

Financial Stress Index and Soundness in Selected Caribbean Countries: Lessons from the Global Crisis.

1) Introduction

The global financial crisis will be retold endlessly as a crises caused by low interest rates, easy credit, and boom in the real estate market followed by greed and corruption that allowed the financial market to get out of control. The crisis however, offer sobering lessons for a global economy caught in the mirage of excessive leverage in the financial market place. The levered investment produced super profits in times of boom and enormous loss when it got busted. The significant feature of a financial system busted in the current era is that the transmission effect of the crises quickly spread to the global economy because of the integration of the world financial and capital markets It goes without saying that econometric models, financial stress test and the Financial Stability Assessment Program(FSAP) have all proved inadequate in predicting the crisis much less containing its contagion effects of the crises on the global economy. This paper critically analyses the tools available to counter financial crisis with specific reference to the Caribbean.

The paradigm that financial markets are efficient has provided that intellectual backbone for the deregulation of the banking since the 1980's allowing commercial banks to be fully involved in financial markets and investments banks to become involved in traditional banking. There is now overwhelming evidence that financial market is not efficient. Bubbles and Crashes are endemic features of financial markets in capitalist countries. (De Grauwe 2008). This was made possible by the repeal of the Glass-Steagal Act that was enacted by President Franklyn Roosevelt during the Great Depression that limits commercial banking role to narrow banking. This deregulation has allowed commercial banks to experiment with high yielding returns in Structured Investment Vehicle (SIV) that they were able to move off their Balance sheet but was forced back on once the option was called that went down at fire sale price.

The Caribbean has not been affected by the direct contagion effect of the first round of the financial crisis; there was still an impact as one of the largest conglomerates in the

Region CLICO went under even though the core banking system continues to remain sound. This was due mainly to the fact that most of the foreign banks are Canadian subsidiary in the Caribbean, which had remained strong in the wake of the global financial crisis. However, the Central Bank of Trinidad and Tobago moved quickly to prevent a run on Republic Bank where CLICO had the majority shares. Later, the Caribbean was again affected with the Stanford debacle as a number of financial agencies lost all investment in this Ponzi Stanford scheme. The Caribbean was however more negatively impacted by the second round effect of the crisis namely the deterioration in the term of trade, reduction of remittances and lower Foreign Direct Investment Flows (FDI) and a dip in tourist arrivals. This is the first major crisis that shook the industrialized economies more particularly the United States with the severity of the crisis threatening the foundation of the global financial system. Even though the impact of the global financial crisis had not been as severe on the Caribbean countries this does not mean that they are merely out of the woods. The study reveals that the Financial System Stability Assessment (FSAP) by the IMF on a selected group of the Caribbean namely Barbados, Jamaica and Guyana shows that these groups of countries remains vulnerable in the wake of the global financial crisis. The Regulatory infrastructure is now being strengthened and was not well developed to counter unforeseen circumstances in the financial sector.

An important point to underline is that the recent crisis began in the shadow financial system and spread to core banking system. Financial supervisors were initially preoccupied with the formal banking sector and not with the risk building in the shadow financial system. The perimeters of regulation that were drawn covered just this aspect of the financial system leaving risk and leverage buildups out of regulators sight. The IMF pointed out that market discipline failed as optimism prevailed; due diligence failed as optimism prevailed ;due diligence was outsourced to credit rating agencies and a financial sector compensation system based on short-term profits reinforced the momentum for risk taking. This led to very high level of risk taking and leverage ratio (thirty five percent) in the shadow banking system that had effective conditions for regulatory arbitrage.

This Research Paper consist of six parts, the first is introduction, the second gives a synopsis of the global financial crises, with abroad over view of market failure and the

global policy response to the financial crises, the third part analyze the different methodology used in measuring Financial Stress with a critical analysis of the capital adequacy ratio, the fourth part deal with financial sector stability and soundness in Selected Caribbean Countries, The fifth part look at systemic risk and vulnerability in selected Caribbean Countries and the last and final part deal with the conclusion and recommendations based on lessons of best practices.

II) THE GLOBAL FINANCIAL CRISES

Overview of Market Failure

The period of high growth rate was blended with low levels of inflation in the world economy in the last two decades that created the ideal conditions for the recent global crisis. Higher surplus especially from institutional investors coupled with lowest interest rates prompted investors around the world to search for higher yielding assets albeit at investment on the lower end of the quality curve. The demand for higher yield investment allowed the financial system to develop new products such as the structured products and new investment that offered higher risk adjusted yield but were in fact more risky than they appeared. (IMF 2009). Further, the quadrupling of foreign reserves especially in the emerging market economies created a global saving glut in search of higher yields provided easy finance especially for a ballooning US household and Current Account deficit that eventually proved fatal.

