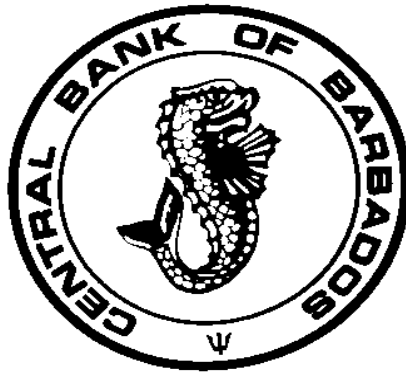# LOAN LOSS PROVISIONING: THE COMMERCIAL BANKING SYSTEM IN BARBADOS

BY

ROLAND CRAIGWELL AND WAYNE ELLIOTT

CENTRAL BANK OF BARBADOS
Research Department

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By

Roland Craigwell

Professor of Economics
University of the West Indies
Cave Hill Campus
And
Research Associate
Central Bank of Barbados

And

Wayne Elliott

Summer Intern
Central Bank of Barbados

July 2010

Correspondence Address: Roland Craigwell, Department of Economics, University of the West Indies, Cave Hill Campus, Bridgetown, BB11000, Barbados. Tel.: +246-4174474; Fax: +246-4174260; Email: Roland.Craigwell@cavehill.uwi.edu

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ABSTRACT

Loan loss provisions provide a financial cushion to institutions by discouraging low levels of bank capital. The purpose of this paper is to investigate the process of loan provisioning within the commercial banks of Barbados. It will place particular emphasis on how commercial banks set their provisional standards and levels. There will also be an evaluation of the expected impact of commercial banks' provisioning on the decisions made by the Central Bank.

Introduction

A loan loss provision is a charge to commercial banks' profit and loss statements, which creates a reserve on the balance sheet of the banks. It can be viewed as a cushioning mechanism which ensures that commercial banks do not lose the entire loan balance outstanding unexpectedly. Without the adjustment for loan losses, the amount of funds lent on the balance sheet would include possible future losses. Furthermore, regulators, creditors and investors could be misled by overstated capital figures.

Different banks have various ways of addressing loan losses. Some may choose to write-off the entire balance on a past due or doubtful loan, even if it could possibly be recovered later. Others may write-down the loan amount against the balance of loans on the balance sheet until the current loan is at its collectable value. The chosen policy can serve as an indicator of the level of a bank's conservatism.

Most of the literature provides a dominant view on loan loss provisioning (Laurin and Majnoni, 2003; Song, 2002). Authors declare and emphasise how difficult it is to compare the processes of provisioning within financial institutions. These difficulties arise mainly because of the different classification and provisioning approaches that are used in different territories. Due to the incomparability of banks' provisioning processes, the peer pressure and market discipline needed to help banking systems grow stronger is less effective and, in some cases, absent. Worldwide banking systems need regulatory harmonisation that reconcile the conflicting aspects, are sound and are general enough to be applied by wider cross-sections of banks (Laurin and Majnoni 2003).

Motivated by the financial crisis of 2007, we embark on this study of the Barbadian Banking System with emphasis on the loan loss provisioning process. Through a questionnaire, we will determine the processes of loan loss provisioning for each commercial banks and if the commercial banks provide more during upswings than they do for downturns. In addition, an econometric study will determine the discretionary factors that affect how much the commercial banks provide for loan loss. This study will present a comparative understanding of the loan loss provisioning process across

commercial banks, explore the timing of provisions and the major factors driving the level of provisions. By delving into this intricate topic, information that is often overlooked in the local banking sector will be discussed and analysed.

The structure of the paper is as follows: Section 2 provides a review of existing literature. Section 3 presents the model estimates and a discussion of results. Section 4 concludes with a summary of the findings, including limitations and policy implications.

2.   Literature Review

Banks aim to recover all credit issued, along with the interest agreed upon. Due to many different factors, the principle and interest are not always collected. Banks have found a technique to soften the impact of such losses: loan loss provisioning. They use many different ways in an attempt to make the provisioning process consistent. In an attempt to consolidate the processes involved and to create clearly defined precepts, across different jurisdictions, loan loss provisioning standards were established.

2.1   Loan Loss Provisioning Standards

The standards that were developed and are now used have some faults and present some problems for regulators and banks alike. E.g. Sometimes banks need to apply more complex internal classification systems, while more standardised systems are required by bank regulators for reporting purposes. These internal classifications are intended to facilitate monitoring and interbank comparisons. Highlighting the content of 'Sound Practices for Loan Accounting and Disclosure' (Basel Committee July 1999), the authors emphasize that there are no uniformed loan classifications, nor is there a standard procedure to assess loan risk across all jurisdictions. They further posit that several concepts of loan loss provisioning are susceptible to different interpretations. To deal with these problems, diverse systems are utilised in different countries (Laurin and Majnoni, 2003).

The International Accounting Standards are guidelines for asset valuation and disclosure. According to Laurin and Majnoni (2003) these standards are yet to give detailed guidance

for loan loss provisioning. Due to the shortcomings of these accounting standards, countries that implement the International Accounting Standards still have different loan loss provisioning regulatory frameworks.

In concurrence, the Central Bank of Barbados, as a regulator, uses the Financial Institutions Act 1998. The Financial Institutions Act governs all Financial Institutions of Barbados. The Act is the benchmark for provisioning in Barbados regardless of the standards the individual commercial banks choose to employ. When reporting to the Central Bank of Barbados, commercial banks must ensure that all information regarding loan loss provisioning is in accordance with the Financial Regulations Act 1998.The Financial Institution Act of Barbados is an adaptation of Basel Accord 1.

In 1988, the Basel 1 Capital Accord was released. Its purpose was to:
1)   strengthen the stability of the international banking system.
2)   set up fair and consistent international banking system standards to decrease competitive inequality among international banks.

One achievement of Basel 1 was defining bank capital and by extension, the capital ratio. This definition was needed to set up a minimum risk-based capital adequacy that applies to all banks and governments. Tier 1 Core Capital includes stock issues (or share holders equity) and declared reserves. This definition is especially important to this research, as loan loss provisions are included in its calculation. Tier 2 Supplementary Capital includes all other capital except short-term unsecured debts.

The best way to measure, manage and mitigate risks differs from bank to bank. An Amendment to Basel Accord 1 was introduced in 1996 which focused on trading risks and allowed some banks to use their own systems to measure their market risks for the first time.

Basel Accord consists of three mutually reinforcing pillars, which together contribute to the safety and soundness of the financial system. The Committee stressed the need for rigorous application of all three pillars. These three pillars are:

1)   Minimum Capital Requirement

2)   Supervisory Review Process

3)   Market Discipline

Saidenberg and Schuermann (2003) posit that capital requirements must be sensitive to the risks to which an institution is exposed. Capital requirements ensure that banks have some minimal level of resources to honor their commitments to their customers. Furthermore, capital requirements are intended to mitigate moral peril. Capital decreases the risk that owners of financial institutions would engage in fraudulent behaviors and makes it more likely for firms to conform to business rules. In essence, the deposits of customers would be safer because of capital requirements, supervisory review and market discipline

Laurin and Majnoni (2003) takes it one step further and warn that the flexibility given to commercial banks through their classification processes limits the use of penalties and sanctions that could be used to regulate inappropriate classification and provisioning. Regulators therefore rely mainly on moral suasion and the threat of sanctions rather than specific penalties or sanctions to enforce the regulations. Capital requirements are relevant because they decrease the incentives to managers who may wish to use loan loss provisions for discretionary purposes.

2.2   Classification Criteria

The provisioning criteria used to estimate losses in the loan portfolio are one of the key ways to assess the adequacy of loan loss provisioning levels and reserves. An inadequate classification of individual loans destabilizes the process of provisioning. Impaired provisioning processes distort figures on the balance sheet and overstate capital and capital ratios (Angklomkliew, George and Packer, 2009). In support of this view, Song (2002) adds that there should be one set of well-known rules governing the provisioning

process. He states that the predominant view on the classification of outstanding loans should be based on a comprehensive assessment of whether or not the borrower is able to service the debt, rather than on the outstanding loan value or the collateral provided. The Basel Committee on Banking Supervision supports this view and states that the loan classification system should take the borrower's current financial condition and paying capacity into consideration. The committee also believes that the current value of collateral and the ability to realize the value of collateral should be included with other criteria that banks deem necessary.

