β	1.196***	0.482***	-0.196	0.518***
	(0.258)	(0.073)	(0.258)	(0.073)
P-value ($H_0 : \beta = 1$)	0.4620	0.0000		
R^2	0.1750	0.2705	0.0057	0.3007
Currency FE	yes	yes	yes	yes
Observations	2,375	3,755	2,375	3,755
Number of Currencies	12	22	12	22

Notes: * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. Currency-time two-way standard errors in parentheses. The UIP premium and expected exchange rate changes are measured using Consensus Forecast.

Table B.4: The Fama Coefficient in Emerging Markets: Composite and Government Policy Risks (12-Months)

	Panel A. Fama Coefficient: $\hat{\beta}_{ij}$				
	Composite Risk	Unpacking Composite Risk		Decomposing Government Policy Risk	
		Government Policy Risk	Confidence Risk	Anti-Democratic Risk	Expropriation Risk
	(1)	(2)	(3)	(4)	(5)
Policy risk$_{i,j}$	-0.555^d	-0.952***	-0.111	-0.686***	-0.729**
	(0.356)	(0.329)	(0.197)	(0.258)	(0.290)
R^2	0.0086	0.0481	0.0009	0.0377	0.0335
	Panel B. Risk Premium: $b_{ij,RP}$				
Policy risk$_{i,j}$	0.555^d	0.952***	0.111	0.686***	0.729**
	(0.356)	(0.329)	(0.197)	(0.258)	(0.290)
R^2	0.0086	0.0481	0.0009	0.0377	0.0335
Observations	275	275	275	275	275

Notes: ^{d}p<0.15 * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. Currency-clustered standard errors in parentheses. All regressions include a constant term. Expected exchange rate changes are measured using Consensus Forecast.

Table B.5: The Fama Coefficient in Emerging Markets: Composite and Government Policy Risks (24-Months)

	Panel A. Fama Coefficient: $\hat{\beta}_{ij}$				
	Composite Risk	Unpacking Composite Risk		Decomposing Government Policy Risk	
		Government Policy Risk	Confidence Risk	Anti-Democratic Risk	Expropriation Risk
	(1)	(2)	(3)	(4)	(5)
Policy risk$_{i,j}$	-0.527**	-0.864***	-0.182	-0.669***	-0.612***
	(0.260)	(0.131)	(0.168)	(0.121)	(0.188)
R^2	0.0202	0.1009	0.0066	0.0902	0.0604
	Panel B. Risk Premium: $b_{ij,RP}$				
Policy risk$_{i,j}$	0.527**	0.864***	0.182	0.669***	0.612***
	(0.260)	(0.131)	(0.168)	(0.121)	(0.188)
R^2	0.0202	0.1009	0.0066	0.0902	0.0604
Observations	132	132	132	132	132

Notes: * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. Currency-clustered standard errors in parentheses. All regressions include a constant term. Expected exchange rate changes are measured using Consensus Forecast.

Appendix C Link between the Fama and the Excess Returns Regressions

Recall that the UIP condition in logs is $s^e_{t+h} - s_t = i_t - i^{US}_t$. Using this condition, we can write the Fama regression as

$$s_{t+h} - s_t = \alpha^F + \beta^F(i_t - i^{US}_t) + \varepsilon_{t+h}. \tag{15}$$

Adding and subtracting $i^*_t - i_t$ from each side of equation (15).

$$s_{t+h} - s_t + (i^{US}_t - i_t) = \alpha^F + \beta^F(i_t - i^{US}_t) + (i^{US}_t - i_t).$$

Multiplying both sides for -1 and defining the realized excess returns as $\lambda^F_{t+h} = i_t - i^{US}_t + s_t - s_{t+h}$, we obtain

$$\lambda^F_{t+h} = \alpha^F_1 + \beta^F_1(i_t - i^{US}_t) + \varepsilon_{t+h}, \tag{16}$$

where $\alpha^F = -\alpha^F$ and $\beta^F_1 = 1 - \beta^F$. Then, if $\beta^F_1 = 0$, increases in the interest rate differential do not correlate with excess return, the Fama regression holds ($\beta^F = 1$) and there is no excess return. Instead, if $\beta^F_1 > 0$, increases in the interest rate differential raise excess returns. The coefficient of the Fama regression becomes less than one ($\beta^F < 1$) and there are UIP deviations.

Appendix D Decomposing the Bias in the Fama Regression

In this appendix, we follow Froot and Frankel (1989) to decompose the bias on the Fama regression arising from systematic errors in expectations and from a risk premium.

- Decomposition of Fama Regression under FIRE.

