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The existence of uncovered interest parity in the CIS countries

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ABSTRACT

This paper examines uncovered interest parity (UIP) for six countries of the Commonwealth of Independent States (CIS) – Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan and Moldova – using quarterly data on spot exchange and three-month Treasury bill interest rates over the period 1995:01–2010:02. Three model specifications are used: the conventional 'approximate' interest differential model specified in first differences of exchange rates and the two unconventional 'precise' models specified in levels of exchange rates. Results obtained from the former model are consistent with UIP, since the coefficient on the interest differential is positive in all cases. These results imply that the CIS currencies offering a significant interest differential tend, on average, to depreciate over the sample period as UIP predicts. Results from the latter two models are strongly supportive of UIP in the long run in all cases, except for Armenia when a restricted specification is used, and Armenia, Moldova and Georgia when an unrestricted specification is used. Yet the deviations from UIP that are allowed in the short run may lead to the profitability of carry trade in the CIS currencies offering the significant interest differentials. The results confirm that carry trade is highly lucrative in all the CIS currencies, and outperforms the U.S. stock market.

1. Introduction

Since the advent of the flexible exchange rates in the early 1970s, the tremendous amount of work has appeared on the theory and empirics of the uncovered interest parity (UIP) hypothesis and its various underlying testable implications. This hypothesis, which is associated with Fisher (1930), postulates that in efficient markets for capital and foreign exchange across countries, in which funds move around freely, transaction costs are absent and economic agents are rational and risk neutral, the market's expected change in spot exchange rates should be equal, on average, to the interest rate differential. As for the market's expectation pertaining to the future change in spot exchange rates, in the standard neoclassical framework it is postulated to be determined by the forward premium (or discount), since covered interest parity (CIP) put forth by Keynes (1923) asserts that the forward premium (or discount) must be equal to the interest differential[1]. Thus another testable implication of UIP is that the forward exchange rate should fully reflect all available relevant information to predict the expected future spot rate. This is also known as the unbiased efficiency (UE) hypothesis postulating that in perfectly competitive and informationally efficient foreign exchange markets, the forward premium (the forward rate) should be an unbiased and an efficient predictor of the market's expected change in the spot exchange rate (the spot exchange rate) such that the expected return on forward speculation is equal to zero over time[2]. Therefore, the OLS estimates of the regression of the future change in spot exchange rates on the interest differential or the forward premium should yield a numerical value of zero for the intercept term, unity for the slope coefficient and zero mean serially uncorrelated for the regression errors[3]. If these hypotheses hold precisely, then currencies yielding high interest rates must depreciate (sell at a discount) against currencies yielding low interest rates by exactly an amount that should offset completely the gain from the interest differentials (forward

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[1] In fact, UIP is obtained by combining CIP and UE, since CIP must always hold as an arbitrage or a hedging condition (see, Moosa, 2004; pp.401–404 for derivation). This also implies that, if CIP holds at all times, testing UE amounts to testing UIP.

[2] In reality, UE can be derived in two ways. First it can be derived from the behavior of risk-neutral investors operating in efficient financial (foreign exchange and capital) markets, as embedded in CIP and UIP wherein both the expected change in exchange rates and the forward premium are determined by the interest differential, which in turn reflects investors' expectations about future inflation rates in domestic and foreign countries. Thus, if CIP and UIP hold together under the twin assumption of rationality and risk neutrality, then by definition it must be true that a one-period forward exchange rate equals the corresponding expected spot exchange rate (see, for example, Smithin, 2002-2003; pp.219–220; and for derivation of UE see Bhatti, 1997; pp.404-7; and Moosa and Bhatti, 1997; pp.79–80). Second, as Moosa (2004; pp.399–400) demonstrates, it can be derived from the behavior of speculators in spot and forward exchange markets alone. Thus, if a speculator believes that a one-period forward exchange rate is lower than his anticipated corresponding spot exchange rate, he can make profit by buying the foreign currency forward and selling spot (and vice versa) when the forward contract matures one period later.

[3] In this regression equation, the intercept term reflects the absence of the risk premium and transaction costs, the slope coefficient measures unbiasedness of the interest differential (the forward premium) in predicting the future change in spot exchange rates and the stochastic regression term captures the impact on the future changes in spot exchange rates of the unsystematic interest rate (forward rate) forecasting errors and omitted factors that keep UIP from holding.

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premium), thereby eventually eliminating all opportunities of the profitability of uncovered interest arbitrage or what is described as carry trade[4]. Thus, the failure of UIP may induce currency managers to engage in carry trade by borrowing funds in a low-interest (funding) currency and investing the borrowed funds in a high-interest (target) currency, betting that the target currency will not depreciate over the holding period so as to offset the gain from the interest differential[5]. Similarly, the failure of the UE hypothesis may motivate carry traders to sell forward currencies that are at a forward premium and buy forward currencies that are at a forward discount to capitalize on the differential between the forward rate and the corresponding future spot rate. The failure of these hypotheses also implies that real interest parity does not hold, and as such domestic monetary authorities across countries will retain the ability to control their short-term interest rates that are different from those prevailing in the rest of the world (Lavoie, 2000; pp.163–165). Thus, the final testable implication of UIP is that if capital markets around the world are highly integrated and if the expected change in spot exchange rates and risk premia are stationary, then the domestic nominal interest rate should move in line with the foreign nominal interest rate, and as such domestic monetary authorities will become unable to control their interest rates. However, most studies investigating the validity of UIP, UE and interest rate linkages across countries have documented evidence which usually indicates the failure of these hypotheses.

