Financial Market Integration, Arbitrage and Interest Rate Parity in the Caribbean

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Abstract

The study utilizes the framework of uncovered interest rate parity (UIP) to examine whether the liberalization of the capital market in a select group of Caribbean countries has led to the increased integration of their money markets, as well as increased integration with the US money market. The paper also investigates the arbitrage opportunities that exist between the three regional money markets and that of the US. The results indicate that UIP does not hold between the regional economies and the US. Moreover, among the three territories, significant arbitrage opportunities were found to exist with respect to short-term investment opportunities in Jamaica for investors in Guyana and Trinidad and Tobago. The high correlation of returns in the short end of the money markets, however, militates against the optimal diversification of risks regionally.

Introduction

One of the most important aspects of the new policy regime in the Caribbean has been the liberalization of the financial market. Indeed, a number of countries have liberalized their capital accounts and adopted flexible exchange rate regimes. Theoretically, rational investors in open financial systems should exploit arbitrage opportunities created by differential rates of return on similar assets in different jurisdictions[1] and this could lead to a tendency for rates on equivalent assets to converge.

An interesting research area concerns the extent to which interest rates on similar assets across jurisdictions have converged, particularly following the formation of the Caribbean Single Market Economy. Arbitrage between markets is critical to bringing about convergence of rates, and accelerating the integration of the financial markets. However, if arbitrage fails to occur, then this raises some interesting issues. For example, if arbitrage is not occurring, is it because of transactions costs or is it because the exchange rate risk premium is too large? Is it because agents in these markets are too risk-averse to exploit these arbitrage opportunities? How do expectations about future exchange rate movement form in these jurisdictions? These questions raise important issues of relevance to policy makers in the region. In particular, depending on the answers to these questions, they have implications for the ability of the domestic authorities to tax financial activity and the ability of the monetary authorities to conduct independent monetary policy. These

[1] This of course assumes that equivalent financial assets in different countries are close substitutes and the major differences relate to the interest rate and currency denomination. It also assumes that there are no significant transactions costs and capital controls.

developments also have implications for the complexity of regulating and supervising financial activity to prevent financial instability.

These issues have generally been well ventilated in developed market economies but have not yet received the attention they deserve in the Caribbean. This paper attempts to fill this gap by reviewing the arbitrage opportunities available (arbitrage gap) in the short end of the money markets of Guyana, Jamaica and Trinidad and Tobago[2], the degree of convergence between foreign interest rates and domestic rates in these countries using the framework of the Uncovered Interest Parity (UIP) and the decomposition of the factors that drive interest parity of the lack thereof. The paper also attempts to glean some policy implications from the empirical results.

Literature Review

Uncovered interest parity (UIP) is one of the more important areas in international finance since it serves as the basis for many theoretical models including the balance of payments (Williamson 1983) and exchange rates (Frankel 1979, Flood and Garber 1984). UIP basically posits that the expected change in the spot exchange rate is going to be driven by current interest differentials between the countries in question. This model assumes that foreign exchange markets are perfect which implies that agents are risk- neutral and expectations are formed rationally. It also assumes that the securities markets are perfect with no transactions costs, taxes or capital controls. Equivalent financial assets in different countries are therefore the same except for their interest rate and their currency denomination. In these conditions arbitrage will tend to equalize any differential in interest rates between countries.

UIP also has many policy implications, chief among them being that sterilized foreign exchange interventions would be relatively ineffective if UIP holds (Taylor 1995). This is so because attempts to change the prevailing spot exchange rate relative to the expected future spot rate would result in countervailing interest rate changes. Interest rate defense of currencies under speculative pressures would similarly be ineffective (Flood and Rose 2001). Deviation from UIP is therefore a

[2] We do not focus on the long end of the market since information is scarce due to the relatively underdeveloped nature of this part of the market and the related infrequency of transactions.

necessary condition for these policy initiatives to work. UIP also has implications for the forecasting of nominal exchange rates since it posits that in an efficient market the nominal interest rate differential should be equal to the expected change in the nominal exchange rate (Bleaney and Laxton 2003).