Consider that the probability limit of the coefficient β^F in equation (5) is given by

$$plim\hat{\beta}^F = \frac{cov(\Delta s_{it+h} - \Delta\overline{s}_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \overline{IR}_i)} \tag{17}$$

where IR_{it} denotes de interest rate differential, $IR_{it} = i_{it} - i_t^{US}$, and the over-line denotes the average of the variable for each country across quarters corresponding to the country fixed effects included in regression (5), i.e. $\overline{X}_i = \frac{1}{T}\sum_{t=1}^{T} X_{it}$. Note that, when we average out across time, we remove the horizon subscript h, but we still consider our specifications at the same forecast horizon (12 month in our case). We can define the forecast errors as $\eta^e_{it+h} = \Delta s_{it+h} - \Delta s^e_{it+h}$ and use them to replace in equation (17) to obtain

$$plim\hat{\beta}^F = \frac{cov(\Delta s^e_{it+h} - \Delta\overline{s}^e_i, IR_{it} - \overline{IR}_i) + cov(\eta^e_{it+h} - \overline{\eta}^e_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \bar{I}R_i)} \tag{18}$$

Using the definition of expected excess returns, we can re-write equation (18) as

$$\begin{aligned}
plim\hat{\beta}^F &= \frac{cov((IR_{it} - \overline{IR}_i) - (\lambda^e_{it+h} - \overline{\lambda}^e_i), IR_{it} - \overline{IR}_i) + cov(\eta^e_{it+h} - \overline{\eta}^e_i, IR_{it} - \bar{I}R_i)}{var(IR_{it} - \overline{IR}_i)} \\
&= \frac{var(IR_{it} - \overline{IR}_i) - cov(\lambda^e_{it+h} - \overline{\lambda}^e_i, IR_{it} - \overline{IR}_i) + cov(\eta^e_{it+h} - \overline{\eta}^e_i, IR_{it} - \bar{I}R_i)}{var(IR_{it} - \overline{IR}_i)} \\
&= 1 + \frac{cov(\eta^e_{it+h} - \overline{\eta}^e_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \overline{IR}_i)} - \frac{cov(\lambda^e_{it+h} - \overline{\lambda}^e_i, IR_{it} - \bar{I}R_i)}{var(IR_{it} - \overline{IR}_i)}
\end{aligned} \tag{19}$$

$$\begin{aligned}
plim\hat{\beta}^F &= 1 + \frac{cov(\eta^e_{it+h} - \overline{\eta}^e_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \bar{I}R_i)} - \frac{cov(\lambda^e_{it+h} - \overline{\lambda}^e_i, \lambda^e_{it+h} - \overline{\lambda}^e_i + \Delta s^e_{it+h} - \Delta\overline{s}^e_i)}{var(IR_{it} - \overline{IR}_i)} \\
&= 1 + \frac{cov(\eta^e_{it+h} - \overline{\eta}^e_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \overline{IR}_i)} - \left(\frac{var(\lambda^e_{it+h} - \overline{\lambda}^e_i) + cov(\lambda^e_{it+h} - \overline{\lambda}^e_i, \Delta s^e_{it+h} - \Delta\overline{s}^e_i)}{var(IR_{it} - \overline{IR}_i)}\right)
\end{aligned} \tag{20}$$

Thus, we have

$$plim\hat{\beta}^F = 1 - b_{RE} - b_{RP} \tag{21}$$

$$\text{where} \quad b_{RE} = -\frac{cov(\eta^e_{it+h} - \overline{\eta}^e_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \overline{IR}_i)} \quad \text{and} \quad b_{RP} = \frac{var(\lambda^e_{it+h} - \overline{\lambda}^e_i) + cov(\Delta s^e_{it+h} - \Delta\overline{s}^e_i, \lambda^e_{it+h} - \bar{\lambda}^e_i)}{var(IR_{it} - \overline{IR}_i)}$$

- *Decomposition of Fama Regression using Expectational Data.*

Consider the regression estimated using expected exchange rate changes

$$\Delta s^e_{it+h} = \alpha + \beta(i_{it} - i^*_{it}) + \mu_i + \varepsilon_{1it+h} \tag{22}$$

The probability limit of β is given by

$$plim\hat{\beta} = \frac{cov(\Delta s^e_{it+h} - \Delta\overline{s}^e_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \overline{IR}_i)} \tag{23}$$

