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An Examination of the Macro-Economic Influence on Nominal and Real Interest Rate Spreads in the Caribbean

Anthony Birchwood

Central Bank of Trinidad & Tobago
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(Draft Preliminary)

Anthony Birchwood
Caribbean Centre for Monetary Studies
The University of the West Indies
St. Augustine
Trinidad

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The study raises the question concerning why commercial bank interest rate spreads vary significantly across territories in the Caribbean Community (CARICOM) in spite of the fact that the territories possess similar regulatory systems and they share commonly owned commercial banks. Moreover, it examines the trend in interest rate spreads and whether they are converging, given evidence of increased financial market integration through cross-border mergers and acquisitions, the liberalised nature of regional financial markets and the growth in the non-bank sector in the region. The primary hypothesis is that cross-country differences and the trend towards convergence in interest rate spreads may be significantly influenced by differences in macroeconomic out-turns. Through the use of panel estimation techniques, the study is done at industry level and the relationships are explored between interest rate spreads and market factors. Indeed, market factors, including GDP growth, inflation ,liquidity and the exchange rate regime, are found to have a significant influence on the magnitude and the convergence of interest rate spreads.

Introduction

The magnitude of interest rate spreads is often regarded as an indicator of competition and efficiency of the banking system. According to Fuentes and Basch (2000), high spreads suggest market inefficiency and acts as an impediment to savings and investment decisions. At the same time, one of the arguments extolling the virtues of liberalisation, is that liberalization would lead to narrower interest rate spreads and reduce the cost of financial intermediation. It is predicted in competitive models that as markets become more competitive, banks would compete on the basis of cost efficiency, rather than depend on interest rate spreads to increase their profitability.

Studies in the international literature do not find support for the McKinnon (1973) and Shaw (1973) hypothesis that liberalization of the financial sector would lead to a reduction in interest rate spreads. For example, Barajas et al (1999) found that high spreads persisted in Columbia despite financial reforms. They found that a major factor driving these spreads was loan quality. Mlachila and Chirwa (2002) used data for a panel of commercial banks in Malawi and found that spreads remained high after financial liberalisation. Nguaioqu (2001) also observed that interest rate spreads in Kenya increased following economic liberalization. Most of these studies sought to investigate interest rate spreads chiefly through bank specific factors, but sometimes they included regulatory, macroeconomic and risk factors.

Despite the fact that the banking industry in the Caribbean is fairly open to new entrants, interest rate spreads in the region continue to be high. Very few studies have investigated the sources of these spreads across the Caribbean territories. Notable exceptions are the studies by Randall (1998), and Moore and Craigwell (2002). This former study utilized bank specific factors to account for interest rate spreads in the Eastern Caribbean. The study found that operating cost was the primary factor influencing interest rate spreads. The latter study found that market power, coupled with supply factors such as intermediation cost, provision for loan losses and the provisioning of services drove interest rate spreads.

Notwithstanding these findings, an interesting question concerns why spreads are significantly higher in some regional territories compared to others, despite the fact that many of the economies share the same banking institutions and similar regulatory systems. In fact, the Eastern Caribbean Currency Union (ECCU) upon which the Randall (1998) study is based, possess a high percentage of banks that are found in the advanced industrialized countries. Yet these banks maintain lower spreads in the industrialized countries and higher spreads in the ECCU. It is contended in this study that some market imperfections which generate larger spreads in the regional markets may arise from differences in macroeconomic performances.

This study investigates the type of macroeconomic influences that may have helped to account for differences in interest rate spreads in the region, for the period 1991 to 2002. The next section outlines the methodological approach employed. This is followed by an examination of stylized facts associated with the regional markets over the period covered by the study. The empirical findings are then reported, following which the study is concluded with a brief summary of the results.

Method of Investigation

Data for the territories, The Bahamas, Barbados, Belize, The Eastern Caribbean Currency Union, Guyana, Jamaica, Suriname, and Trinidad and Tobago are pooled for the period 1991 to 2001. The study takes a long view, so that annual data are used in the estimations. All data, except for commercial bank reserves, loans and deposits are extracted from the report on economic convergence, a report produced by the Caribbean

Centre for Monetary Studies. The bank variables are taken from the monthly statistical reports of the respective central banks.

