



An Empirical Investigation of the Relationship between Offshore Centre Activity and Banking System Performance in the Caribbean

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Abstract

Bank performance in one country may be dependent on the performance of other financial institutions within the country as well as within the region. Specifically, this study investigates ways in which offshore financial centers influence domestic banking activity in the Caribbean. The spatial econometric technique is employed to account for dependencies among the banking sectors within a sample of ten Caribbean Islands over the period 1994 to 2004. Spatial dependencies will exist in banking sector performance if financial sectors throughout the Caribbean are financially integrated. Traditional panel data techniques are also utilized to control for country-specific and time-specific unobservable factors which influence banking performance. Results indicate that the presence of the offshore sector has not had a positive impact on key financial indicators such as private sector credit to GDP, loan-to-deposit interest rate spread, net interest income and the capital to assets ratio. However, domestic banks located in OFC jurisdiction have earned higher profits and hold a higher share of assets relative to GDP compared to domestic banks located in non-OFC countries. Additionally, there is limited evidence of spatial interdependence. That is, the study finds that Caribbean region does not have integrated banking sectors.

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1. Introduction

Offshore financial centers (OFCs) have received increased focus from international authorities and central planners in recent years. In particular, a few developing economies have announced their intentions to establish an OFC within their borders in an effort to increase economic activity. Some of the specific reasons behind the establishment of an OFC include the opportunities to: diversify the economy; generate revenue from taxes and services fees; create employment; increase access to international capital markets; generate positive skills & technological spillovers; increase foreign currency inflows; and increase competitiveness in the domestic financial sector.

This study builds on previous work by Rose and Spiegel (2006) by investigating the impact that OFCs have on the performance of a country's domestic banking sector. In particular, the study identifies the impact of OFC activity on the balance sheet and income statements of domestic banks. In contrast to Rose and Spiegel, this study also employs spatial econometric panel data techniques to control for unobservable market effects that would otherwise be captured by the Ordinary Least Squares (OLS) error term.¹ Thirdly, this study investigates a relatively homogenous group of countries within a single geographical region, enabling more precise estimates of the effect of OFC activity on domestic banking sectors.

The impact of offshore business on the balance sheets and income accounts of banks is examined using a panel of ten Caribbean countries over the period 1994 to 2004, seven of which are classified as OFCs, as well as a reduced data set of five Caribbean territories covering the same period. Dummy variable techniques are used to capture structural differences in the performance of the domestic commercial banking sector of OFC Caribbean territories compared to non-OFC territories.

¹ See, for example, Blonigen *et al* (2005).

The rest of the paper is organized as follows. Section 2 describes typical characteristics of OFCs. Laws governing Caribbean offshore companies are briefly discussed in Section 3. Section 4 summarizes a review of the OFC literature. The model specification, econometric approach and data are discussed in Sections 5 and 6 respectively. Analysis of the banking sector data and discussion of the empirical results are done in Section 7. Section 8 concludes the paper.

2. Understanding the OFC

Offshore businesses are categorized as such because they are incorporated or resident in the OFC but conduct business solely with non-residents. There are three groups of OFCs: primary financial centers, secondary financial centers (or regional financial centers) and booking centers. OFCs of the Caribbean generally fall into the latter group. Alternatively, London, New York and Japan are the primary financial centers of the world. The primary center is an intermediary for the exchange of world capital and has strict regulatory guidelines for the protection of all parties in play. Primary centers manage the globe's wealth through banking services such as the issuance of loans and acceptance of deposits as well as through asset management services such as financial analysis and asset trading. Services offered within a primary center also include hedge fund management and insurance brokerage. Unlike secondary and booking centers, the sources and uses of capital are often located simultaneously in both domestic and regional markets.

Regional financial centers, like primary centers, have developed financial markets and infrastructure. However, unlike primary centers, regional centers have relatively small domestic economies and their main role is to intermediate funds in and out of its own geographical area. Regional centers can be broken down into two groups, funding centers and collection centers. Funding centers such as Singapore and Panama are centers in which offshore banks import capital and are the primary source of funds in the local economy. Collection centers include countries such as Bahrain that generate excess savings for export.

The third type of financial center is the booking center. The booking center is a tax haven that levies no or low taxes on profits from foreign activity and offers special tax privileges to all foreigners and foreign businesses. In addition to the tax benefits received, international companies incorporate in booking centers to benefit from the light regulatory standards of these jurisdictions. In the booking center, the sources and uses of funds of international companies are primarily conducted in other jurisdictions but are recorded locally for accounting purposes. In addition, international companies are typically not allowed to conduct business with residents or local companies.

Three main branches of OFC business are incorporated in booking centers. These are offshore companies, offshore trusts, and offshore banks. Some popular types of offshore companies include trading companies, trusts companies and property holding companies, all of which benefit from surpluses gained from minimal or no tax policies of the booking center. Trading companies specialize in massive imports and exports in which separate groups of companies can also benefit from lower prices and the economies of scale received from large cross-border trading activity. An offshore trust is an obligation in which an individual places assets with a trustee for the benefit of recipients. In addition to tax breaks, offshore trusts typically are not obligated by legislation to make holdings of property public information. This level of privacy has some significant value to exceptionally wealthy asset holders. Similarly, property holding companies preserve the wealth of its clients by avoiding inheritance taxes or taxes on capital gains when incorporated in tax haven OFCs.

Highly skilled professionals also seek tax haven OFCs jurisdictions in order to enjoy minimum tax burdens. Financiers, athletes, film makers and actors, just to name a few, may become OFC residents in order to benefit from untaxed profits and investments. The level of activity of offshore companies, trusts and skilled professionals located within the booking center will largely determine the demand for offshore banking. Like offshore companies and trusts, offshore banks enjoy low tax burdens, simple regulatory

frameworks, no foreign exchange controls and secrecy in banking, all of which help generate higher profits when incorporated in a tax haven OFC.

3. Some Legal Frameworks of Caribbean OFCs

There are 72 OFCs listed by the IMF in 2000 of which 15 are Caribbean Islands. There is significant variation in legislature overseeing Caribbean OFCs. The following OFCs are those included in the empirical investigation.

- Antigua: International companies are those conducting business solely with foreigners and foreign businesses. International non-investment companies are exempt from paying income taxes, taxes on profits, and taxes on capital gains for 50 years. International investment companies pay 2.5 per cent tax on dividends paid to foreigners.
- The Bahamas: International banks pay no income, withholding, or corporation tax. There are no taxes on profits or capital gains. International public banks are required to keep a minimum US\$2.0 million in paid-up capital, a minimum 5.0 per cent of assets and a minimum 8.0 per cent of risky assets. All offshore banks are required to have a physical presence in Bahamas and are required to maintain banking records locally. International companies cannot conduct business with residents.
- Barbados: Barbados levies regressive tax rates starting at 2.5 per cent on all profits and gains up to \$10.0 million (local currency) continuing to 1.0 per cent tax on all profits and gains in excess of \$30.0 million. However, no taxes are levied on capital gains, income or securities and assets owned by non-residents. Offshore banks are required to keep audited balance sheets and income statements. Resident international banks are required to hold minimum capital of US\$500,000.0. International businesses are not allowed to accept loans from domestic banks or conduct business with residents.
- Dominica: Offshore companies can conduct business tax-free for 20 years and there are no requirements for the filing of financial statements. International business companies are not

allowed to conduct business with residents. Dominican's offshore act makes strict restrictions on the disclosure of international company information.