Combining the definition of expected excess returns in equation (1) and (23) we obtain

$$\begin{aligned} plim\hat{\beta} &= \frac{cov((IR_{it} - \overline{IR}_i) - (\lambda^e_{it+h} - \overline{\lambda}^e_i), IR_{it} - \overline{IR}_i)}{var(IR_{it} - \bar{I}R_i)} \\ &= 1 - \frac{cov(\lambda^e_{it+h} - \overline{\lambda}^e_i, IR_{it} - \overline{IR}_i)}{var(IR_{it} - \overline{IR}_i)} \end{aligned} \tag{24}$$

The probability limit of the Fama coefficient – β – of the regression estimated using expectational data is given by

$$plim\hat{\beta} = 1 - b_{RP} \tag{25}$$

$$\text{where} \quad b_{RP} = \frac{var(\lambda^e_{it+h} - \overline{\lambda}^e_i) + cov(\Delta s^e_{it+h} - \Delta\overline{s}^e_i, \lambda^e_{it} - \bar{\lambda}^e_i)}{var(IR_{it} - \overline{IR}_i)}$$

Appendix E The Fama Puzzle Revisited: A Decomposition Analysis

In this section, we conduct a decomposition analysis to unpack the channels through which policy risk affects the risk premium and downwards bias the Fama coefficient. Recall that the Fama coefficient for country i in window j can be expressed as $plim\hat{\beta}_{ij} = 1 - b_{ij,RP} = 1 - \frac{var(\lambda^e_{ij}) + cov(\Delta s^e_{ij}, \lambda^e_{ij})}{var(IR_{ij})}$ (equation (12)).

Mathematically, one could evaluate how an increase in policy risk in window j in country i affects its Fama coefficient by taking derivatives of this expression with respect to risk. After some algebra, the change in the Fama coefficient would be

$$\frac{\partial\hat{\beta}_{ij}}{\partial \text{policy risk}_{ij}} = \underbrace{-\frac{1}{var(IR_{ij})}\frac{\partial var(\lambda^e_{ij})}{\partial \text{policy risk}_{ij}}}_{\text{UIP Premium Volatility}} \underbrace{- \frac{1}{var(IR_{ij})}\frac{\partial cov(\Delta s^e_{ij}, \lambda^e_{ij})}{\partial \text{policy risk}_{ij}}}_{\text{Comovement ER \& UIP Premium}} + \underbrace{\frac{b_{ij,RP}}{var(IR_{ij})}\frac{\partial var(IR_{ij})}{\partial \text{policy risk}_{ij}}}_{\text{Interest Rate Volatility}}. \tag{26}$$

Equation (26) shows that the change in the Fama coefficient stems from three forces: (i) changes in the volatility of the UIP premium (first term), (ii) changes in the comovement between the expected exchange rate change and the UIP premium (second term), and (iii) changes in the volatility of the interest rate differential (third term). Equation (26) is a mathematical derivation for a particular country i at window j but, under the assumption that each component of the risk premium responds homogeneously across time and countries, we can estimate each of these three forces econometrically.[38] That is, we can regress $var(\lambda^e_{ij})$, $cov(\Delta s^e_{ij}, \lambda^e_{ij})$ and $var(IR_{ij})$ on policy risk and obtain the *average* responses to policy risk across countries and time (i.e. $\frac{\Delta var(\lambda^e_{ij})}{\Delta \text{policy risk}_{ij}}$, $\frac{\Delta var(IR_{ij})}{\Delta \text{policy risk}_{ij}}$ and $\frac{\Delta cov(\Delta s^e_{ij}, \lambda^e_{ij})}{\Delta \text{policy risk}_{ij}}$). Because these derivatives are weighted by the variance of the interest rate differential in each country i and window j and the last derivate is additionally weighted by the risk premium term $b_{ij,RP}$, we estimate them econometrically employing Weighted Least Squares.[39] More precisely, we estimate

$$Y_{ij} = \gamma_4 + \gamma_5 \,\text{policy risk}_{ij} + \varepsilon_{1ij}, \tag{27}$$

[38] To understand this assumption, note that equation (26) captures the change in the β coefficient in a country i at time j upon an increase in policy risk in that period. Yet the econometrician is not interested in each individual response of each country at each moment of time, but on the *average* response across time and countries. To compute average responses, we can assume that each component of the risk premium in equation (26) responds homogeneously across time and countries, and employ these homogeneous responses to obtain the average response of the Fama coefficient to changes in policy risk. Hence, under this homogeneity assumption, the derivative – $\frac{\partial\beta_{ij}}{\partial \text{policy risk}_{ij}}$ – can be interpreted as the *average* response of the Fama coefficient.

