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NON-INTEREST INCOME AND FINANCIAL PERFORMANCE AT COMMERCIAL BANKS IN THE CARIBBEAN

BY

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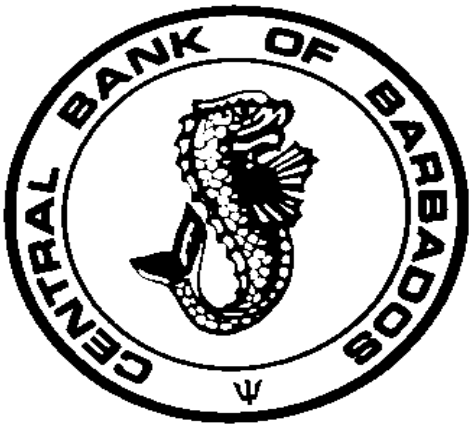

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Abstract

This study discusses the trends in non-interest income at commercial banks in the Caribbean between 1985 and 2001, as well as investigates the determinants of non-interest income and its impact on commercial bank financial performance in Barbados. The paper reveals that the incidence of non-interest income in Barbados declined over the period, contrary to the findings in Jamaica and Trinidad and Tobago as well as the wider developed world. A review of the literature and a panel data regression model confirm that the result for Barbados may be attributed to the absence of some of the factors that were pinnacle to the generation of non-interest income in developed countries, such as deregulation and technological change, especially for the development of loan securitization and credit scoring. The empirical evidence supports bank characteristics and the ATM technology as the most influential factors shaping the trend of non-interest income in the banking industry in Barbados and suggests that non-interest income is positively related to both bank profitability and earnings volatility.

Key words: Non-interest income, panel data

JEL: C23, N2

1. Introduction

The traditional role of commercial banks has centered on intermediation and the generation of net interest income through two core activities; namely, the collection of deposits on which banks pay interest and the issuing of loans for which they receive interest income. Over the years, however, commercial banks (in the United States and other developed countries) have gradually expanded beyond their traditional role and sources of income to encompass more activities that generate non-interest income.

While a number of studies address various issues relating to commercial banks in the Caribbean, to the authors' knowledge, none of these specifically focus on the impact of non-interest income on banks' financial performance. This study, therefore, seeks to fill this void in the Caribbean economic literature by investigating the part that non-interest income has played in Barbados' commercial banking industry. Specifically, it examines whether non-interest income has assumed a more important role in commercial banking operations and whether it has been linked to improved bank financial health.

The paper is structured as follows: section 2 examines the trend in non-interest income at commercial banks in selected Caribbean countries and section 3 draws comparisons with banking systems in other developed nations. The factors influencing non-interest income worldwide and in Barbados are discussed in sections 4 and 5 respectively. Section 6 looks at the possible consequences of non-interest income on bank financial performance, while section 7 defines the empirical model and section 8 deals with data, methodology issues and the results of the estimation procedure. Concluding remarks end the paper.

2. Trends in Non-Interest Income in Selected Caribbean Countries

There was an overall increase in the absolute level of non-interest income in the Barbadian commercial banking industry during the sample period 1985 to 2001. In 1985 aggregate non-interest income of commercial banks was approximately $33.1 million, and by 2001 this total had grown to about $117.9 million. Figure 1 shows that, in general, the rise in non-interest income was more pronounced after 1993. Additionally, large banks experienced a stronger overall growth than smaller banks, while the latter registered the bigger average annual rate of increase.

However, despite the rise in aggregate levels of non-interest income in Barbados, various measures of the incidence of non-interest income (Table 1a) suggest that its relative importance in the commercial banking industry has actually diminished. Specifically, industry non-interest income-to-assets fell by 0.27 of a percentage point during the period to 2.18% in 2001. The data reveals that for large banks, non-interest income as a percentage of total assets was fairly stable throughout the period but decreased by 0.20 of a percentage point to 2.16% at the end of 2001. At small banks, however, the comparable ratio of non-interest income-to-total assets exhibited considerable fluctuation, shrinking from 3.51% in 1985 to 2.35% in 2001. Industry non-interest income as a percentage of operating income also decreased between 1985 and 2001, by 5.9 percentage points to 33.47%. For large banks, non-interest income-to-operating income dropped from 37.7% to 33.1%, while smaller banks experienced a more substantial contraction from 60.1% to 36.3%.

With regard to the composition of non-interest income in the commercial banking industry, Table 1b clearly shows that fee income represents the most significant component of non-interest income in Barbados, even though the overall industry ratio of fee income to non-interest income decreased from 88.5% in 1985 to 83.3% by 2001, while the portion of non-interest income arising from other non-fee sources grew to 16.7%, up from 11.5% in 1985. At small banks, fee income was the sole source of non-interest income between 1985 and 1994, but its contribution gradually decreased thereafter to 58.4% in 2001, as other non-fee sources expanded to 41.6% of total non-interest income. The ratio of fee income to non-interest income at large banks fell only marginally over the period to 86.3%, with other non-fee income providing about 13.7% of total non-interest income. Further disaggregation of fee income across the industry reveals that small banks saw a rise in the proportion of non-interest income attributed to service charges on deposit accounts, but registered sharp declines in the contribution of foreign exchange charges and other fee income. Additionally, although less pronounced, large banks recorded movements similar to those of small banks in the share of non-interest income provided by foreign exchange and service charges. However, in contrast to small banks there was a noticeable increase in the percentage of non-interest income derived from the other fees category at large banks.

Over the past two decades, non-interest income indicators in the commercial banking industry in Trinidad and Tobago and Jamaica exhibited significant overall growth. Aggregate non-interest income in Trinidad and Tobago's commercial banks jumped by 509% between 1985 and 2001, from TT$149.5 million to TT$935.3 million (see Figure 2). Furthermore, non-interest income as a percent of operating income grew from 22.6% in 1984 to 39.0% in 2001, while non-interest income as a proportion of total assets expanded by approximately 1.2 percentage points to 2.8% over the same period (Table 2). Similarly, between 1989 and 2001, aggregate non-interest income in the Jamaican commercial banking industry expanded by 2655%, from JA$910 million to JA$25,069 million (Figure 3). During the same years, non-interest income as a percentage of operating income rose from 73.9% to 112.7% and non-interest income relative to total assets increased by 4.0 percentage points to 10.5% (Table 2). These outcomes reveal that non-interest activities have become a relatively more important feature in the commercial banking industries of Trinidad and Tobago and Jamaica. In the case of Jamaica it should be noted that non-interest income actually represented the primary source of commercial bank operating income throughout the period 1989 to 2001.