The main method of classifying loans is by the time that has passed since the last payment was due. The longer the time past the last due date, the less likely it is for commercial banks to recover the entire balance and the greater the bank's provision for the outstanding balance. This method is used mainly as a trigger, after which further analysis is undertaken. Relying on the 'time past the due date' analysis only, would cause losses to be recognized later in the loan analysis rather than earlier.

Many countries have become aware of the inefficiencies of the 'time past due' analysis and agree that more forward-looking criteria should be taken into account. Such criteria were the borrower's cash flow and repayment capacity. Today, some commercial banks look at the borrower's behavior as a proxy for their willingness to repay a loan. An example of this is a case where a borrower misses a few payments, the commercial bank contacts him but he gives no suitable reason for his delinquency. This indicates that a default may be in the near future and that a provision should be made.

The Financial Standards have special categories for loans with varying characteristics. This specification is very transparent to facilitate its general use. As used in the United States of America, some regulators use the criteria as set out by Basel Accord 1. This system is made up of five main categories:

- Pass: The borrower's financial condition is sound. There is adequate credit documentation and collateral is not impaired. This extends to loan payments that are in arrears of up to 1 month.

- Special Mention: The credit is up to date but there is evidence that suggests that the borrower's finances or collateral may become impaired. Loans that were renegotiated and are secured for a minimum of a year are captured in this category. Loan payments that are in arrears for 1-3 months are found here.

- Substandard: There is well-defined credit weakness and the primary source of repayment is insufficient to service the debt. This also houses the part of the doubtful loans that is secured. Loan payments that are in arrears for over 3 months are found here.

- Doubtful: Loans classified this way have all the characteristics of a substandard loan. The collection of the debt in full is highly uncertain and not likely. The unsecured portions of loans that are 6 or more months in arrears are captured here.

- Loss: These are loans that are uncollectible. It is either not practical or desirable to try to recover any further payments/collateral. The unsecured portion of the loan is 12 or more months in arrears.

Another major difference across many jurisdictions, as pointed out by Cortavarria et al (2000), is the classification of restructured loans. Restructured loans are loans that have been modified to better ensure the loan balance is recovered. Specifically, these are loans that had their terms renegotiated because of deterioration in the borrower's finances. Some jurisdictions may reclassify a restructured loan. In the Czech Republic, for instance, they may classify it as substandard while in Thailand it may be considered as 'special mention' or even a pass might be given. However, these classifications may not be given immediately but over a reasonable period of time.

Credit analysis should ensure that restructuring is based on sound underwriting standards because the cost to recover collateral is time sensitive. In other words, if the collateral was collected early, and the option of restructuring not issued, then the bank may have recovered more of the outstanding loan balance (Cortavarria et al 2000).

Just as there are different ways to classify loans and different categories to be classified into, there are different types of loan loss provisions. The type of provisioning in one economic community may not be suitable in another.

2.3   Types of Loan Loss Provisioning

Balla and Mckenna (2009) highlight the major differences between the traditional incurred loss method of loan provisioning and an alternative dynamic loan loss provisioning method. Dynamic provisioning is a statistical method that utilizes the historical data for various asset classes. It determines the level of provisioning periodically and the provisions which should be event driven, conversely, the incurred loss method delays provisioning until economic downturns.

Dynamic provisioning is a deliberate method to build the loan loss reserve in good economic times. The built up reserve then eases pressures on earnings and capital by absorbing loan losses during an economic downturn. Balla and Mckenna (2009) suggest that the traditional incurred loss method approach may magnify the bust because most bad loans will only reveal themselves during recessions. For this reason, they believe that banks through the dynamic provisioning process could reduce the cost of provisioning by taking provisions early when economic conditions are good. Thus, Balla and Mckenna (2009) state that the key difference is not the level of provisioning but the timing of the provisioning.

Wesel (2010) comments that the miscalibration of provisioning rates either causes an excessive burden on banks or it leads to an insufficient cushion during the downturn. Furthermore, dynamic provisioning rates need to be formulated in accordance with loan default history that is at least a full credit cycle. This requirement reduces the risk of over or under provisioning eventual loses. A deficit in the loan loss reserves hints that capital ratios are overstating their ability to absorb unexpected losses. This is another reason why regulators pay such close attention to the loan loss reserves.

Taking the analysis a step further, Bouvatier and Lepetit (2006) highlight the two components of loan loss provisioning: a non-discretionary component and a discretionary component. The non-discretionary component is designed to cover expected loan losses in the banks' loan portfolio. The authors state that this component drives the cyclicality of loan loss provisioning and it leads to a misevaluation of expected credit losses.

Bouvatier and Lepetit (2006) add that the discretionary component is caused by management's use of loan loss provisioning for their own objectives. They give at least three functions for which banks' management uses loan loss provisioning. Bikker and Metzemakers (2002) confirm these hypotheses and proceed to explain how the banks' management applies each function.

The first such function is the practice of earnings management where banks reserve more in good years to cover for bad years. This effectively raises and lowers income, and by extension profits and dividends, as desired. The second is the management of the capital ratio. This is possible because loan loss provisions may be apart of regulatory capital depending only on the stipulations of the territory. The third function is tax evasion and it is common because provisions are tax deductible in most countries. Dziobek et al (2000) also suggest that, if loan loss provisions count as regulatory capital and are tax deductible, management has a greater incentive to use loan provisions. Loan loss provisions lower the tax burden. This is facilitated by a shift from Tier 1 capital to general provisions. Loan loss provisions could also inadvertently signal financial strength. A bank's level of loan loss provisions and reserves could indicate that it is strong enough to withstand a financial blow to the loan portfolio.

Using the theoretical model by Cavallo and Majnono (2002), Bikker and Metzemakers (2002) did their study using the balance sheet data of 29 Organisation for Economic Co-operation and Development countries. The authors found that banks that hold a greater amount of risky loans on the balance sheet act somewhat prudently and provision more. The authors also found evidence in support of the capital management hypothesis. It was found that banks provision more when their capital ratios are low. It also emerged that

provisions depend strongly on credit risk. In harmony with most previous authors, evidence confirmed that provisions depend significantly on the business cycle.

Bikker and Metzemakers (2002) found no clear evidence to indicate that an increase in provisioning during successive years of economic boom resulted in higher reserves after year of recession. There was also no evidence that the erosion of reserves after years of consecutive recession was due to increased provisioning in years of economic boom.

Bouvatier and Lepetit (2006) maintain that the propensity to use loan loss provisioning to smooth income is greater for banks with good performance relative to banks with moderate performance. The authors concluded that, during upswing phases, weak specific provisions encourage the expansion of credit. With sudden downturns, the identification of problem loans constrains the banks to make provisions thereby reducing their ability to provide new credit. Poorly capitalized banks appear more constrained by provisioning.

2.4   *The Financial Institutions Act 1998- Loan Loss Provisions*

Another key question that needs to be answered in order to complete the provisioning process is how much to provision for each category of loans. As described by the Financial Regulations Act 1998, the following minimum levels of provisions should be assigned to each of the loan classification categories above, following the annual review of the loan portfolio:

Classification	*Level of Provision*
Pass	0%
Special Mention	0%
Fully Secured Substandard and Residential up to 6 months past due	0%
Substandard (Other)	10%
Doubtful	50%
Loss	100%

There is also a 1% provision. This must be made for the balance of the loan portfolio that was not reviewed in the past 12 months.

One of the criteria, which is critical during the analysis of loan loss provisioning, is the security that backs the loan.

2.4   Collateral

Collateral in its simplest definition is a form of security to a lender in case the borrower fails to repay a loan. Collateral plays an important role in the financial sector, as it is a means of covering potential losses. Collateral is therefore considered a secondary method of repayment. The Basel Committee recognizes the importance of collateral and advises that the loan classification process should take the ability to realize collateral into consideration. Collateral alone cannot substitute for a comprehensive assessment of the borrower, thus, the two should be done together.

Laurin and Majnoni (2003) suggest that there are many different approaches concerning whether and how collateral should be considered when classifying loans and determining their appropriate provisions. All regulatory frameworks do not guarantee the acceptance of some forms of collateral. This makes it difficult to compare the loan provisioning processes across different jurisdictions.

Song (2002) posits that when classifying a troubled loan, it is reasonable that a conservative value of the collateral be taken into account, instead of just the value of the collateral. This conservative value represents a truer picture of the amount that can actually be recovered, after taking the cost of collection into consideration.