Due diligence that was supposed to analyze the risks inherited in these new instruments was outsourced to credit rating agencies that utilized sophisticated mathematical models that investors took not only for granted but had little understanding of their implications. The generous compensation and bonuses paid out to the fund managers based on short-term profits created further momentum for risk taking. New institutions proliferated with utmost ease while there were 610 hedge funds valued US \$38.9 Billion in 1990 by the end of 2006 there were 9,462 with US \$1.5 Trillion under management Bank in a very innovative

manner set up a host of “conducts” and “Structured Investment Vehicles” (SIV) to keep these risky assets off their balance sheet. This created the ideal conditions for the exploitation of regulatory arbitrage that had created hidden systemic risk. The calling of these securities forced the commercial banks to make the sudden adjustment by incorporating this high risk asset on to their balance sheet .While financial regulation was not equipped to uncover risk concentration and the flawed incentive behind the financial boom macro economic policies failed to take into account the accumulation of systematic risks in the financial system and the bubble in the housing market.

The crisis also offered sobering lesson about the dangers of easy credit policy that fuelled the rapid build up of debt. In the last two decades household and financial institution borrowed at unprecedented level to invest into the housing and real estate markets. As is characteristic with all levered investment resulting from easy credit it generated great profits as the price of assets rose in value in the period of euphoria and heavy loss as the price of assets tumbled. Once the flow of credit was disrupted the return to normalcy tended to be a very slow process thereby impacting negatively on economic activity.

The failure of the market has brought into question the adequacy of the existing prudential rules and regulations to first identify a crisis and to control a crisis situation. In this regard instruments have been under rigorous scrutiny. Further, the global financial crisis has also brought into question the debate that market functions efficiently and is a self correcting process.

B) Policy Response to the Global Financial Crisis

The most immediate response to mitigating future for financial crisis has been to address the inadequacy of the current regulations. The IMF has argued for the perimeter of the current regulations to be expanded to encompass institutions and markets that were outside the scope of regulations and in some cases beyond the detection of regulators and supervisors. In this regard a two tier approach would be adopted to avoid duplication. Most financial institution and activities would be in the outer perimeter and would be

subjected to only disclosure requirements while those that pose systematic risks will be moved to the inner perimeter and be subjected to prudential regulations.

This should include:

- Institutions that are counterparties to risk transfers from the requested sectors new regulations should target off balance sheet entities such as Structured Investment Vehicles that could be used to acquire risky assets from banks and other regulated firm.
- Investment firms that use leverage and are apt to amplify downward spirals of asset prices when need to deleverage, that is to sell assets prematurely.

The Squam Lake Working Group on Financial Regulation (April 2009) argued that banks must satisfy regulatory capital requirements that are intended to ensure they sustain reasonable losses and generally specified as a ratio of some measure of the capital to come measure of assets such as total assets or risk adjusted assets. Capital requirements should be higher for larger banks, banks that hold more liquid assets and banks that finance more of their operations with short-term debts. They also argued for systematic regular the central bank to oversee the health and stability of the overall financial system.

A major challenge of prudential regulation is to remove procyclical elements without negating risk based decision making within financial institution with the regulation of capital. Ensuring adequate liquidity is another procyclical feature of the financial system that needs to be addressed to ensure that financial firms have access to adequate funds to lend during downturn.

Basu, Choueiri and Pascual (2006) have proposed moving beyond the Current Financial Sector Assessment Programs (FSAP) towards the Financial Sector Surveillance. The IMF currently conducts a Financial Programming exercise that entails a medium term analysis of economic performance on the bases of macro economic flows of the real, fiscal, monetary and external sectors. A debt sustainability analysis is then conducted that provide a framework for evaluating fiscal and external sector performance. The proposed toolkit is expected to incorporate the FSAP analysis with the stress testing. The key feature of the

proposed toolkit is to integrate the aggregate profit and loss (P&L) accounts of the financial sector into the standard programming exercise used in Fund Surveillance. The projection of the P&L A/C over the medium term generates a profit which net of dividend translates into a path for capital buildup. Capital adequacy based solvency measures for the financial sector can then be constructed from the projected path of capital and risk weighted assets. This creates condition for a check of consistency in the integration between the macro economic and financial framework.