Table 3 provides a breakdown of non-interest income in Trinidad and Tobago and Jamaica. In general for Trinidad and Tobago, fee income was the most important category of non-interest income between 1986 and 2001, representing on average about 52.3% of the total; while foreign exchange profit/loss was the second largest category, averaging approximately 27.1%. Dividend, rental and trust service income combined contributed an average of 6.6% to non-interest income over the period and other income sources provided 14.0% on average. A closer look at the movements in these sub-categories over time reveals how the structure of non-interest income has evolved in Trinidad and Tobago. After a moderate degree of fluctuation over the period, fee income as a proportion of non-interest income expanded by 8.8 percentage points to 56.7% by 2001. Dividend, rental and trust service income as a percentage of non-interest income remained relatively stable over the period, increasing from 7.2% in 1986 to 8.1% in 2001. The ratio of foreign exchange profit/loss to non-interest income fell by 10.3 percentage points to 21.9%, while on the other hand, the portion of non-interest income arising from other sources rose from 12.8% in 1986 to 13.3% in 2001.

In Jamaica, investment income is by far the dominant source of non-interest income at commercial banks, increasing its share from 61.5% in 1989 to 82.9% in 2001 (see Table 3). Service charges, fees and commissions - collectively the second largest contributor to non-interest income - registered a 2.9 percentage points decline in its share to 11.4% by the end of the period. Similarly, foreign exchange gains and the other income category also decreased as a percentage of non-interest income, with the former falling from 9.8% to 4.6% and the latter dropping from 14.4% to 1.1%.

3. A Comparison with Banking Systems in the Developed World

Table 4 shows a comparison of banks' non-interest income as a percentage of total assets for various countries in 2001. The Caribbean islands ranked in the upper range, Barbados is 6th out of 19 countries, below Trinidad and Tobago and Jamaica who topped the standings, even above the developed industrial countries in Europe and North America. Hence, Caribbean countries appear to be generating more non-interest income per dollar of assets than other major countries in the world. It was noted in the previous section that the ratio of non-interest income to assets has been decreasing in Barbados but increasing in Trinidad and Tobago and Jamaica. In Hawtrey (2003), only four out of the sixteen developed countries studied, namely Australia, United Kingdom, Norway and New Zealand, registered declines in non-interest income as a ratio of total assets over the years 1992 to 2001. Of the remaining countries in the sample, Denmark, Finland, Canada and France experienced the most noticeable expansions in this ratio during the period. Furthermore, Hawtrey (2003), among others, reports that in general the increasing trend for non-interest income in the developed countries more reflects rising revenue from wealth management and financial market operations than retail banking fees.

It would be useful to see how the recent trends in fee income - that excludes other non-interest income - in the Caribbean compares with other developed countries. From Table 3 it is apparent that while reliance on fee income declined somewhat in both Barbados and Jamaica during the period 1985 to 2001, it increased in Trinidad and Tobago owing largely to a significant rise in fees associated with loans. In the United States, according to Stiroh (2004), the biggest expansion in non-interest income between 1980 and 2000 was in fees and other income, although the other categories (fiduciary income, service charges and trading revenue) showed sizeable growth as well.

4. Factors Influencing Non-interest Income

A review of the literature suggests that there are four main factors that could have led to growth in non-interest income in the banking industry worldwide. These are deregulation, supervision, globalization and rapid technological advances in information flows, communications infrastructure and financial markets. Banking industry deregulation fosters competition between banks, non-banks and financial markets by removing restrictions that stunt the evolution of the banking system, constrain the efficiency of the financial product markets and extend the lives of poorly run and /or sub-optimal-sized commercial banks (see DeYoung and Rice (2003) and Hawtrey (2003)).

In the United States, for example, deregulation took the form of three pieces of legislation: Regulation Q, Gramm-Leach-Bliley and Riegle-Neal. The repeal of Regulation Q ceilings on deposit rates allowed banks to pay market rates of interest to depositors, causing banks to un-bundle deposit pricing – in which they compensated depositors for below-market interest rates by giving away a variety of other services – in favour of separate charges (that is, non-interest income) for individual retail deposit products.

The Gramm-Leach-Bliley Act of 1999 provided banks with greater scope to expand into non-traditional financial fee-based activities like securities underwriting, insurance sales and retail brokerage. The Riegle-Neal Act of 1994 and other state-level compacts gave banks more freedom to spread across geopolitical boundaries. Banking companies took advantage of this new emancipation and acquired existing banks in other states as well as rationalized their multi-bank organization structures by combining bank charters. These changes led to consolidation within the banking industry and the resultant large banks were able to employ high-volume automated lending technologies to generate income from non-interest activities.

Advances in information and communications technology (for example, the Internet and Automatic Telling Machines (ATMs)), new intermediation technologies for processes like loan securitization and credit scoring, and the introduction and expansion of financial instruments and markets (high yield bonds, commercial paper, financial derivatives) all impacted on the levels and types of non-interest income at commercial banks, and as was mentioned in the preceding paragraph, were helped by the process of deregulation. In essence, these changes meant that banks could extract fee

income from customers who were willing to pay for use of ATMs and /or the Internet rather than undertake business at traditional branches. In addition, loan securitization enabled banks to better leverage their equity capital by moving loans off balance sheets. By reducing the amount of deposit funding necessary to originate a dollar's worth of new loans, loan securitization decreases the importance of intermediation in favor of non-interest income (loan origination and servicing fees). Moreover, greater access to the commercial paper market, although depriving larger banks of large denomination, high quality, short term, commercial loans, allowed them to earn fee income from providing back-up lines of credit that firms need to float commercial paper.

An additional overarching factor that may have led to an increase in non-interest income world-wide is the introduction of the new regulatory requirements – Basel I and Basel II, the latter still to be finalized. According to Hawtrey (2003), these capital requirements, drawn up by the Bank of International Settlements, can positively affect the cost of capital and compliance of banks. Consequently, banks have to look more closely at the different assets on their books and price them accordingly.

A further force impacting on non-interest income is globalization that, in some cases, has led to mergers and acquisitions. Hawtrey (2003) laments that as the pace of globalization quickens, banks will find their business exposed to overseas competitors and will have to fall in line with world pricing benchmarks, especially in the area of fee-based activities like corporate finance and payments devices.

5. Why Has the Incidence of Non-Interest Income at Banks in Barbados Not Increased?

The best way to answer this question is to use the previous review of the factors that have increased non-interest income in the rest of the world and compare them with the situation in Barbados. Given this, five main factors can be spelt out: (i) deregulation; (ii) expanding consumer needs; (iii) technology; (iv) supervision, and; (v) globalization.