- St. Kitts: Offshore banks face regressive tax rates starting at 2.5 per cent on the first EC\$10.0 million down to a rate of 1.0 per cent on profits exceeding EC\$30.0 million. Offshore banks are required to keep a minimum capital reserve of EC\$2.0 million and file audited balance sheets and income statements. International banks are permitted to use foreign funds in the domestic market.
- St. Lucia: International banks face no capital requirements or requirements to keep records of financial statements. International companies may choose to pay no income tax, capital gains tax, or may choose to be liable for income tax and capital gains tax at a rate of 1.0 per cent.
- St. Vincent: Class 1 international banks must maintain paid-up capital of US\$1,000,000.0. The international bank must establish a physical presence on the island and employ local workers. International banks pay no tax and must submit audited accounts yearly. International businesses may seek approval to do business with residents.

4. Literature Review

A large difficulty in quantifying features of OFC activity is the secrecy under which OFC business takes place. Zorome (2007) established an empirical methodology to classify OFCs throughout the world. Using data on the exports of financial services taken from IMF's Balance of Payments year book, Zorome classifies OFCs as those countries with exports of financial services greater than one standard deviation away from the mean of the sample countries. He finds that this statistical criterion gives considerable overlap with lists of OFC published by the IMF.

Rose and Spiegel (2006) investigated the impact of OFC activity on neighboring economies using OLS. Their study found a complementary relationship between OFCs and their neighbours. In particular, the study used measures of banking sector competitiveness, such as the interest rate spread and banking sector concentration between 2001 and 2002, to show that closer proximity to an OFC increases the

competitiveness of banking sectors and the financial depth neighbouring countries. Desai et al. (2005) further defend a complimentary relationship between tax haven and non-tax haven firm activity. Using multinational firm level data, they show that establishing an affiliate in a tax haven is associated with greater sales and investment growth of affiliates located in non-tax haven countries.

The effect of OFC activity in the local economy may be as important as its effect on neighbours. There is contradicting evidence on the consequences of tax breaks in the Caribbean. Goyal et al. (2005) estimate the value of forgone revenue from tax concessions to be as high as 16.0 per cent of GDP for some CARICOM territories and find that the granting of tax concessions had little direct impact on foreign direct investment. Sosa (2006) calculates marginal effective tax rates and finds that tax concessions increase the firm's incentive to invest in the Caribbean. Hines (2004) gives further support for tax haven policy. Hines uses regression analysis to evaluate the impact of different aspects of the tax haven economy. Using data from 1982 to 1999, Hines finds that tax haven economies attract greater foreign investment and have higher GDP growth rates. In addition, foreign firms employ a significantly larger percentage of workers in tax haven countries than they employ in their non-tax haven counterparts.

The allocation of physical and financial capital worldwide is significantly determined by OFC activity. The liberalization and expansion of the offshore industry is held partly accountable for the East Asian crisis and the Argentina crises of the 1990s. Increased lending and short term borrowing brought about by domestic financial liberalization made these countries highly vulnerable to exchange rate risk and changes in creditor confidence (see Errico and Barrero, 1999). Offshore services industries may also magnify the third market effects of capital flow to host nations. For example, Argentina increased its reserve requirements and implemented more stringent accounting policies in the 1990s. This change in regulation was followed by a sudden capital flow reversal to the OFC in the Cayman Islands, contributing to the Argentina crises (see Williams et al., 2005).

Other researchers have evaluated the extent to which international banking flows reflect tax policy. Huizinga et al. (2004) examine the relation between tax policy and banking sector foreign liabilities. They use bilateral bank liabilities data on 21 developed countries from the Bank of International Settlements and tax data from PriceWaterhouseCoopers covering the period 1983 to 1999. Using OLS, they find that liabilities to international non-bank entities are indeed intended to avoid taxes. Coupled with minimizing their tax burden, asset holders relocate capital to avoid financial regulatory umbrellas (see Boyrie et al., 2005).

The aforementioned studies highlight some of the roles OFC activity has played in the development of economies worldwide. The performance of domestic banking sectors is perhaps the most important determinant of economic development in today's global economy. More developed banking sectors promote efficient use of a nation's capital, generating higher levels of consumption, productivity and welfare. Domestic banking performance is reflected in bank specific characteristics such as the bank's capital adequacy ratio, the value of the bank assets as well as the bank's profitability. These aspects of banking performance are determined by local market specific characteristic such as the home country's inflation rate, the banking industry concentration and the home country's income (see Pasiouras and Kosmidou, 2007, and Demigurc-Kunt and Huizinga, 1999).

5. Model Specification

The empirical estimation will be based on a model of domestic banks facing offshore competition formulated by Rose and Spiegel (2006). In this model, depositors aim to maximize their after tax wealth and are faced with a choice of saving capital in their home country or making deposits in an OFC. Offshore deposits in tax haven countries offer a financial advantage. However, there are transactions costs associated with savings in offshore jurisdictions. Domestic borrowers are also faced with the choice of both domestic and offshore banks as sources of funds.

Rose and Spiegel show that domestic banks' loan amounts are inversely related to the amount of loans made by offshore banks. The researchers' further show that loans made by offshore banks decrease as the distance to borrowers increase. In addition, Rose and Spiegel show that home bank profit in equation (1) is positively related to the distance to the nearest OFC and inversely related to the amount of loans made by the offshore competitor. Domestic bank profits are represented by:

$$[1] \quad \pi = (R - r)L_h$$

where, π represents domestic banking profits, $(R - r)$ represents the interest rate spread and L_h represents home lending amounts. The model implicitly assumes that bank lending rates, R , is a decreasing function of loans made.

6. Econometric Specification and Data

Bank performance in one country may be dependent on the performance of other financial institutions within the country as well as within the region. This study employs spatial econometric technique to account for dependencies between banking sectors of different countries. Traditional panel data techniques are also utilized to control for country specific and time specific unobservable factors which influence banking performance. Spatial dependencies will exist in banking sector performance if financial sectors throughout the Caribbean are financially integrated. In this event, domestic banks will be competing throughout the region, and as a result a country's banking sector performance will be dependent on the performance of banking sectors in other countries.