This paper contributes to the strand dealing with the empirical testing of UIP directly by utilizing data on both interest rates and exchange rates. For this purpose, UIP is tested for six countries of the Commonwealth of Independent States (CIS) – Azerbaijan, Armenia, Georgia, Kazakhstan, Kyrgyzstan and Moldova – over the period 1995:01–2010:02. This is done by using three model specifications. The first model is the 'approximate' conventional interest differential model specified in first differences of exchange rates. The OLS results obtained from this model are consistent with UIP, since the coefficient of the interest differential is positive in all cases. These results indicate that most of the CIS currencies offering interest rates higher than the U.S. dollar tend, on average, to depreciate against the U.S. dollar over the sample period under investigation. It is, however, argued that the approximate UIP model suffers from different problems.

First, the OLS estimates from this model tend to converge on the true parameters at a relatively slower speed compared with the model specified in levels of exchange rates. Second, the approximate model is likely to be misspecified when changes in exchange and interest rates are too high, since it neglects the term $\Delta s^e \times R^*$ on the presumption that it is too small. Third, the OLS estimates from the UIP model specified in levels of exchange rates will be consistent (or superconsistent) if the variables underlying this model are cointegrated. Finally, the OLS estimates would not be valid if the variables underlying both sides of this model were found not to be I(0). In fact, in four of six cases the null of a unit root in the interest differential cannot be rejected, implying that the interest differential is not stationary. The alternative 'precise' specifications used here do not suffer from such problems. The first specification used here examines whether the interest parity forward rate (the spot exchange rate adjusted by a factor reflecting the interest differential) is an unbiased and an efficient predictor of the future spot exchange rate. This specification is 'restricted', since it presumes implicitly that the coefficients on both the current spot rate and the interest rate differential are equal to unity. The second specification used here is 'unrestricted', since it tests empirically rather than imposes implicitly that the coefficients on the current spot rate and the interest rate differential are equal to unity. UIP performs better when it is examined on the basis of the model specified in levels of exchange rates rather than first differences of exchange rates.

The reason motivating this work goes as follows. The first reason is that since the independence from the Soviet Union, these countries have indeed undertaken impressive measures to integrate themselves into the world economy, in particular the United States. They have liberalized not only their current account transactions against non-CIS countries but have also liberalized their transactions related to capital accounts. National currencies in most of the CIS countries are fully convertible. Besides, these countries have experienced a moderate increase in trade and capital flows. The second reason is that interest and exchange rates have been relatively more volatile in the CIS countries than the United States. Taken together, these factors are likely to have created an environment much conducive to UIP in the CIS countries. The third reason is that only little work has been conducted on examining the relevance of UIP for the CIS countries. The remainder of the paper is structured as follows. Sections 2–4 provide a coherent overview of the empirical work on UIP, UE and nominal interest rate linkages. In Section 5, an attempt is made to present a brief exposition of the UIP hypothesis, model specifications in levels and first differences of exchange rates and the restrictions underlying them. Section 6 deals with the data sources, testing methodology and empirical results. Concluding remarks are presented in the final section.

2. Empirical evidence on UIP

2.1. Direct tests of UIP based on the conventional interest differential model

The bulk of empirical work conducted, inter alia, by Cumby and Obstfeld (1984), Gaab et al. (1986), Mayfield and Murphy (1992) and McCallum (1994) employing conventional estimation procedures (ordinary least squares (OLS) or seemingly unrelated regressions (SUR)) to test the regression of the future change in exchange rates on the interest differential have produced results which are usually and decisively inconsistent with the UIP relationship. Most often, the majority of these studies have reported that the estimated value of the coefficient of the interest differential is negative[6], implying that unlike the prediction of UIP high yielding currencies tend, on average, to appreciate rather than depreciate over time. The negative relationship between the future change in exchange rates and the interest differential has been confirmed by many researchers. In his survey of the empirical studies on UIP, McCallum (1994) concludes that the average value of the coefficient of the interest differential equals −3 instead of +1, whereas Engel (1996) concludes that the coefficient lies between −3 and −4. In a survey of 75 published papers, Froot and Thaler (1990) report that the average value of the estimated coefficient of the interest differential is −0.88. They report few cases where the sign of the coefficient on the interest rate differentials in exchange rate prediction equations is consistent with UIP. Flood and Rose (2002) argue that "a strong consensus has developed in the literature that UIP works poorly"

[4] Moosa (2010) argues that carry trade is essentially another better name for uncovered interest arbitrage since it is a risky operation, and as such the failure of UIP does not necessarily imply the profitability of carry trade. La Marca (2007) argues that carry trades are not pure arbitrage strategies as the funding in low interest currencies and investment in high interest currencies involve duration risk as well as, in many cases, exchange rate risk.

[5] It is argued (e.g. Gyntelberg and Remolona, 2007; and Moosa and Halteh, 2012) that carry traders typically choose currencies that offer a significant interest differential to compensate for the underlying foreign exchange risk, borrowing in low-interest currencies and lending in high-interest currencies, and that profit will be made on carry trade only if the target currency does not depreciate against the funding currency by a percentage that exceeds the interest differential. The carry trade strategy is, therefore, practiced hoping that exchange rate movements will not overwhelm the interest rate differential, in the sense that any gain from the interest rate differential is wiped out by foreign exchange losses.

[6] The failure UIP is rationalized on three grounds. First, UIP fails because market's expectations are irrational (see Frankel and Froot, 1990; Mark and Wu, 1998). Second, a time-varying risk premium exists (see Domowitz and Hakkio, 1985; Nieuwland et al., 1998). Third, if the policy behavior is taken into account, then the future changes in exchange will be negatively related to the interest rate differential (see McCallum, 1994). Assuming that policy makers adjust interest rates to smooth out movements in exchange and interest rates, McCallum (1994) derives a reduced form equation under rational expectations showing that there is a negative relationship between the future change in exchange rates and the interest differential or the forward premium.