The significance of macroeconomic variables to the wedge between lending and deposit rates is examined by panel estimation techniques. Accordingly, the models are formulated to investigate the macroeconomic influences on lending and deposit rates in nominal and real terms. As such the models are:

$$rspread = f(gr, \inf, \ln dp, depres) \quad \ldots\ldots(1)$$
$$rspreadr = f(gr, \ln dp, depres) \quad \ldots\ldots(2)$$

where gr is the growth of GDP; inf is the inflation rate; *fiscur* is the fiscal current account balance; *fistot* is the overall fiscal balance; $\ln dp$ is the ratio of new loans to new deposits; *depres* is the deposit by commercial banks in the central bank; and *rspreadr* is the real interest rate spread, calculated as *rspread* - inf .

The real spread is calculated as $(rlen - \inf) - rdep = (rlen - rdep) - \inf = rspread - \inf = rspreadr$. This suggests that banks are charging a lending rate high enough to compensate for expected inflation and would therefore ideally like the real lending rate to be above the nominal deposit rate in order to increase the real marginal returns. Alternatively, *rspeadr* can be derived from the idea that banks will like to increase their marginal returns by paying a real deposit rate below the nominal lending rate, such that $rlen - rdep - \inf = rspread - \inf = rspreadr$.

Banks are assumed to correctly anticipate the inflation rate, as they seek to increase their marginal returns. Consequently, it is assumed that they display rational expectations with respect to the inflation rate by anticipating the inflation rate correctly, in pricing either the lending or deposit rate. In terms of transmission, Cuckierman and Hercowitz (1990) put forward the argument that an increase in inflation leads to portfolio substitution into real assets, and therefore leads to a rise in the demand for intermediation. In the face of increased demand, an oligopolistic market structure affords banks the opportunity to raise profitability by widening their nominal interest rate spreads.

The models in this study go further than those in the literature, where the macroeconomic factors are often confined to economic growth and inflation. The basic argument is that in a small open economy, where a large percentage of the banks are foreign owned, bank specific factors are largely shaped by the macroeconomic environment given that the regulatory systems are similar. However, the relationship between most of the macroeconomic variables and interest rate spread is largely an empirical matter, as there are sound theoretical arguments for interest rates to move in either direction in response to economic stimuli. Moreover, as Brock and Franken (2002) points out, there is no generally agreed framework in the literature for investigating the macroeconomic influences on interest rates. For example, one channel of influence, derived from Bernanke and Gertler (1989, 1990), is that economic growth can improve the net worth of borrowers and consequently reduce interest rate spreads. However, this situation can be altered, depending on the liquidity conditions and the demand for credit in the economy.

The relative increase in the demand for loans relative to deposits can also provide clues concerning the liquidity conditions faced by banks. However, the impact on the direction of interest rate spreads rates is largely an empirical matter, as it depends to a great extent on whether interest rate movements are driven by supply or demand factors. Where the demand for loans dominates the supply, lending rates can be expected to rise faster than deposit rates, thereby widening the interest rate spreads. However, spreads can also narrow, where the supply of deposits dominate the demand for loans, causing spreads to narrow.