Assuming that banking sector performance is a function of the performances in other countries such that,

$$[2] \quad y_i = \alpha + \beta X_i + \mathfrak{F}(y_j) + \varepsilon_i$$

and

$$[3] \quad \mu_i = \mathfrak{F}(y_j) + \varepsilon_i$$

where y_i represents the financial indicator of country i , X_i represents the country's market characteristics, $\mathfrak{Z}(y_j)$ represents spatial dependency of financial sector performance between country i and country j , and ε_i is the unobserved effect. Equation (3) becomes the residual in the OLS estimate of (2). These OLS estimates will lead to non-constant variance error giving rise to high confidence intervals and high t-stats on the coefficients. OLS estimates of (2) will be unbiased and consistent but will not be best. The spatial econometric technique employed in this study will achieve minimum variance estimators of equation (2).

The estimation technique will also take into account the advantages of employing fixed effects estimations, that is, accounting for heterogeneity in spatial dependencies and heterogeneity over time (see Appendix B). Equation (4) is the estimating equation used:

$$[4] \quad y_{it} = \rho_i W y_{jt} + \beta_1 OFC + \beta_2 DistoOFC_{it} + \beta_3 X_{it} + \gamma_t + \varepsilon_{it}$$

where y_{it} are the financial indicators of country i at time t . $DistoOFC$ measures the distance to the nearest OFC, which captures transactions cost in offshore borrowing and lending. OFC is a dummy variable with value one if the country is an OFC. Spatial dependency in banking sector performance is represented by $\rho_i W y_{jt}$, which is country specific and γ_t represents unobservable time specific effects. Estimation of equation (4) without accounting for the country-specific and time-specific effects will lead to violations of Gauss-Markov assumptions resulting in high confidence intervals and inaccurate t-tests on the coefficients giving rise to biased and inconsistent estimates of coefficients. The coefficients of interest are β_1 , β_2 , and ρ_i . A statistically significant ρ_i will imply the existence of a financially integrated market throughout the Caribbean region. X_{it} represents other control variables that influence banking sector performance. These factors include the country's real GDP growth, inflation rate, infrastructural quality, exchange rate regime and home market size.

Two data sets are employed in the analysis. The first covers 10 Caribbean countries (Antigua, The Bahamas, Barbados, Dominica, Grenada, Jamaica, St. Kitts, St. Lucia, St. Vincent, and Trinidad and Tobago) over the years 1994-2004. This full data set is used to investigate relationships in commercial bank asset size relative to GDP, credit issued to the private sector relative to GDP and average interest rate spread in each economy. The second data set is created due to data limitations and covers five territories; The Bahamas, Barbados, Jamaica, Trinidad & Tobago and the ECCU. The second data set is used to analyze the profitability and capital accounts of commercial banks in these regions. Data limitations arise because measures of profitability and the capital accounts of commercial banks are only available for the ECCU as a group of countries. This group of countries includes Antigua, Dominica, Grenada, St. Kitts, St. Lucia and St. Vincent.

The spatial lag weighting matrix is created by using geographical coordinates of the largest city of each country. The Geographical Distance Matrix Generator version 1.2.2 was used to calculate the kilometer distance between the largest cities of each country. The spatial matrix in the full country data set is a 10 x 10 block diagonal matrix defined as:

$$[5] \quad W = \begin{bmatrix} 0 & w(d_{ij}) & w(d_{ik}) \\ w(d_{ji}) & 0 & w(d_{jk}) \\ w(d_{ki}) & w(d_{kj}) & 0 \end{bmatrix};$$

where

$$w(d_{ij}) = \frac{98.41}{d_{ij}}$$

Here, weights are an inverse function of the distance between two countries (See Appendix A, Table 6). The shortest bilateral distance between any two countries within the sample is represented by 98.41 (i.e., the distance between St. Lucia and St. Vincent).

For the reduced sample of 5 jurisdictions, the spatial matrix W is a 5 x 5 block diagonal matrix with 337.17 being the shortest distance between any two jurisdictions (i.e., Barbados and the ECCU territories), such that:

$$w(d_{ij}) = \frac{337.17}{d_{ij}}$$

The spatial lag weighting matrix is then row normalized so that row totals sum to one. The spatial weighted independent variable has the interpretation as the distance-weighted banking sector performance in other Caribbean countries. Therefore, a positive and significant coefficient on the spatial lag term is evidence of complementarities in banking sector performance across countries.

Banking sector soundness is measured using a number of variables. These variables include: the asset to GDP ratio, measuring the size of commercial banks; capital to total assets ratio, measuring the extent to which depositors are protected against insolvency risks; return on commercial banks assets and interest income to interest expense ratio, measuring commercial bank profitability. Domestic credit extended to the private sector as a share of GDP and average interest rate spread are used to measure the overall depth of the domestic banking sector of each country.

All financial data are in real terms by the decimal GDP deflator value. The decimal GDP deflator was calculated by dividing the GDP deflator by 100. GDP deflator data was taken from line 99BIPZF of the IFS. Data for the Bahamas and Grenada was normalized using the consumer price index (CPI). The base year is 2000 for all countries with the exception of Grenada for which 1990 was used as the base year.²

Measures of banking soundness were calculated using the balance sheet and income statements of commercial banks in each country. Commercial banks' total assets comprises of claims on the central bank and other banks, loans and advances, investments in treasury bills and government securities,

² Using 1990 as the base year for Grenada is due to data limitations.

foreign assets, and fixed assets. Commercial banks' capital account comprises of paid up capital, reserves held, and equity. The capital account to asset ratio was calculated by dividing the capital account by total assets. Return on assets was calculated as net profit before tax divided by average assets held. Interest income to interest expense ratio was calculated by dividing the interest income of commercial bank by its interest expenditure.

Average interest rate spread was used to capture the overall competitiveness of the local financial sector in each country. The measure, with the exception of Trinidad, was taken from the World Bank's World Development indicators (WDI). The interest rate spread for Trinidad was obtained from the Central Bank of Trinidad and Tobago. The interest rate spread was measured as bank loan rates less bank deposit rates. Credit issued to the private sector by deposit taking institutions was taken from the IFS and is used to capture the depth of the banking sector in each country.

A number of dummy variables were also created. These include a dummy variable which is equal to one for OFCs and zero for non-OFC Caribbean countries. A country was classified as an OFC if it was included in the Financial Stability Forum's Report of the Working Group on Offshore Centres (2000). An OFC was assigned a value of one the year after legal statutes concerning offshore activity was enacted. A dummy variable was also created to equal to one if the country is a member of the ECCU. Further, a dummy variable was created to equal to one if the country managed a pegged exchange rate and zero otherwise. Finally, a dummy was created to equal to one if the country under went a significant financial crisis and zero otherwise. The data on exchange rate regime was taken from IMF's Annual Report on Exchange Arrangements and Restrictions.

The log of distance to the nearest OFC is used as a proxy for transactions costs in conducting business with an OFC. Log distance to the nearest OFC is calculated as the log of the kilometer distance to the

nearest OFC. The date in which a country adopts OFC practices is taken into account, as a result the distance to the nearest OFC is a time variant variable.

