



Covered interest rate parity in emerging markets

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Abstract

This paper finds that while covered interest rate parity holds for large and small triple A rated economies, it holds for emerging markets only for a three-month maturity. For a five-year horizon the size and frequency of violations lead to the conclusion that covered interest rate parity does not hold for longer maturities for Brazil, Chile, Russia and South Korea. Overall this paper finds that aspects of credit risk are the source of violations in CIRP in the long-term capital markets rather than transactions costs or the size of the economy.

Introduction

One of the fundamental tenets of international finance is covered interest rate parity CIRP. This relation says that exchange rate forward premiums (discounts) offset interest rate differentials between two sovereigns. This paper examines the role of the size of the underlying economy, transaction costs and aspects of credit risk such as volatility, market and default risk in apparent deviations in CIRP for Brazil, Chile, Russia, South Korea, Norway and the United Kingdom. Table 1 shows that Brazil and Russia were rated below investment grade on January 1, 2003, the date that this study commences, and all emerging economies were upgraded to some extent by October 31, 2006, the date that this study ends.² Thus this dataset encompasses a time of fairly stable market conditions and remain untainted by the peculiarities of the recent credit crunch. Meanwhile Norway and the United Kingdom remain triple A rated throughout the sample period.

CIRP is well established in recent decades amongst the OECD economies for short-term instruments. Any apparent deviations are due to transactions costs (Al-Loughani and Moosa, 2000, Bhar et al., 2004, Taylor, 1987, Taylor, 1989) and during the extreme market conditions of 2007–08, spill over effects from counter party credit risk in the money market (Baba & Packer, 2009). Otherwise large deviations after transactions costs are rare and fleeting (Louis, Blenman, & Thatcher, 1999) and in recent years have

virtually disappeared (Batten & Szilagyi, 2010). Batten, Chan, Chung, and Szilagyi (2011) find that market frictions due primarily to interest rate volatility cause the parity price to vary within a trading ban. Aliber (1973) finds that credit risk can explain violations in CIRP in the pre floating exchange rate regime in the late 1960s. Another possible reason why covered interest rate parity may not hold is tax (Levi, 1977) but Stroble's (2001) model finds that CIRP remains unaffected by capital gains tax.

However Fong, Valente, and Fung (2010) find large numbers of deviations in covered interest rate parity for the Hong Kong Dollar for the short term capital market. They find evidence that most of these deviations are caused by liquidity and credit risk premia yet some violations persist and can be exploited by traders able to negotiate small transaction fees. Moreover Fletcher and Taylor (1996) also find that deviations from CIRP are neither rare nor short lived in the long dated capital market. They do not provide an economic reason why this is the case however. Moreover, except for Fong et al. (2010) CIRP has not been examined for capital markets outside the OECD club. This paper seeks to address these gaps by examining CIRP for Brazil, Chile, Russia and South Korea for the short and long-term horizons.

We are also curious to see whether the size of the economy plays any role in evident violations in covered interest rate parity. For instance, the volume of foreign exchange transactions can be much smaller for modest sized economies so a lack of liquidity can lead to violations in covered interest rate parity. For this reason we also examine the United Kingdom, a large triple A rated economy and Norway, a small triple A rated economy and compare their results with the emerging market economies.

A salient feature of this study is the quality of the data. This study uses time synchronised closing daily mid, bid and ask prices for the spot currency, three month and five year forward currency exchange rates, three month interest rate, five year swap interest rate and five year credit default swap rates as reported by Bloomberg™ as of 16:30 British Standard Time BST. Only data for instruments that were flagged by Bloomberg™ as actively traded were used. The credit default swap data allows for an examination of the role of credit risk and the bid and ask data allows for an examination of the role of transaction cost in explaining apparent deviations in CIRP.

