MPRA

Munich Personal RePEc Archive

Loan loss provisioning in the commercial banking system of Barbados: practices and determinants

Craigwell, Roland C and Elliott, Wayne A

University of the West Indies, Cave Hill Campus, Barbados

2011

Loan Loss Provisioning in the Commercial Banking System
of Barbados: Practices and Determinants

By

Roland Craigwell [1]

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

And

Wayne Elliott

Undergraduate Student
University of the West Indies
Cave Hill Campus
And
Summer Intern
Central Bank of Barbados

November 2010

---

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

Loan Loss Provisioning in the Commercial Banking System
of Barbados: Practices and Determinants

Roland Craigwell and Wayne Elliott

Abstract

The purpose of this paper is to investigate the process of loan loss provisioning within the commercial banking system of Barbados. It uses questionnaires and interviews to ascertain how banks set their provisional standards and levels. In addition, the results from this approach reveal, for the first time in Barbados, the individual banks' procedures for loan loss provisioning. An evaluation of the impact of macroeconomic and bank specific factors on commercial banks' provisions utilising panel dynamic ordinary least squares is also undertaken. Both sets of factors are found to influence the level of provisions. In particular, loan loss provisions are heavily dependent upon the performance of the real economy and competition in international markets is shown to have serious implications for the banking sector in both the short and long run. Moreover, this study asserts that larger banks in Barbados are better able to screen loans and avoid defaults.

Introduction

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

One of the major consequences pertaining to the financial crisis of 2007 is to raise concerns about the need for closer control and supervision on lending institutions. In Barbados, the Central Bank has started to review the regulatory framework of these activities with the goal of minimising the adverse effects of future crises. International regulators (International Monetary Fund, World Bank, and the Bank for International Settlements) have suggested several reforms, and programs aimed at strengthening the international banking and financial system. One key element of these reforms highlighted by the regulators is to assess the process of loan loss provisioning.

Given the above, this study evaluates the loan loss provisioning process of the banking system of the small open economy of Barbados. It is the first of its kind to be undertaken on this country and possibly, on the wider Caribbean. Two methodologies are used: interviews with the main objective of ascertaining how banks provide for loan losses, and an econometric model which will explore the main factors driving the level of provisions.

The structure of the paper is as follows: Section 2 gives some background information on loan loss provisions. Section 3 presents the methodologies while section 4 describes the results derived from employing the various methods. Section 5 concludes with a summary of the findings, including limitations and policy implications.

2. Background

On account of many different factors, the principle and interest that banks agree upon with their creditors are not always collected. As a result, they have to apply a technique to soften the impact of such losses: loan loss provisioning. To make the provisioning process consistent across different jurisdictions, banks use many different means, of which a major one is utilising loan loss provisioning standards.

2.1 Loan Loss Provisioning Standards

The Basel 1 Capital Accord was released in 1988 seeking to create a competitive international banking system by strengthening its stability and setting up fair and consistent standards. It consists of three mutually reinforcing pillars - minimum capital requirements, the supervisory review process and market discipline - which together contribute to the safety and soundness of the financial system.

The Basel Committee (1999) emphasizes that there are no uniformed loan classifications, nor is there a standard procedure to assess loan risk across all jurisdictions. It further posits 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). Also,

there was a move to introduce more suitable standards, for example, The International Accounting Standards (IAS), to resolve some of these issues. 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 IAS still have different loan loss provisioning regulatory frameworks. For instance, sometimes banks need to apply more complex internal classification systems, while more standardised systems are required by bank regulators for reporting purposes.

In concurrence, the Central Bank of Barbados, as a regulator, uses the Financial Institutions Act 1998 which is an adaptation of Basel Accord 1. Prior to the current Act, financial institutions were governed by the Financial Intermediaries Regulatory Act (1992) which was predated by the Banking Act (1978). The Financial Institutions Act (1998) governs all financial institutions in Barbados. It is the benchmark for loan loss provisioning regardless of the standards the individual commercial banks choose to employ. When reporting to the Central Bank of Barbados, banks must ensure that all information concerning loan loss provisioning is in accordance with the Financial Institutions Act 1998. However, the flexibility given to commercial banks through their classification processes, limits the use of penalties and sanctions that could be utilized to regulate inappropriate classification and provisioning (Laurin and Majnoni, 2003). Regulators therefore rely mainly on moral suasion and the threat of sanctions rather than specific penalties to enforce the regulations.

2.2 Classification Criteria

The provisioning criteria employed 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 inaccurate classification of individual loans destabilizes the process of provisioning, which, in turn, distorts the figures on the balance sheet and overstate capital and capital ratios (Angklomkliew et al, 2009). In support of this view, Song (2002) adds that there ought to be one set of well-known rules governing the provisioning process. He states that 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 (1999) supports this viewpoint but also believes that the current value of collateral and the ability to realize this value should be included with other criteria that banks deem necessary.

The main method of classifying loans is by the time that has elapsed 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 banks' provision for the outstanding balance. This procedure is used mainly as a trigger, after which further evaluation is undertaken. Relying only on the 'time past the due date' approach 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' methodology and agree that more forward-looking criteria - borrower's cash flow and repayment capacity - should be taken into account. Consequently, some commercial banks now 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.