The uncovered interest parity (UIP) model posits that the expected interest rates on equivalent local and foreign securities would tend to converge (when the spot exchange rate between two countries are factored in) on the grounds that agents in the market will exploit arbitrage opportunities in situations where the rates are not equivalent in such a way as to drive the rates closer together. A failure of this condition to hold implies a number of possibilities. For example, it may indicate that the foreign securities are in fact imperfect substitutes and agents may need to be compensated for a higher risks associated with these securities. It may also indicate markets are not efficient and that there are significant transactions costs, which prevents arbitrage from operating efficiently to drive interest rate convergence and then parity.

Given the importance of UIP in international finance, many studies have sought to test whether UIP or its real counterpart real interest rate parity (RIP) in fact holds. Most studies have in fact been unable to show that the relationship exists (Davidson 1985, Loopesko 1984, Hodrick 1987, MacDonald and Taylor 1992) while those that have been more supportive of UIP includes Meredith and Chinn 1998, Flood and Rose 2001, Moosa and Bhatti 1996, Bleaney and Laxton 2003 and, Wu and Fontas 2000.

For studies in which UIP failed to hold[3], many concluded that a significant constant or time-varying premia existed that frustrated the achievement of parity (Froot and Frankel 1989 and Frankel and Chinn 1993). Other reasons which have been advanced for the failure of this condition, include the so called “peso” problem (Krasker 1980), a simultaneity bias driven by the dynamic of the actions of the monetary policy authority (McCallum 1994), incomplete information and the process of rational learning where repeated “mistakes” are made (Lewis 1988, Lewis 1989) and self fulfilling

[3] The majority of empirical studies have indicated that UIP does not hold. Moreover, many of these studies have results that are the opposite to that posited by UIP (Froot and Thaler 1990).

prophecies of rational agents or rational "bubbles" (Flood and Hodrick 1990, Mussa 1990, Obstfeld and Rogoff 1986).

The risk premium bias argument posits that constant or time varying risk premium in the foreign exchange market exist which frustrate interest parity. The literature that explores this reason for the failure of UIP generally focuses on building conceptual models of the risk premium as defined by the deviation from UIP. This approach often concludes that the prediction bias which causes the failure of the UIP condition to hold, is really an omitted variable problem which can be addressed by including a behavioral model of the risk premium in the right hand side of the UIP equation. The peso problem reason for the failure of UIP draws its name from an episode of prolonged forward discount before its widely anticipated devaluation in 1976. Essentially, the basic point this event illustrate is that even if expectations are formed rationally, the forward rate can still be a biased predictor of the future spot rate in finite samples because when agents expect the rate to change in response to policy or some other event which fails to materialize over a fairly long period.

Another explanation for the failure of UIP revolves around the failure to simultaneously estimate a related relationship between interest rate differentials and exchange rates driven by the dynamics of the short-term foreign exchange market interventions of the monetary authorities. This seems to be corroborated by the evidence of a statistically significant but incorrect signed relationship between the change in exchange rates and the level of foreign exchange market intervention, which implies a simultaneity bias (Dominguez and Frankel 1993). A fourth explanation for the failure of UIP is that market participants lack adequate information and is engaged in a process of rational learning about factors which impact on the behaviour of exchange rates. Agents may therefore act rationally on information available at time t to make forecasts of exchange rates at time $t+1$ but because they need to learn continuously as market conditions change they are prone to making repeated mistakes. A fifth reason which have been advanced for the failure of UIP relates to the notion of self fulfilling prophecies of rational agents but few believe it to have much plausibility in empirical work. The theoretical possibility of rational "bubbles" reflect the fact that many rational expectations models have indeterminacies which generate multiple equilibria and, in the case of exchange rate behaviour models, infinite numbers of solutions for the time-part of the exchange rate. The fact that the time-part of forward forecast errors do not explode over time suggests, however, that rational bubbles are an unlikely explanation of the forward prediction bias and a reason for the failure of UIP (Obstfeld 1989).

In studies where interest rate parity was found, attempts were made to deal with some of these methodological weaknesses. For example, Wu and Fountas (2000) attempted to account for stationarity and structural breaks, where long term interest rate were used instead of short term rates since short rates are more contaminated by monetary policy initiatives which could frustrate parity, especially when testing between countries that react differently to the some shocks (Meredith et. al. 1998) and when more credible proxies for the expected exchange rate are used (King 1998).