In contrast to Fong et al. (2010) this paper finds that for a three-month time horizon, deviations in CIRP are rare and are nearly fully explained by transaction costs for all four emerging markets that are examined. Any remaining violations are trivial. It is possible that our results differ from Fong et al. (2010) as they use tick data rather than time synchronised end of trading day data so violations that occur during the day are exploited and arbitrated away by the close of business. However, we do find that deviations in CIRP can be large and frequent for the long-term capital markets. Specifically, after transactions costs Brazil, Chile, Russia and South Korea all show some degree of violation in CIRP at a five-year horizon. In contrast Norway and the UK show no evidence of violation of covered interest rate parity at either the three-month or five year horizons. This suggests that it is credit risk rather than the size of the economy that is related to violations in CIRP. While credit default swaps CDS can help explain some of the emerging market violations, still large and frequent CIRP violations remain. In fact, when insuring deviations from CIRP with CDS the deviation from covered interest rate parity often changes sign from a large negative to a large positive thereby suggesting that CDS contracts overprice credit risk. However, like Fong et al. (2010) regressing proxies for aspects of credit risk on deviations from covered interest rate parity finds that credit risk is at least part of the explanation for these violations as the largest violations of covered interest rate parity are associated with factors related to credit risk. Overall this paper finds that there are indeed violations in covered interest rate parity in the long-term capital markets but only for emerging economies. Moreover, credit risk rather than the size of the economy or transactions costs appear to be the source of these violations.

The plan for this paper is as follows. Section 2 derives CIRP for single and multiple periods and show how CIRP can be obtained even in the presence of credit risk. Section 3 introduces the data and the methodology. Section 4 presents the numerical analysis that examines the size and importance of discrepancies in covered interest rate parity. Section 5 conducts a regression analysis on discrepancies in covered interest rate parity. Section 6 then summarises and concludes.

Section snippets

CIRP with and without credit risk

To appreciate how credit risk impacts on CIRP, it is useful to review classic CIRP in detail. The problem faced by an investor wishing to access higher foreign interest rates $r_f > r$ is shown in the diagram below. Note that S represents the number of foreign currency units per USD (i.e. 3 Brazilian reals to \$1).

Transaction	T = 0	T = 1
Borrow initial investment S_0 and agree to pay domestic interest rate r and principal with funds received from foreign bonds S_1 to be converted into dollars one period hence.		

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Data and methodology

One problem encountered in examining covered interest rate parity is a lack of high quality observations on long-term interest rates the terms of which are comparable across different markets. A ready solution is the interest rate swap market. This market has evolved into one of the most important international fixed income markets. This instrument allows investors to convert a sequence of floating rate payments into a fixed stream and vice versa. The quote is always the fixed rate against the...

Numerical analysis

We now examine deviations in returns from covered interest rate parity evaluated at the mid transaction prices. The deviations in returns are examined twice, first without adjusting for credit risk by subtracting the right hand side of Eq. (1b) from its left hand side and second after adjusting for credit risk by subtracting the right hand side of Eq. (2b) from its left hand side. This step examines covered interest rate parity assuming that transactions costs are zero and so should provide the ...

Regression analysis

The numerical analysis concludes that while covered interest rate parity does hold for the UK and Norway in the short and long term and for the emerging markets for the short term, it does not hold for emerging markets for longer-term maturities. Therefore we would like to explain these deviations by

regressing common proxies for aspects of credit risk such as market risk premiums, volatility and default risk on the absolute value of DCIRP.

It is natural to suggest that market turbulence can be...

Summary and conclusions

This paper examines deviations in covered interest rate parity for Brazil, Chile, Russia, South Korea, Norway and the UK. While there is little evidence of any violation in covered interest rate parity at three months maturity, the size and frequency of violations in covered interest rate volatility increase with maturity for the four emerging markets. This study concludes that covered interest rate parity holds for the UK and Norway for short and long-term capital markets but holds for the...

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...Although they take into account credit risk by utilizing credit default swap premium to investigate market efficiency for the long-term period, they employ a standard CIP condition (with transaction costs) for the short-term period. Unlike Skinner and Mason (2011), we try to develop a new model to accommodate EM-specific features to investigate market efficiency for a short-term period. Our model is closely related to that of Blenman (1991), who devises CIP under market segmentation....

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...Then, given the estimated parameters in Tables 4–11, our next step is to examine the main underlying explanatory variables. Specifically, as in Clarida and Taylor (1997) and Clarida et al. (2001) we include variables that reflect main macroeconomic development such as output, inflation, risk free rate as in Skinner and Mason (2011),³ unemployment rate, balance of payments, terms of trade and budget deficit, obtained from Datastream. In addition, we choose some variables to reflect risks and uncertainty on a wider institutional, economic and political base, see for example Cosset and Doutriaux de la Rianderie (1985), Bailey and Chung (1995), such as legal risk, tax risk, operational risk, political risk, economic risk and security risk, obtained from Global Insight....

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