Jokivuolle and Peura (2003) provide a distinctive addition to literature as they highlight the sensitivity of using collateral as a source of recovery. They consider that collateral could provide the least protection when it is most needed. The value of most assets depends positively on the overall business conditions driven by common market factors.

Thus, most assets are positively correlated with each other. For example, if a company is unable to meet its debts and goes into default, its assets, which are not high enough to cover its liabilities, are usually the same ones that would have been pledged as collateral. These same assets are likely to have low values resulting in low collectible values. Jokivuolle and Peura (2003) present a simple option-theoretic model similar to Merton (1974), which concludes that it is important to acknowledge factors such as collateral values, borrower default probability and asset values.

Collateral also plays a major role when making decisions about the amount of provision to be made on an impaired loan. The question that arises is whether or not to 'net off' the collateral value against the impaired loan amount before a provision is made. There are numerous arguments on both sides of this coin. Arguments against 'netting off' refer mainly to deriving the collectible value for collateral. There are difficulties with valuing, limited marketability and legal impediments of liquidating collateral. Legal procedures are usually prolonged, expensive and may include extra costs for court and sales fees. For these reasons, it is believed that collateral values should not be deducted from impaired loan values.

The case for the inclusion of collateral in the calculation is simpler. If the collateral is liquid, of high quality or is a marketed government issued security then it can be easily recovered and appraised. It is for these reasons that only collateral that can be reliably measured should be included in the loan provisioning process.

The monitoring of the value of collateral is another issue that banks should consider. Banks should establish a mechanism periodically to have collateral appraised. Assets that cannot be seized, possessed or foreclosed should not be considered capital. Continuously monitoring capital could steer a bank clear of tremendous losses in the loan portfolio. As witnessed in the early 1990s, neglecting to monitor collateral values could be perilous to financial institutions (Song 2002).

3.   Methodology, Data and Results

The primary interest of this paper is the loan loss provisioning practices of the commercial banks in Barbados. The key participants in this study are the employees of the commercial banks who are directly involved with or manage the processes of loan loss provisioning. A questionnaire will be used to gain insight into the individual commercial bank's procedures. One representative from each bank will assist in filling out the questionnaire and providing the information that is required. Regulatory staff who deals specifically with the commercial banks will also be interviewed to gain their perspectives of the processes. The questionnaire consists of twenty questions within five sections which are structured similar to the literature review.

Other sources of information will be the financial records and policies of the commercial banks as required by their regulator- The Central Bank of Barbados. Data will be on a quarterly basis over the period 2002-2010. The staff of The Central Bank of Barbados will provide the data that the commercial banks would have reported over the study period. Reports of audits and site checks will also be reviewed to get an idea of the weaknesses that existed prior to this study.

Quantitative data from the Central Bank will be used for regression analysis. The models used are similar to Khemraj and Pasha (2009) and Anglomkliew et al (2009). Khemraj and Pasha (2009) and Anglomkliew et al (2009) were used because of their success in explaining Guyana's and Asia's loan loss provisions respectively. Another reason is because the data was readily available for Barbados. A static ordinary least squares model was established based on the panel data collected. After this, general and specific models were generated to determine the significant variables in the data set. The variables of the specific model were determined by their significance as explanatory variables within the general model using a general to specific approach.

In addition, a two stage least squares model was also generated to adjust for biased estimators and the lags of the dependant variable that were used as explanatory variables.

Cross sectional weights were also included to take care of the effects of homoscedasticity. Fixed effects were used because the study contained data from all the commercial banks in Barbados thus it captures the effects of all observed and unobservable variables.

Explanatory Variables Selected and their Expected Signs

Where i = 1….6.

Log(Dep_i) represents the logarithm of the ratio of loan loss provisions to total loans for the i-th bank.

(RGDP_i) represents the changes in real gross domestic products for the i-th bank. The Real Gross Domestic Product is expected to have a negative relationship on loan loss provisions. It is expected that as the economy expands, loan payment defaults should be less likely to occur because of increased income, thus, a reduced provisioning level based on a person's ability to service their debt.

Log(Earn_i) represents the logarithm of profits before tax and provisions divided by total assets for the i-th bank. If commercial banks are using provisions to smooth earnings we expect to see a positive relationship between loan loss provisions and earnings.

Log(Inf_i) represents the logarithm of inflation as the changes in the Retail Price index for the i-th bank. A positive relationship is expected between loan loss provisions and inflation. Inflation makes it more expensive to service debts so the provision for defaults should increase if inflation increases.

Log(LoAs_i) represents the logarithm of total loans divided by total assets of the i-th bank. A positive relationship between this variable and loan loss provisions is expected. The higher total loans are to total assets describes the amount of credit risk relative to assets. Therefore, it is expected that if a bank has a high ratio then it will need to provide more for the credit risk it is taking on.

(Siz_i) represents the assets of the i-th bank divided by the total assets of all the banks. The expected sign for this variable is ambiguous. It is believed that the sign will be negative if banks are better able to manage credit risk efficiently during the credit rationing stage because they have better screening processes- due to their size. Size in effect is a gauge of the 'commercial bank space', similar to the market share, that a bank occupies based on the proportion of its assets to all commercial banks' assets.

(LoC_i) represents the changes in total loans for the i-th bank. A positive relationship is expected to emerge. Rapid credit growth is expected to imply higher defaults and by extension the larger the loan portfolio the higher the risk of default.

Log(REER_i) represents the logarithm of the real effective exchange rate for the i-th bank. For countries with fixed exchange rates and major export industries, it is expected that if the currency appreciates that local exports would become relatively more expensive when compared to foreign products. This implies that since a substantial number of loans go to such exporting enterprises that an expected appreciation of this variable should have a positive impact on loan loss provisions.

C represent the stochastic error term.

Variable	(RGDP_i)	(Earn_i)	(Inf_i)	(LoAs_i)	(Siz_i)	(LoC_i)	(REER_i)
Sign	(-)	(+)	(+)	(+)	(+)/(-)	(+)	(+)

Fixed effects were included into the models to capture the effect of all variables that do not vary over the individual unit. By using panel data it reduces the effects of other omitted variable bias allowing the model to be more robust. In essence, the fixed effects assume that the error term captures all correlation between unobservable data over the time period.

3.1   Findings of Questionnaire/Interviews

The structure of the loan provisioning process in Barbados is such that the Central Bank regulates loan loss provisions by setting minimum provisioning levels on a categorical system. The Central Bank's regulations provide the commercial banks with the criteria for loan classification and minimal provisioning levels. The Central Bank then conducts credit reviews of the individual bank's loan portfolios to ensure compliance with the criteria and categories of the Financial Institutions Act. The purpose of the Financial Institutions Act is to level the playing field across banks and other financial institutions, making regulations more enforceable.

One problem that surfaces is that the commercial banks have different internal rating systems for classifying their loans and not that they do not know the regulations of the Central Bank. They all use the same indicator as the Central Bank -the time past the due date and incorporate other indicators such as internal credit scores, the borrower's significant assets, the value and type of collateral as well as other borrower specific characteristics. One reason for a difference in classification is that the commercial banks use The International Financial Reporting Standards (IFRS). The International Financial Reporting Standards do not align perfectly with the Central Bank's Regulations on provisioning. However, the hierarchy is such that no matter what standards the commercial banks decide best for their personal use, their provisions and reserves must comply with the Central Bank's regulations.

 Due to the differences in the classification ratings for loans, regulators usually face the problem of synchronization. They must seek to decide, based on the criteria of the categories given in the commercial bank's ratings, which one(s) match the criteria set out in the regulations. This process is necessary in determining which provisioning level is being used in calculations and is usually well documented by the commercial banks.
One reason the commercial banks use the International Financial Reporting Standards is because these standards are more flexible. This flexibility is desired because it allows the commercial banks to take the current valuation of assets and collateral into consideration.

On the other hand, under the Central Bank's regulation, the historical value of the loan is used to estimate the provision. This may create a disparity in the amount to be provisioned for when assets/loans are reviewed under International Financial Reporting Standards compared to the Financial Institutions Act of Barbados.

The provisioning levels in Barbados are set using hindsight. The commercial banks usually use historical insight, the current economic trend and sector specific knowledge to estimate what level of provisioning they should use. Some banks also have no jurisdiction in determining their own provision levels and take on the level passed on by their head offices. Sometimes the provisioning levels decided by the commercial banks are less than those of the Central Bank. This discrepancy is corrected by the creation of an additional account which stores the difference if the bank's actual provision is less than the Central Bank's regulated provision.