111) Measuring Financial Stress and Capital Adequacy Ratio

Financial stress can be defined as an interception to the normal functioning of financial markets. Financial stress has been associated with a number of phenomena:

- Increased uncertainty about fundamental value of assets
- Increased asymmetry of information
- Decreased willingness to hold risky assets (flight to quality)
- Decreased willingness to hold liquid assets (flight to liquidity)

The financial stress index which was first developed by the Bank of Canada was popularized in the United States with the Kansas City Financial Stress Index (KCFI). The index has been able to successfully identify past episodes of financial stress for instance the 1990-91 recessions and the current financial crisis in the US. The index recorded its largest increase ever in the month of September, when Lehman Brothers filed for bankruptcy, AIG was rescued and two large troubled banks were absorbed by other banks after intervention by regulators. By March 2009, the index was three times greater than any of the peaks in the late 1990's and early 2000's, the last period of financial stress.

The financial stress index approach has been used by the IMF and the Bank of Canada to classify financial stress as severe when the index exceeds the historical mean by a certain number of standard deviations. Bank of Canada uses a relatively high cut off of two

standard deviation above mean, while the IMF employs a lower cutoff of one standard deviation above mean.

An increase in financial stress can lead to a decline in economic activity through three possible channels. The first is the increase in uncertainty about the prices of financial assets and the economic outlook. The second is through an increase in the cost of businesses and household of financial spending. Financial stress can also make it more expensive for firms to raise funds by issuing new equity. Finally, financial stress can lead to a slowing of economic activity when banks tightened their credit standard.

This new measure KCFS Index has successfully performed well in identifying financial stress in the last 20 years. The KCFS Index is based on the financial variables, each of which captures one or more key features of financial stress. The KCFI can be considered serious when it has a high cut off point two standard deviation above means or a cut off in term of percentiles. The KCFI is considered high when it equals or exceeds the value of the index in some benchmark episode such as the Russian default (1998) or the Enron Accounting scandal (2002).

Cardarelli, Elekdag, and Lall (2009) analysed past episodes of financial stress and their implication for economic activity by constructing an index of financial stress in banking, securities, and foreign exchange markets as the sub index components in 17 advanced economies identifying 117 episodes of financial stress over the last 30 years. They found that half of these episodes of financial stress were associated with an economic downturn or recession however, when a slow down is preceded by financial stress in the banking sector it is substantially more severe and tends to involve two to three times greater cumulative output losses and tend to endure two to four times as long. They found evidence of commercial banks operating in more arm's length financial system than those where a greater share of financial intermediation relies on financial market rather on traditional relationship based (and bank dominated) activates tend to be more procyclical. Thus more arm's length financial system are associated with more procyclical bank behavior and more vulnerable to banking stress. They concluded that in the event of significant financial

stress the early recognition of losses and measures to support the speedy restoration of capital can help reduce the output consequences of financial crises. At the same time attention need to be paid to longer term moral hazard implication of any strategy to restore financial stability.

In a study that is more related to the Caribbean scenario with a relative un sophisticated financial sector, Dr Worrel examined the impact of shocks and advanced scenario on capital adequacy of banks and banking system and in particular how quickly the risk weighted capital adequacy ratio(CAR) falls to the statutory minimum and further to the point of insolvency. His approach took into consideration 1)credit risk assessment, that examines the impact on the CAR over time of migration of loans from better to a worse loan quality classification 2) exchange rate risk where by a depreciation of 50 percent reduces it's CAR from 18.6% to a level just above the statutory 8% 3) a 50% increase in interest rates leaves the CAR of the banking system a little above the 8% threshold.4) the impact of credit growth, the NPL ratio and the NPL migration matrix. 4) the impact of the combined scenarios of credit growth NPL migration, exchange rate, and interest rate changes. Using a hypothetical example of six banks he pointed how the approach of stressing to failure can be applied to evaluate exposure to a number of risk factors.

Limitations of the Capital Adequacy Ratio Arguments

There is another school of taught led by well known academic like Paul De Grauwe and Joe Stiglitz that regulations alone cannot work in preventing another financial crisis and more needed to done at the policy level. De Grauwe argued that the Basel approach to stabilize the banking system has an implicit assumption that financial markets are efficient allowing us to model the risks commercial banks take and to compute the required capital adequacy ratios that will minimize the risks. He argued this approach is unworkable because the risks that matter for commercial banks are tail risks associated with bubbles and crashes and these cannot be quantified.

Another major flaw underlined by De Grauwe was the belief that markets would regulate themselves via the idea of mark to market. If financial institutions used mark to market

rules the discipline of the market would force them to price their products right. Slow price always reflected fundamental values. However, mark to market rules instead of being a disciplining force work procyclically. As a result mark to market rules in the period of boom exacerbated the sense of euphoria and intensified the bubble to ever unrelated to fundamentals. Further, funding of bank activities increasingly occurred through the interbank market as banks ever increasing investing in high risks assets while obtaining funding from the interbank market. In contrast to deposits from the public these interbank deposit were not guaranteed thus creating ideal connotations for a liquidity crisis.