Another major difference in loan loss provisioning practices across 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. In the Czech Republic, for instance, bankers may characterize restructured loans as substandard while in Thailand they may be placed in the 'special mention' or pass category. However, the reclassifications of the restructured loans may not be implemented immediately but may be undertaken over a period of time when bankers are satisfied that borrowers are meeting the terms of the new contracts. Bearing this in mind, credit analysts 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 characterize loans and various categories for loans to be classified into, there are several 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 two broad categories of loan loss provisioning: the dynamic loan loss provisioning procedure and the traditional incurred loss method. Dynamic provisioning is a statistical method that utilizes the historical data of various asset classes. It determines the event driven provisioning periodically. It is a deliberate way to construct 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. Conversely, the incurred loss method delays provisioning until the economy fails to grow; it may magnify the bust because most bad loans will only reveal themselves during recessions. In essence, the key difference between the two categories of loan loss provisioning is not the level of provisioning but its timing (Balla and Mckenna, 2009).

Bouvatier and Lepetit (2006) also distinguished between non-discretionary and discretionary loan loss provisioning. 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. The discretionary component is caused by management's use of loan loss provisioning for its own objectives. Bouvatier and Lepetit (2006) give at least three functions for which banks' management utilises loan loss provisioning (see also Bikker and Metzemakers, 2002). The first 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 which is possible on account of loan loss provisions being a part of the regulatory capital depending on the stipulations of the territory.

The third function is tax evasion and this is common because provisions are tax deductible in most countries.

In addition, Bikker and Metzemakers (2002) argue that the propensity to use discretionary 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 restricted by provisioning. 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 loss provisions which should lower the tax burden. Loan loss provisions could also inadvertently signal financial strength. A bank's level of loan loss provisions and reserves may 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) examined balance sheet data of 29 Organization for Economic Co-operation and Development (OECD) countries and found that banks that hold a greater amount of risky loans act somewhat prudently and provision more. There was also evidence in support of the capital management hypothesis that banks lend more when their capital ratios are low. In addition, it emerged that provisions depend strongly on credit risk. In harmony with most previous authors (for example, see Laeven and Majnoni, 2003; Floro, 2010; Jiménez and Saurina, 2006; Wezel, 2010), the evidence confirmed that provisions depend significantly on the business cycle. However, Bikker

and Metzemakers (2002) could not support the hypothesis that an expansion in provisioning during successive years of economic boom resulted in higher reserves after the year of recession. There was also no evidence in favour of the hypothesis that the erosion of reserves after years of consecutive recession was due to increased provisioning in years of economic boom.

2.4   *How much to Provide for Loan Losses?*

Another key question that needs to be answered in order to complete the provisioning process is how much to provide for each category of loans. As described by the Financial Institutions Act 1998, following the annual review of the loan portfolio, each loan classification category should be assigned minimum levels of provisions. As a result, the substandard, doubtful and loss categories are considered as classified debt and are provided for whilst pass, special Mention and mortgages (up to six months) are not. Therefore, reserves are comprised of the provisions on total categorical classified debt; 10% for the total substandard loans value, 50% for total doubtful and 100% for loss loan amounts. There is also a 1% provision that is made for the balance of the loan portfolio which was not reviewed in the past 12 months. One of the criteria, which is critical during the analysis and categorisation of loans, is the security that backs the loan.

2.5   *Collateral*

Collateral in its simplest definition is a form of security to a lender in case the borrower fails to repay a loan. It plays an important role in the financial sector, as it is a means of covering potential losses. The Basel Committee (1999) recognizes the importance of collateral and advises that the loan classification process should take the ability to realize collateral into consideration.

There are many different approaches concerning whether and how collateral should be viewed when classifying loans and determining their appropriate provisions (Laurin and Majnoni, 2003). All regulatory frameworks do not guarantee the acceptance of some forms of collateral. This contributes to the problems in comparing the loan loss provisioning processes across different jurisdictions. Once there is acceptance of some form of security, 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 be recovered, after taking the cost of collection into consideration. Jokivuolle and Peura (2003), in an attempt to provide insight into the estimation of the credit risk quantity, highlight the sensitivity of using collateral as a source of recovery. 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.

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. 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. Consequently, only collateral that can be reliably measured are likely to be incorporated in the loan provisioning process.

The monitoring of the value of collateral is another issue that banks are expected to grapple with. Banks may 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 may be perilous to financial institutions (Song, 2002).

3. Methodology

3.1 *Questionnaires and Interviews*

One of the primary interests of this paper is to ascertain the loan loss provisioning practices of commercial banks in Barbados. The key participants interviewed are therefore the employees of the banks who are directly involved with or managed the processes of loan loss provisioning. Regulatory staff and relationship officers from the Central Bank of Barbados who deal specifically with the commercial banks were also interviewed to gain their perspectives of the processes.

The questionnaire- available on request- was designed to acquire information from all six commercial banks in Barbados during the interview. It is structured similar to the literature review and consists of twenty questions within the following sections: the standards that are

followed, loan loss provisioning practices including the treatment of collateral and how the banks' management feel about their levels of provisions and reserves.

3.2   Econometric Models and Data

Econometric Models

Finding out how the commercial banks provide for loan losses is important but this does not give sufficient information to describe the major determinants of loan loss provisioning in Barbados, which is required because provisions and reserves lessen the impact of non-performing loans that are sometimes major leading indicators of banking crises. As a result, this paper applied the panel dynamic ordinary least squares (PDOLS) methodology proposed by Kao and Chiang (2000) and adopted by Mark and Sul (2003) to estimate regression models aimed at assessing the factors that influence loan loss provisioning in Barbados in the short and long run. PDOLS is based on the single equation DOLS procedure pioneered by Saikkonen (1991) and generalized by Stock and Watson (1993) and has the following similar features: it allows for the direct estimation of a mixture of I(I) and I(0) variables, performs well in small samples and avoids the issue of endogeneity. Further, statistical inference on the parameters of the co-integrating vector is facilitated by the fact that the t-statistics of the estimated coefficients have an asymptotic normal distribution, even with endogenous regressors (Stock and Watson, 1993).