Moreover, the vast majority of studies investigating the existence of UIP are based on developed market economies, which generally have low inflation and floating exchange rate regimes. UIP may, however, work differently in countries where interest and exchange rates are much more volatile. UIP may also become more relevant as financial markets deepen and as agents become more sophisticated and comfortable engaging in arbitrage across boarders. In fact Flood and Rose (2001) finds that "While UIP still does not work well it works better than it used to,.", indicating that the objective conditions needed for UIP to hold has increasingly gotten closer to what is required.

Many of these studies, however, suffer from methodological deficiencies such as additional assumptions being imposed on the UIP conditions, the proxy used for expected exchange rates (rational expectations is assumed and the current exchange rate is used for the expected exchange rate) and because of the econometric method used such as the failure to deal with the issue of stationarity and to account for structural breaks in the testing procedure (King 1998).

In this context, we seek to examine whether uncovered interest rate parity (UIP) between Caribbean economies and the US holds, with respect to the money market. In particular, we are interested in those territories which have liberalized their financial systems both in terms of eliminating restrictions on capital flows and adopting flexible exchange rate regimes, since the issue has serious policy implications for these jurisdictions. These issues include the scope for independent monetary policy, the effectiveness of interventions in the foreign exchange market and the actual degree of capital mobility. Accordingly, Guyana, Jamaica and Trinidad and Tobago are the critical territories of interest. The investigation of the UIP condition also helps to shed light on the convergence of rates and the factors that may be of influence in this regard.

Theoretical Framework

As mentioned before, UIP is based on the proposition that if domestic interest rates are not equal to agents' expected returns on equivalent foreign securities, then they will borrow at the relatively low interest rates and invest the proceeds at the relatively high rate until the two are equalized.

Formally, the notion of UIP can be stated as follows. Assuming that i_t and i_t^* are the interest rates that can be earned between time t and $t+1$ on local currency investments in countries A and B, respectively. Also let S_t and F_t be the spot and forward exchange rate between the currencies of the two countries. The uncovered version of the interest parity condition considers the option of holding units of currency B in B denominated investments and converting into currency A at the spot exchange rate that prevails at time t+1. This investment decision would lead to an accumulation of $S_{t+1}(1+i_t^*)$ units of currency A. The important distinction of using this investment option is that in this option the investor remains uncertain about the exchange rate until the day of conversion arrives. This means that the foreign exchange risk is left **uncovered** during the period between times t and t+1.

The UIP model posits that market forces (arbitrage) will work to equalize the return that investors expect to earn on the uncovered investment alternative to the return on the no-risk option of converting into currency A initially, the version of the interest parity condition where the exchange rate risk is **covered**. In particular, if the expected value at time t of the spot exchange rate at time t+1 can be expressed as $E_t S_{t+1}$, the UIP model can be expressed as

$$E_t S_{t+1}(1+i_t^*) = S_t(1+i_t) \qquad (1)$$

Taking logs (indicated by lower case letters) and rearranging we get

$$E_t s_{t+1} - s_t = r_t - r_t^* \qquad (2)$$

Where r_t and r_t* are the domestic (1+i_t) and foreign (1+i_t*) rates of return on equivalent securities in different countries at time t. Equation (2) is the risk free arbitrage conditions that hold irrespective of the preferences of investors. The absence of reliable data on expectations of future exchange rate movements means, however, that we are unable to formally test the proposition in this form. If one assumes that investors are risk-neutral and they form their expectations of future exchange rates rationally, the expected future spot exchange rate can be regarded as an unbiased predictor of the actual future spot rate. If we assume rational expectation holds then future realizations of the spot rate will equal the spot rate at time t plus a white noise error term, which is uncorrelated with information known at time t, which includes the interest rate differential and the spot exchange rate.

$$s_{t+1} = E_t s_{t+1} + u_{t+1} \qquad (3)$$

where u_{t+1} denotes the error term. Substituting (3) into (2) we get:

$$s_{t+1} - s_t = r_t - r_t^* + u_{t+1} \qquad (4)$$

Equation (4) can also be expressed as

$$\Delta s_{t,t+1} = r_t - r_t^* + u_{t+1} \qquad (5)$$

Equation (5) embodies the UIP proposition when investors are risk-neutral and expectations are formed rationally. In effect, therefore, one is testing the UIP proposition jointly with the assumption of rational expectations in the foreign exchange markets and we can do this via the equation:

$$\Delta s_{t,t+1} = b_0 + b_1(r_t - r_t^*) + u_{t+1} \qquad (6)$$

Under the assumption of rational expectations, the error terms would be serially uncorrelated and have zero means. The null hypothesis of UIP (sometimes called the "unbiasedness hypothesis") can then be expressed as b_0=0, b_1=1. In practice, however, most of the literature has focused on b_1 since this gives an idea of degree of proportionality between exchange rate changes and interest rate differentials.