Stiglitz, Hellmann and Murdock (2000) in an article entitled “Liberation, Moral Hazard Banking and Prudential Regulation: Are Capital Requirement Enough”, argued that in a dynamic model of moral hazard, competition can undermine prudent bank behavior while capital –requirements can induce prudent bank behavior, the policy yield Pareto-inefficiency outcomes. They stated that capital requirements reduce gambling incentives by putting bank equity at risk. However, they have a pervasive effect of harming banks franchise values, thus encourage gambling. Pareto-efficient outcomes can be achieved by adding deposit rate controls as regulatory instrument, since they facilitate prudent investment behavior by increasing franchise values.

This school of thought has found major flaws in the liberalization of the financial sector without having proper safe guard mechanism in place. They have contradicted the widely accepted view that the market is a self correction process. They were certainly vindicated when the financial crises wrecked havoc on the global economy and the global financial market threatens to go under with the price of failure. However, it took the most radical solution such the nationalization of failed financial institution to correct the distortion and prevent global crises.

The current capital adequacy ratio Basel 11 regime has three major flaws that must be addressed¹.First it is the procyclicality of the requirement which allows for even greater financial risk to be supported by a thin capital base in good times and a scramble for more expensive capital as assets are marked down in bad times. Critics of fair value accounting of mark to market accounting pointed out that having to mark down assets to the value

¹ See Benn Steil ‘Lessons of the Financial Crises’

they would fetch in a quick fire sale significantly exacerbates the procyclicality problems in down turn. Secondly, is the role of officially sanctioned credit agencies in assigning risk rating that determining capital adequacy requirement? The third flaw is the role of proprietary value at risk (var) model employed by banks. These models based on historical data have shown systemically lacking in encompassing black swan risk.

IV) Financial Sector Stability and Soundness in Selected Caribbean Countries

The financial system in the Caribbean offers a range of financial services for industries, commerce and household. These services are provided mainly at commercial banks, quasi financial institutions and insurance companies. Commercial banks remain the principal source of credit, providing mainly working capital for industries and commerce. The financial market could still be considered to be at an incipient stage of development with limited trading in equity, commercial paper and bonds.

This section looks at the financial soundness in a select group of Caribbean countries namely Trinidad and Tobago, Barbados and Guyana. The Caribbean did not suffer from the immediate contagion effect of the global financial crisis due mainly to the fact that the system is not that sophisticated and integrated with the world financial and capital markets. The equity and secondary market is now developing as there are not many companies or project that relies on the regional capital market for financing. Another factor that impacted positively on the Caribbean despite the global financial crisis was the first round effect and the impact on the Caribbean was more or less contained.

The past crisis have shown that the Caribbean tends to feel the crisis with a lag that impact mainly on the macro-economic environment that eventually feed into balance sheet of the financial system.

A comparative analysis Financial Soundness Indicators for the four years period (2005-2008) for Barbados, Jamaica, Guyana and Trinidad and Tobago have all shown a consistent pattern regulatory capital to risk weighted assets ratio (see table 1). Trinidad and Tobago being the highest at 18.8 followed by Guyana at 14.9 and Barbados and Jamaica at 13.9 respectively at the end of 2008. The select group of Caribbean countries is comfortably placed above the threshold in terms of capital adequacy and compares well with their peers in the Western Hemisphere.

The non performing loan to total loans ratio for the Caribbean shows mix result for the period under review with Guyana leading in the negative performance even though it was brought down from 13.9% to 5.2% by 2008 it still remains above the selected group of Caribbean countries and all the other identified in the table in Latin American and the Caribbean.

The other indicators of Financial Soundness the return on Assets and equity pointed to Trinidad and Tobago being the healthiest of the select group of Caribbean countries above the 3% mark on assets and 25% market on equity. Guyana recorded the lowest return at 0.5% on assets and 6.3% on equity.

In sum, the core indicators in Table 1 have placed the deposit taking institution in the select group of Caribbean countries in a reasonable position of Financial Soundness. The capital adequacy, asset quality, earning and profitability and the liquidity position of the commercial banks have all indicated comfortable ratio that represents a healthy financial system. However, these ratios are not to be misplaced to mean that their robust performance mean a sudden crisis situation cannot erupt. Comparative economic theory pointed to the fact that crisis can suddenly erupt in the best of circumstances.