The primary trigger that commercial banks in Barbados use to determine if a loan is to be classified as non-performing is the 'time past the due date'. This is simply the number of days that have passed since the last payment was due. In addition to timing, there are other criteria that can be used to further classify the loan when an in-depth look is taken. Such criteria include the borrower's cash flow, the type of collateral and the probability of collection of the debt. The amount and purpose of the loan do not impact on the level on provision applied to the loan but may become relevant when credit is being rationed.

The commercial banks in Barbados partition their provisioning into two provisions for loan loss. These include: (1) a general provision and (2) a loan specific provision when providing for the individual loan amounts. The first type of provisioning is also seen in Australia, France, Korea, The Netherlands, Saudi Arabia and Singapore where the technique is called pooling while the second type of provisioning is the more common method used worldwide.

For some commercial banks in its simplest form loan loss provision = Debt – Security (adjusted by the time value of money). This method is not the one employed by the

Central Bank's regulation because collateral is not considered, rather the provision is made based only on the classification of the account.

The most common type of securities in Barbados is property- land and houses. These securities are usually valued by third party appraisals. The bank's management uses its insight into certain characteristics about these securities to augment these third party appraisals. For example, if a property which is located in a high crime area receives a high valuation, it is not enough to proceed based on this valuation alone but it is also considered that if the loan falls through; the bank may have problems selling the property. As a precaution commercial banks also revalue the securities which are surrendered.

Regulatory monitoring of commercial banks in Barbados is of a continuous nature. The commercial banks report to the Central Bank of Barbados on a weekly, monthly, quarterly and annual basis. To supplement these reports, officials also conduct on-site inspections to test different key areas of concern. These concerns may range from grievances with a particular process to the traditional high-risk areas such as capital management and credit risks.

3.2   Findings from the Numerical Data Collected

Figure 1: Actual vs Required Loan Loss Provisions
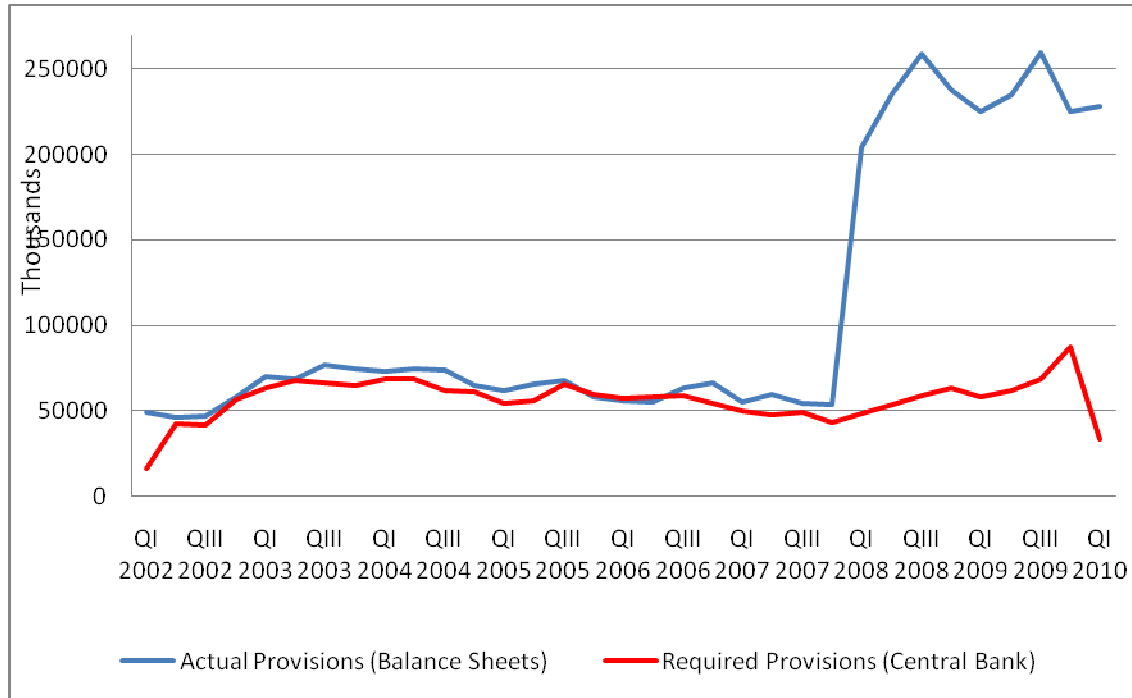
Required provisions are the provisions that are calculated by the Central Bank of Barbados based on their classifications as determined by The Financial Institutions Act 1998. Actual provisions reflect the amount that banks actually set aside to cover losses within their loan portfolios.

The study asked commercial bankers whether or not they believed that their provision and reserve levels were adequate. Commercial bankers all responded in the affirmative. From Figure 1 it can be established that commercial banks have provided more than required by their regulators-The Central Bank of Barbados in recent times. One observation from the graph is that there are many small fluctuations in the data set, with an average increase of 9% over the years this is due to the fact that commercial banks are constantly adjusting their provisions based on the economic climate and previous loan default behaviours. Over the period Q2 2002 and Q3 2007 regulatory provision and actual provision levels trended very closely together with actual provisions being slightly

higher. As of the fourth quarter of 2007 there was a significant increase in actual provisions with only a slight increase in the level of regulatory provision.

This spike in actual provisions could be ascribed to the financial crises of 2007. At this time the financial expectations in Barbados were dismal thus, banks would have been trying to increase their reserves as the economic climate was and continues to be very unstable. There is no corresponding spike in the regulatory provisions because regulatory provisions are based solely on a set percentage of the loans within the different non-performing categories. After the third quarter of 2008, actual provisions have been fluctuating and are generally unstable but are still very high when compared to the regulated provision levels.

In Barbados, loan loss provisions to total loans trend differently for each bank. The reason for such an occurrence is the difference in the credit levels and types of credit issued by each individual bank. Certain loans within particular industries and sectors have been historically proven to be more likely to default. Such loans would carry a higher actual provision, thus the level of loan loss provisions within individual banks over this time period would have been different. In effect, banks which offer many loans within a certain sector, which has been

Figure 2: <u>Loan Loss Provisions to Total Loans</u>
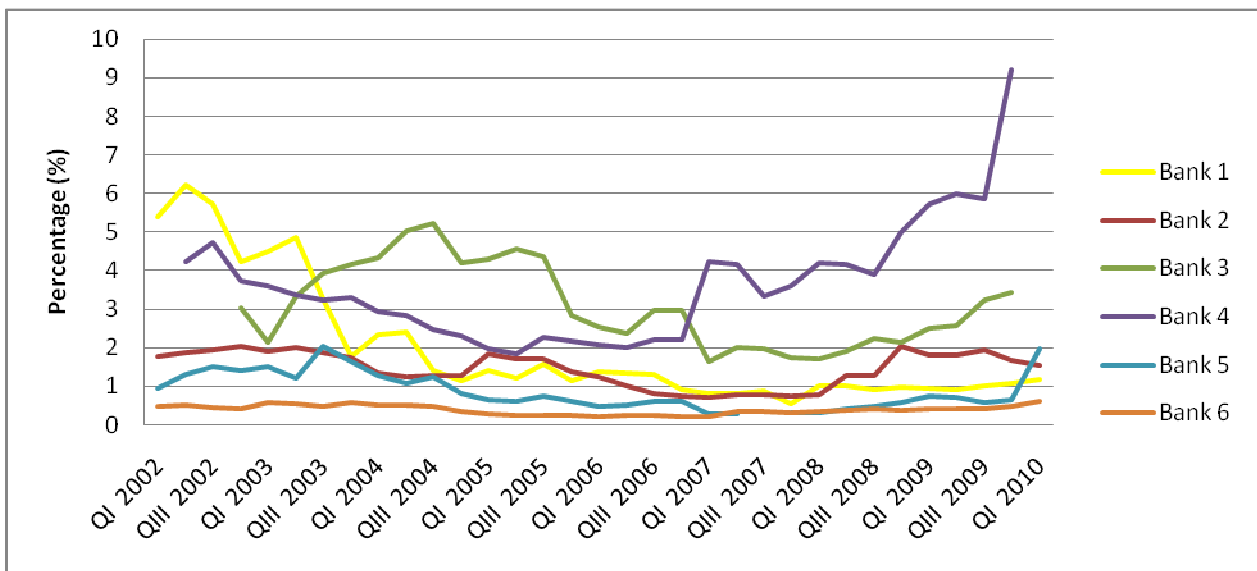
flagged for higher provisions, would have overall higher provisions than another bank which has primarily low default rates. For example, mortgages usually carry low provision rates, so a bank with mainly mortgages would have a lower actual provision. This is because people seldom default on mortgage payments since people place a high importance on keeping their properties.