The application of PDOLS involves three steps. First, panel unit root tests are employed to check the stochastic nature of the variables. The procedures used are due to Levin, Lin and Chu (LLC) (2002), and Breitung (2002) [which have a common unit root process as their null hypothesis], Im, Pesaran and Shin (IPS) (2002), the Augmented Dickey Fuller - Fisher Chi-

square (ADF) [whose null assumes individual unit root processes] and the Hadri z-statistic which has a null hypothesis of no unit root.

If the variables are non-stationary, the next step is to test for co-integration. The methods employed are the residual based panel and group statistics tests of Kao (1999). The more popular Pedroni (1999) co-integration tests were attempted but the data set lacked enough observations for estimation. Finally the short run and long run factors influencing loan loss provisioning is determined.

The following long run model is estimated:

$$LLP_t = \alpha_0 + \beta X_t + \sum_{i=-k}^{k} \phi X_{t-1}^1 + e \tag{1}$$

where X is a vector of all explanatory variables, X^1 is a subset of I(1) variables of X, β is a vector of long –run coefficients and e is a well behaved error term. The leads and lags of the first differenced I (1) regressors are included to deal with the problems of endogeneity and autocorrelation. In this paper, the models begins with five leads and lags and as is customary the general to specific methodology is executed in order to obtain a parsimonious representation of the regression equations. Therefore, only statistically significant variables are retained in the model.

In addition, a general Error Correcting Model was done so that the short run coefficients could be obtained. This is given as follows

$$\Delta LLP_t = \beta_o + \sum_{1=1}^{m} \beta_{1_t} \Delta Y_{t-1} + \sum_{1=0}^{m} \beta_2 \Delta X_{t-1}^1 + \sum_{1=0}^{m} \beta_3 Z_{t-1} + \sum_{i=1}^{m} \varphi(Y_{t-1} - \beta X_{t-1}) + \mu \qquad (2)$$

Changes in the loan loss provisions on total loans ratio are a function of its past, lagged first difference non-stationary variables (X^1), lagged stationary variables (Z) and the lagged error correcting term. The short run effects are captured by $\beta_1, \beta_2 \, and \, \beta_3$ while the rate at which loan loss provisions readjusts to steady state, after disequilibrium have occurred, is given by φ.

The independent variables used in this study to explain the natural logarithm of loan loss provisions (*Lllp*) combines variables from Khemraj and Pasha (2009) and Anglomkliew et al (2009) and can be broadly categorized into two types: macroeconomic and bank specific. The macroeconomic variables include: the natural logarithm of real gross domestic product (*lGdplev*) which is expected to have a negative association with *Lllp*. It is anticipated that as the economy expands, loan payment defaults are less likely to occur because of increased income, thus, a reduced provisioning level based on a person's ability to service their debt. *lPrices* represents the logarithm of the Retail Price Index and a positive relationship is expected between this variable and *Lllp* since inflation makes it more expensive to service debts, which may cause the provision for defaults to rise. The association between the logarithm of the real effective exchange rate *(Reer)* and *Lllp* is likely to be positive following the argument that for countries with fixed exchange rates and major export industries, it is anticipated that if the currency appreciates those local exports would become relatively more expensive when compared to foreign products. This implies that since a substantial number of loans go into exporting enterprises that an expected appreciation of this variable should have a positive impact on *Lllp*.

With respect to the bank specific variables *lEarn* represents the logarithm of profits before tax and provisions divided by total assets for the individual bank. An ambiguous sign between *Lllp* and earnings is anticipated. If banks are using provisions to smooth earnings a positive relationship is likely. A direct link between the logarithm of total loans divided by total assets of the banks (*lLoAs*) and *Lllp* is expected. Total loans to total assets describe the amount of credit risk. Therefore, if a bank has a high loan to asset ratio it may provide more provisions for the credit risk it is undertaking. *lSiz* is a proxy for the size of the bank and represents the logarithm of the bank's assets divided by the total assets of all the banks. The a priori 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. A positive association is likely between the logarithm of the total loans for the banks (*ltloans*) and *Lllp*. Rapid credit growth implies higher defaults and by extension, the larger the loan portfolio the greater the risk of default. During the interviews, commercial bankers said that they use historical default information when making decisions on current loan loss provisions. For this reason, a positive relationship is expected between the logarithms of non-performing loans to total loans ratio (*lNpl1*). Higher interest rates imply that borrowers should find it harder to service their debt, thus, leading to more defaults and higher provisions. In essence, a direct link between (*Rir*) and *Lllp* is anticipated.

Data Issues

The data utilised in this paper cover the quarterly period from 1996 to 2009 and were obtained from the Central Bank of Barbados. The dependent variable is loan loss provisions on total loans ratio (*Lllp*) and the independent variables are as follows: real gross domestic product (*lGdplev*),

the Retail Price Index (*lPrices*), the real effective exchange rate (*Reer*), profits before tax and provisions divided by total assets (*lEarn*), total loans as a ratio of total assets (*lLoAs*), the bank's assets divided by the total assets (*lSiz*), total loans (*ltloans*), nonperforming loans divided by total loans (*lNpl1*) and the real interest rate (*Rir*) given by the total weighted average loan rate minus inflation. The descriptive statistics of the series are shown in Table 1.

Over the period of interest there was one amalgamation and a number of acquisitions. The amalgamation occurred in 2002Q4. There was further restructuring of this new venture in 2006Q1 when one bank increased its share capital by buying a part of the other bank's share. As a result of this amalgamation and the fact that one bank now prevails the data prior to 2002Q4 was summed as if this bank existed as it appears today, over the entire study period. Although this summation does not truly represent the structure of the banking sector from 1996 to 2002Q3 it was necessary to maintain a consistent dataset.