Deregulation of the financial sector in the United States and other developed countries and its consequential increased competition has not really filtered down into the Barbadian banking system and therefore the steady narrowing of net-interest margins has not occurred in Barbados (see

Craigwell and Moore (2002)). With respect to expanding consumer needs, there appears to be no significant new types of bank activity in Barbados. For instance, there still seems to be the heavy reliance on past book accounts rather than superannuation which is particular to funds management. Technology change can impact non-interest income in three different ways; namely, through loans securitization and credit scoring, disintermediation and new delivery channels. In Barbados, there is little evidence of loans securitization and credit scoring. Additionally, although other financial institutions have been growing, banks are still the dominant force in the financial sector in Barbados (see Belgrave, Craigwell and Moore (2004)). Hence, disintermediation does not appear to be a major factor affecting non-interest income in Barbados. New delivery channels like automated telling machines (ATMs) have provided more choice and convenience for customers for additional fees (see Parris (2002) and Coppin, Craigwell and Moore (2003)). With regard to bank supervision, Basel I and II have not really been finalized in Barbados and it is doubtful that banks have looked at pricing the assets on their books differently as a result of these regulatory requirements. Finally, globalisation has created some mergers and acquisitions and this might have encouraged Barbadian banks to fall in line with world pricing benchmarks and international practices, affecting fee income in the process. In summary, it seems that most of the major factors that cause banks in the developed world to generate more non-interest income have not been fully realised in Barbados.

6. Some Potential Consequences of Non-interest Income on Bank Performance

Ceteris paribus, increased non-interest income will improve bank earnings but will also change its' output mix, variable and fixed inputs as well as financing structure. In the United States, for instance, when non-interest income trended up during the 1990s, commentators felt that it was due to falling overall income volatility occasioned by diversification of the average commercial bank across a larger number of product lines (see DeYoung and Rice (2003)). Moreover, it was thought that shifting the source of bank income from relatively volatile intermediation–based activities with its attendant credit and interest rate risks to relatively less volatile fee-based income with no such credit and interest rate risks would reduce overall income volatility. These arguments found support from the early empirical studies (see for example, Roger and Sinkey (1999)). However, recent works indicate that neither of these beliefs holds on average.

DeYoung and Roland (2001) argue that fee income may not necessarily have stabilizing effects relative to interest income and in fact may increase the volatility of bank earnings. First, most bank loans are relationship based and consequently have high switching costs, while the majority of fee-based activities are not relationship based. Hence, despite credit and interest rate risks, banks revenue from loan interest may be less volatile than bank non-interest income from fee-based activities. Second, within the context of an ongoing lending relationship, the main input needed to produce fee-based products is fixed or quasi–fixed labor owing to the low switching and information costs of customers. This is contrary to a variable input (interest expense) for loans. Thus, fee-based activities employ greater operating leverage than lending activities, making operating income more sensitive to revenue volatility. Third, most non-interest activities like trust services, mutual fund sales and cash management require the bank to hold little or no fixed assets – so unlike interest-based products like portfolio lending they require little or no regulatory capital. Therefore, fee-based activities are likely to employ more leverage than lending activities, which makes the level of bank earnings more volatile as a result of the increasing riskiness of banks stemming from higher leverage (the so called leverage effect). Besides, DeYoung and Roland (2001), recent work by Stiroh (2004) and others have shown that diversification into non-banking activities increases the overall riskiness of banks. For banks in Europe, Smith, Staikoura and Wood (2003) also found that non-interest income tends to be more volatile but both income streams are negatively related, suggesting that non-interest income may reduce the variability of bank net earning by stabilizing bank's operating income. In sum, the evidence above shows that the expansion into non-bank activities and its effect on the income stability of banks are still controversial, and appears data specific.

7. The Empirical Model

The model employed in this study draws from DeYoung and Rice (2003) and consists of three equations: non-interest income as a percentage of assets (NIIRATIO1), bank profitability (ROA) and the variability of bank earnings (SIGMAROA). These three equations, given below, capture the inter-relationships between non-interest income and financial performance.

$$NIIRATIO1_{t,i} = c1 + a1*RELROA_{t,i} + b1*CORERATIO_{t,i} + d1*FTERATIO_{t,i} + f1*LNASSETS_{t,i} + g1*FOREIGNBHC_{t,i} + h1*JOBGROWTH_{t,i} + k1*LOANRATIO_{t,i} + m1*RESHARE_{t,i} + n1*CISHARE_{t,i} + p1*CCBANK_{t,i} + q1*ATM1_{t,i} + r1*CONSHARE_{t,i} + s1*LOANCONC_{t,i}$$

$$ROA_{t,i} = c2 + a2*NIIRATIO1_{t,i} + b2*CORERATIO_{t,i} + d2*LOANCONC_{t,i} + f2*FTERATIO_{t,i} + g2*LNASSETS_{t,i} + h1*FOREIGNBHC_{t,i} + k1*JOBGROWTH_{t,i} + m2*LOANRATIO_{t,i} + n2*CCBANK_{t,i}$$

$$SIGMAROA_{t,i} = c3 + a3*NIIRATIO1_{t,i} + b3*CORERATIO_{t,i} + d3*LOANCONC_{t,i} + f3*FTERATIO_{t,i} + g3*LNASSETS_{t,i} + h3*FOREIGNBHC_{t,i} + k3*JOBGROWTH_{t,i} + m3*LOANRATIO_{t,i} + n3*CCBANK_{t,I}$$

Subscripts *t* and *i* indicate periods and banks, respectively. NIIRATIO1 appears in all three equations, hence the focus of the following discussion will be on this variable and its respective equation. Generally, NIIRATIO1 can be expressed as a function of bank efficiency, technology change, bank strategy, bank size and organization as well as the bank environment. That is:

NIIRATIO1 = f(Bank efficiency, Technological change, Bank strategy, Bank size and organization, Bank environment)

Identifying appropriate indicators for the determinants is a difficult task because of the unavailability of some of the data and because the chosen proxy may have more than one interpretation. With these caveats in mind the indicators of the determinants will now be given. Bank efficiency (RELROA) is measured by each bank's relative financial performance, calculated as the bank return on assets minus the average return on assets of the other banks. The sign on the coefficient of this variable is likely to be ambiguous since it is not clear that well managed banks will generate lower or higher amounts of non-interest income per dollar of assets. However, the evidence from North America suggests that this sign should be negative as non-interest income is fairly volatile and the return from non-interest income is not large enough to justify the added risk (see DeYoung and Rice (2003)).

Technology change (ATM1) is captured by a dummy variable reflecting the introduction of ATMs. The number of ATMs per capita and the number of cashless transactions per capita would have been preferable but they were not available. As DeYoung and Rice (2003) argue, this type of technology advance and adoption is expected to increase non-interest income at banks by generating new fee income that more than outweighs the losses of fee income related to the reductions in cash balance depositors need to hold in checking and other liquid bank accounts.