For instance, the trend for bank 1 shows a steady decline in the loan loss provision to total loans ratio from 6.2% in the first quarter of 2002 to 1.7% in the first quarter of 2010. This implies that there was an increase in the loan portfolio over the years until 2005 or that there was a fruitful economic period and high provisions where not made. After 2005, the trend levels do not vary very much. This marker also coincides with the point at which regulated capital was slightly higher than actual provisions. This suggests that banks were not providing enough based on the financial regulations. On the other hand, the ratio for bank 6 remained constant over the entire time period. Overall, provisions were adequate for the level of classified debt and loan write-offs for all institutions remained low.

3.3 Regression results

Report on the Models Used

Table 1: Panel Stationary tests

Variable		Levin, Lin & Chu t	Breitung t-stat	Im, Pesaran and Shin W-stat	ADF - Fisher Chi-square	PP - Fisher Chi-square
Dep	Level	-4.884***	-0.325	-3.749***	49.555***	39.897***
	1st Difference	-13.03***	-6.476 ***	-11.853***	120.849***	125.965***
Earn	Level	7.098	-1.096	-2.046*	-2.046***	121.016***
	1st Difference	31.91	-7.251***	-7.492***	77.933***	211.889***
Inf	Level	-10.28***	-6.924***	-9.177***	94.055***	98.406***
	1st Difference	17.862	-9.649***	-6.757***	68.621***	161.264***
LoAs	Level	-4.865***	-0.122	-4.637***	53.071***	48.474***
	1st Difference	-27.41***	-2.116**	-20.448***	119.026***	129.508***
LoC	Level	-7.0368***	-3.461***	-6.063***	60.716***	66.32***
	1st Difference	-18.811***	-5.328***	-18.107***	179.73***	199.646***
Rgdp	Level	13.39	1.909	0.384	5.747	161.804***
	1st Difference	-30.496***	-7.946***	-35.590***	146.808***	214.616***
RIR	Level	-10.672***	-6.223***	-9.132***	91.529***	90.786***
	1st Difference	10.774	-6.991***	-5.193***	49.944***	145.833***
Siz	Level	-3.763***	-0.600	-4.995***	46.276***	53.175***
	1st Difference	-9.356***	-10.322***	-9.470***	96.961***	115.84***
REER	Level	-1.032	-0.943	-1.779*	18.341	14.783
	1st Difference	-5.815***	-2.431***	-4.828***	44.182***	43.479***

Note: *** ** and * indicates significance at the 1%, 5% and 10% level respectively. All test were done using an intercept with an automatic selection of lags.

The null hypotheses for the above test is that there exist a common root (first two test) or an individual root (latter three test).The dependant variable (**Dep**) - loan loss provisions to total loans is stationery- it has no individual roots at the 1%,5% or 10% using any of the three test. The Levin, Lin and Chu t test suggests that the variable is stationary at the 1%, 5% and 10% level but the Breitung t-statistic does not find stationarity at any of these levels.

The first difference analysis of earnings **(Earn)** says it is stationary- it has no individual roots at the 1%, 5% or 10% using any of the three test. The Levin, Lin and Chu t test suggests that the variable is non-stationery while the Breitung t-statistic finds stationarity at the 1%, 5% and 10% level.

The Inflation rate **(Inf)**, real interest rate **(RIR)**, changes in total loans **(LoC)** and the real Gross Domestic Product **(Rgdp)** is stationary at all significant levels. The first difference of the loans to assets ratio **(LoAs)** and the relative size of the individual bank's assets to total assets **(siz)** are stationary at all levels..
.
The first difference of the real effective exchange rate is stationary at all levels but only the Im, Pesaran and Shin W-stat finds it to be significant at the 10% level when it is given in levels.

The static model was a simple regression which yielded two significant variables (Appendix Table #2). The total loan to assets ratio proved **(LoAs)** to be significant but carries an adverse relationship while the real effective exchange rate **(REER)** has a strong positive significant relationship with the dependent variable. The model explained 86.6% of variation in loan loss provisions but the Durbin Watson test statistic was very low (0.467). These results suggest the model is spurious.

The other empirical method took a general to specific approach. The general equation (Appendix-Equation # 2) was estimated using three lags. Ideally, at least four lags should have been used since data was collected on a quarterly basis but this model lacked sufficient degree of freedom to handle the ideal number of lags. As a result, three lags were used in the general model. Diagnostics on this model suggested that it was a reasonable estimation of the information it sought to represent.

The general model only contains two variables (Appendix Table #3), namely the provision to total loans ratio from the previous period **(dep$_{t-1}$)** and real gross domestic product from two periods before **(rgdp$_{t-2}$)**, that were significant at all confidence intervals

with 96.7% of the variation in loan provisions being explained by the regression. A Durbin Watson test statistic of 2.02 led the authors to reject the hypothesis that the variables are auto-correlated. The majority of the variables used in the general model, lags inclusive, carry the expected sign.

The specific model which was constructed using the significant variables which remained via the general-specific approach (Appendix Table #4). Six explanatory variables are significant at all confidence levels. Namely, these variables are the provisions to total loans ratio from one period prior **(dep_{t-1})**, real gross domestic product from two periods prior **($rgdp_{t-2}$)**, profit before taxes and provisions divided by total assets ratio **($earn_{t-2}$)**, the current inflation rate **(inf)**, the change in total loans from three period prior **(loc_{t-3})** and the real effective exchange rate from three periods prior **($reer_{t-3}$)**. 97.2% of the variation in loan loss provisions is explained by the specific model with a Durbin Watson statistic of 1.947. The variables of the specific model all have the expected signs.

In particular, the real effective exchange rate from three periods before the current period ($REER_{t-3}$) has a strong positive influence on loan loss provisioning. This implies that anytime there is an appreciation in the real effective exchange rate, which causes local output to appear relatively more expensive than foreign produce, then the loan loss provision levels within banks should increase in the third period following the event. Higher defaults are expected to occur due to less income being generated through exports.

Similarly, the ratio of provisions to total loans from one period (**dep_{t-1}**) before the current period is the second strongest explanatory variable for current loan loss provisions. The sign obtained by this variable is positive and suggests that the higher this ratio is one period prior, the higher the ratio is expected to be in the current time period. One possible explanation for this occurrence may be the cyclical nature of the business cycle. This suggests that a period of hardship is most likely to be followed by another one until the cycle breaks. This implies that if banks had a period of hardship, they would anticipate another and increase their provisioning levels. This result is consistent with expectations

based on prior information gathered on the questionnaires. Commercial banks usually use historical default information along with current and previous business cycle information when determining their current levels of provisioning.

4. Conclusion

This paper examines the components of the loan loss provisions within the commercial banks of Barbados. It encompasses information acquired through the use of a questionnaire along with data from the country's commercial banks' regulator- The Central Bank of Barbados. It seeks to explore the processes of the provisioning systems within Barbados as well as to provide an econometric study of the main factors which drive loan loss provisions.

The main factors affecting the loan loss provision to total loans ratio are the provisions to total loans ratio from one period prior **(dep_{t-1})**, real gross domestic product from two periods prior **($rgdp_{t-2}$)**, profit before taxes and provisions divided by total assets ratio **($earn_{t-2}$)**, the current inflation rate **(inf)**, the change in total loans from three period prior **(loc_{t-3})** and the real effective exchange rate from three periods prior **($reer_{t-3}$)**. It should be noted that the real effective exchange rate has the strongest effect on the dependant variable.

As commented by Laurin & Majnoni (2003) in their study within the twenty three jurisdictions represented in the Basel Core Principles Liaison group, we also wish to comment that in Barbados the flexibility given to commercial banks through their classification processes limits the use of penalties and sanctions that could be used to regulate inappropriate classification and provisioning. Regulators rely mainly on moral suasion and the possibility of sanctions rather than specific penalties or sanctions to enforce their regulations.