Country population is used to proxy for home market size. Population data was taken from the IFS. Inflation was calculated as the percentage change in CPI, with the exception of Antigua. Antiguan inflation is measured as the percentage change in the GDP deflator. CPI was taken from line 64 of the IFS. The growth rate of GDP was calculated as the annual percentage change of real GDP. GDP at current prices was taken from line 99BZF of the IFS. GDP for The Bahamas in 2004 was taken from the Central Bank of Bahamas due to IFS data limitations. The number of telephone lines per 1000 people is used as a proxy for infrastructural quality. The data was taken from World Bank's World Development Indicators. Estimates for missing values were calculated using the average percentage change in the data between 1990 and 2002. St. Lucia's data for 2003 and 2004 was interpolated by multiplying by 1.102225, the 13 year average. St. Kitts' 2003 value was calculated by multiplying the percentage change of the previous period by the value in 2002.

7. Data Analysis and Results

Countries in the reduced sample of five jurisdictions were ranked by their relative place in financial indicators (see Appendix C). An overall financial sector score was computed by summing the country's rank position in each indicator. Using this methodology, The Bahamas has the over-all best financial sector performance, followed by the ECCU, then Barbados, then Trinidad and Tobago and then Jamaica. Trends in profitability have been generally stable throughout the region with the exception of Jamaica. The banking sector in Jamaica experienced a significant fall in return on assets and recorded significant losses during the financial crisis over the period 1996 to 2000. Average ROA for the region as a whole was 1.99 per cent over the sample period.

The impact of Jamaica's financial crisis was also reflected in the capital account of the banking sector. Capital to assets ratio in 1997 fell by 45.0 per cent of the previous year's value. Generally, however, capital accounts to asset ratios have steadily increased throughout the region over the sample period. Bahamian banks were the most solvent in 2004, holding a capital to asset ratio of 17.0 per cent, in contrast to the Barbados banking sector that had the lowest capital to asset ratio in 2004 of 7.75 per cent.

Commercial bank's assets to GDP and private sector credit to GDP ratios of Bahamas, Barbados, and the ECCU grew at a much faster rate than that of Jamaica and Trinidad & Tobago over the review period. The Bahamas, Barbados and the ECCU had an overall average growth rate of 5.4 per cent and 2.7 per cent of bank assets to GDP and private sector credit to GDP, respectively. This compared to overall growth rates of 0.6 per cent in banking sector assets to GDP and 0.7 per cent in private sector credit to GDP for Jamaica and Trinidad.

In addition to having the worst financial sector performance ranking over the review period, Jamaica also performed poorly in economic characteristics among these groups of jurisdictions. Jamaica had the lowest average real GDP growth rate of -4.6 per cent and the highest fluctuation in real GDP growth with a standard deviation of 0.077. Jamaica and Trinidad & Tobago also had the highest rates of inflation and the lowest level of infrastructural quality per capita. Trinidad does boast however the highest growth rate in real GDP of 6.6 per cent over the sample period 1993 to 2004. It must be noted that Jamaica's population is greater than the population of The Bahamas, Barbados, Trinidad & Tobago and the ECCU combined. The latter group of countries has a combined population in 2004 of 2.47 million people, compared to Jamaica's 2.64 million in 2004.

Estimation Results

Estimation results show that there are significant structural differences in the domestic banking sectors of OFCs and non-OFC Caribbean countries (see Table 1). The coefficients on the OFC dummy for each equation are significant at least at the 10.0 per cent level, with the exception of equation (5).

The sign on the OFC coefficient in equation (4) implies that domestic banks located in an OFC have a higher ROA of 2.2 per cent relative to domestic banks located in non-OFC countries. Increased bank profits can stem from either increases in interest income, decreases in interest expense, decreases in non-interest expenses (such as decreases in operational costs), or from increases in non-interest income (such as the income generated from foreign exchange transactions, commissions and fees). An insignificant coefficient on the OFC dummy in equation (6) signals that increases in ROA in OFC countries did not arise from increases in interest income or decreases in the interest expense of domestic banks. Rather, higher profits for domestic banks located in OFCs resulted from additional *non-interest* income or a reduction in *non-interest* income expenditure.

In addition to higher profits, domestic banks located in OFCs possess higher assets relative to GDP by 1.9 per cent and make fewer loans relative to GDP by 2.2 per cent, compared to domestic banks located in non-OFC countries. This result suggests that domestic banks located in OFCs shifted their portfolios away from loans on the domestic market towards investments in securities markets or the acquisition of foreign assets.³ Shifting away from credit investments can reduce the level of efficiency in the loans market. This finding is, in fact, supported by the coefficient on the OFC dummy in equation (3), which is significant at the 5.0 per cent level. The sign on this coefficient indicates that loan-to-deposit interest rate spreads are higher in OFC countries reflecting lower banking sector efficiency compared to non-OFCs. Domestic banks in OFC countries also hold 7.1 per cent less capital to assets than domestic banks in non-OFC Caribbean countries, which is reflective of weaker capital adequacy.

³ This is supported by analyzing the financial statements of domestic banking sectors located in OFCs.

The fact that banking sectors close to OFCs and those within OFCs exhibited significantly higher interest rate spreads highlights the finding that the ability to raise significant profits through non-interest bearing activities reduces the level of domestic competition and efficiency in the domestic credit market. This relationship does not hold, however, for domestic banks located in OFCs which are close to other OFCs. The interaction term $OFC*Indist$ has a negative and significant impact on ROA as well as interest rate spread.

Notwithstanding lower efficiency and capital adequacy levels, domestic banks located in OFCs may enjoy positive externalities from neighboring OFCs.⁴ A 1.0 per cent decrease in the distance from one OFC to another will increase profits by 0.0005 per cent. This apparent positive externality may be as a result of some kind of agglomeration effect in offshore banking sectors in the Caribbean. Domestic banks located in non-OFC countries do not experience positive externalities from neighboring OFCs. In this instance, a 1.0 per cent increase in the log distance to the nearest OFC will increase commercial banks' ROA by 0.003 per cent. The coefficient on $\ln(DistoOFC)$ is positive and significant at the 1.0 per cent level.

Distance from an OFC had no significant impact on loans made to the private sector, assets held as a percentage of GDP, the capital account or the ratio of interest income to interest expense for either OFC domestic banks or non-OFC domestic banks. All coefficients on $Indistance$ and $OFC*Indistance$ are insignificant at the 10.0 per cent level. Based on these results, it is apparent that neighbouring offshore banks do not offer competitive benefits to domestic banking sectors in the Caribbean.

⁴ A closer examination of this phenomenon is beyond the scope of this paper and is left for future research.

Table 1. Empirical Results

Spatially lagged dependent variable with spatial and time period fixed effects.