Several indicators were tried to capture the strategic responses of banks. From the lending side, the loan-to-asset ratio (LOANRATIO), the composition of the loan portfolio (real estate (RESHARE), consumer (CONSHARE) and commercial and industrial loan share (CISHARE), and the riskiness of the loan portfolio (allowance for loan-losses-to-assets ratio (LOANQUALITY)), loan concentration Herfindahl index (LOANCONC)) were all included. High levels of loan-to-assets are indicative of an intermediation-based lending strategy in which banks rely on interest income. Therefore, the sign on this variable should be negative. The a priori impact on the loan portfolio will depend on the specific features of the respective loan categories in generating fee income. In Barbados, for example, real estate lending may provide more opportunities for fee income at banks than consumer and installment loans since for the majority of customers banks are the first and only choice for the acquisition of land and home ownership. In this case, the sign on the parameter of the real estate variable is expected to be positive while that on consumer and installment loans, where there are several lending alternatives, is likely to be negative. The commercial and industrial loan share variable is likely to be ambiguous. With respect to the riskiness of the loan portfolio, standard finance theory argues that the more risky the banking sector portfolio the greater non-interest income should be to compensate banks' shareholders for risk.

Apart from the lending side of the banks' strategy, this study also incorporates a core deposits-to-assets ratio (CORERATIO) to capture the traditional relationship banking, a dummy variable for credit card banks (CCBANK) to reflect the effects of the non-traditional banking strategy and the ratio of full time employees to deposits to represent personalized services (FTERATIO). Banks with large amounts of core deposits funding tend to generate high levels of non-interest income per dollar of assets, suggesting that close relationships with depositors provide ready customers additional fee-based services and/or allow banks to take advantage of inelastic demand (due to

switching costs) and increase the prices of these services. Non-interest income should be positively related to credit card banking. The sign of the coefficient on the personalized service variable is expected to be positive, implying that customers are willing to pay higher fees to banks that offer increased levels of personal service. DeYoung and Rice (2003) noted that this variable could also represent inefficient spending on labor.

Bank size (LNASSETS) and organization (FOREIGNBHC) are captured by the log of assets and a dummy variable reflecting the difference between local and foreign banks. Although the literature generally suggests that it is large foreign banks that tend to generate more non-interest income, there is no priori reason why small local banks cannot use non-interest income to boost their revenue streams.

The bank environment is measured in this paper by economy wide job growth (JOBGROWTH). This variable is expected to carry a positive sign as greater job growth should be associated with increased income and banking activity in the economy.

The equations for bank profitability and the variability of bank earnings contain NIIRATIO1 as well as most of the other explanatory variables from the NIIRATIO1 equation acting as controls. Bank profitability is measured by bank return on assets (ROA), while the variability of bank earnings is the standard deviation of the return on assets (SIGMAROA). According to the discussion in Section 6 non-interest income should increase bank earnings but its effect on volatility is ambiguous.

8. Data, Methodology and Results

The definitions of all the variables along with their descriptive statistics are given in the Appendix. The data are obtained from the Central Bank of Barbados. To conduct the econometric analysis, an unbalanced panel of quarterly observations for the seven commercial banks in Barbados during the period 1985 to 2001 is used. The three equations in the model are estimated as a system of equations employing the seemingly unrelated regression estimation method. Three-stage least squares was tried but there were problems related to the validity of the instruments, largely because the latter were confined to the balance sheet and income statement of the banks. This omission will

be problematic if the regressors are significantly correlated with the error terms (Baltagi, 2005). All computations are done using the econometric software programme Eviews 5.

Results of the model estimation are presented in Table 5. The majority of the coefficients are significant and have economic reasonable signs. The following discussion of the regression output first focuses on the non-interest income equation and then deals briefly with the remaining two equations.

It seems that the relative performance of banks is not important in explaining non-interest income in Barbados. The bank environment indicator, measured by job growth in the economy, is also insignificant, suggesting that non-interest income is not affected by the external environment of banks. These results are contrary to the findings in the United States (see DeYoung and Rice (2003)) where these factors were all found to be significant determinants of non-interest income. However, the variables reflecting the size and organization of banks are significant but carry a negative sign that deviates from the empirical evidence in the United States. Thus, foreign banks in Barbados generate less non-interest income per dollar of assets than local banks and larger banks are associated with lower non-interest income than smaller banks.

As is the case for the United States, the loan-to-assets indicator carries the a priori sign, that is, high levels of loans-to-assets correspond to low levels of non-interest income. Nevertheless, the positive signs on the 'RESHARE', 'CISHARE' and 'CONSHARE' variables suggest that banks that focus on consumer lending create more opportunities to sell fee-based services and similarly, banks that expend resources on real estate lending, as well as commercial and industrial lending, tend to earn more non-interest income. These results are against the evidence found in the United States by DeYoung and Rice (2003) where it is argued that consumers usually shop for mortgages and other loans beyond the commercial banks. Banks that are active in the credit card business also tend to generate more fee income. With respect to the riskiness of the loan portfolio, the insignificance of the parameter on the Herfindahl index suggests that risk is not a major determinant in generating non-interest income in Barbados. The ratio of allowance for loan-losses-to-assets was also included as a measure of loan quality but was omitted because it resulted in a singular matrix and consequently least squares estimates could not be obtained.

The variable 'CORERATIO', which represents traditional relationship banking, is insignificant, implying that banks in Barbados have not been able to take advantage of the close relationships with depositors to encourage them to undertake additional fee-based services and/or pay higher fees for these services given that customers' demand is inelastic due to switching costs. The credit card variable and the proxy for personalised service are both significant and positively related to non-interest income, the latter indicating that customers are willing to pay fees to banks that provide higher levels of personalized services.

Finally, the technology variable behaved as expected indicating that technology is important to the generation of non-interest income in Barbados. Hence, banks with more advanced technology such as ATM banking tend to generate higher levels of non-interest income per dollar of assets.

In the case of the other two equations, return on assets (ROA) and standard deviation of return on assets (SIGMAROA), the main objective of this paper is to determine how non-interest income relates to these alternative measures of bank financial performance. To this end, only the explanatory variable NIIRATIO1 will be discussed, although the results for all of the independent variables are presented in Table 5. The evidence suggests that non-interest income is a highly significant determinant of bank profitability, as measured by the return on assets, such that an increase in the level of non-interest income is associated with a considerable rise in return on assets. In addition, according to the regression output, the variable NIIRATIO1 is positively related to SIGMAROA, therefore, it can be inferred that raising the level of non-interest income per dollar of assets would lead to higher variability in earnings. These findings are in line with recent studies undertaken for the United States (see DeYoung and Rice (2003) and Stiroh (2004)).

Conclusions

This paper discusses the trends of commercial bank non-interest income in the Caribbean, as well as examines the determinants of non-interest income in the Barbadian banking system and its impact on the financial performance of commercial banks. It finds that the incidence of non-interest income in Barbados declined over the period 1985 to 2001, contrary to other countries in the Caribbean and the wider developed world. Apparently, most of the major factors that cause banks

in the developed world to generate more non-interest income, like deregulation and technological change for the development of loan securitization and credit scoring, have not yet taken root in Barbados. Bank characteristics and the ATM technology seem to be the most influential factors shaping the pattern of non-interest income in the banking industry in Barbados, results confirmed by an empirical model using panel data. Furthermore, increases in non-interest income are linked to greater bank profitability but also to higher earnings volatility.