[39] The WLS is a good econometric approximation of the derivatives in equation (26). More precisely, the derivatives in equation (26) refer to the response of each country i at time j and are weighted by variables at country i and time j level. So, these are individual responses for each country and time pair. Instead, the WLS weights each observation for each country and time to compute average responses. Put it differently, the WLS weights each observation to estimate individual responses, while the derivatives in equation (26) are the average responses weighted by country and time.

where $Y_{ij} = \{var(\lambda^e_{ij}), cov(\Delta s^e_{ij}, \lambda^e_{ij}), var(IR_{ij})\}$. The regressions for $var(\lambda^e_{ij})$ and $cov(\Delta s^e_{ij}, \lambda^e_{ij})$ are weighted by the variance of the interest rate differential in each country i window j, and that for $var(IR_{ij})$ is weighted by the ratio of the risk premium term and the variance of the interest rate differential in each country i window j.[40]

We assess the impact of the policy risk on the Fama coefficient using our composite risk variable. Panel A in Table E.1 presents the results and shows that the driver of the downward bias of the Fama coefficient is the increase in the volatility of the UIP premium. In particular, column 1 shows that the coefficient of the variance of the UIP premium is positive and highly statistically significant, while the other two coefficients – the covariance between exchange rate change and the UIP premium and the interest rate volatility– are close to zero. This result indicates that a one standard deviation in that increases in composite risk associates with a 0.49 percentage points decrease in the volatility of the UIP premium. We can then use the estimated coefficients to check how each of these three forces contribute to the bias of the Fama coefficient. As expected, the increase in the volatility of the UIP premium explains 87% of the bias of the Fama coefficient arising from changes in composite risk.[41]

We then evaluate how composite risk affects each of the component of the variance of the UIP premium. Recall that the UIP premium in country i in period j is given by $\lambda^e_{ij} = IR_{ij} - \Delta s^e_{ij}$ and, thus, its variance is equal to

$$var(\lambda^e_{ij}) = var(IR_{ij}) + var(\Delta s^e_{ij}) - 2cov(IR_{ij}, \Delta s^e_{ij}). \tag{28}$$

To assess the impact of composite risk on each term of equation (28), we regress each of these components on composite risk. Panel B in Table E.1 shows that composite risk associates with increases in both the volatility of the interest rate differential and the volatility of the exchange rate change. Yet the increase in the volatility of the interest rate differential is larger. The estimated coefficients imply that one standard deviation increase in composite risk associates with a 0.16 increase in the variance of the interest rate differential and 0.10 increase in the variance of the expected exchange rate change. The higher increase in the volatility of the interest rate differential is remarkable because it highlights a disconnect between the interest rate and exchange rate changes, and suggests that a country's composite risk is priced in the interest rate differential in emerging markets. In this way, increases in a country's composite risk lead to higher increases in the interest rate differential, which becomes the source of the UIP premium.

[40] Alternatively, with time series long enough, one could estimate these regressions separately for each country, i.e. without imposing homogeneity across countries. That is, one could estimate regression (27) for each country and obtain individual γ_{4i}. Unfortunately, because our data spans only between 1996m11 and 2018m12, we do not have enough time series variation to estimate these coefficients consistently. As West (2012) shows, in models where the discount factor approaches one, the coefficient in the Fama regression could be inconsistent in small samples.

[41] Note that the sum of the estimated coefficients of equation (26) (0.878) and the coefficient reported in Table E.1 (0.584) are not exactly identical, due to the presence of non-linearities in this decomposition.

Table E.1: Decomposition of The Bias of Fama Coefficient in Emerging Markets

	Panel A: Decomposition of Bias of Fama Coefficient		
	UIP premium Volatility (1)	Comovement ER & UIP premium (2)	Interest Rate Volatility (3)
Composite risk$_{i,j}$	0.765***	0.115	0.002***
	(0.066)	(0.176)	(0.001)
Contribution to $\frac{\partial \beta_{ij}}{\partial \text{composite risk}_{ij}}$	87	13	0
($\frac{\partial \beta_{ij}}{\partial \text{composite risk}_{ij}}$ normalized to 100)			
R^2	0.8213	0.0433	0.0072
	Panel B: Components of the Volatility of the UIP Premium		
	$var(IR_{ij})$ (1)	$var(\Delta s^e_{ij})$ (2)	$cov(IR_{ij}, \Delta s^e_{ij})$ (3)
Composite risk$_{i,j}$	0.241*	0.153***	-0.062
	(0.138)	(0.032)	(0.053)
R^2	0.1494	0.1953	0.0626
Observations	180	180	180

Notes: * p < 0.10 ** p < 0.05 *** p < 0.01. Currency-clustered standard errors in parentheses. All regressions include a constant term. The UIP premium and expected exchange rate changes are measured using Consensus Forecast.