	Full Sample			Reduced Sample		
	Bank Assets to GDP (1)	Credit to GDP (2)	Interest Rate Spread (3)	Return on Assets (4)	Interest Income to Interest Expense (5)	Capital to Asset (6)
<u>Variables of Interest</u>						
OFC	1.928* (1.707)	-2.240*** (-4.632)	22.858** (2.48)	2.210* (1.77)	-60.105 (-1.184)	-7.107** (-2.445)
lnDistance to OFC	0.102 (-0.693)	0.029 (0.48)	6.085*** (5.32)	0.322*** (3.42)	-1.257 (0.33)	-0.311 (-0.143)
OFC*lnDistance to OFC	-0.17 (-1.053)	0.1079 (0.162)	-6.309*** (-4.959)	-0.375*** (-3.958)	-0.837 (-0.220)	-0.002 (-0.007)
OFC*GDP Growth	2.156** (2.403)	0.271 (0.74)	2.283 (0.40)	0.01 (0.151)	-0.887 (-0.346)	0.15 (0.97)
OFC*Inflation	-0.026* (-1.680)	0.003 (0.529)	0.067 (0.529)	-0.003*** (-0.511)	-0.019 (-0.475)	-0.001 (-0.539)
OFC*lnTelephone Lines	-0.339 (-1.100)	0.041 (0.306)	-0.904 (-0.663)	-0.240*** (-3.993)	-1.761 (-0.729)	-0.454*** (-3.303)
OFC*lnPopulation	-0.166 (-0.961)	0.413*** (6.01)	-0.904 (-0.663)	-0.032 (-0.187)	12.254* (1.75)	1.493*** (3.74)
<u>Control Variables</u>						
GDP Growth	-0.997** (-2.145)	0.125 (0.66)	-1.779 (-0.478)	0.009 (0.26)	1.845 (1.25)	-0.051 (-0.606)
Inflation Rate	0.019*** (3.989)	0.005** (2.40)	0.094** (2.37)	0.001 (1.75)	-0.002 (-0.089)	0.003** (2.33)
Pegged Exchange Rate	-0.163* (-1.801)	0.016 (0.44)	-2.431*** (3.33)	-0.001 (-0.124)	0.5969** (2.07)	-0.009 (-0.531)
Financial Crisis	0.188** (1.997)	0.018 (0.47)	2.493*** (3.31)	-0.003 (-0.606)	-0.501*** (-2.889)	-0.043*** (-4.409)
ECCU	-0.402*** (-3.615)	0.298*** (-6.646)	7.157*** (-8.127)	-0.134*** (-3.807)	-4.553*** (-3.192)	-0.452*** (-5.659)
lnTelephone Lines	0.825*** (3.01)	0.462*** (3.87)	2.117 (0.91)	0.118** (2.20)	-0.383 (-0.174)	0.374*** (3.09)
lnPopulation	-0.897*** (-7.970)	-0.062 (-1.347)	4.159*** (4.51)	0.428** (3.08)	0.116 (0.02)	-0.03 (-0.094)
W*Dependent Variable	0.0719 (1.063)	0.034 (0.59)	0.118*** (2.71)	-0.042 (-0.431)	-0.044 (-0.481)	0.017 (0.21)
no. of observations	110	110	110	55	55	55
R ²	0.834	0.874	0.897	0.6428	0.709	0.823

1. *** significant at the 1% level, **significant at the 5% level, * significant at the 10% level

2. Asymptotic t-stats are shown in parenthesis.

There is no significant spatial dependency in any of the financial indicator dependent variables, apart from interest rate spread. This general result indicates that domestic banking sectors throughout the Caribbean are not meaningfully integrated. The significant coefficient on the spatial lag term in equation (3), however, implies that a there was 1.2 per cent increase in interest rate spread for every 10.0 per cent increase in the distance-weighted interest rate spread of surrounding banking sectors. This result suggests that there are complementarities in competitiveness in loan and deposit markets throughout the Caribbean.

8. Conclusion

This study sheds light on the impact of OFC activity on domestic banking sectors within the Caribbean. It is important to note that five of the seven Caribbean OFCs included in this study do not allow international companies to conduct business with residents. This may explain why the presence of the offshore sector has not had a positive impact on key banking sector indicators such as private sector credit to GDP, loan-to-deposit interest rate spread, net interest income and the capital to assets ratio. The study also finds that neighbouring OFC activity does not compete with the domestic banking sector, as closer distance to an OFC had little overall effect on the domestic banking sector.

However, domestic banks located in OFCs have earned higher profits from non-interest income activities and, in addition, have shifted their asset portfolios away from the credit market. Domestic bank profits were also significantly higher for those banks are located in OFCs close to other OFC jurisdictions. However, a causal relationship cannot be posited within the scope of this paper.

Policy makers in jurisdictions planning to adapt offshore sectors should aim to carefully identify the mechanisms through which spillover effects flow to the domestic banks located in OFCs as well as banking sectors which have other OFCs as close neighbours. In accomplishing this, new OFC economies will maximize the benefits gained from the adoption of an OFC sector.

Appendix A

Table 2.

Territories with Offshore Financial Centers

Africa	Asia and Pacific	Europe	Middle East	Western Hemisphere
Djibouti	Cook Islands	Andorra	Bahrain	Anguilla
Liberia	Guam	Campione	Israel	Antigua
Mauritius	Hong Kong	Cyprus	Lebanon	Aruba
Seychelles	Japan	Dublin		Bahamas
Tangier	Malaysia	Gibraltar		Barbados
	Macao	Guernsey		Belize
	Marianas	Isle of Man		Bermuda
	Marshall Islands	Jersey		British Virgin Islands
	Micronesia	Liechtenstein		Cayman Islands
	Nauru	London		Costa Rica
	Niue	Luxembourg		Dominica
	Philippines	Madeira		Grenada
	Singapore	Malta		Montserrat
	Tahiti	Monaco		Netherland Antilles
	Thailand	Netherlands		Panama
	Vanuatu	Switzerland		Puerto Rico
	Western Samoa			St. Kitts and Nevis
				St. Lucia
				St. Vincent & Grenadines
				Turks and Caicos
				United States
				Uruguay

Source IMF (2000).

Table 3.

Relative Size of the Caribbean OFC

Jurisdiction	Offshore Banks	International Business Companies
Anguilla	2	3,041
Antigua & Barbuda	15	13,500
Aruba	2	4,320
Bahamas	301	47,040
Barbados	56	4,673
Bermuda	N	13,337
British Virgin Islands	13	360,000
Cayman Islands	580	30,000
Dominica	1	8,601
Grenada	2	2,293
Montserrat	11	22
Netherland Antilles	39	18,750
St. Kitts and Nevis	1	13,800
St. Lucia	2	1,052
St. Vincent & the Grenadines	10	6,342
Turks and Caicos	8	13,952

Source: U.S Department of State (2003).