Table 1: Descriptive Statistics

	Lllp	lEarn	lGdplev	lLoAs	lPrices	lSiz	lTloan	Reer	Rir	LNpl1
Mean	0.485	-4.880	5.526	3.894	4.732	1.330	12.926	96.561	10.945	1.542
Median	0.648	-4.824	5.516	3.993	4.729	2.240	12.966	96.371	10.714	1.511
Maximum	3.065	-3.239	5.694	4.323	4.932	3.682	14.299	104.540	12.192	3.830
Minimum	-1.664	-7.346	5.362	3.112	4.589	-6.397	11.421	88.974	9.642	-16.118
Std. Dev.	1.047	0.824	0.085	0.293	0.092	2.756	0.798	4.078	0.783	1.295
Skewness	-0.070	-0.354	0.130	-0.726	0.318	-1.574	-0.204	0.123	0.040	-7.480
Kurtosis	2.253	2.815	2.055	2.321	2.483	3.924	1.867	2.035	1.612	103.932
Jarque-Bera	8.077	7.491	13.449	35.942	9.409	150.638	20.290	13.886	27.063	145753
Probability	0.018	0.024	0.001	0.000	0.009	0.000	0.000	0.001	0.000	0.000
Sum	163.106	-1639.680	1856.654	1308.216	1589.946	446.910	4343.155	32444.64	3677.594	518.179
Sum Sq. Dev.	367.479	227.468	2.425	28.689	2.807	2544.865	213.372	5570.053	205.357	562.087
Observations	336	336	336	336	336	336	336	336	336	336

The first acquisition during the period occurred in 2003Q4 and the second, in 2004. The last one came in 2008Q2 but this did not disrupt the data series as separate reporting continued up to the end of the review period. All in all this presents a full data set of six banks spanning the entire period for the banking system that prevails today.

Figure 1: Loan Loss Provisions to Total Loans

Percentage (%)
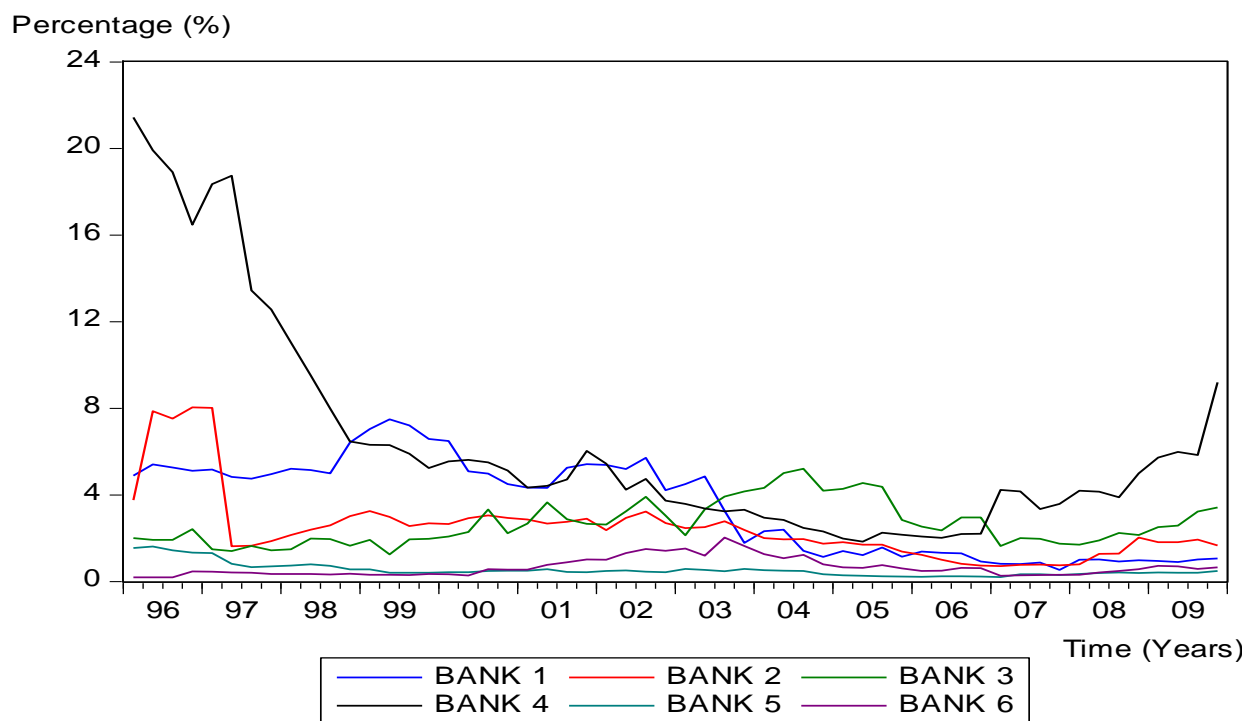
In Barbados, the behaviour of loan loss provisions to total loans ratio is different for each bank (Figure 1). For instance, one bank showed a steady decline in this ratio from 1.62% in 1996Q2 to its lowest level (0.21%) in 2006Q1 followed by a steady increase to 0.49% at the end of 2009. On the other hand, the provisions ratio for another bank was 0.19% at the beginning of 1996 and expanded over the next seven years to it maximum of 2.03% in 2003Q2. Subsequent to this, the ratio recorded a steady decline during the following four years before it began to rise with the onset of the financial crisis in 2007 when it reached 0.70% in 2009Q2. The main reason for this discrepancy in the behaviour of banks is the difference in the credit levels and types of credit

issued by each bank. Certain loans within particular industries and sectors have been historically proven to be unlikely to default and would carry a lower actual provision. For example, a bank with mainly mortgages in its portfolio would have a lower actual provision because people seldom default on mortgage payments since they place a high priority on keeping their properties.