As discussed above, where UIP has failed many attribute the failure to risk premia. This has directed attention to building conceptual models of the risk premium. This risk premium is generally defined as the deviation from UIP. That is, taking from (2) above, instead of:

$E_t s_{t+1} - s_t - r_t + r_t^* = 0$ which indicates that if UIP does not hold we have

$$E_t s_{t+1} - s_t - r_t + r_t^* = \rho_t \qquad (7)$$

which indicates that UIP is frustrated by a risk premium ρ_t or

$$E_t s_{t+1} - s_t = r_t - r_t^* + \rho_t \qquad (8)$$

Following steps (3) through (6) we get

$$\Delta s_{t,t+1} = b_0 + b_1(r_t - r_t^*) + \rho_t + u_{t+1} \qquad (9)$$

Equation (8) suggests that the failure to find UIP may be due to an omitted variable problem, which could be solved by extending the right hand side of the model to include a behavioral model of ρ_t.

Many authors have suggested the kind of factors driving the magnitude of the risk premium. Boulos and Swanson (1994) argue that factors such as transactions costs, tax effect, liquidity premiums and or measurement errors drive the risk premium while Flood and Rose (2001) indicate that exchange rate and interest rate volatility may be significant determinants of the risk premium. We therefore assume that the risk premium can be modeled as:

$$\rho = f(er_v, i_v, tr, liq) \qquad (10)$$

where

er_v is the volatility of exchange rates,

i_v is the volatility of domestic treasury bill rate

tr is transaction cost

liq is the excess liquidity in the case of Guyana and Jamaica, and excess reserves in the case of Trinidad and Tobago.

Volatility in exchange rates can trigger the use by the monetary authorities of higher interest rates to defend the currency. Unstable domestic interest rates may encourage investors to seek a higher premium in order to invest in the locally denominated asset. The transaction cost variable is the difference between the bid and asking price of the exchange rate. This variable is used to capture inefficiencies in the currency market, so that the wider the difference, the greater the risk premium demanded by investors should be. The excess liquidity is used to capture the prevailing monetary context. High excess liquidity is expected to exert downward pressure on domestic interest rate and therefore narrow the spread, where local rates were already higher than the foreign rates.

The volatility of the exchange rate and the treasury bill rate was computed as a moving standard deviation according to the general maturity profile of the treasury bill considered. For example, the volatility of a 3-month treasury bill rate was computed by taking the standard deviation over the last three months, for each successive rate. A similar calculation was done for the exchange rate.

Methodology

For the purpose of this study, the empirical methodology centers around the investigation of three concerns: 1) tests for uncovered interest rate parity, 2) tests for convergence of risk premia in the regional money markets, 3) exploration of the factors generating risk premia.

Test for the long-run uncovered interest rate parity

Equation (6) forms the basis of the tests of interest rate parity. A challenge in conducting such tests is the determination of the forward rate. In all countries, the time horizon for the forecast of the forward rate is set to coincide with the maturity of the treasury bill being considered. For example, the forward exchange rate when considering a 3-month treasury bill is set at the corresponding three months. In Guyana and Trinidad and Tobago, the three-month treasury bills are considered, so that the forward rate is forecasted for a 3-month horizon. Similarly, in Jamaica, the 6-month treasury bill is considered, and the forward rate is set at a 6-month horizon. These instruments were selected because of the frequency with which they are traded in the respective markets, compared to other maturities. Agents are assumed to be rational, so that the actual exchange rate at the end of the forecast horizon is assumed to be correctly forecasted. The equation is estimated by OLS, providing that the terms are I(0). If however, the variables are I(1)s, then the cointegration methodology is considered.

Tests for convergence of the risk premia in the regional money markets

The risk premia was calculated using equation 7. The convergence of the risk premia was examined by finding the significance of the differences in risk and returns between markets, and the long run association of returns. The significance of the differences is tested through the use of ANOVA. Returns are measured in terms of the risk premia, while the volatility of the returns is measured by the standard deviation of the risk premia of the series for each country. Following this, the returns are tested for cointegration.