Table 4.
OFC Inception Information

Country	Statute	Date
Bermuda	Tax Exemption Act	1966
Turks and Caicos	Companies Ordinance	1981
Antigua	International Business Companies Act	1982
The British Virgin Islands	International Business Companies Act	1984
Aruba	Exempt Company Act	1988
The Bahamas	International Business Companies Act	1989
The Cayman Islands	Banks and Trust Companies Law	1995
Dominica	International Business Companies Act	1996
St. Vincent	Offshore Finance Authority Act	1996
St. Kitts	The financial services Statutory Rules and Order	1997
St. Lucia	International Bank Act	2000

Table 5.

Source of Commercial Bank Indicators

Country	Source
Antigua	ECCB Monetary Statistics
Dominica	ECCB Monetary Statistics
Grenada	ECCB Monetary Statistics
St. Kitts	ECCB Monetary Statistics
St. Lucia	ECCB Monetary Statistics
St. Vincent	ECCB Monetary Statistics
The Bahamas	The Central Bank of The Bahamas Quarterly Economic Review
Barbados	Central Bank of Barbados Annual Statistical Digest
Jamaica	Bank of Jamaica Unaudited Quarterly Assets and Liabilities of Commercial Banks
Trinidad & Tobago	Central Bank of Trinidad & Tobago Economic Bulletin Appendix

Table 6.

Shortest Distance to OFC

Country	OFC (Years)	Distance (Km)
Antigua	Barbados (1980-84)	500.05
	The British Virgin Islands (1985-96)	333.95
	Dominica (1997)	204.18
	St. Kitts	101.97
Bahamas	Bermuda (1980-82)	1464.69
	Turks and Caicos (1982-04)	668.24
Barbados	Bermuda (1980-82)	2196.11
	Antigua (1983-97)	500.05
	St. Vincent (1998-00)	184.27
	St. Lucia (2001-04)	183.22
Dominica	Barbados (1980-82)	310.23
	Antigua (1983-04)	204.18
Grenada	Barbados (1980-96)	270.99
	St. Vincent (1997-2004)	136.39
Jamaica	Barbados (1980-82)	1926.47
	Turks and Caicos (1983-1995)	681.13
	The Cayman Islands (1996-04)	507.81
St. Kitts	Barbados (1980-84)	574.26
	The British Virgin Islands (1985-88)	236.07
	Aruba (1989-04)	101.97
St. Lucia	Barbados (1980-96)	183.22
	St. Vincent (1997-04)	98.41
St. Vincent	Barbados (1980-00)	184.27
	St. Lucia (2001-04)	98.41
Trinidad & Tobago	Barbados (1980-1996)	1408.58
	St. Vincent (1997-04)	1391.84

Appendix B

B-1

Least squares estimates of ρ in equation (4) will lead to inconsistent estimates since the spatial term is endogenous and correlated with the error. A maximum likelihood estimator of ρ was employed which maximizes the log likelihood function

$$\ln(L) = -\frac{n}{2} \ln(\pi) - \frac{n}{2} \ln (y - \rho W y)' (y - \rho W y) + \ln |I_n - \rho W|$$

B-2

Fixed effects and spatial fixed effects are accounted for by regressing

$$y_{it} = y_{it} - \bar{y}_i - \bar{y}_t + \bar{y}$$

on

$$W y = W y - \overline{W y}_i - \overline{W y}_t + \overline{W y} \quad \text{and} \quad X_{it} = X_{it} - \bar{X}_i - \bar{X}_t + \bar{X}$$

$$\text{where } \bar{y}_i = \frac{1}{t} \sum_{t=1}^T y_{it} \quad \text{and} \quad \bar{y} = \frac{1}{nT} \sum_{i=1}^n \sum_{t=1}^T y_{it}$$

Appendix C

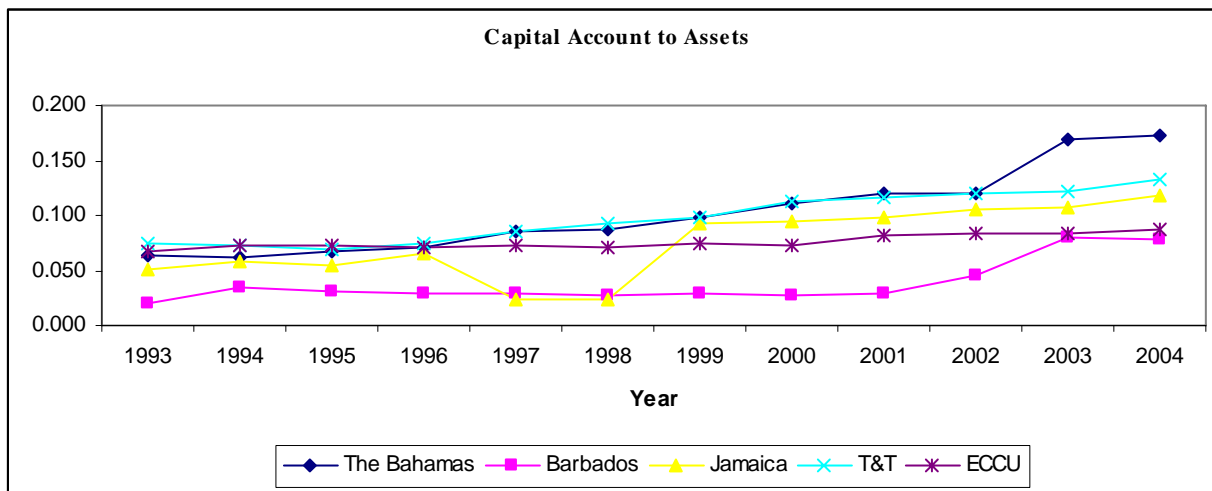
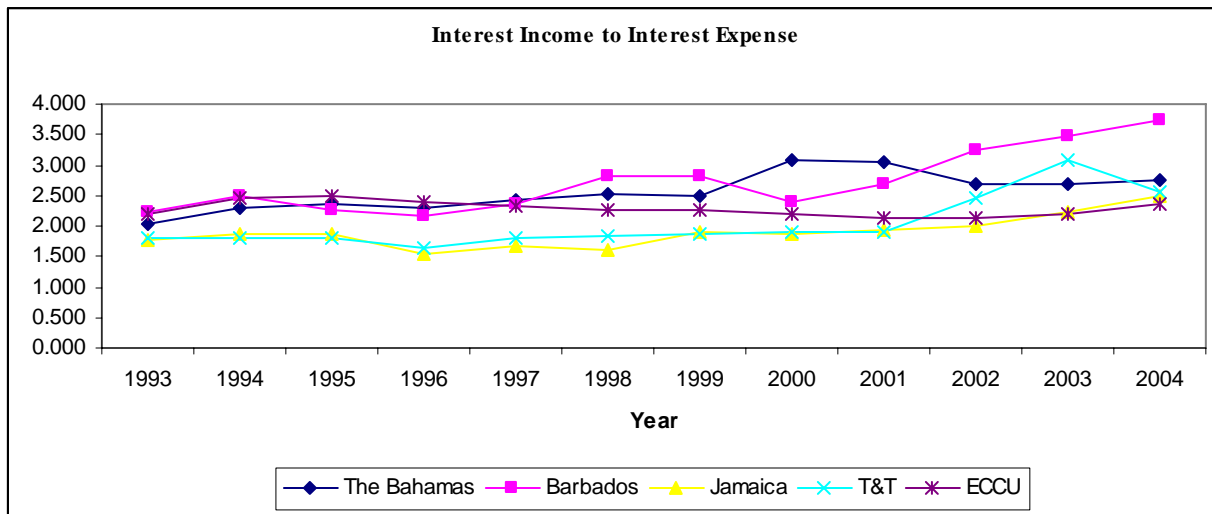
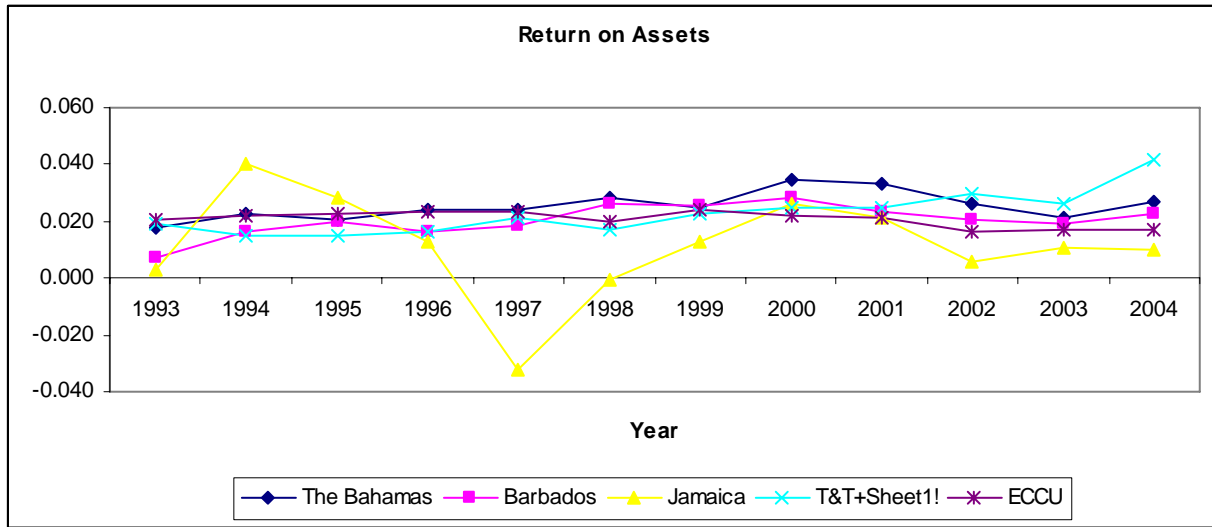
C-1