4. Results

4.1 Findings of the Questionnaire and Interviews

The structure of the loan provisioning process in Barbados is such that the Central Bank regulates loan loss provisions by setting minimum levels on a categorical system. The Bank provides the commercial banks with the criteria for loan classification and minimal provisioning levels. It then conducts credit reviews of the individual bank's loan portfolios to ensure compliance with the criteria and categories of the Financial Institutions Act (1998). The purpose of this Act is to level the playing field across banks and other financial institutions, making regulations more enforceable.

An issue that is highlighted by regulators is the discrepancy between required and actual provisions. Required provisions are the provisions calculated by the Central Bank of Barbados based on their classifications as determined by The Financial Institutions Act 1998 while actual provisions reflect the amount that banks 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 and all responded in the affirmative.

From Figure 2 it is observed that there are many small fluctuations in the data as commercial banks are constantly adjusting their provisions based on the economic climate and previous loan default behaviours. It can also be seen that regulatory provision and actual provision levels move very closely together but commercial banks provided more than required by their regulator, the Central Bank of Barbados. As of the 2006Q2 there was an upward trend in actual provisions with an opposite movement in the level of regulatory provisions for the subsequent four periods. With the onset of the financial crisis of 2007, one can recognise that the actual and regulatory provisions begin to go in the same direction. What is of greater significance is that these two trends vary significantly in the recent period between 2007Q2 and 2009Q4. The regulatory provisions are noticeably lower than the actual provisions because the former are based solely on a set percentage of the loans within the different non-performing categories and allows for no discretionary influences. Also, the financial expectations in Barbados were dismal thus, banks would have been trying to raise their reserves as the economic climate was and continues to be very unstable.

Figure 2: Actual verses Required Loan Loss
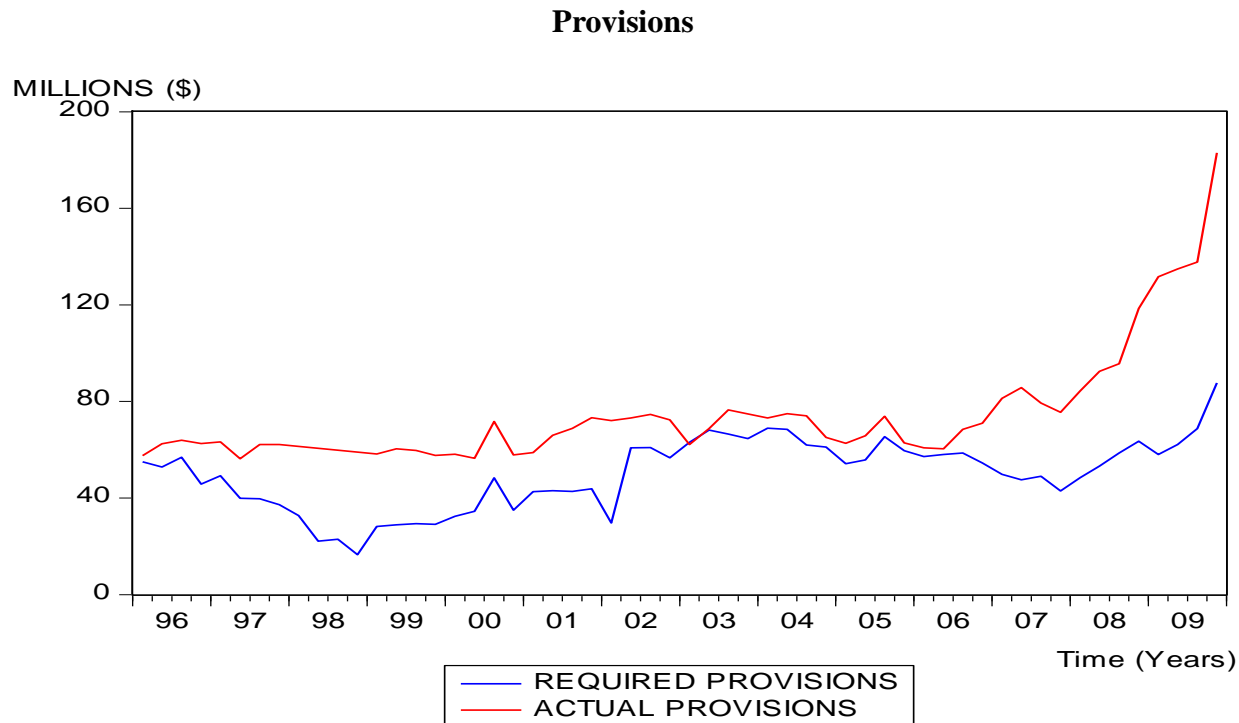
Provisions

The underlying cause of the discrepancy between regulatory and actual provisions is because commercial banks have different internal rating systems for classifying their loans. The interviews highlight that commercial banks use the same primary 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. The reason for the difference in classification is that the commercial banks utilize The International Financial Reporting Standards (IFRS) or the Generally Accepted Accounting Principles (GAAP) which 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 are best for their personal use, their provisions and reserves must comply with the Central Bank's regulations. Commercial banks usually employ the IFRS because they are more

flexible. This flexibility is desired because it allows the 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.

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 commercial banks' loan categories, which one(s) match the criteria set out in the regulations. This process is necessary in determining which provisioning level is being employed in the calculations and is usually well documented by the banks.