Exploration of the factors generating risk premia

The functional relation in (10) is examined principally through the use of impulse response functions to examine their impact on the risk premia, of a one standard deviation shock on current and future values of the other endogenous variables. The impact is shown both incrementally and cumulatively for different short-term horizons, in order to study the importance of the explanatory factors.

The frequency of the data is monthly for Guyana, and Jamaica, but bi-weekly for Trinidad and Tobago. The data series for both Guyana and Jamaica are from January 1994 to June 2003. In the case of Trinidad and Tobago, it runs from January 2000 to June 2003.

Results

Tests for Interest Rate Parity

A criticism of earlier studies on interest rate parity, is that they used classical regression techniques, but ignored the stochastic nature of the variables under study.[4] Indeed, non-stationarity in the error term will cause OLS estimates not to be consistent and the standard tests will not be based on the

[4] See for example, Mishkin (1984) and Gaab et al. (1986).

appropriate distributions. As a preliminary step, therefore, the stochastic properties of the spreads were investigated by establishing their order of integration. Where both the exchange rate and interest rate spreads were found to be I(0), then OLS estimation was used. However, if they were both I(1), then the spreads will be tested for cointegration. Unit root tests were conducted using the tests recommended by Dickey and Fuller (1981) as well as the tests suggested by Phillips and Perron (1988). The test results re-enforced each other, so that only the results of the ADF are reported.

Table 1 Unit Root Tests

	Level Series			1st Dif		
	C	C&T	NCT	C	C&T	NCT
Guyana						
$er_{t+3} - er_t$	-4.2***(2)	-4.2***(2)	-3.9***(2)			
$i_t - i_t^*$	-2.7*(0)	-2.2(0)	-2.0*(0)		-9.4***(0)	
Jamaica						
$er_{t+6} - er_t$	-3.57***(0)	-1.26(6)	-2.6**(1)		-7.0***(0)	
$i_t - i_t^*$	0.75(0)	-0.34(1)	1.6(0)	-7.3***(0)	-7.4***(0)	-7.2***(0)
Trinidad and Tobago						
$er_{t+3} - er_t$	-3.2**(3)	-3.2*(3)	-3.2***(3)			
$i_t - i_t^*$	-0.68(0)	-2.83(0)	0.85(0)	-11.4***(0)	-11.4***(0)	-11.3***(0)
Risk Premia						
ρ_{Guyana}	-1.31(1)	-2.4(1)	0.49	-4.31***(0)	-4.3***(0)	-4.3***(0)
$\rho_{Jamaica}$	-0.14	-3.22*(1)	2.06(0)	-4.06(0)***		-3.71***(0)
$\rho_{T\&T}$	-0.79(0)	-2.94(0)	0.84(0)	-7.29(0)***	-7.23***(0)	-7.05***(0)

Notes: The variables in paranthesis represent the lag length selected. Lag length was determined through the use of the Schwarz information criterion (SC). C is a constant, C&T is a constant and time trend, and NCT is no constant and time trend. *** is significant at a 1 per cent level, ** is significant at a 5 per cent level, and * is significant at a 1 per cent level.

Both terms were I(0) only in the case of Guyana (See Table 1). An attempt was therefore made to test for interest rate parity using OLS. The initial regression showed a very low R^2 (see Table 2). Moreover, the regression exhibited higher order serial correlation. Despite the fact that the serial correlation problem was reduced by the addition of the AR(2) term, the main parameter of interest, β, was not close to unity. Thus the interest rate parity condition was rejected for Guyana.

Table 2: Tests of the Interest Parity Condition in Guyana.

$\hat{\alpha}$	$\hat{\beta}$	AR(1)	AR(2)	DW	R^2
0.0163	-0.008			0.239	0.012
0.0118	-0.004	1.3104***	-0.5013***	1.9113	0.84

Notes: 1. The dependent variable is the spread between the forward and spot exchange rates
2. *** is significant at a 1 per cent level, ** is significant at a 5 per cent level, and * is significant at a 10 per cent level.

The interest rate differential turned out to be I(1) in Jamaica and Trinidad and Tobago, while the spread between the forward and spot rates in both countries were found to be I(0). The variables by themselves were not cointegrated, therefore, rejecting the hypothesis that there was a long-run relationship between both terms. The evidence therefore did not support the hypothesis of interest rate parity between the US and these countries.