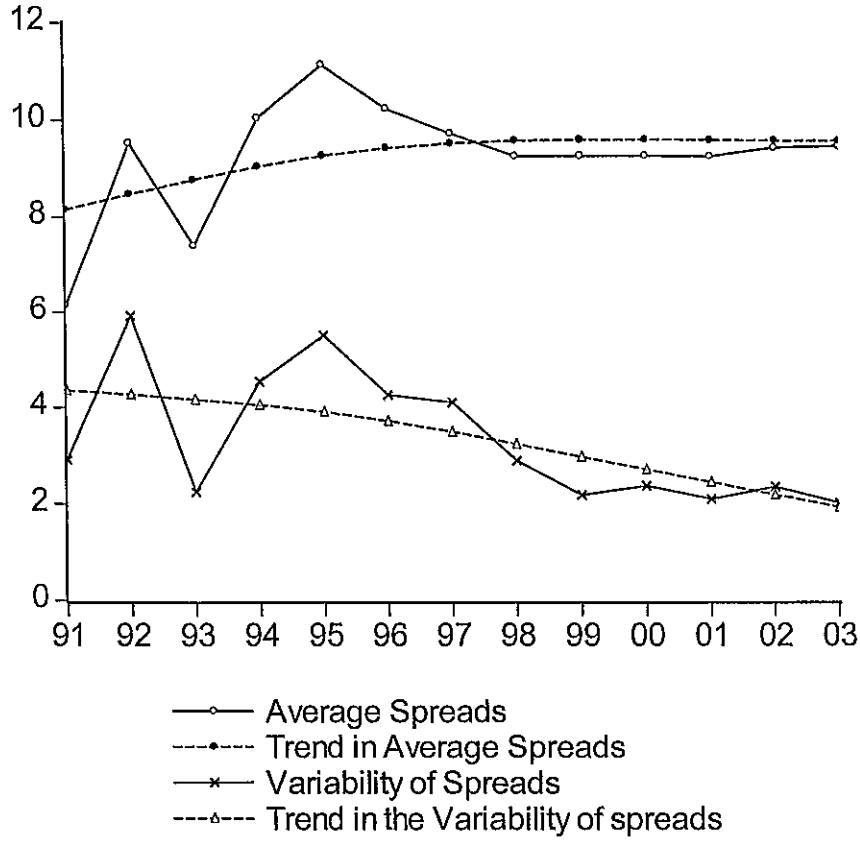
Finally, an attempt is made to account for the tax on financial intermediation by examining the proportion of deposits of the commercial banks, that are lodged in the central bank, by examining the change in the ratio of deposits of the commercial banking industry in the central bank to total deposits received by the commercial banks. The idea being that as commercial bank reserves increase in the central bank, banks may try to compensate for the liquidity tax by widening the spread. This provides a very crude proxy at best, as the variable represents a composite of reserve requirements, prudential reserves held by commercial banks, and unused funds accumulated from the financial intermediation process. As a result, the sign of the coefficient can be in either direction following increases in the ratio. For example, increases in the ratio can lead to banks reducing their lending rates and therefore narrow their spreads in order to off load some of the surplus funds on their hands. On the other hand where it is driven by reserve requirement, banks may opt to widen their interest rate spreads by raising their lending rates.

Stylised Facts Related to the Industry in the Region.

The regional economies are open to the entry of foreign banks. However, the number of banks by territory decreased from 92 in 1991 to 83 by 2003, mainly as a result of merger activity (See Birchwood 2003). At the end of 2003, 50 per cent of the banks were foreign owned, while 13 per cent were owned by cross border interests. There was therefore some degree of supply integration in the region, so that fragmentation of the regional markets as indicated by the CGCED report, was more likely to be on the demand side. Aggregated data are not available, but there has been cross-border flows in the region, evidenced by the fact that some banks have been able to trade liquidity. Trade by banks has been facilitated through cross-border ownership and the increased integration of money and capital markets.

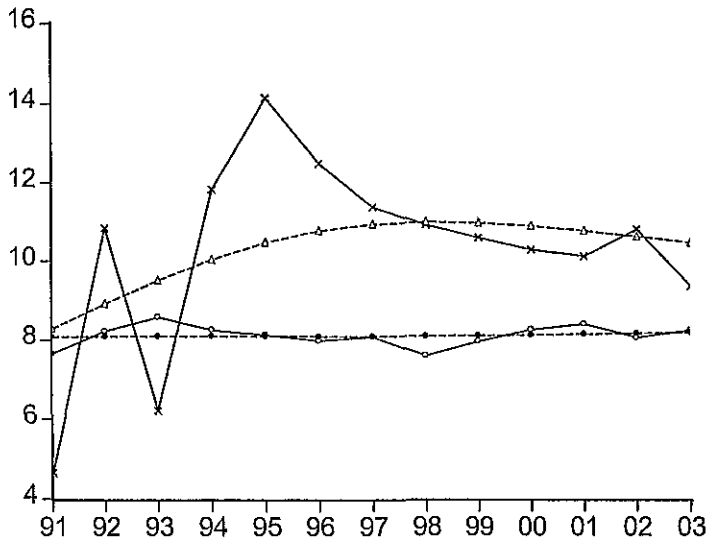
In spite of these occurrences, spreads in the region widened (See Figure 1). The average spread increased from 6.1 per cent in 1991 to 9.5 per cent by 2003.

Figure 1 Trend in Nominal Interest Rate Spreads and Convergence



There is some evidence of σ convergence as the coefficient of variation trended downwards over the period. But such convergence took place around rising interest rate spreads.

