Conditioning carry trades: Less risk, more return

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Prior studies show that extreme interest rate differentials (IRDs) and high foreign exchange rate (FX) volatility have substantial explanatory power for the validity of UIP. We show that these contemporaneous drivers also have predictive power by implementing a conditional currency carry trade (CT) strategy that excludes regimes for which UIP is likely to hold. Conditioning high FX volatility only, or on both FX volatility and extreme IRDs outperforms the base-case unconditional CT strategy in virtually any of the settings analyzed. Conditioning on very large IRDs only shows mixed findings. Our strategy works best for smaller CT portfolios.

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1. Introduction

In this paper we investigate currency carry trade (CT) strategies, that aim at exploiting exchange rate mispricing by taking short positions in low-interest rate currencies and long positions in high-interest rate ones (e.g. Koijen et al., 2018).1 According to a standard international finance theory, the so-called ‘uncovered interest rate parity’ (UIP), these investments should yield a zero profit, because the expected return of the currency exchange rate should exactly offset the difference in the underlying interest rates. Empirically, however, these CT investments tend to yield a positive return over longer time horizons (Christiansen et al., 2011; Jordà and Taylor, 2012; Villanueva, 2007). As these gains of CT strategies are small but positive most of the time but are occasionally wiped away due to adverse movements in the exchange rate, The Economist has coined carry trades as ‘picking up nickels in front of steamrollers’ (The Economist, 2006).

Although according to the academic literature there is much evidence that UIP does not hold in general (e.g. Engel, 1996; Hodrick, 1987; Lewis, 1995; Sarno, 2005), which explains the profitability of CT strategies over longer windows, UIP might be valid in specific regimes. In this paper we focus on two such regimes that have a contemporaneous effect on the validity of UIP, namely when interest rate differentials (IRDs) are large and foreign exchange (FX) volatility is high. We show that these regimes also have predictive power such that exploiting them in a conditional currency carry trade strategy could improve its performance.

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1 While there is widespread agreement that the currency carry trade (CT) market has rapidly grown over the past years, the exact number of billions of dollars traded per day in the CT market can hardly be determined with publicly available data (Curcuru et al., 2010; Galati et al., 2007).
We propose three conditional CT strategies. Our main conditional CT strategy, that we call the CONDFXIRD strategy, conditions on so-called ‘extreme’ IRDs during periods of high FX volatility by disregarding the corresponding investment opportunities. Using a sample of 25 countries over the period 1985–mid 2015 we show that this conditional CT strategy outperforms the conventional unconditional CT strategy (base-case) in terms of mean return, holding period return, Sharpe ratio, and skewness. Our robustness checks include alternative extreme IRD cutoff rates, alternative definitions of extreme IRDs, various FX volatility thresholds, alternative definitions of FX volatility, VIX as an alternative regime switch indicator, the impact of the Lehman crisis, the number of long and short positions in the CT strategies, and the choice of currencies in the investment opportunity set. We show that our findings are robust to all these settings. We also show that the number of positions is important: our main conditional CT strategy works best for smaller CT portfolios, i.e. for portfolios with two long-two short positions or one long-one short positions.

Our second and third conditional CT strategies test whether both conditions (i.e. extreme IRDs during high FX volatility) have to be met in order to outperform the base-case. In our second conditional CT strategy (that we call CONDFX) we condition on FX volatility only, which in our setup implies that in high FX volatility regimes we switch to a passive investment strategy. This strategy has the best performance in terms of average return, Sharpe ratio, holding period return, and skewness. Yet, this CONDFX strategy does not consistently outperform the base-case throughout all the robustness checks. In some settings this strategy outperforms the base-case on some performance indicators because of its dramatically lower standard deviation of returns (due to periods where no investments are made), which boosts its Sharpe ratio in spite of its low(er) returns. In our third conditional CT strategy (that we call CONDIRD) we condition on extreme IRDs only. That is, the highest IRDs are truncated from the investment opportunity set regardless of the FX volatility regime. This strategy shows mixed performance relative to the base-case across all settings. Fig. 1 summarizes our main findings.