The rejection of the interest rate parity in all three countries, suggests that there is significant risk premia associated with these markets. Chart 1 shows the level of risk premia associated with these markets, over the common period, January 2000 to March 2003. The premia was tested between all three markets to see whether there was any significant difference between returns and volatility. The ANOVA results suggest that returns in the Jamaica market are significantly higher than in Guyana and in Trinidad and Tobago (See Table 3). In fact, there was no significant difference in the returns emanating from the money markets in the latter two countries. Additionally, the volatility of returns were greater in Jamaica than in the other two territories, thereby suggesting a positive relation between risk and return between the three territories.

Table 3. Test of equality of the risk premia: Means and Standard Deviations

	Guyana	Jamaica	Trinidad and Tobago	Anova F Statistic: All Three	Anova F Statistic: Guyana and Trinidad and Tobago	Brown-Forsythe (modified Levene) test: All Three	Brown-Forsythe (modified Levene) test: Guyana and Trinidad & Tobago
Mean	0.97	1.58	1.02	26.77***	0.50		
Std	0.33	0.52	0.31			10.69***	0.41

Note: *** is significant at a 1 per cent level, ** is significant at a 5 per cent level, and * is significant at a 10 per cent level.

An attempt was also made to examine the association between the risk premia in all three markets, to see to what extent short-term investments in the markets will diversify risks. As a preliminary step, the correlations between the variables were inspected and turned out to be high, (See Table 4). The risk premia variables were I(1)s in all markets, so that they were tested for cointegration. The variable was found to be cointegrated across countries, suggesting a long-run association between the returns obtained in the markets (See Table 5). The result suggests that buying treasury bills across these three regional countries will not optimally diversify risks in the long-run for investors.

Table 4 Correlation between Risk Premia of Countries

	ρ_{Guyana}	$\rho_{Jamaica}$	$\rho_{T\&T}$
ρ_{Guyana}	1	0.92	0.96
$\rho_{Jamaica}$		1	0.92
$\rho_{T\&T}$			1

Table 5 Cointegration Tests: Risk Premia

	Eigenvalue	Trace Statistic	Max-Eigen Statistic
r=0	0.55	34.85***	26.36***
r<1	0.17	8.48	6.09

Notes: *** is significant at a 1 per cent level, ** is significant at a 5 per cent level, and * is significant at a 10 per cent level.

The wider economic issue, however, is whether the movements in the rates are driven by common factors, given the fact that they share a long-run association. The association between the risk premia with stability, demand and supply factors and transactions costs are shown in Table 6. The correlations vary significantly between the countries according to the variables considered.

Table 6 Correlation between monetary conditions and Risk Premia

Monetary Conditions	Guyana	Jamaica	Trinidad and Tobago
Exchange Rate Volatility	0.0227	0.43	0.29
Interest Rate Volatility	0.35415	0.31	0.12
Excess Liquidity	0.65886	0.39	-0.01
Transactions Cost	-0.43798	0.02	0.61

Impulse analysis was used to examine the dynamic interactions between risk premia and the variables of interest. Incremental movements in the response of risk premia to shocks are shown in Charts 2-4, while the cumulative impact is shown in Table 7. The diagrams suggest that most of the shocks last at least a year in their impact on the risk premia. An examination of Table 7 suggests that there are certain commonalities in the factors impacting on the movement in risk premia. Shocks on the risk premium are the most important factor impacting on the variation in the risk premia, and its effect is procyclical. This suggests that past information on movements in the risk premia is the most important variable impacting on the future level of risk premia. Secondly, exchange rate volatility generally has a positive impact on the risk premia in each country. This suggests that the more volatile the exchange rate is, the more likely the risk premia is to increase, no doubt because of interest rate increases to buffer the exchange rate risk.

The countries differ, however, in terms of the order of importance of stability, liquidity and transactions cost variables. In Guyana, the volatility of the exchange rate is the second most important factor impacting on the risk premia at the maturity of the treasury bill instrument and at the end of the 12 months. Interest rate volatility is the second most important variable impacting on the risk premia, but its impact is countercyclical. This may stem from the downward trend that the rate exhibited over the period.