In was revealed during the interviews that the provisioning levels in some commercial banks are computed using hindsight while in the others only current information is taken into consideration. Also, some local banks have no authority in determining their own provision levels and take the level passed on by their international head offices. Sometimes, the provisioning levels decided by the commercial banks are less than those of the Central Bank and have to be corrected by the creation of an additional account.

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'. In addition to timing, there are other criteria that can be employed such as 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 of provision applied to the loan but may become relevant when the decision to issue credit is being made.

Other important information derived from the interviews are (1) commercial banks in Barbados partition their loan loss provisioning into a general provision and a loan specific provision related to the individual loan amounts; (2) Central Bank's regulations do not consider collateral while some banks do; (3) the most common type of securities in Barbados is property - land and houses – which are usually valued by third party appraisals but this value is sometimes adjusted by the bank's management to reflect other characteristics about these securities; and (4) regulatory monitoring of commercial banks is of a continuous nature, with reporting to the Central Bank of Barbados done 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 which may range from grievances with a particular process to the traditional high-risk areas such as capital management and credit risks.

4.2   Econometric Results

The results of the panel unit root tests mentioned above revealed that all the variables, except the logarithm of loans to assets ratio (*lLoAs*), logarithm of operating profit on total assets ratio (*lEarn*) and the logarithm of non-performing loans divided by total loans ratio (*lNpl1*)**,** are integrated of order 1 [I(1)], that is, they need to be differenced once to become stationary (see Table 2). *lLoAs, lEarn and lNpl1* are all stationary in levels I(0).

Table 2: Panel Stationary Tests

Variable		Levin, Lin	Breitung	Im, Pesaran and	ADF - Fisher	PP - Fisher Chi-
Lllp	Level	-1.78997**	2.25073	-1.38674*	16.4544	15.5911
	1st Difference	-17.8331***	-6.04304***	-17.4028***	213.590***	215.380***
lEarn	Level	-3.59849***	-2.43416***	-4.37206***	51.3037***	103.556***
	1st Difference	1.00358	-3.14124***	-10.4063***	121.558***	135.691***
lprices	Level	2.84057	0.40571	2.86434	1.51318	2.07558
	1st Difference	-15.0916***	-13.8678***	-13.5521***	162.483***	161.502***
lLoAs	Level	-.91547***	0.87629	-3.02976***	31.4518***	30.4265***
	1st Difference	-17.4912***	-11.4741***	-16.5494***	199.925***	204.049***
lTloan	Level	-0.06293	0.52110	3.04777	4.68405	6.32559
	1st Difference	-15.5133***	-10.6867***	-13.5692***	163.121***	168.525***
lgdplev	Level	-2.38532***	-0.44658	-0.72176	10.6070	16.9463
	1st Difference	15.3195	-2.69677**	-3.25119***	29.8734***	304.050***
RIR	Level	1.43881	-1.49582*	2.34140	2.09488	2.38555
	1st Difference	-22.1595***	-17.2348***	-18.3591***	228.123***	227.148***
lSiz	Level	-1.78875**	-3.34322***	-1.73913**	21.5210**	49.6274***
	1st Difference	-14.9972***	-13.1326***	-16.0338***	195.809***	247.959***
REER	Level	-0.73426	-2.85402***	-2.34624***	22.2960**	12.0016
	1st Difference	-15.4053***	-12.0439***	-12.3879***	145.579***	141.504***
lNpl1	Level	-3.27370***	-0.08771	-4.70317***	57.9441***	58.1823***
	1st Difference	-20.8006***	-8.39757***	-20.9672***	245.288***	223.927***

Note: *** ** and * are the critical values for the rejection of the null hypothesis of a (common or individual) unit root at the 1%, 5% and 10% level respectively. All tests were done using an intercept with an automatic selection of lags except for the Breitung Common Root Test which utilises an intercept with a trend. Lags were selected automatically using Schwarz information criterion.

The long run determinants of the PDOLS model are presented in Equation (3). It is derived from a general model and reduced to a parsimonious form using the general to specific methodology a la Hendry. The leads and lags are omitted to save space.

$$Lllp = \underset{(9.8285)}{12.88967^{***}} - \underset{(-2.8962)}{0.10641^{***}} LEarn + \underset{(1.7218)}{0.10574^{*}} LNpl1 - \underset{(-7.3808)}{0.71419^{***}} LTloan - \underset{(-5.2328)}{0.46973^{***}} LSiz$$
$$+ \underset{(4.6764)}{0.023564^{***}} \operatorname{Re}er - \underset{(-7.3859)}{0.2151^{***}} Rir - \underset{(-2.2739)}{0.65675^{***}} L\Pr ices \qquad \textbf{(3)}$$

$$R^2 = 0.918408$$

Note: t- statistics of regressors are shown in parentheses. ***, ** and * indicates significance at the 1, 5 and 10% level of testing, respectively. R^2 is the coefficient of determination. The standard errors in brackets are heteroskedasticity consistent a la White (1980).

Seven significant variables can be found in this long run model and they explained 91.8% of the variation in loan loss provisions (*Lllp*). The operating profit on total loans ratio (**lEarn**) has an adverse relationship with provisions. This result is consistent with Angklomkliew et al (2009) and it suggests that the commercial banks in Barbados are not using *Lllp* to smooth income in the long run. The real effective exchange rate (**Reer**) has a weak positive significant relationship with the *Lllp*, implying that the impact that the real economy has on provision levels is minuscule. This was also found to be the case in Pasha and Khemraj (2009). The level of classified debt on total loans (**LNpl1**) is only significant at the 10% level and has the a priori sign, indicating that as the level of classified debt or non-performing loans increases *Lllp* also advance.