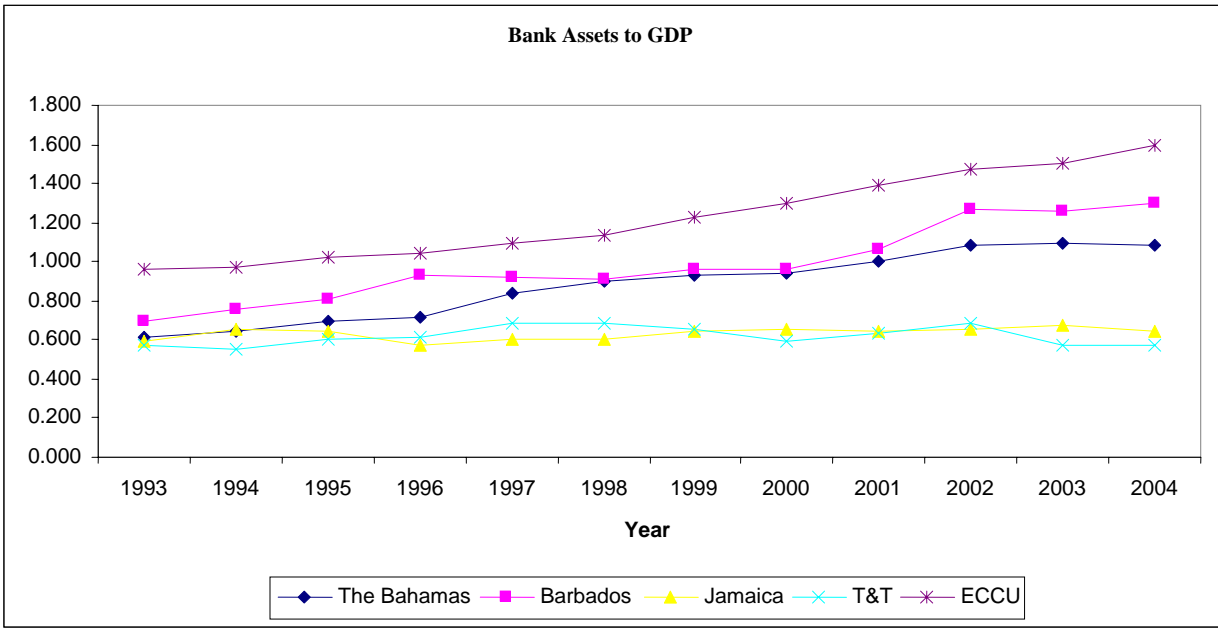
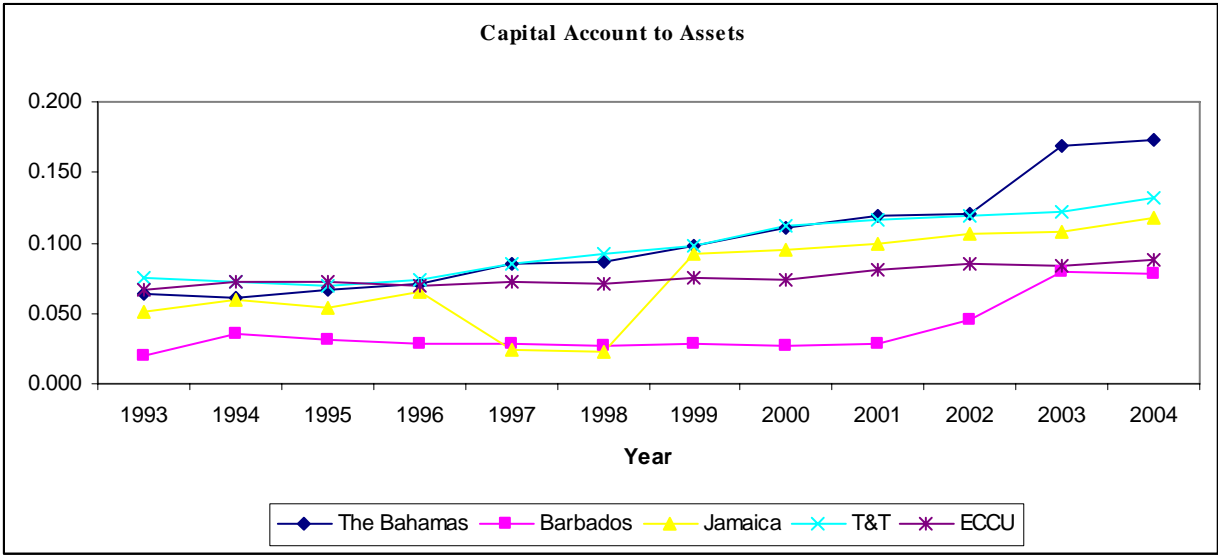
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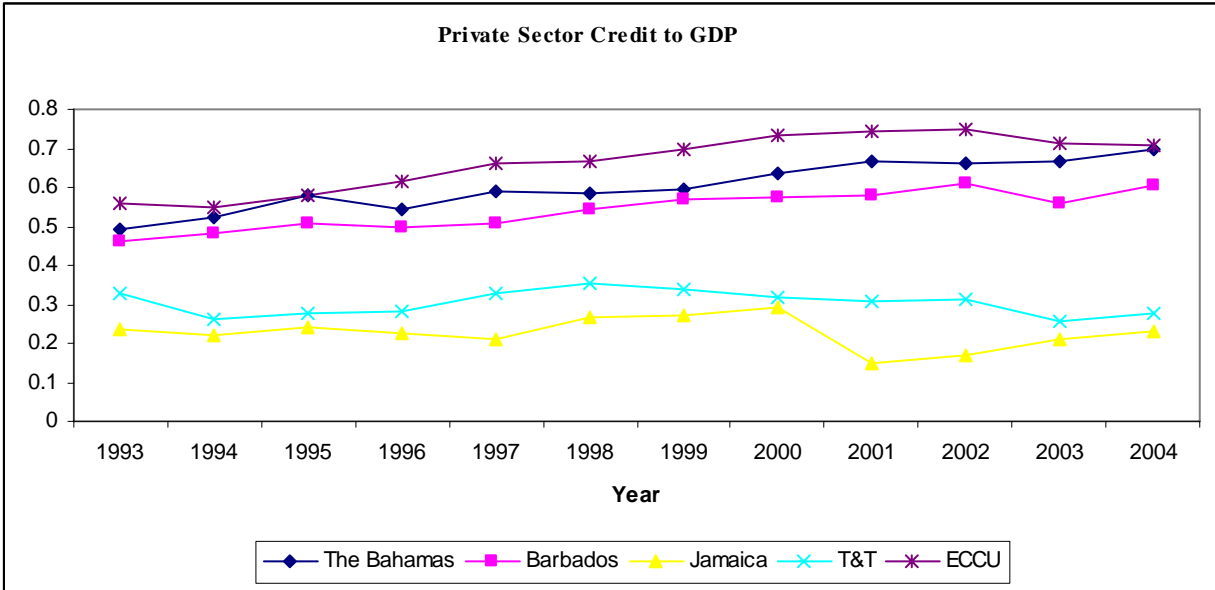
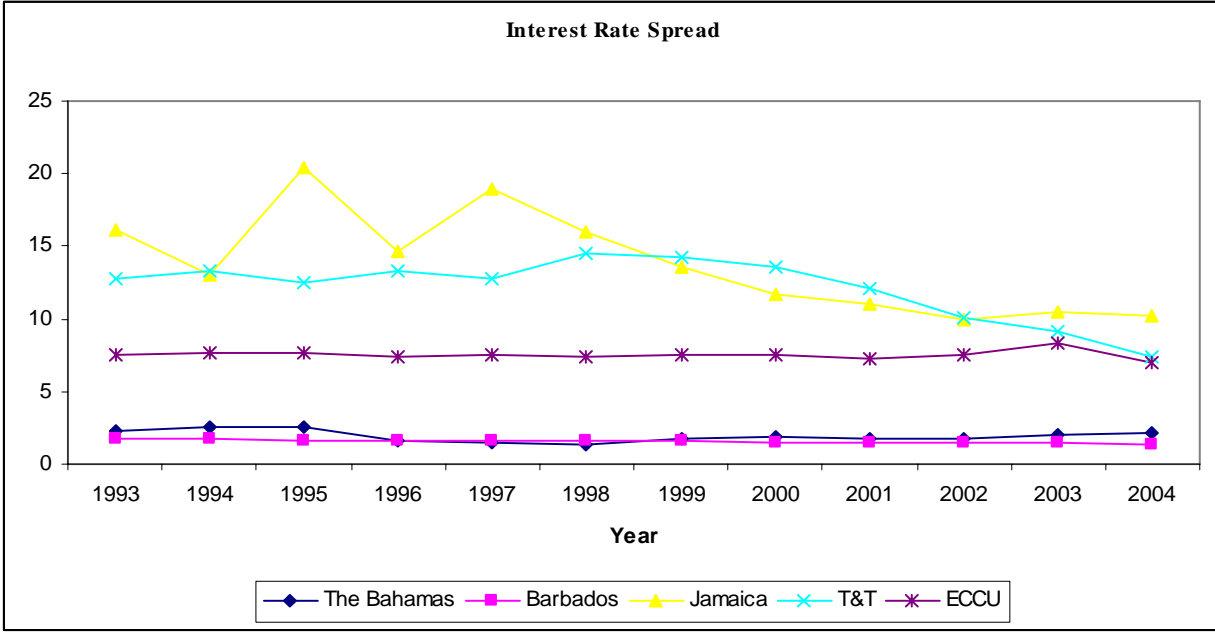
Variable Averages