In Jamaica, liquidity has the largest impact, after shocks in the risk premia itself. The effect is countercylical, suggesting that there is a liquidity effect on interest rates. That is, a positive shock in liquidity dampens the magnitude of the risk premia. Exchange rate stability plays the second largest role in the third and 6th month, but it is overtaken by transactions costs in the 12th month.

With respect to Trinidad and Tobago, transactions costs consistently played the second largest role in generating increases in the risk premia. Indeed, an examination of the incremental changes suggests that shocks in transactions costs lead to higher increases in risk premia and died away slowly.

Table 7. The Cumulative Impact of Shocks on the Risk Premium

Period		Risk premium	Interest volatility	Exchange rate volatility	liquidity	Transactions cost
3	Guyana	0.35	-0.11	0.01	-0.03	-0.08
	Jamaica	1.21	0.30	0.29	-0.33	0.23
	Trinidad and Tobago	0.63	-0.05	-0.01	0.07	0.18
6	Guyana	0.54	-0.18	0.18	0.02	-0.16
	Jamaica	2.24	0.43	0.62	-0.62	0.59
	Trinidad and Tobago	0.97	0.07	0.06	0.06	0.34
12	Guyana	0.65	-0.39	0.58	0.24	-0.22
	Jamaica	3.90	0.45	1.00	-1.12	1.10

	Trinidad and Tobago	1.19	0.30	0.38	-0.13	0.57

Conclusions

In spite of capital market liberalisation, the results do not support the existence of uncovered interest rate parity between the three Caribbean territories and the US market, with respect to money market rates. Accordingly, there is scope in the regional markets for the exercise of monetary policy independent of the US.

Notwithstanding their segmentation with the US market, the risk premia associated with investments in the regional money markets are showing early signs of moving together along a common long-run path. This fact would limit the degree to which investors can diversify risks across all three markets. However, it is questionable as to how long the similar trend would continue, since the trend in each market appears to be driven by different factors. This implies that although there are broad similarities across these markets, there are important differences in structure and functioning that cannot be ignored in investment decision making. Nevertheless, the results show that there are significant arbitrage opportunities for investors emanating from Guyana and Trinidad and Tobago with respect to investing in the money market in Jamaica, given the higher returns available in that market after taking exchange rate movements into account.