Figure 2 Comparison of Trends in Nominal Interest Rate Spreads Between Countries with Fixed and Floating Exchange Rates



—○— Interest Rate Spreads for Countries with Fixed Exchange Rates
---•--- Trend in Average Interest Rate Spreads for Countries with Fixed Exchange Rates
—×— Interest Rate Spreads for Countries with Floating Exchange Rates
---△--- Trend in Interest Rate Spreads for Countries with Floating Exchange Rates

Figure 3 Trend in Real Interest Rate Spreads and Convergence

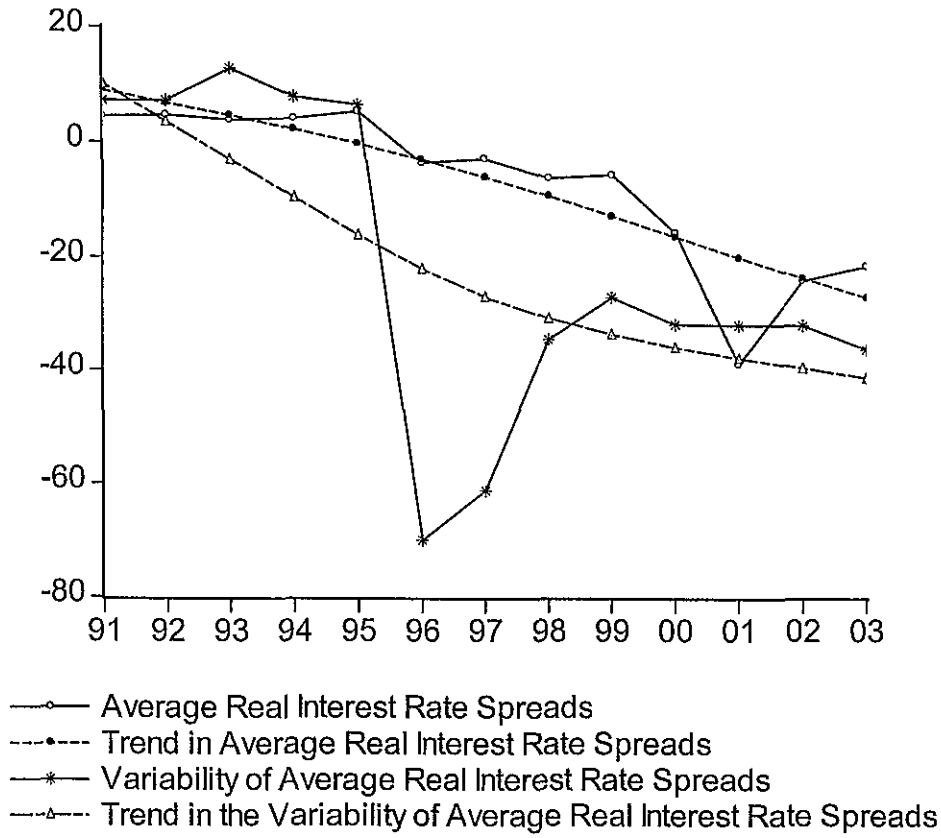


Figure 4 Trend in Real Interest Rate Spreads for Countries with Fixed Exchange Rates