The relative market share (**lSiz**) of commercial banks has an adverse sign with *Lllp*. This suggests that, unlike Guyana (Pasha and Khemraj, 2009), the larger banks in Barbados are more able to screen loans through better risk management strategies thus providing a stronger loan portfolio. Contrary to the results seen in Jimenez and Saurina (2005) a negative link between provisions and the real interest rate (**Rir**) is observed. The retail price index (**LPrices**) gives evidence that the price level affects *Lllp* in the long run. However, it should be noted that the a priori sign was positive. The parameter on the total number of loans (**LTloan**) has an adverse sign. This indicates that as total loans increases *Lllp* will decrease. This anomaly between a priori and actual signs can be explained if one considers that bigger banks in Barbados are the ones with the largest loan portfolios and are better able to screen possible defaults. Hence it is expected that as total loans expand then *Lllp* should contract.

The results of the PDOLS error correcting model (ECM) are reported in Equation (4).

$$Lllp = 1.683799^{***}_{(4.1007)} + 0.101463^{***}_{(2.3817)} d(LDep1_{(-3)}) + 0.074894_{(1.5618)} d(LDep1_{(-4)}) - 1.20615^{***}_{(-4.8949)} d(LTloan)$$

$$+ 0.660077^{***}_{(5.6323)} d(L\Pr ices_{(-3)}) - 0.445547^{**}_{(-2.4593)} d(LGdplev) + 0.026876^{*}_{(1.6451)} d(LEarn_{(-5)}) \qquad \textbf{(4)}$$

$$- 0.065133^{**}_{(-1.9606)} d(Rir_{(-3)}) + 0.013059^{***}_{(2.9136)} d(\text{Re} er_{(-4)}) - 0.03217^{*}_{(-1.7649)} d(lSiz) - 0.129188^{***}_{(-4.0764)} ECM_{(-1)}$$

$$R^2 = 0.247186$$

Note: t- statistics of regressors are shown in parentheses.. ***, ** and * indicates significance at the 1, 5 and 10% level of testing, respectively. R^2 is the coefficient of determination. The standard errors in brackets are heteroskedasticity consistent a la White (1980). 'd' represents the first difference operator.

The error correcting term in this model is negatively signed, has the a priori magnitude (less than one) and is very significant; its coefficient suggests that given an exogenous shock to *Lllp* it returns to equilibrium with 12.9% of the initial shock dissipating in the ensuing quarter. This finding for the error correcting term supports the earlier result that the variables cointegrate.

Except for *LGdplev* and L*Npl1* all the other variables are significant in both the long run and ECM formulations. In addition, the signs of the parameters in both specifications are similar excluding *LPrices* and *LEarn*. With respect to the ECM all the variables have the a priori sign except for the real interest rate (*Rir(-3)*) and total loans (*LTloan*). The variable for total loans has a very significant negative relationship with *Lllp* and suggests that as the loan portfolio grows *Lllp* should decrease. In support of this is the relative market share variable (*LSiz*) which is significant at the 10% level and carries a negative sign, implying that larger banks are better at risk management. The gross domestic product (*LGdplev*) has the expected relationship with *Lllp*, indicating that a one unit rise in *LGdplev* causes a 44.6% reduction in *Lllp*. This is consistent

with the results obtained in the interviews where bankers state that as incomes increase creditors appear better able to service their debt and avoid default.

To shore up the effect of the real economy on loan loss provisions the real effective exchange rate from four periods prior (*Reer(-4)*) is significant and has the expected sign; if it advances by one unit a 1.3% change in *Lllp* in the same direction results. The retail price index from three periods before (*Lprices(-3)*) also proved to have a influential effect on *Lllp*. As prices expand by one unit *Lllp* are expected to rise by 66% as it would now be harder to service debt. Finally, the model suggests that the short run expectation is quite small with a value of 17.36%. The signs obtained on these lagged parameters (*Lllp$_{t-3}$ and Lllp$_{t-4}$*) are positive and imply that the higher the value of these parameters, the more banks must provide for current *Lllp*. This persistence in *Lllp* implies that a period of hardship is most likely to be followed by another one until the cycle breaks. Information gathered from the interviews found a similar result, namely, that commercial banks usually use historical default data along with current and previous business cycle information when determining their current levels of provisioning.

5. Conclusion

This paper examined the components of the loan loss provisions within the banking system of Barbados. It combines information acquired through the use of interviews along with data from the regulator- The Central Bank of Barbados. The study also used an econometric model to explore the main factors which drive loan loss provisions. The results revealed, for the first time in Barbados, and possibly regionally, a greater appreciation for the individual procedures of the commercial banks as it pertains to loan loss provisioning. Additionally, the paper discovered that all of the factors affecting loan loss provisions were significant in both the long run and short

run; non-performing loans ratio and real gross domestic product were only significant in the long run and the short run, respectively.

This article showcased the persistence of loan loss provisions and revealed how current and forecasted economic trends could influence the levels of reserves that provide safety for depositors. A heavy dependence of loan loss provisions on the real economy emerged and is evidenced in the significant relationships between loan loss provisions and the real effective exchange rate, the retail price index and real gross domestic product. This implies that regulators and policy makers' need to keep abreast of leading economic indicators both locally and internationally as competition could influence the level of defaults and, by extension, loan loss provisions.

In particular, this research proposes that commercial banks are using loan loss provisions to smooth income in the short run. This means that as income falls, profits will decline, and tax revenue, which is calculated based on profits, will follow suit. Consequently, it is very important for policy makers in Barbados to take the relationship of loan loss provisions and tax revenue into consideration.

In addition, evidence from the model suggested that the larger commercial banks were better able to screen borrowers to avoid future defaults in both the long and short run, probably, through the use of more efficient risk management strategies.