Despite the robust performance the Trinidad and Tobago Central Bank had to intervene in January 2009 in CLICO Investment Bank (CIB) and two insurance companies, the Colonial Life Insurance Company (CLICO) and the British American Insurance Company

(Trinidad) Limited (BA). The Republic Bank where CLICO was the largest shareholder was brought under administration of the Central Bank. The action was taken to protect bank's depositor and the policy holders of the insurance company after both institutions were unable to meet their obligations.

CLICO Investment Bank is a non-bank financial institutions accounts for 11.4% of the total assets of the banking system in Trinidad and Tobago with more than 42% of the bank loan portfolio to affiliated companies that were of poor quality which did not provide a cash flow for the bank thus giving rise to an illiquid position. Further, CIB paid interest rates which were significantly high in an effort to lure investors. CLICO (Trinidad) and BA (Trinidad) and BA accounted for over 52% of insurance liabilities in Trinidad and Tobago this share is also large in Guyana and Barbados where CLICO has a large concentration of insurance business. This again bring to fore the non deposit financial institution and threatening the entire financial system.

The CLICO largest regional financial institution is a conglomerate structure with multiple lines of business that include banking, mortgages, insurance and other financial lines of business. The dominance of mixed conglomerates with sizable intra-group exposure have reduced transparency and not within the purview of regulatory oversight. This posed a serious challenge for the region after the CLICO debacle. In Guyana, three of the commercial banks with inter group exposure and owned by influential businesses reflect the similar problem.

V) Systematic Risks and Vulnerability in Selected Caribbean Countries

The financial soundness indicators for 2008 have to be seen within the context of a favourable global and domestic environment. Moreover, the first round impact of the crisis on the Caribbean Financial System was fairly limited since bank in the region had not exposed to sub prime mortgage while bank credit expansion is based on domestic deposit and limited foreign loans and last but not least the large foreign banks are mainly Canadian Banks which were seriously affected by the International Financial Crisis. As a result the banking system remains fairly resilient.

The Caribbean economies were impacted more negatively in the second round effect of the global financial crisis with the decline in global demand. Economic activity in the US was declining by 6.25 percent on an annual basis and unemployment rising to nearly 10 percent. The weakening demand for commodities will translate in a fall in prices, there has been a serious decline in tourism; reduction in remittances and Foreign Direct Investment flows. These impacts have a way of feeding into with a lag the Profit and Loss and the Balance Sheet of the Banking System as past experience has shown.

While attempts has been made to model and analyze the regulated formal financial sector not much work was accomplished on the shadow financial system and unregulated sector. Experience has shown that the shadow financial was where the two current financial crises materialize in the US. The shadow financial sector has created problems already for Caribbean economies with Jamaica being a classic case in the mid 90's. The FINSAC programme was put in place to avert a collapse of the Banking system.

A number of Caribbean economies have investments in Ponzi Schemes that led to severe financial loss when the scheme collapsed. The Stanford Scheme had led to losses in at least two financial institutions with one trust company losing as much as 10 percent of its reserves, and had to restructure its capital base with an injection of equity to survive. Quansi financial institutions such as Credit Union, Trust companies that are unregulated

had faced financial difficulties, at least two credit union were in red with one closing operations in Guyana in the height of the financial crises .

The operations of informal financial scheme or Ponzi scheme had lured savers with higher interest rates. There was a famous vegetable scheme that offered over 30 percent interest rates; the liquid of this scheme has led to losses estimated at over US 2 million for small savers. Most of the Regulatory Institution complained of their inability to audit these schemes under the existing legal framework. However this did not prevent citizen from being caught in the scam that one can only guess is a fraudulent.

VI) RECOMMENDATIONS AND CONCLUSION

The most important recommendation is revamping of the regulatory structures with the widening of the perimeter of regulation to encompass institutions and markets outside of the scope of regulation and beyond the detection of regulators supervisors. These institutions are those that are counterparties to risk transfers from the regulated sectors: new regulation should target off balance sheet entities that acquire risky assets and investment firms that use leverage.

Prudential regulation is expected to remove procyclical elements without negating risk-based decision making within financial institutions. Incentives should be introduced to encourage firms to accumulate additional capital buffers during upturns and let them run down during downturns. One way is by making capital requirements countercyclical. In recent years a number of Central Banks in the Caribbean has upgraded their legislative framework and supervisory practices. The enactment of new and updated Financial

Institutions Act (FIA) that addresses deficiencies in the old legislation. Some of the new provisions included are

- Consolidated supervision of conglomerate that focus on the entire group thereby reducing opportunities for regulatory arbitrage and the shifting of risk within the group.**
- The establishment of Financial Holding Companies to deal with mixed group structures that include regulated financial institutions and unregulated commercial entities that make it difficult to assess and contain the risk associated with their exposure.**
- Application of credit exposure limits. All counterparty credit risk will be treated to a large exposure limit that includes exposure to counterparty.**

A number of Caribbean countries are now upgrading their insurance act along with improving the regulatory and supervisory capacity the new insurance act have now empowered the authorities to restrict license and take control of troubled company and suspend operations, strengthen the statutory fund, enforce minimum capital requirements and risk based capital requirements.