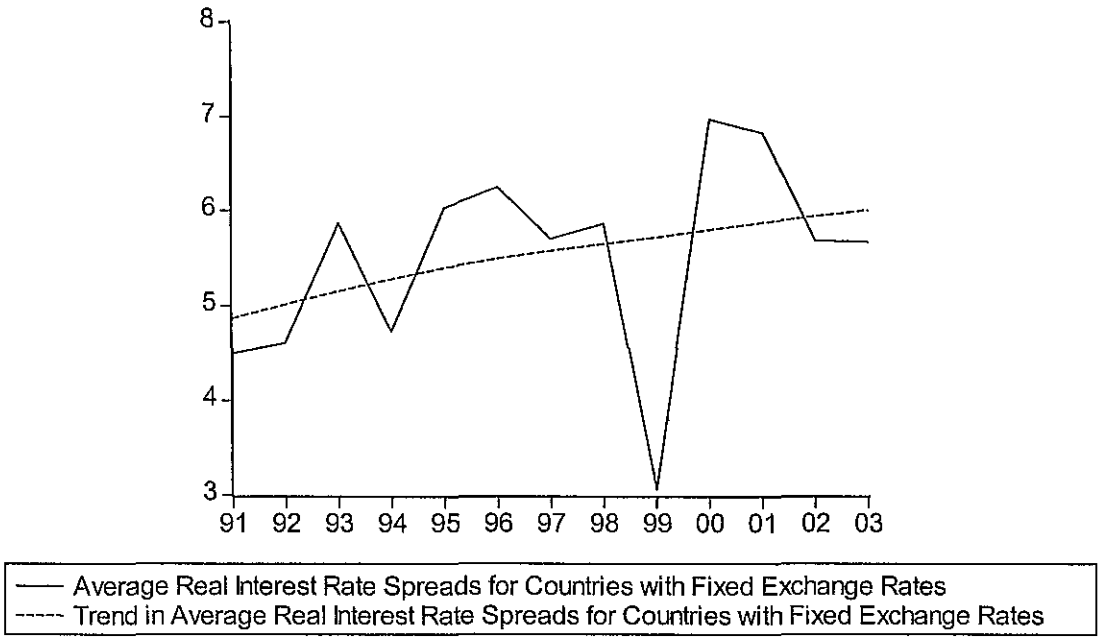
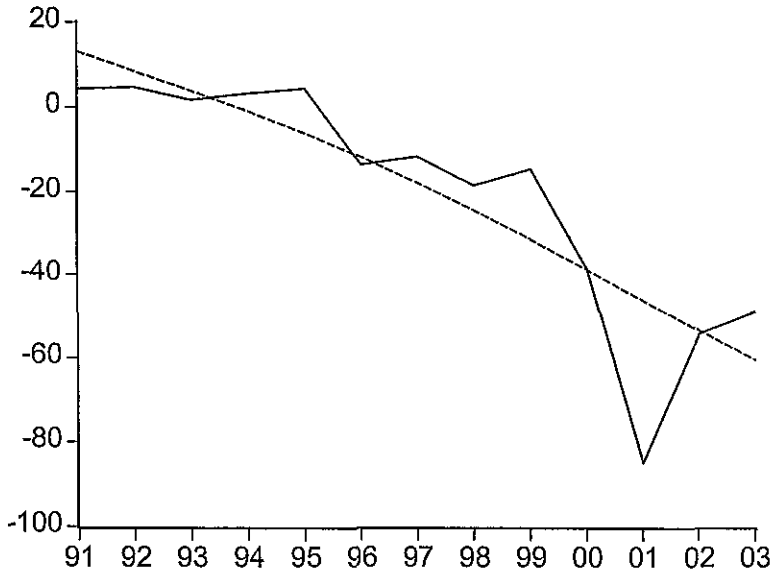


Figure 5 Trend in Real Interest Rate Spreads for Countries with Floating Exchange Rates



The widening of spreads goes against the predictions of the neoclassical models where under financial liberalization, market entrants will emerge to increase competition, and force banks to compete on the basis of efficiency, rather than use spreads to increase profits. Moreover, spreads are expected to narrow as banks diversify their sources of income and become less interest dependent. Conditions in the region could have added to market imperfections, could have therefore lead to wider interest rate spreads. For example, the number of banks reduced rather than increased, so that openness has not resulted in a broadening of competition.

It is also interesting to note that though the regional economies experienced positive growth for most of the period, and bank assets and deposits rose rapidly, more than tripling (See Birchwood 2003). However, the growth of loans lagged behind that of deposits. Birchwood and Nicholls (2000) contends that investment demand did not keep pace with the rapid rise in deposits. During this time, the governments in most territories ran expansionary budgets in the face of increasing liquidity in the region.

Table 1 Averages per country for the Period 1991 to 2001

ɔuntry	Growth	Inflation	Current Fiscal Balance	Overall Fiscal Balance	Loans to Deposits	Commercial Bank Deposits in the Central Bank	Nominal Interest Rate Spread	Real Interest Rate Spread
ıe Bahamas	2.24	1.98	1.17	-1.73	1.19	0.05	8.20	5.81
arbados	1.12	2.55	2.95	-1.92	0.70	0.044	7.108	4.27
elize	5.46	2.16	3.15	-4.61	-1.45	0.08	9.76	6.51
CCU	2.54	2.32	1.09	-4.07	0.85	0.06	7.53	5.78
uyana	4.59	7.62	3.65	-3.45	0.67	0.18	9.43	-5.15
maica	0.96	22.02	1.47	-1.85	0.12	0.0002	14.16	-10.68
ıriname	1.04	101.45	-4.80	-4.83	0.73	0.27	12.71	-52.70
rinidad and ɔbago	2.89	5.65	0.92	-0.58	2.16	0.26	7.24	1.5

Notes: Fiscal Balances are displayed as a percentage of GDP. Loans to deposits represents the change in gross loans as a ratio of the change in deposits. Nominal interest rate spread represent the weighted average lending rate minus the weighted average deposit rate. Real Interest rate spread represents the nominal interest rate spread less inflation.