One implication of the study is that banks must hold enough reserves to lessen the impact of adverse shocks to the economy. It would appear that the shortcomings of the current regulatory framework could curtail this development, therefore, considerable groundwork should continue to be done to propel the Barbadian Banking System to a better regulatory framework: Basel Accord 2.

In Barbados, the current regulatory methods are proving to be successful possibly because there are few commercial banks. Their adherence to the reporting regulations and their willingness to incorporate the suggestions made by the regulator improves the long standing relationships and communication channels between banks and the Central Bank. Therefore, there is normally no need to apply any sanctions or penalties. However, there is not sufficient flexibility of regulative authority to prevent the major disparity between regulatory and actual provisions during undesirable economic times, as evidenced in the recent financial crisis.

In light of this belief, this paper argues that an additional x-factor that could be controlled by the Central Bank be included. This would give regulatory staff the much needed flexibility to influence the regulated provision and to compensate for the deficiencies in the current historical category value method until a better alternative can be fully adapted.

There are also limitations of this study that provide scope for future research. Variables such as the loss given default and the probability of default were contemplated but were not included because of the large amount of information required to construct appropriate proxies. Also, given the importance of the offshore banking sector to Barbados, future work could be directed

towards these institutions. Such a study could be aimed at making a comparison of their loan loss

provisioning practices with the local commercial banks'.

References

Angklomkliew, S., George, J., and Packer, F. (Dec 2009) "Issues and Developments in Loan Loss Provisioning: The Case of Asia." BIS Quarterly Review.

Balla, E. and McKenna, A., (2009). "Dynamic provisioning: a countercyclical tool for loan loss reserves." Economic Quarterly, Federal Reserve Bank of Richmond, issue fall, pages 383-418.

Basel Committee on Banking Supervision (1999) "A New Capital Adequacy Framework." Bank for International Settlements

Bikker, J.A. and Metzemakers, P.A.J., (2002). "Bank provisioning behaviour and procyclicality." Research Series Supervision 50, Netherlands Central Bank, Directorate Supervision.

Bouvatier, V. and Lepetit, L., (2008). "Banks' procyclical behavior: Does provisioning matter?" Journal of International Financial Markets, Institutions and Money, Elsevier, vol. 18(5), pages 513-526, December.

Breitung, J. (2002), "Nonparametric Tests for Unit Roots and Cointegration." Journal of Econometrics 108, 343-364.

Cortavarria, L. Kanaya, A., Song, I. and Dziobek, C.H, (2000) "Loan Review, Provisioning, and Macroeconomic Linkages." IMF Working Papers 00/195, International Monetary Fund.

Floro, D, (2010) "Loan Loss Provisioning and the Business Cycle: Does Capital Matter? Evidence from Philippine Banks." Bank for International Settlements.

Greenidge, K. and Grosvenor, T.,(2010), "Forecasting Non-Performing Loans in Barbados." Business. Finance and Economics in Emerging Economies Vol 5 No.1 2010.

Im, K.S, Pesaran, M.H. and Shin, Y. (2003) "Testing for Unit Roots in Heterogeneous Panels." Journal of Econometrics 115(1): 53-74.

Jiménez, G. and Saurina, J., (2006), "Credit cycles, credit risk, and prudential regulation" International Journal of Central Banking (2), 65-98.

Jokivuolle, E., and Peura, S. (2003). "Incorporating Collateral Value Uncertainty in Loss Given Default Estimates and Loan-to-value Ratios. European Financial Management." 9(3), 299-314. Retrieved from E-Journals database.

Khemraj, T., and Pasha S. (2009) "The determinants of non-performing loans: an econometric case study of Guyana." Presented at the Caribbean Centre for Banking and Finance Bi-annual Conference on Banking and Finance, St. Augustine, Trinidad.

Kao, C., (1999). "Spurious Regression and Residual-Based Tests for Cointegration in Panel Data." Journal of Econometrics, 90, 1-44.

Kao, C., and Chiang, M. (2000) "On the estimation and inference of a cointegrated regression in panel data." Advances in Econometrics 15, 179-222.

Laeven, L. and Majnoni, G., (2003). "Loan loss provisioning and economic slowdowns: too much, too late?" Journal of Financial Intermediation, Elsevier, vol. 12(2), April.

Laurin, A. and Majnoni, G. (2003) "Bank loan classification and provisioning practices in selected developed and emerging countries." World Bank working paper series; no. 1, Report Number 26056

Levin, A., Lin, C. and Chu, S,. (2002) "Unit root tests in panel data:Asymptotic and finite-sample properties." Journal of Economics 108: 1-24.

Mark, N., and Sul, D., (2003). "Cointegration Vector Estimation by Panel DOLS and Long-run money Demand." Oxford Bulletin of Economics and Statistics 65(5), 655-80.

Pedroni, P., (1999). "Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors." Oxford Bulletin of Economics and Statistics 61, 653-678.

Saikkonen, P. (1991), "Asymptotically Efficient Estimation of Cointegration Regressions." Econometric Theory, 7, 1-21.

Song, I. (2002). "Collateral in Loan Classification and provisioning." IMF- Monetary and Exchange Affairs Department. EconLit with Full Text, EBSCOhost(accessed June 10,2010).

Stock, J., and Watson, M., (1993). "A Simple Estimator of Cointegrating Vectors in High Order Integrated Systems." Econometrica,61, 783-820.

Wezel, T., (2010) "Dynamic Loan Loss Provisions in Uraguay: properties, Shock Absorption Capacity and Simulations Using Alternative Formulas." IMF Working Papers, Vol., pp. 1-22, 2010.

White, H. (1980). "A Heteroskedasticity- Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." Econometrica, vol. 48, issue 4, 817-838.