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Table 1a: Non-interest Income (Percentage of Assets and Operating Income) in Barbados

	Aggregate Banks		Small Banks		Large Banks	
	Non-interest Income		Non-interest Income		Non-interest Income	
	% of Total Assets	% of Operating Income	% of Total Assets	% of Operating Income	% of Total Assets	% of Operating Income
1985	2.45%	39.4%	3.51%	60.1%	2.35%	37.7%
1986	2.24%	35.6%	1.87%	37.7%	2.29%	35.4%
1987	2.12%	34.4%	1.81%	32.8%	2.16%	34.5%
1988	2.13%	34.3%	1.51%	30.7%	2.22%	34.7%
1989	2.36%	33.4%	1.69%	28.8%	2.46%	33.9%
1990	2.35%	36.3%	1.94%	33.1%	2.41%	36.7%
1991	2.36%	33.7%	2.18%	35.6%	2.38%	33.5%
1992	2.20%	31.5%	2.45%	33.0%	2.17%	31.3%
1993	2.26%	35.8%	1.12%	29.8%	2.41%	36.2%
1994	2.35%	35.1%	1.23%	25.4%	2.49%	36.0%
1995	2.32%	34.2%	2.52%	31.1%	2.30%	34.7%
1996	2.21%	36.6%	1.88%	34.2%	2.25%	36.9%
1997	2.32%	37.8%	1.82%	30.1%	2.37%	38.6%
1998	2.31%	32.4%	2.39%	32.0%	2.30%	32.4%
1999	2.25%	32.8%	2.39%	33.5%	2.24%	32.8%
2000	2.34%	34.3%	2.88%	38.8%	2.28%	33.8%
2001	2.18%	33.5%	2.35%	36.3%	2.16%	33.2%

Source: Central Bank of Barbados

Table 1b: Composition of Non-interest Income in Barbados

	Aggregate Banks					Small Banks					Large Banks				
	Composition of Non-interest Income					Composition of Non-interest Income					Composition of Non-interest Income				
	Fee Income				Other Non-interest Income	Fee Income				Other Non-interest Income	Fee Income				Other Non-interest Income
	Foreign Ex. Charges	Service Charges	Other Fees	Total Fee Income		Foreign Ex. Charges	Service Charges	Other Fees	Total Fee Income		Foreign Ex. Charges	Service Charges	Other Fees	Total Fee Income	
1985	58.7%	8.5%	21.3%	88.5%	11.5%	51.2%	2.3%	46.5%	100.0%	0.0%	59.6%	9.4%	18.0%	87.0%	13.0%
1986	60.0%	9.1%	20.6%	89.6%	10.4%	50.3%	3.3%	46.5%	100.0%	0.0%	61.1%	9.8%	17.6%	88.4%	11.6%
1987	64.0%	11.6%	13.9%	89.5%	10.5%	57.4%	5.2%	37.4%	100.0%	0.0%	64.7%	12.3%	11.2%	88.3%	11.7%
1988	62.4%	8.4%	19.7%	90.5%	9.5%	58.4%	5.2%	36.3%	100.0%	0.0%	62.9%	8.8%	17.9%	89.6%	10.4%
1989	63.4%	9.3%	18.0%	90.7%	9.3%	61.6%	6.5%	31.8%	100.0%	0.0%	63.6%	9.6%	16.5%	89.7%	10.3%
1990	64.6%	9.4%	15.8%	89.8%	10.2%	61.0%	6.0%	33.0%	100.0%	0.0%	65.1%	9.8%	13.9%	88.7%	11.3%
1991	57.9%	11.0%	19.9%	88.8%	11.2%	56.7%	7.2%	36.1%	100.0%	0.0%	58.1%	11.5%	17.8%	87.4%	12.6%
1992	50.8%	12.0%	26.5%	89.2%	10.8%	62.9%	8.1%	29.0%	100.0%	0.0%	49.3%	12.4%	26.2%	87.9%	12.1%
1993	51.2%	12.5%	30.4%	94.1%	5.9%	47.5%	13.0%	39.5%	100.0%	0.0%	51.4%	12.5%	29.9%	93.8%	6.2%
1994	53.2%	9.9%	27.2%	90.3%	9.7%	50.9%	17.1%	32.0%	100.0%	0.0%	53.4%	9.4%	26.9%	89.6%	10.4%
1995	53.3%	9.8%	21.7%	84.8%	15.2%	48.0%	12.4%	26.6%	87.0%	13.0%	54.0%	9.5%	21.1%	84.6%	15.4%
1996	48.7%	10.7%	23.0%	82.4%	17.6%	31.0%	11.9%	11.0%	53.9%	46.1%	50.3%	10.6%	24.0%	84.9%	15.1%
1997	47.2%	9.5%	25.9%	82.7%	17.3%	30.9%	12.5%	19.8%	63.1%	36.9%	48.6%	9.3%	26.5%	84.3%	15.7%
1998	49.1%	8.5%	25.9%	83.5%	16.5%	27.9%	10.3%	18.0%	56.2%	43.8%	51.3%	8.3%	26.7%	86.4%	13.6%
1999	47.3%	9.3%	21.9%	78.5%	21.5%	21.4%	9.7%	22.4%	53.5%	46.5%	50.1%	9.3%	21.8%	81.2%	18.8%
2000	46.1%	11.8%	25.7%	83.6%	16.4%	16.2%	9.1%	30.3%	55.6%	44.4%	50.0%	12.1%	25.1%	87.3%	12.7%
2001	44.0%	11.8%	27.5%	83.3%	16.7%	16.0%	12.0%	30.5%	58.4%	41.6%	47.4%	11.8%	27.2%	86.3%	13.7%

Source: Central Bank of Barbados

Notes: Commercial banks are classified as small if their average assets over the last 10 years (1992 – 2001) is less than $500,000; banks whose 10 year average assets exceeds $500,000 are classified as large

Table 2: Non-Interest Income (Percentage of Assets and Operating Income) in the Caribbean