APPENDIX

<div align="center">Appendix Table #1: Summary Statistics</div>

	DEP	EARN	INF	LOAS	LOC	REER	RGDP	SIZ
Mean	1.454528	0.013081	1.138257	49.45191	2.647965	95.4019	0.477457	16.66667
Median	1.142802	0.011216	0.906301	51.695	2.735881	94.84259	0.203287	18.46861
Maximum	6.205295	0.038921	5.318292	77.52031	28.02626	104.5426	7.995082	35.8994
Minimum	0	0	-2.35467	0	-12.9472	88.93279	-7.13095	0
Std. Dev.	1.215965	0.00907	1.499636	15.9512	5.092681	4.251713	3.800726	9.289809
Skewness	1.929508	0.634987	0.563978	-0.47048	0.397242	0.519146	0.110549	-0.01475
Kurtosis	7.019675	2.599287	3.947781	3.062084	6.136402	2.249523	2.246848	1.823375
Jarque-Bera	236.7547	14.63059	17.36459	7.336231	83.74579	13.13013	4.774952	11.42887
Probability	0	0.000665	0.00017	0.025525	0	0.001409	0.091861	0.003298
Sum	266.1787	2.590007	218.5453	9791.479	508.4093	18317.17	88.80707	3300
Sum Sq. Dev.	269.1	0.016206	429.5413	50124.82	4953.662	3452.719	2672.421	17001.21
Observations	183	198	192	198	192	192	186	198

The Static Model

The below table displays the results of a fixed effect regression model estimated using a ordinary least squares estimation on Barbadian commercial bank's data from 2002 until 2010.

Equation # 1

$$\log(dep\_i) = (rgdp\_i) + \log(inf\_i) + \log(loas\_i) + (siz\_i) + (loc\_i)$$
$$+ \log(earn\_i) + \log(reer\_i) + \log(rir\_i) + c$$

From the table below it can be seen that only the ratio of total loans on total assets and the real effective exchange rate are significant determinants of the dependant variable.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP_?	0.005478	0.012348	0.443623	0.6581
LOG(INF_?)	-0.099916	0.078943	-1.265678	0.2081
LOG(LOAS_?)	-1.680804	0.291017	-5.775624	0.0000*
SIZ_?	-0.011219	0.014066	-0.797568	0.4267
LOC_?	-0.004235	0.006803	-0.622575	0.5347
LOG(EARN_?)	0.017122	0.076986	0.222405	0.8244
LOG(REER_?)	3.980863	0.829356	4.799942	0.0000*
LOG(RIR_?)	-0.397674	0.331163	-1.200842	0.2322
C	-10.20163	3.626297	-2.813235	0.0057

Weighted Statistics

R-squared	0.86611	Mean dependent var	0.232376
Adjusted R-squared	0.851725	S.D. dependent var	0.990209
S.E. of regression	0.381295	Sum squared resid	17.59169
F-statistic	60.20955	Durbin-Watson stat	0.467431
Prob(F-statistic)	0		

Unweighted Statistics

R-squared	0.827788	Dependant	0.25323
Sum squared resid	18.2913	Durbin-Watson stat	0.437917

<u>The Dynamic Model</u>

The dynamic model is divided into two sections: 1) The General model and 2) The Specific model. The specific model was derived from the general model using only the significant variables.

1)   <u>The General Model</u>

Equation # 2

$\log(dep\_i)_t = \log(dep\_i)_{t-1} + \log(dep\_i)_{t-2} + \log(dep\_i)_{t-3} + rgdp\_?(-1)_z + \log(earn\_i)_z + \log(inf\_i)_z + \log(loas\_i)_z + (siz\_i) + (loc\_i)_z + \log(reer\_i)_z + c$

Where: i= (1….6) banks   z = t- n   t= current time period   n= -3…0

Appendix: Table #3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(DEP_?(-1))	0.570842	0.13314	4.2874	0.0001
LOG(DEP_?(-2))	-0.175152	0.20638	-0.849	0.401
LOG(DEP_?(-3))	0.423252	0.187	2.2634	0.029
RGDP_?(-1)	-0.019209	0.01564	-1.228	0.2264
RGDP_?(-2)	-0.066355	0.01963	-3.381	0.0016
RGDP_?(-3)	-0.041077	0.02581	-1.592	0.1191
LOG(EARN_?)	-0.003217	0.06552	-0.049	0.9611
LOG(EARN_?(-1))	0.09792	0.06417	1.526	0.1347
LOG(EARN_?(-2))	0.182267	0.11415	1.5968	0.118
LOG(EARN_?(-3))	0.148075	0.1538	0.9628	0.3413
LOG(INF_?)	0.272159	0.15146	1.7969	0.0797
LOG(INF_?(-1))	0.144662	0.14762	0.9799	0.3329
LOG(INF_?(-2))	0.1077	0.16671	0.646	0.5219
LOG(INF_?(-3))	0.051876	0.08826	0.5878	0.5599
LOG(LOAS_?)	-0.387312	0.37351	-1.037	0.3058
SIZ_?	0.015062	0.01743	0.864	0.3926
LOC_?	-0.010931	0.00641	-1.705	0.0958
LOC_?(-1)	0.001542	0.00648	0.2379	0.8131
LOC_?(-2)	-0.001925	0.00724	-0.266	0.7916
LOC_?(-3)	0.013114	0.00576	2.2771	0.0281
LOG(REER_?)	-2.463427	4.10404	-0.6	0.5516
LOG(REER_?(-1))	1.133251	5.90995	0.1918	0.8489
LOG(REER_?(-2))	-3.649934	8.02714	-0.455	0.6517
LOG(REER_?(-3))	9.669423	6.69588	1.4441	0.1563
C	-18.14032	10.2651	-1.767	0.0846
R-squared	0.981079	Mean dependent var		0.1009
Adjusted R-squared	0.967695	S.D. dependent var		1.0839
S.E. of regression	0.194807	Sum squared resid		1.5559
F-statistic	73.30556	Durbin-Watson stat		2.0281
Prob(F-statistic)	0			

Unweighted Statistics

R-squared	0.9556	Mean dependent var	0.1704
Sum squared resid	2.705503	Durbin-Watson stat	1.9905

2)   The Specific Model

Equation # 3

$$\log(dep\_i)_t = \log(dep\_i)_{t-1} + (rgdp\_i_{t-1}) + (rgdp\_i_{t-2}) + \log(earn\_i)_{t-1} + \log(earn\_i)_{t-2}$$
$$+ \log(inf\_i)_t + (loc\_i)_{t-3} + \log(reer\_i)_{t-3} + c$$

Where:

$\log(dep\_i)$ represents the logarithm of the ratio of loan loss provisions to total loan for the i-th bank at time current (t) and one period previously (t-1).

$(rgdp\_i)$ represents the changes in real gross domestic products for the i-th bank at one (t-1) and two (t-2) periods prior.

$\log(earn\_i)$ represents the logarithm of profits before tax and provisions divided by total assets for the i-th bank at one (t-1) and two (t-2) periods prior.

$\log(inf\_i)$ represents the logarithm of inflation as the changes in the Retail Price index for the i-th bank at the current (t) time period.

(loc_i) represents the changes in total loans for the i-th bank three time periods prior (t-3).

$\log(reer\_i)$ represents the logarithm of the real effective exchange rate for the i-th bank three time periods prior (t-3).

C represent the stochastic error term.

The below table displays the results of a fixed effect regression model estimated using a two stage least squares estimation on Barbadian commercial bank's data from 2002 until 2010.