Liquidity pressures accumulated in most cases as the increase in new loans was lower than the rise in deposits in most territories. One exception is Trinidad and Tobago where net new loans increased by 17 times that of net new deposits. However, loans increased by less than new deposits in all other periods for that country.

Tests were conducted with respect to the equality of mean interest rate spreads across the member territories (See Table 2). The nominal spreads exhibited by the banking

industries in four countries, Barbados, The Bahamas, ECCU and Trinidad and Tobago were significantly the lowest and they were not significantly different from each other. Interest rate spreads were significantly the highest in both Jamaica and Suriname. These results coincide with the magnitude of inflation rates in the region, where the territories with higher inflation rates displayed significantly wider spreads.

Table 2 Equality of Nominal interest rate spreads between countries

Countries	Mean	Test for Equality of Means	
		T statistic	F Statistic
Bahamas, The	8.20		2.14
Barbados	7.11		
ECCU	7.53		
TT	7.24		
TT and Belize		4.20***	17.63***
Belize	9.76	0.55	0.30
Guyana	9.43		
Guyana and Jamaica		2.54**	6.44**
Jamaica	14.16	0.59	0.35
Suriname	12.71		

Interestingly, the countries with the highest nominal interest rate spreads exhibited the lowest spreads in real terms (See Table 3). Accordingly, Guyana, Jamaica, Suriname and Trinidad and Tobago exhibited the lowest real spreads and their spreads were not significantly different from each other. At the same time, the countries with fixed exchange rates exhibited lower inflation rates and the highest real spreads.

Table 3 Real Interest Rate Spreads

Countries	Mean	Test for Equality of Means	
		T Statistic	F Statistic
Guyana	-5.15		0.18
Jamaica	-10.68		
Suriname	-52.70		
Trinidad and Tobago	1.59		
Trinidad and Tobago and Barbados		1.86*	3.49
Barbados, Belize, The	4.27-6.51		1.60

Bahamas, ECCU			

Tests were also conducted to see whether the exchange rate regime mattered to the magnitude of interest rate spreads. The results show that countries with floating exchange are regimes exhibited higher nominal spreads (See Tables 4 and 5). The results were reversed with respect to real spreads as the territories with floating exchange rates exhibited lower spreads, with spreads being negative for these territories after adjustments in inflation.

Table 4: Equality of Nominal Interest Rate Spreads between Countries with Floating and Fixed Exchange Rates

Exchange Rate Regime	Mean	Test for Equality of Means	
		T Statistic	F Statistic
Fixed Exchange Rate	8.11	3.13***	9.85***
Floating Exchange Rate	10.28		

Table 5: Equality of Real Interest Rate Spreads between Countries with Floating and Fixed Exchange Rates

Exchange Rate Regime	Mean	Test for Equality of Means	
		T Statistic	F Statistic
Fixed Exchange Rate	5.22	3.32***	11.05***
Floating Exchange Rate	-20.46		

Estimation Results

As a first step, group unit root tests were conducted with respect to nominal and real interest rate spreads (See Tables 6 a and b). Accordingly, the tests emplyed were those by Levin, Lin and Chu (2002), Breitung (2000), Im, Persaran and Shin (2003), and Hadri (2000). In addition, Fischer type tests by Maddala and Wu (1999), and Choi (2001) were employed. Lag lengths are determined by the use of the modified Schwartz Information Criterion. The group unit root tests generally rejected the hypothesis that the variables contained a unit root whether common or individual.

Table 6a: Panel Unit Root Tests for Nominal Interest Rate Spreads

Pool unit root test: Summary
Sample: 1991 2003
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic selection of lags based on SIC: 0 to 2
Newey-West bandwidth selection using Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.4916	0.0000	40	458
Breitung t-stat	-1.82445	0.0340	40	418
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-8.37517	0.0000	40	458
ADF - Fisher Chi-square	210.608	0.0000	40	458
PP - Fisher Chi-square	215.599	0.0000	40	473
Null: No unit root (assumes common unit root process)				
Hadri Z-stat	5.57780	0.0000	40	513

** Probabilities for Fisher tests are computed using an asympotic Chi -square distribution. All other tests assume asymptotic normality.