	The Bahamas	Barbados	Jamaica	Trinidad & Tobago	ECCU
Return on Assets	0.025 (0.004)	0.019 (0.007)	0.012 (0.017)	0.023 (0.009)	0.021 (0.002)
Interest income/Interest Expense	2.560 (0.312)	2.724 (0.514)	1.899 (0.261)	2.041 (0.427)	2.285 (0.126)
Capital to Assets	0.102 (0.038)	0.038 (0.019)	0.074 (0.032)	0.097 (0.022)	0.076 (0.007)
Interest Rate Spread	1.948 (0.385)	1.567 (0.114)	13.820 (3.475)	12.144 (2.136)	7.507 (0.303)
Bank Assets to GDP	0.880 (0.175)	0.986 (0.198)	0.632 (0.031)	0.619 (0.048)	1.226 (0.222)
Credit to the Private Sector	0.603 (0.064)	0.541 (0.048)	0.226 (0.041)	0.303 (0.032)	0.665 (0.072)
GDP Growth	0.034 (0.031)	0.026 (0.021)	-0.046 (0.077)	0.066 (0.042)	0.029 (0.020)
Inflation	1.714 (0.897)	1.801 (2.178)	14.490 (9.302)	5.140 (2.370)	1.980 (0.593)
Ln Telephone Lines per 1000 (2004)	438.998	504.803	189.065	246.871	360.020
Population (2004)	318,762	268,881	2,644,593	1,301,307	585,142

Standard Deviations are in Parenthesis







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