Appendix: Table #4

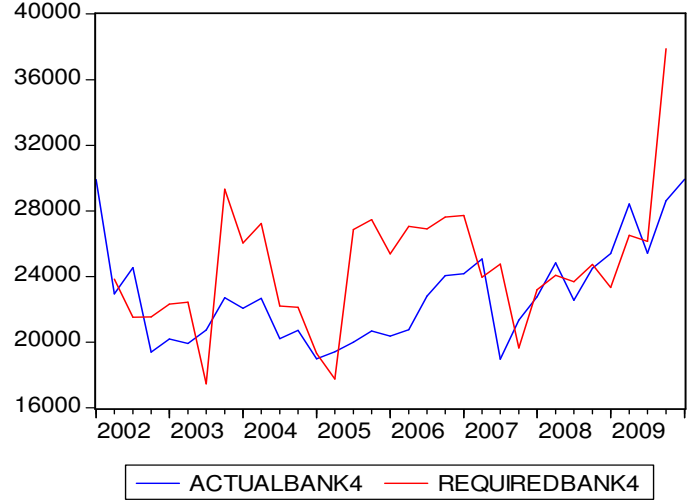| Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(DEP_?(-1))	0.768193	0.05864	13.09947	0.000
RGDP_?(-1)	-0.021599	0.01106	-1.95329	0.0557
RGDP_?(-2)	-0.039014	0.00918	-4.24907	0.0001
LOG(EARN_?(-1))	0.126254	0.07267	1.737282	0.0877
LOG(EARN_?(-2))	0.195967	0.05826	3.363495	0.0014
LOG(INF_?)	0.104088	0.03087	3.371701	0.0013
LOC_?(-3)	0.013211	0.00412	3.20471	0.0022
LOG(REER_?(-3))	3.907307	0.67188	5.815506	0.000
C	-16.22412	3.10685	-5.22206	0.000
R-squared	0.977442	Mean dependent var		0.014265
Adjusted R-squared	0.972297	S.D. dependent var		1.193914
S.E. of regression	0.198719	Sum squared resid		2.250886
Durbin-Watson stat	1.917877	Instrument rank		28

Unweighted Statistics

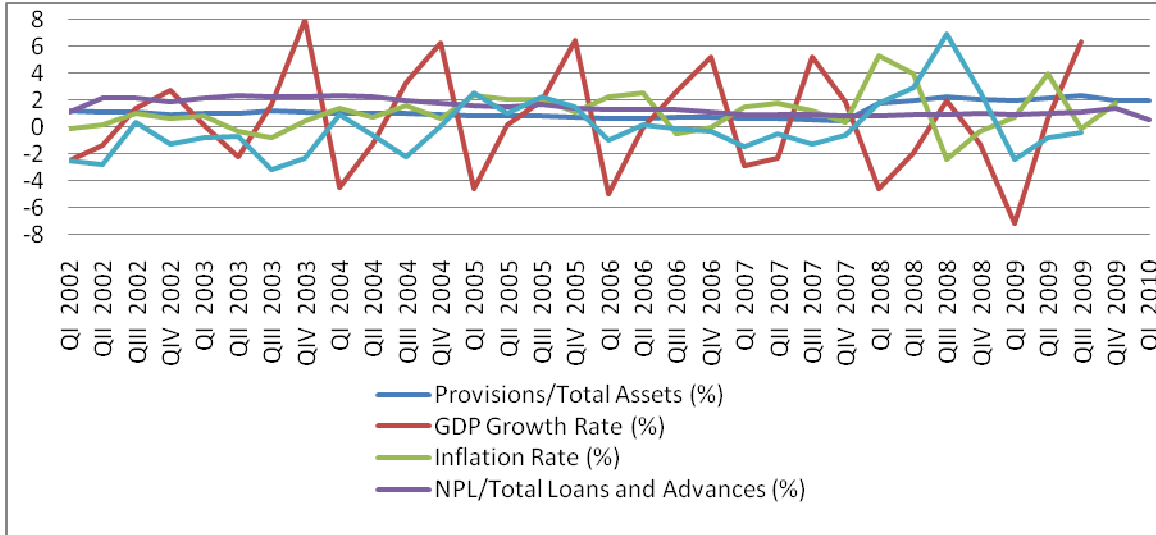| R-squared	0.941779	Mean dependent var	0.170354
Sum squared resid	3.547628	Durbin-Watson stat	1.947361