Our motivation to condition on both extreme IRDs and FX volatility regimes is based on prior studies that have extensively researched the role of FX volatility and extreme IRDs as key drivers of currency risk premia. A key finding of the FX volatility literature is that in periods of high FX volatility the returns of the carry trade strategy is low or even negative whilst periods of low FX volatility deliver positive CT returns (Christiansen et al., 2011; Clarida et al., 2009; Lustig et al., 2011; Menkhoff et al., 2012). Furthermore, the so-called extreme sampling literature shows that UIP is more likely to hold for extreme IRD observations (cf. Huisman et al., 1998; Lothian and Wu, 2011) which seems to contradict the logic of conventional CT strategies because CT strategies try to obtain their risk-arbitraging profits exactly from these extreme IRD positions. Bansal and Dahlquist (2000) show that for developed markets’ currencies, UIP is particularly violated if US interest rates exceed foreign rates. Lastly, Baillie and Chang (2011) combine the findings of both strands of literature (FX volatility and extreme IRDs) and show that UIP is likely to hold for extreme IRDs during high FX volatility periods. Therefore we expect that these regimes do not positively contribute to the performance of a CT strategy. As a consequence, we expect that truncating these extreme IRDs during periods of high FX volatility from the investment opportunity set should enhance CT performance.

A possible explanation why UIP is likely to hold for extreme IRDs during high FX volatility periods is provided by the ‘limits to speculation hypothesis’. Under this hypothesis transaction and opportunity costs might prevent traders from exploiting currency mispricing (Hochradl and Wagner, 2010; Lyons, 2001; Sarno, 2005). Furthermore, these costs are idiosyncratic (and thus heterogeneous across investors) and time-varying. If the interest rate differentials (IRDs) are small then only a small number of traders are able to exploit the mispricing. Yet, the larger the IRD the more likely that it overcomes the transaction and opportunity costs for other investors as well. Therefore, increases in IRDs will engage an increasing number of traders to risk-arbitrage away the mispricing (see, e.g. Baldwin, 1990) and consequently trade volumes as measured by order flows will increase, which in turn leads to higher FX volatility (Evans, 2010; Evans and Lyons, 2002a,b; Sager and Taylor, 2008). In sum, under the limits to speculation hypothesis, UIP is thus likely to hold for large IRDs during periods of high FX volatility, and these investment opportunities will thus not contribute to the performance of a CT strategy.4

Our findings have the following important implications. First, conditioning a CT strategy on regimes where UIP is likely to hold can outperform the base-case conventional strategy. These gains are substantial, while the strategy is simple to implement, and does not come at a real cost. Second, the individual performances of our conditional CT strategies vary. When considering average and holding period returns and Sharpe ratios, our CONDFX CT strategy performs best. The CONDFXIRD strategy (which conditions on both FX volatility and extreme interest rate differentials) has a slightly lower outperformance of the conventional CT strategy, but its outperformance is much more robust across all robustness tests. Though our results can be improved even more by means of an exact parametrization of our FX volatility indicator and ‘extreme’ IRD definition, the purpose of our paper is not to calibrate these indicators to obtain the best-possible outperformances (for one data set). Instead, we show that conditioning carry trades on volatility and extreme IRDs improve their performance.

This paper has the following contributions to the growing literature on currency carry trades. First, we show that conditioning on regimes where UIP is likely to hold always leads to outperformance in terms of average return, holding period returns, Sharpe ratio, and crash risk (i.e., skewness). Though the importance of extreme IRDs and FX volatility have been

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2 Our main analysis focuses on CT portfolios with 2 long and 2 short positions, that rebalance monthly. See Section 2 for the full specifications.
3 Although Baillie and Chang (2011) show that UIP is likely to hold for positive extreme IRDs during high FX volatility periods, we follow the extreme sampling literature by using absolute extreme IRDs in our main analysis. As robustness check we will separately test the effect of positive and negative extreme IRDs on CT performance.
4 Since transaction and opportunity costs vary across traders and across time, pinpointing the exact threshold of UIP regimes is not possible. Therefore observing higher FX volatility and higher IRDs can only imply an increased likelihood that UIP will hold.
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