	Barbados		Trinidad		Jamaica	
	Non-interest Income		Non-interest Income		Non-interest Income	
	% of Total Assets	% of Operating Income	% of Total Assets	% of Operating Income	% of Total Assets	% of Operating Income
1985	2.45%	39.4%	1.54%	22.6%	n.a.	n.a.
1986	2.24%	35.6%	1.46%	21.9%	n.a.	n.a.
1987	2.12%	34.4%	1.37%	22.6%	n.a.	n.a.
1988	2.13%	34.3%	1.45%	24.1%	n.a.	n.a.
1989	2.36%	33.4%	1.45%	23.7%	6.50%	73.9%
1990	2.35%	36.3%	1.32%	23.6%	6.49%	69.1%
1991	2.36%	33.7%	1.67%	28.0%	7.55%	69.9%
1992	2.20%	31.5%	2.09%	29.9%	9.49%	85.4%
1993	2.26%	35.8%	3.07%	42.1%	9.10%	76.6%
1994	2.35%	35.1%	2.43%	39.2%	10.15%	76.3%
1995	2.32%	34.2%	2.20%	38.2%	9.04%	75.2%
1996	2.21%	36.6%	2.42%	42.3%	8.76%	74.2%
1997	2.32%	37.8%	2.28%	37.2%	6.75%	67.3%
1998	2.31%	32.4%	2.08%	33.2%	11.55%	106.5%
1999	2.25%	32.8%	2.64%	36.9%	11.78%	111.9%
2000	2.34%	34.3%	2.53%	35.1%	11.47%	115.1%
2001	2.18%	33.5%	2.77%	39.0%	10.45%	112.7%

Source: Central Bank of Barbados, Central Bank of Trinidad and Tobago, Robinson J. (2002)

Table 3: Composition of Non-interest Income in the Caribbean

	Barbados				Trinidad				Jamaica			
	Non-interest Income				Non-interest Income				Non-interest Income			
	Fee Income											
	Foreign Exchange Charges	Service Charges	Other Fees	Other Non-interest Income	Fee Income	Foreign Exchange Profit/(Loss)	Dividend, Rental, & Trust Services Income	Other Non-interest income	Fees, Service Charges, Commissions	Invest-ments	Foreign Exchange Gains	Other Non-interest Income
1985	58.7%	8.5%	21.3%	11.5%	40.6%	n.a.	n.a.	59.4%	n.a.	n.a.	n.a.	n.a.
1986	60.0%	9.1%	20.6%	10.4%	47.8%	32.2%	7.19%	12.8%	n.a.	n.a.	n.a.	n.a.
1987	64.0%	11.6%	13.9%	10.5%	54.5%	29.2%	8.20%	8.0%	n.a.	n.a.	n.a.	n.a.
1988	62.4%	8.4%	19.7%	9.5%	41.9%	35.7%	7.92%	14.5%	n.a.	n.a.	n.a.	n.a.
1989	63.4%	9.3%	18.0%	9.3%	53.5%	23.9%	6.97%	15.7%	14.3%	61.5%	9.8%	14.4%
1990	64.6%	9.4%	15.8%	10.2%	58.7%	25.4%	7.62%	8.2%	13.1%	58.7%	15.5%	12.7%
1991	57.9%	11.0%	19.9%	11.2%	53.5%	20.0%	7.58%	18.9%	11.3%	39.7%	37.2%	11.9%
1992	50.8%	12.0%	26.5%	10.8%	48.7%	18.2%	9.50%	23.6%	9.4%	61.7%	16.4%	12.4%
1993	51.2%	12.5%	30.4%	5.9%	40.5%	41.7%	3.49%	14.4%	10.6%	63.7%	16.6%	9.1%
1994	53.2%	9.9%	27.2%	9.7%	46.9%	35.7%	4.82%	12.6%	10.5%	73.0%	10.9%	5.6%
1995	53.3%	9.8%	21.7%	15.2%	52.5%	33.3%	4.60%	9.6%	14.7%	68.9%	12.1%	4.2%
1996	48.7%	10.7%	23.0%	17.6%	54.0%	26.0%	4.27%	15.7%	13.6%	69.6%	6.0%	10.7%
1997	47.2%	9.5%	25.9%	17.3%	56.7%	21.0%	5.21%	17.1%	18.3%	66.0%	7.9%	7.8%
1998	49.1%	8.5%	25.9%	16.5%	59.4%	23.2%	7.16%	10.2%	10.5%	83.9%	4.1%	1.5%
1999	47.3%	9.3%	21.9%	21.5%	55.2%	24.2%	5.10%	15.5%	9.4%	85.7%	3.2%	1.7%
2000	46.1%	11.8%	25.7%	16.4%	56.8%	21.6%	7.84%	14.1%	9.7%	85.1%	4.2%	1.0%
2001	44.0%	11.8%	27.5%	16.7%	56.7%	21.9%	8.13%	13.3%	11.4%	82.9%	4.6%	1.1%

Source: Central Bank of Barbados, Central Bank of Trinidad and Tobago, Robinson J. (2002)

Table 4: A comparison of banks' non-interest income as a Percentage of total assets for various countries in 2001

Country	**Non-interest Income (%)**
Australia	1.5
Belgium	0.9
Canada	2.2
Denmark	1.3
Finland	3.1
France	1.7
Germany	0.7
Italy	1.1
Netherlands	1.2
New Zealand	1.2
Norway	0.8
Spain	0.9
Sweden	1.5
Switzerland	1.7
U.K.	1.4
U.S.	2.6
Average	**1.5**
Jamaica	10.5
Barbados	2.2
Trinidad & Tobago	3.5

Sources: Central Bank of Barbados, Central Bank of Trinidad and Tobago, Robinson J. (2002), Harvey 2003,

Table 5: Regression Results

Estimation Method: Seemingly Unrelated Regression
Sample: 1985Q1 2001Q4
Included observations: 56
Total system (unbalanced) observations 612
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: NIIRATIO1				
RELROA	0.0131	0.0168	0.7784	0.4367
CORERATIO	0.0008	0.0012	0.6929	0.4886
FTERATIO	0.4682	0.1368	3.4228	0.0007
LNASSETS	-0.0020	0.0005	-4.1729	0.0000
FOREIGNBHC	-0.0015	0.0007	-1.9723	0.0491
JOBGROWTH	0.0010	0.0017	0.6086	0.5430
LOANRATIO	-0.0039	0.0007	-5.6961	0.0000
RESHARE	0.0089	0.0015	5.9595	0.0000
CISHARE	0.0056	0.0018	3.1343	0.0018
CCBANK	0.0024	0.0005	4.5417	0.0000
ATM1	0.0025	0.0006	4.4958	0.0000
CONSHARE	0.0215	0.0030	7.2496	0.0000
LOANCONC	0.0000	0.0000	1.2856	0.1991
Dependent Variable: SIGMAROA				
LOANCONC	0.0000	0.0000	-1.1196	0.2634
NIIRATIO1	0.2787	0.0577	4.8293	0.0000
CORERATIO	-0.0073	0.0012	-6.0413	0.0000
FTERATIO	-0.0460	0.1037	-0.4438	0.6573
LNASSETS	-0.0012	0.0004	-3.1102	0.0020
FOREIGNBHC	0.0016	0.0006	2.8080	0.0052
JOBGROWTH	0.0023	0.0022	1.0644	0.2876
LOANRATIO	-0.0014	0.0005	-2.8577	0.0044
CCBANK	-0.0014	0.0018	-0.7792	0.4362
Dependent Variable: ROA				
NIIRATIO1	1.1320	0.1493	7.5823	0.0000
CORERATIO	0.0097	0.0036	2.7218	0.0067
LOANCONC	0.0000	0.0000	2.5321	0.0116
FTERATIO	-1.7172	0.3555	-4.8300	0.0000
LNASSETS	0.0007	0.0012	0.5876	0.5571
FOREIGNBHC	0.0001	0.0018	0.0699	0.9443
JOBGROWTH	0.0047	0.0057	0.8135	0.4163
LOANRATIO	0.0035	0.0014	2.5246	0.0119
CCBANK	-0.0039	0.0021	-1.8150	0.0701
Determinant residual covariance	1.80E-123			