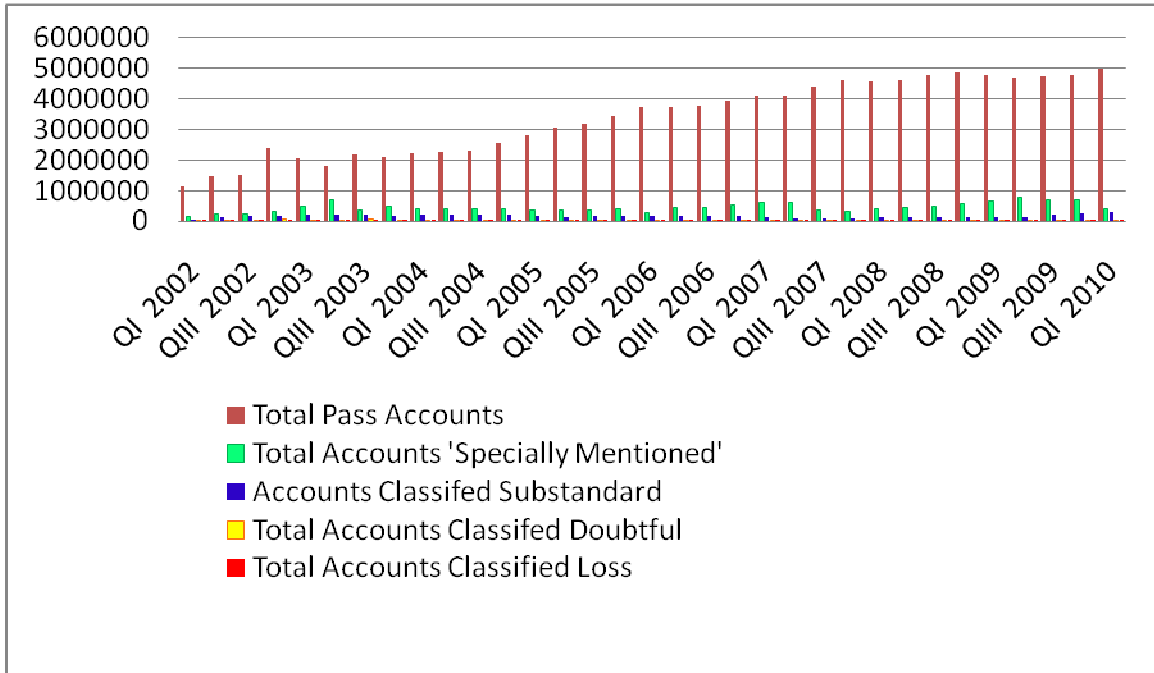## Graph #1: The Total Number of Loans issued by the Commercial Banks in Barbados
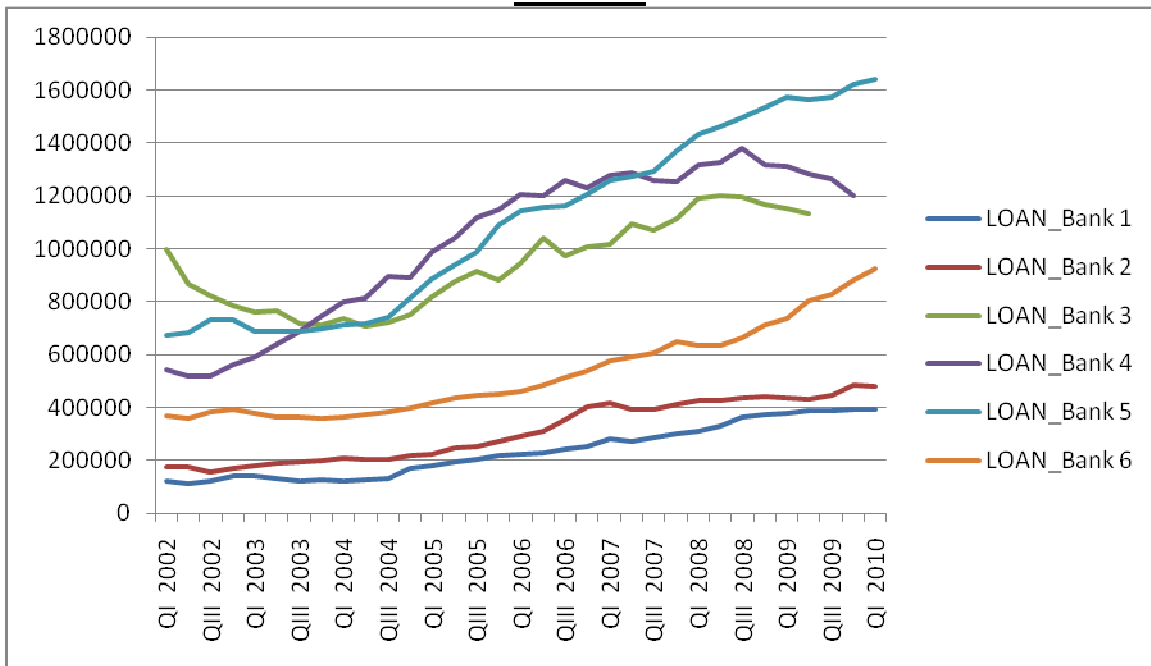
Graph #2: The Loan Loss Provisions of the Commercial Banks (Thousands ($))
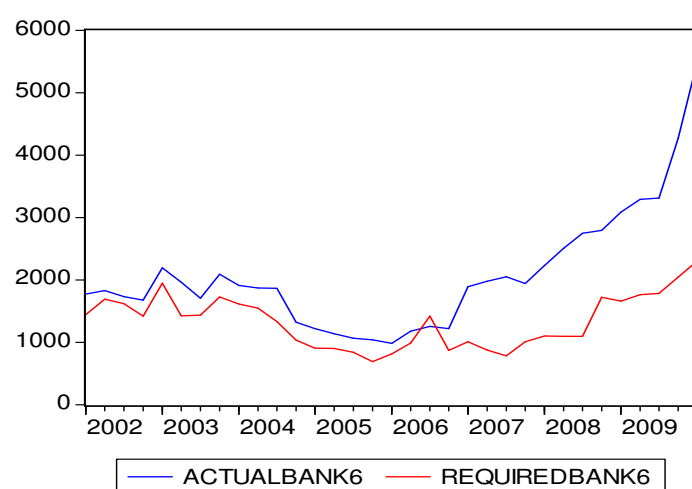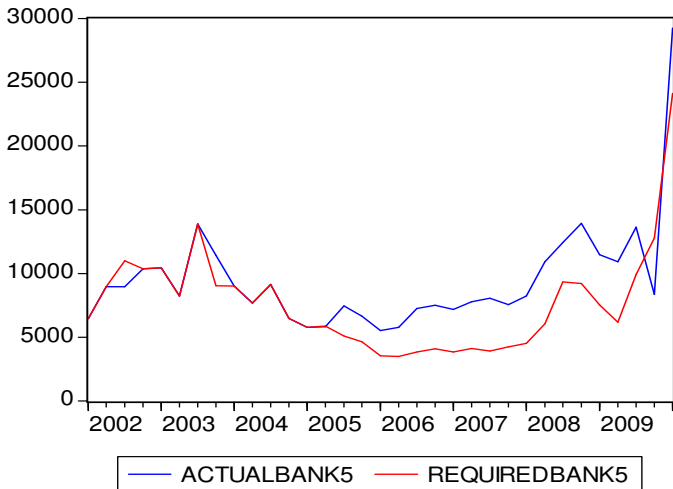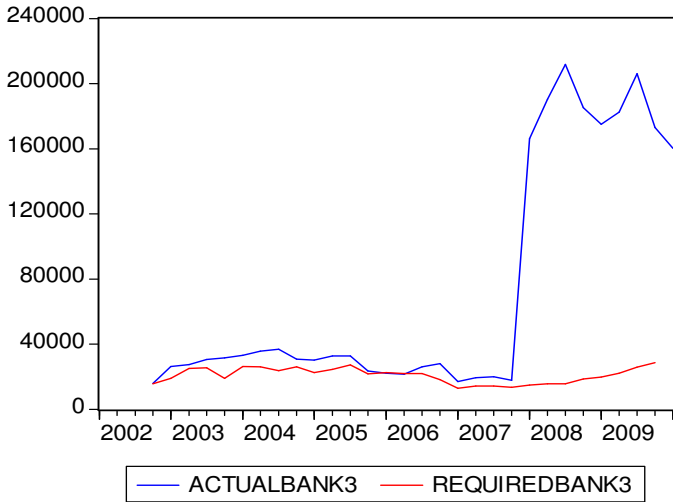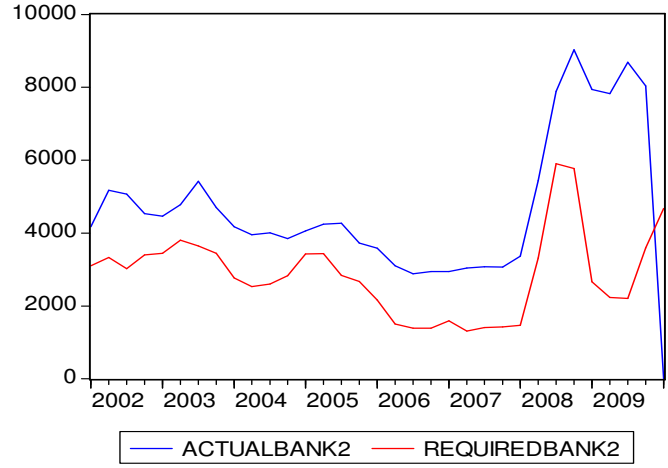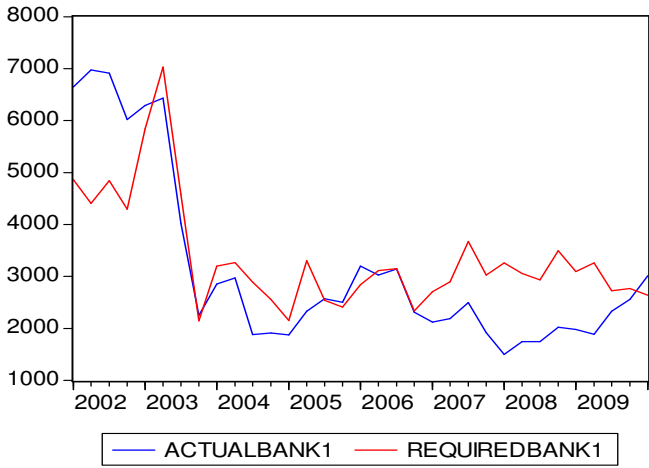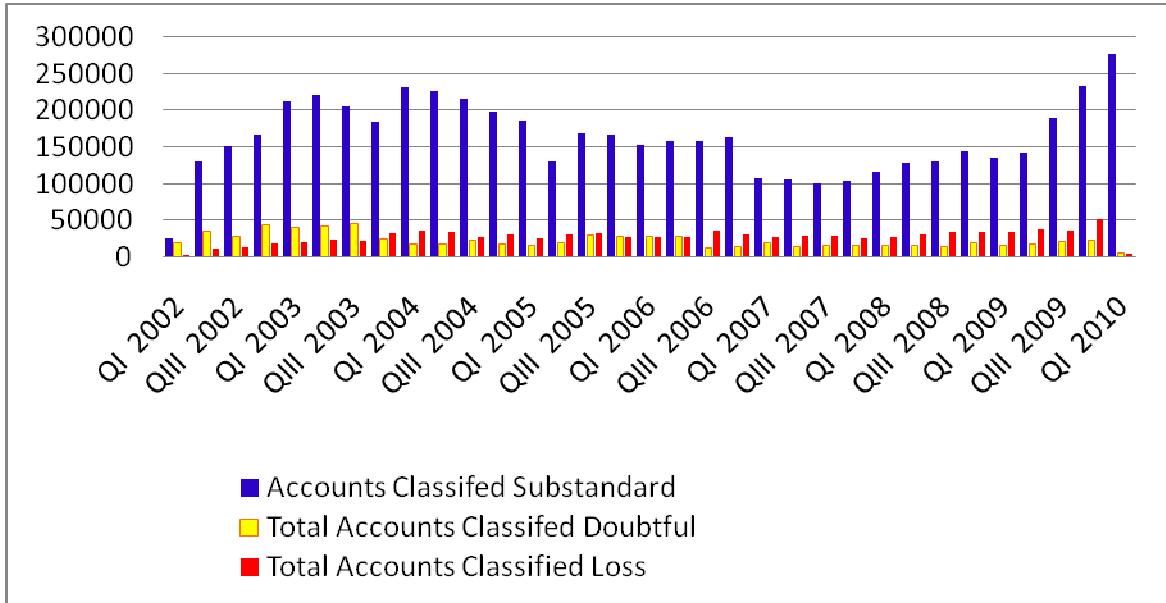
Graph #3: <u>The Rates of Change of Explanatory Variables</u>

Legend:
- Provisions/Total Assets (%)
- GDP Growth Rate (%)
- Inflation Rate (%)
- NPL/Total Loans and Advances (%)

Graph #4: <u>The Number of Loans by Financial Institutions Act's Classifications</u>

Legend:
- Total Pass Accounts
- Total Accounts 'Specially Mentioned'
- Accounts Classifed Substandard
- Total Accounts Classifed Doubtful
- Total Accounts Classified Loss

Graph #5: <u>The Number of Non-Performing Loans Only</u>

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