The Squam Group (2009) argued that two broad principles should guide the longer term response to the financial crises. The first is the incentive for private regulators to self regulated that is having mechanism in place to raise the cost of risk that threaten solvency and not rely solely on those in the market who are human being with their own foibles and blind spot. Secondly, the central importance of what is known in engineering and management as Safe-Failed approaches that is making institutions resilient in the face of wider failures.

Finally, the global financial crises have placed on the agenda a complete analysis of the financial sector and the role of central banks in ensuring not only price stability but financial stability. Over the year revisions to monetary frame work have successfully combat inflation? However, over the same period financial stability frame work has not kept pace with financial sector regulation appearing to have lost a key objective that is mitigating systemic risk? In this regard central bank is best place to be the systemic regulator of the financial system. Finally, the crisis itself has reinforced the debate whether market is a self correcting process and as the financial Times recently pointed out history is replete with such intellectual debate with no decisive victory.

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Appendix I. Stress Testing Procedures, Assumptions and Outcomes in Barbados.

- 1. This appendix describes the methodology and results of the stress tests that were carried out as part of the Barbados FSAP Update.** The assessment is based on a bottom-up estimation of the vulnerabilities of onshore subsidiaries to various exceptional but plausible shocks. However, it is important to recognize that scenario analysis is not general equilibrium analysis, and is considered an imperfect guide to gauge the resilience to the shocks analyzed if macro policy framework, and/or the financial system were to diverge fundamentally from the current one. The shocks and scenarios used in the stress test analysis were chosen in collaboration with the CBB. The CBB provided individual bank data as of September 2007.

Coverage-Institutions and Risks

Institutions

- 2. The stress test covers the four subsidiaries on the on-shore banking system, and it is based on data as of September 2007.** The two foreign branches on the on-shore system were not included in the exercise given that minimum capital requirements do not apply for them.
- 3. The stress test assesses the resiliency of the system to a number of shocks, including to the economic activity, interest rate, exchange rate, liquidity, as well as shocks to macroeconomic variables for the world economy.**

Summary of Methodology

Credit Risk

4. The credit risk analysis consisted on tracking the impact on commercial banks' CAR of shocks to default rates of the banks' loans. This was accomplished by first estimating a one-year horizon, 95 percent confidence level simplified value at risk (VaR) for each bank. Assuming that the portfolio loss distribution can be characterized by its mean and its variance and that the vector of default probabilities is given exogenously, the VaR of the loan portfolio delivers the expected and unexpected losses. The adjustments of banks' CAR after each shock or scenario was calculated from the sum of expected losses and unexpected losses, net of existing provisions under the assumption of a uniform probability of default for all borrowers in the same bank, and a Gamma probability distribution for loan losses. The following parameters/assumptions were used in the calculations:

- The loss given default (LGD) was assumed to be the same for all loans, at about 25 percent, based on discussion with commercial banks (indicating a 0-40 percent range).
- The unsecured share of bank assets was assumed to be about 20 percent of total assets across banks. An 80 percent ratio of secure assets is a conservative assumption based on some banks' broad estimations during meetings. Credit card loans and consumer loans seem to have the lowest levels of collateralization.
- Loan default probabilities (PD) were assumed to be homogenous and independent from each other, and were approximated using the evolution of NPLs and their expected levels after each shock or scenario. Expected NPLs were projected based on historical relationships between NPL levels and key macroeconomic variables (GDP growth, nominal interest rates and inflation).
- The effective loan portfolio concentration was estimated by computing a Herfindahl-Hirschman index using the most disaggregated loan category available.

In addition, to compare the results of the 2002 FSAP stress test analysis, the mission also tracked the impact on each bank's CAR of an increase in each bank's provisioning associated with different hypothetical increases in NPLs (see Stress Testing the Banking System technical note).

Interest Rate Risk

5. Changes in the nominal interest rate in Barbadian dollars were considered. The impact of an upward parallel move in the yield curve on banks capitalization was assessed over a one-year horizon. The test combines:

- The direct effects on the balance sheet for interest bearing and liabilities; a gap method was used. The indirect effect over the quality of the portfolio is included in the credit risk stress test.
- The effects of potential mark-to-market losses derived from banks' holdings of fixed rate government papers; according to authorities estimates most of the portfolio-90 percent approximately-is held to maturity; a duration model was used.