Figure 1

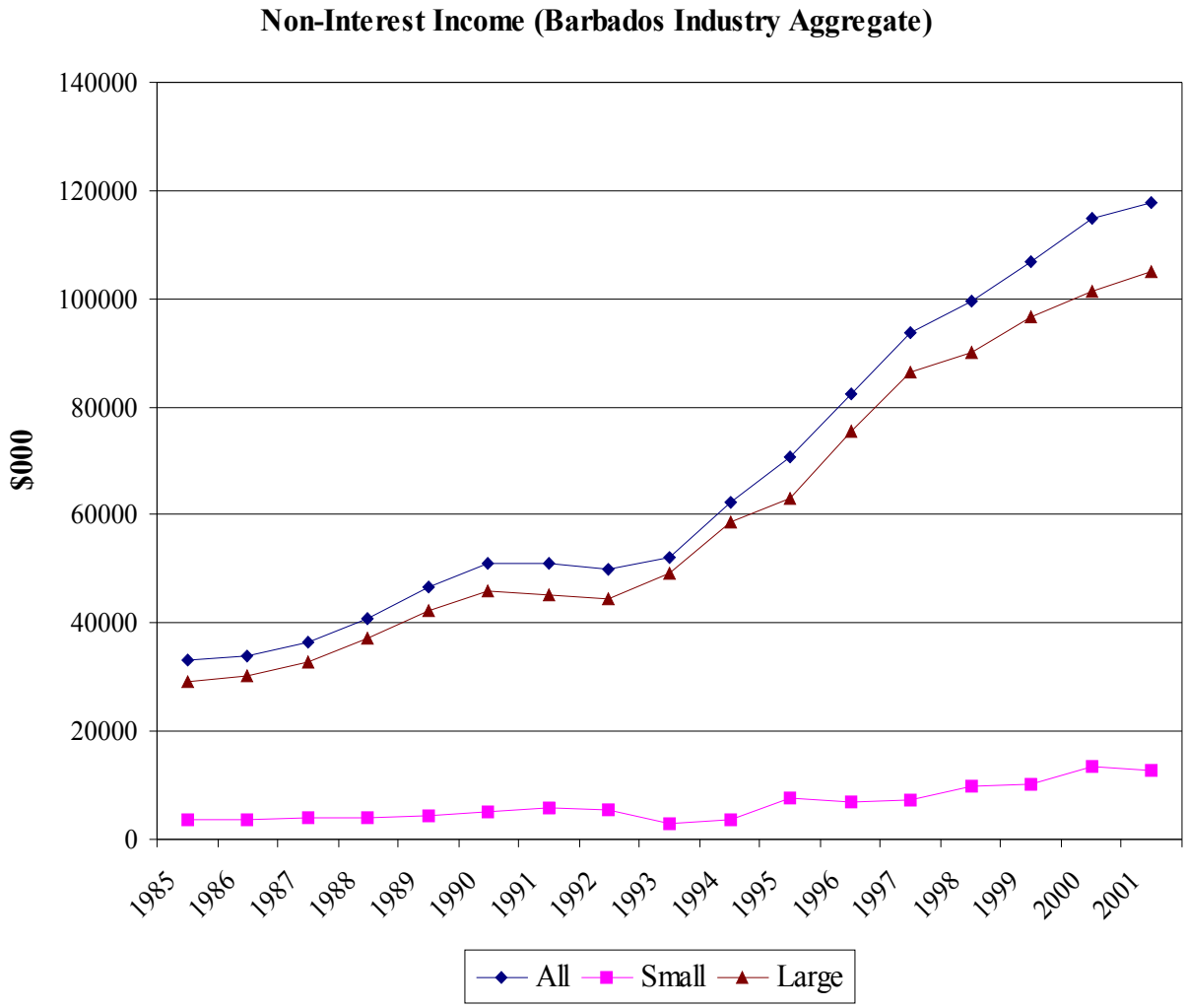

Non-Interest Income (Barbados Industry Aggregate)
$000
140000
120000
100000
80000
60000
40000
20000
0
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
All
Small
Large