Notes: Variables are: Nominal Interest Rate Spreads, GDP Growth, The ratio of Loans to Deposits and the Ratio of Commecial Bank Deposits in the Central Bank. There are eight cross sections pertaining to each variable: The Bahamas, Barbados, Belize, ECCU, Guyana, Jamaica, Suriname and Trinidad and Tobago.

Table 6b: Panel Unit Rot Tests for Real Interest Rate Spreads

Pool unit root test: Summary
Date: 11/02/04 Time: 10:27
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic selection of lags based on SIC: 0 to 2
Newey-West bandwidth selection using Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-10.8063	0.0000	40	454
Breitung t-stat	-2.46956	0.0068	40	414
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.80052	0.0000	40	454
ADF - Fisher Chi-square	191.134	0.0000	40	454
PP - Fisher Chi-square	204.838	0.0000	40	473
Null: No unit root (assumes common unit root process)				
Hadri Z-stat	8.94957	0.0000	40	513

** Probabilities for Fisher tests are computed using an asympotic Chi -square distribution. All other tests assume asymptotic normality.

Notes: Variables are: Nominal Interest Rate Spreads, GDP Growth, The ratio of Loans to Deposits and the Ratio of Commecial Bank Deposits in the Central Bank. There are eight cross sections pertaining to each variable: The Bahamas, Barbados, Belize, ECCU, Guyana, Jamaica, Suriname and Trinidad and Tobago.

Given stationarity, panel estimation were conducted with respect to nominal and real interest rate spreads. A fixed effects cross sectional SUR was employed as the preferred technique, as the panel contains different economies and the entire region is represented. However, the result of the random effects model are reported for the sake of comparison.

Table 7: Panel Estimation Results for Dependent Variable: Nominal Interest Rate Spreads

	Dependent Variable: Nominal Interest Rate Spreads	Dependent Variable: Real Interest Rate Spreads

	Fixed Effects, Cross Sectional SUR	Cross Sectional Random Effects	Fixed Effects, Cross Sectional SUR	Cross Sectional Random Effects
C	9.17***	9.18***	-7.49***	-0.99
GDP Growth	0.07***	0.09	-1.05***	-0.01
Inflation	0.02***	0.03***		-0.15
Net New Loans to Net New Deposits	0.06***	0.05	0.33***	0.15
Commercial Bank Deposits in the Central Bank to Total Bank Deposits	-2.37***	-3.76	1.07	-56.8
Weighted R Squared	0.99	0.15	0.92	0.03
Unweighted R Squared	0.52	0.23	0.19	0.02
F Statistic	752.3***	3.54**	67.04***	0.75

Notes: The fixed effects model is estimated after adjusting for cross sectional and contemporaneous heteroskedasticity

With regards to the nominal interest rate spreads, inflation turned out to have a significant and positive impact on interest rate spreads when both fixed and random effect techniques were applied. The significance of the inflation rate is consistent with the idea that banks factor in inflationary expectations in determining their spreads. However, in the fixed effects model, the results also suggested that GDP growth and increases in the ratio of net new loans to net new deposits contributed to the widening of spreads. There was also evidence of a liquidity effect as the build up in commercial bank deposits in the Central Bank caused banks to narrow their spreads as they attempt to grapple with the challenge of excess liquidity.

In terms of real interest rate spreads, only the fixed effects cross sectional SUR was valid as the cross sectional random effects technique failed the F test. Based on the former,

GDP growth and net new loans to new deposits was significant. However, GDP growth carried a negative sign, in contrast to when nominal interest rate spread was the dependent variable. The result suggest that real spreads would tend to narrow in response to growth, after banks adjust their spreads for price expectations. The result is consistent with the hypotheses advance by Bernanke and Gertler (1989 and 1990) concerning the likelihood that growth would improve borrower net worth and therefore reduce interest rate spreads.

The evidence upholds the importance of liquidity conditions in the determination of interest rate spreads across the region. The demand for loans relative to the supply of deposits remained positive regardless of whether nominal or real spreads are considered and spreads tended to narrow as commercial banks build up deposits in the central bank.

Conclusion

The results emanating from the study suggests that macroeconomic factors contribute to interest rate spreads in the Caribbean. Accordingly, the results suggest that in addition to microeconomic factors obtained in previous studies, differences in interest rate spreads across the region may be due to differences in economic cycles, inflation and liquidity conditions. Moreover, the difference in the exchange rate regime mattered to the magnitude of interest rate spreads.

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