Exchange Rate Risk

6. Depreciation/appreciation of the Barbadian dollar was considered. Those results include:

- The direct effect on the balance sheet derived from any currency mismatch.
- The indirect effect of any impact on the banks' portfolio quality. Discussions with CBB's staff suggested that an x percent depreciation would lead to and x/20 percent of new NPL of foreign currency loans.

Liquidity Risk

7. The test assesses whether banks would be able to survive liquidity drains without resorting to outside sources of liquidity (CBB). The scenarios considered include:

- A dry-up of up to 50/100 percent of the funding from parents institutions.

- Deposits run of up to 50 percent in a 30-day period.

Scenarios Analysis

- 8. Given that shocks tend to hit small open economies simultaneously, a scenario analysis is also presented.** The system is subject to shocks to the tourism and construction domestic sectors, as well as to shocks to the US economy and international oil prices.

Source:

Financial Soundness Indicators

Financial Soundness Indicators , 2004-2007 In Percent

	2004	2005	2006	2007
Capital to risk-adjusted assets	14.3	14.4	15.5	14.3
NPLs to total loans	17.8	13.9	11.6	11.3
Provision for loan loss to NPLs	39.7	44.4	41.0	49.4
Return on assets	1.4	1.7	2.4	2.0
Return on equity	16.4	21.3	27.7	22.6
Liquid assets to total assets	33.3	32.5	33.0	25.9

sources: Guyana Authorities; and Fund Staff estimates

**Guyana: Financial System Structure
In Percent of GDP**

	2000	2001	2002	2003	2004	2005	2006	2007
Total Financial System Assets	128	138	147	150	154	164	161	146
Commercial Banks	91	95	98	94	94	99	98	89
Insurance Companies	10	10	13	18	22	17	15	15
New Building Society	11	14	16	16	17	17	17	15
Pension Schemes	8	8	10	10	10	9	9	8
Finance Companies & Merchant Banks	4	4	4	4	4	16	16	14
Trust Companies	5	5	5	5	5	5	5	4
Credit Unions	0	1	1	1	1	N.A	N.A	N.A

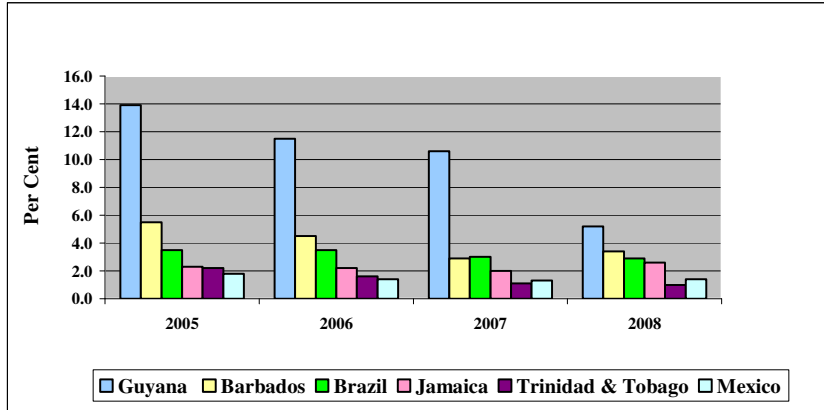
Source: Bank of Guyana (Statistical Bulletin, September 2007)

Guyana: Financial System Structure, 2006

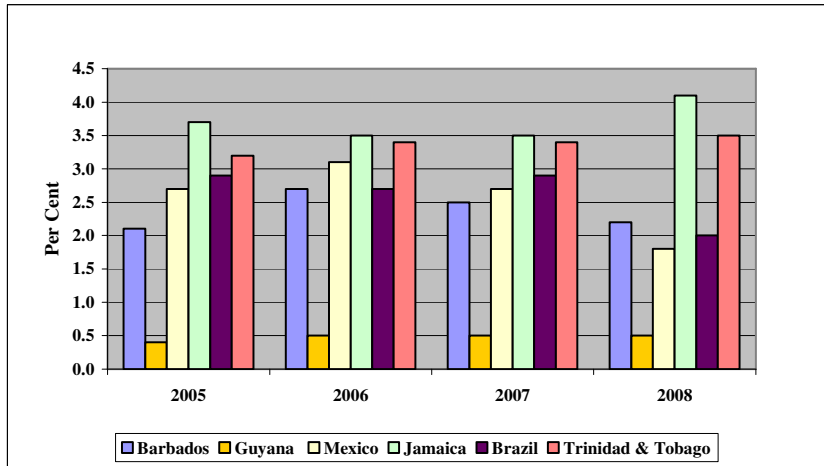
	Financial System						
	Number of		Assets		Loans		Deposits
	Institutions	Branches	G\$ Billion	Percent of Total	Percent of GDP	Percent of Total	Percent of Total
Commercial Banks	6	25	180.2	61.3	98.4	63.9	68.2
Local	3	11	74.5	25.3	40.7	38.0	40.7
Overseas	3	14	105.6	35.9	57.7	25.9	27.5
Nonbank Financial Institutior	40	0	85.8	29.2	46.9	32.6	31.8
Insurance companies	10	N.A	27.9	9.5	15.2	3.5	N.A
Total Financial Sector	56	25	293.9	100.0	160.5	100.0	100.0