Figure 2

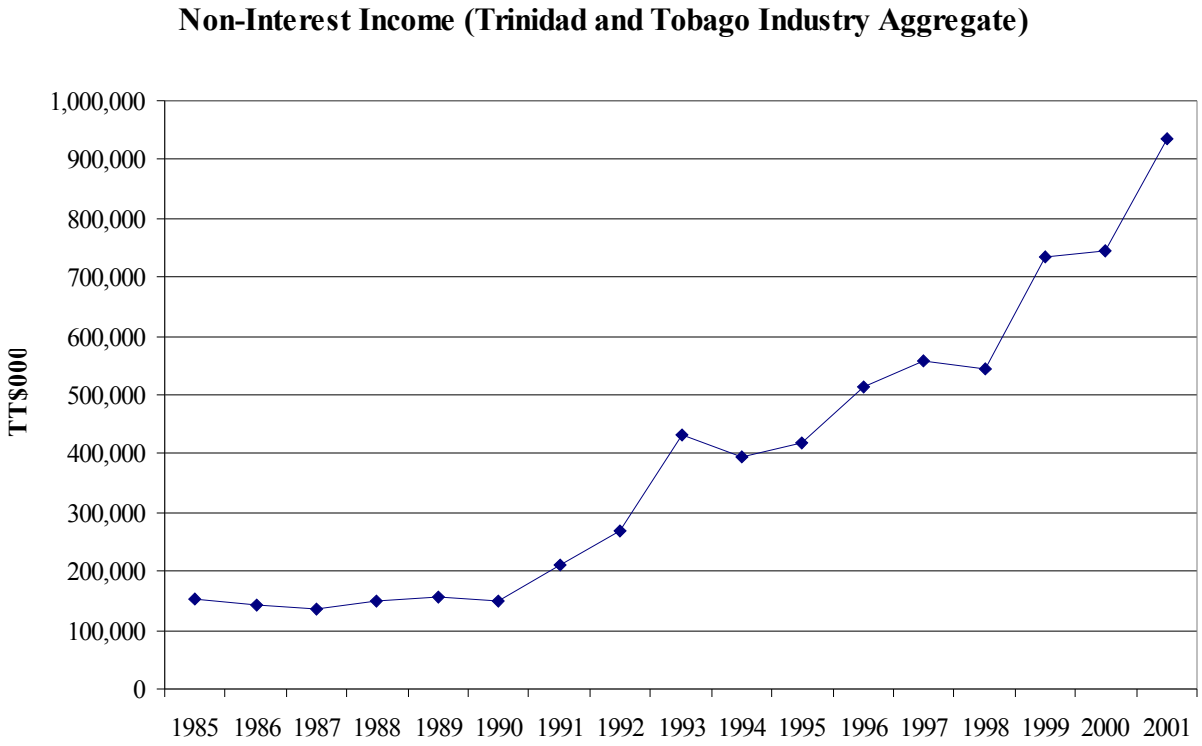
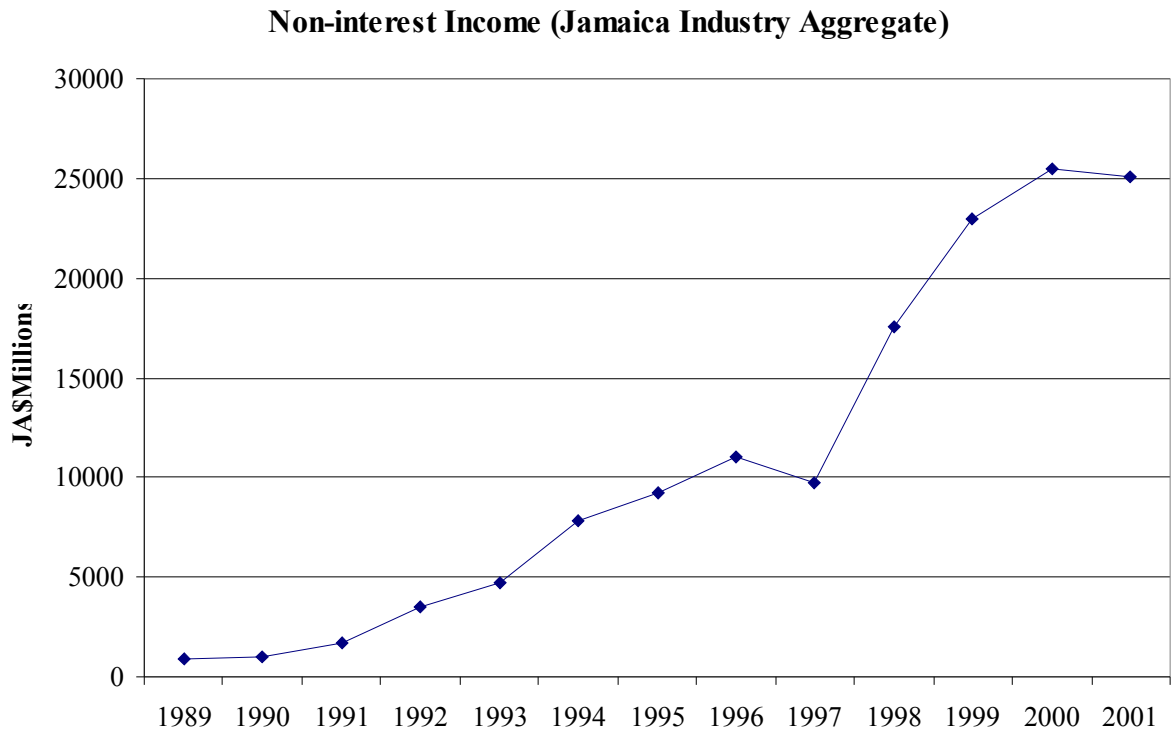

Non-Interest Income (Trinidad and Tobago Industry Aggregate)
TT$000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001

Figure 3


Non-interest Income (Jamaica Industry Aggregate)
JA$Millions
30000
25000
20000
15000
10000
5000
0
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001

Appendix

Variable Definitions

Variables	Definition
NIIRATIO1	Non-interest income divided by total assets.
ROA	Return on asset, calculated as bank net income divided by total assets.
SIGMAROA	Standard deviation of return on assets.
RELROA	Bank i's relative performance over the last quarter: ROA of bank i in period t-1 minus the average ROA of all banks in period t-1.
LOANRATIO	Total loans divided by total assets.
CISHARE	Commercial and industrial loans (Manufacutring and Mining, Commerce and Trade, and Construction loans) divided by total loans.
CONSHARE	Consumer loans divided by total loans
CORERATIO	Transactions deposits (Demand & Savings) plus time deposits divided by total assets.
FTERATIO	Number of bank employees divided by transactions deposits.
RESHARE	Mortgage loans divided by total loans.
LNASSETS	Natural log of bank assets deflated by RPI based in 2001
LOANCONC	Loan concentration Herfindahl index, based on share of Consumer, C&I, Agriculture and Fishing and All Other loans.
LOANQUALITY	Reserve for bad debt divided by total assets.
CCBANK	Dummy = 1 if more than 25% of bank assets are held in credit card loans.
FOREIGNBHC	Dummy = 1 if bank is an affiliate of a bank holding company headquartered in a foreign country.
ATM1	Dummy = 1 if bank has ATM machines.

Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Observations
NIIRATIO1	0.006	0.006	0.019	0.001	0.002	0.907	6.799	351.480	476
SIGMAROA	0.002	0.002	0.011	0.000	0.002	2.125	7.977	849.496	476
ROA	0.004	0.004	0.020	-0.015	0.004	-0.607	5.775	181.933	476
RELROA	0.000	0.000	0.013	-0.015	0.004	-0.114	4.329	36.037	476
CORERATIO	0.805	0.830	1.043	0.310	0.102	-0.845	3.468	54.894	428
LNASSETS	8.273	8.419	9.423	6.018	0.655	-0.838	3.320	57.734	476
LOANRATIO	0.430	0.422	1.434	0.085	0.202	1.503	7.908	657.121	476
CONSHARE	0.167	0.171	0.369	0.008	0.071	0.064	3.340	2.617	476
CISHARE	0.452	0.403	0.952	0.094	0.224	0.453	2.110	31.959	476
RESHARE	0.056	0.000	0.559	0.000	0.120	2.706	9.773	839.317	268
LOANCONC	5170.983	5024.500	9073.000	3178.000	1326.896	0.652	3.140	34.153	476
JOBGROWTH	0.021	0.024	0.089	-0.087	0.034	-0.858	4.420	98.425	476
CCBANK	0.015	0.000	1.000	0.000	0.121	8.001	65.015	45804.990	268
FOREIGNBHC	0.782	1.000	1.000	0.000	0.414	-1.363	2.856	147.690	476
FTERATIO	0.002	0.001	0.008	0.001	0.001	2.566	11.836	1444.492	332
ATM1	0.555	1.000	1.000	0.000	0.498	-0.220	1.048	79.380	476
LOANQUALITY	0.014	0.011	0.208	0.000	0.018	4.485	44.623	25078.930	332