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Chart 1 Risk Premium

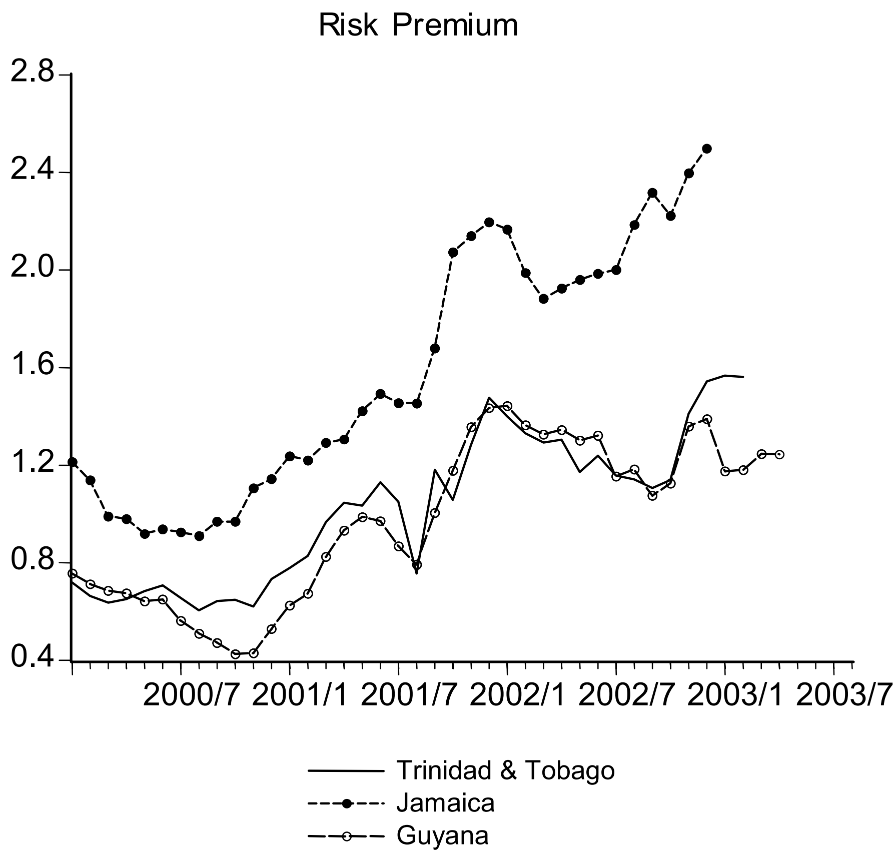

Chart 2 Guyana: Generalised Impulse Response Functions

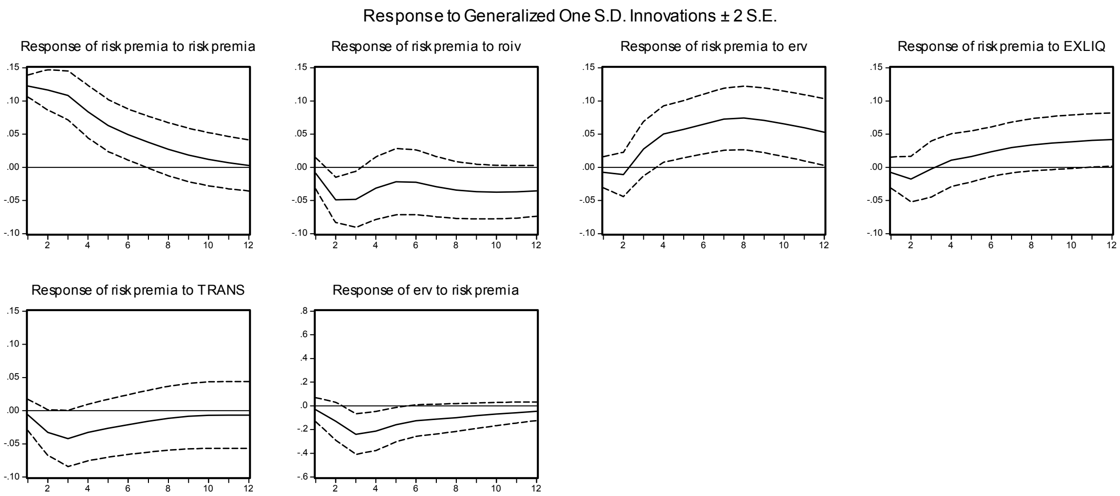

Chart 3 Jamaica: Generalised Impulse Response Functions

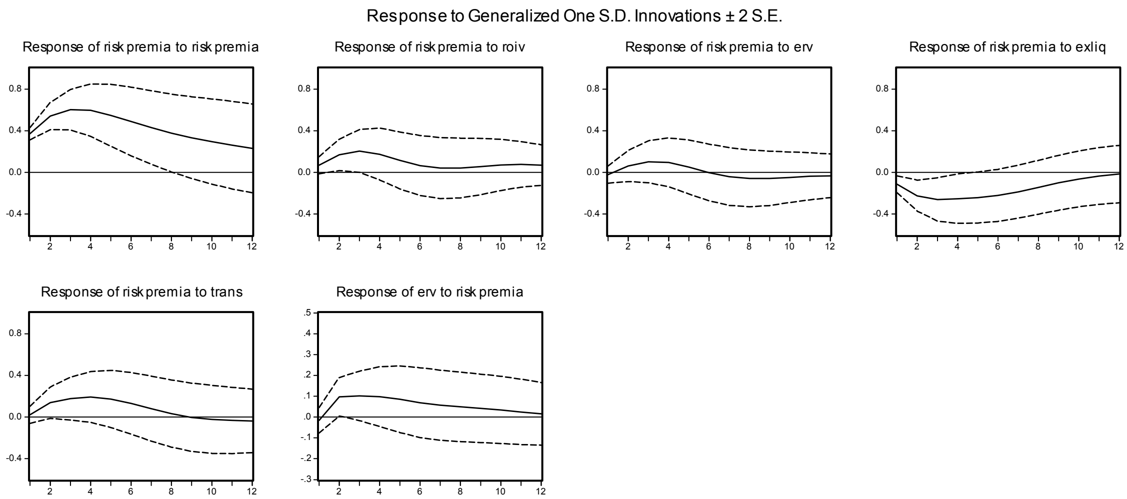

Chart 4 Trinidad and Tobago: Generalised Impulse Response Functions