Source: Bank of Guyana

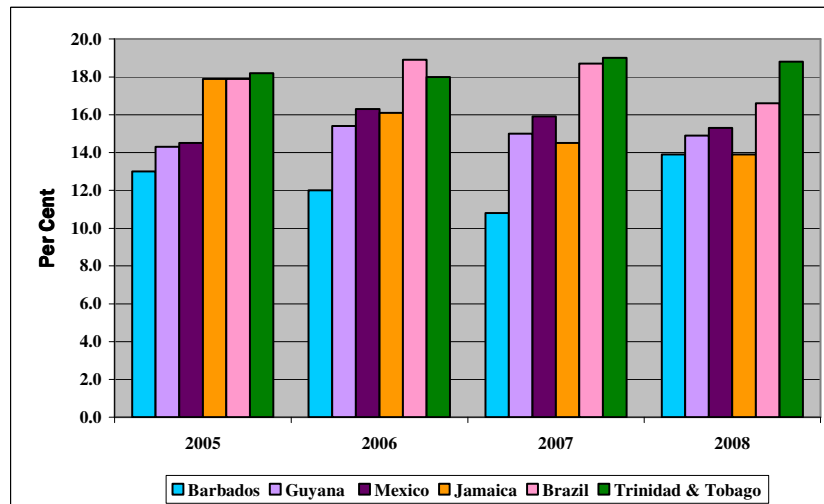
(i) Non Performing Loans to Total Loans



(ii) Return on Assets



(iii) Capital Adequacy



(i) Regulatory Capital to Risk Weighted Asset

Per Cent				
	2005	2006	2007	2008
Brazil	17.9	18.9	18.7	16.6
Chile	13.0	12.5	12.2	12.1
Columbia	14.7	13.1	13.6	13.4
Dominican Republic	12.5	12.4	13.9	15.8
Mexico	14.5	16.3	15.9	15.3
Barbados	13.0	12.0	10.8	13.9
Guyana	14.3	15.4	15.0	14.9
Jamaica	17.9	16.1	14.5	13.9
Trinidad & Tobago	18.2	18.0	19.0	18.8

(ii) Non Performing Loans to Total Loans

Per Cent				
	2005	2006	2007	2008
Brazil	3.5	3.5	3.0	2.9
Chile	0.9	0.8	0.8	0.9
Columbia	2.7	2.6	3.3	4.0
Dominican Republic	5.9	4.5	5.0	3.8
Mexico	1.8	1.4	1.3	1.4
Barbados	5.5	4.5	2.9	3.4
Guyana	13.9	11.5	10.6	5.2
Jamaica	2.3	2.2	2.0	2.6
Trinidad & Tobago	2.2	1.6	1.1	1.0

(iii) Return on Assets

Per Cent				
	2005	2006	2007	2008
Brazil	2.9	2.7	2.9	2.0
Chile	1.3	1.3	1.1	1.2
Columbia	2.7	2.5	2.4	2.4
Dominican Republic	1.8	1.9	2.5	1.7
Mexico	2.7	3.1	2.7	1.8
Barbados	2.1	2.7	2.5	2.2
Guyana	0.4	0.5	0.5	0.5
Jamaica	3.7	3.5	3.5	4.1
Trinidad & Tobago	3.2	3.4	3.4	3.5

(iv) Return on Equity

Per Cent				
	2005	2006	2007	2008
Brazil	29.5	27.3	28.9	20.4
Chile	17.9	18.6	16.2	18.9
Columbia	22.1	20.2	19.5	20.0
Dominican Republic	22.4	21.7	28.0	28.0
Mexico	24.4	26.2	19.9	12.8
Barbados	25.2	27.6	21.4	NA
Guyana	5.7	6.9	6.8	6.3
Trinidad & Tobago	25.2	27.2	27.3	25.9

(ii) Non Performing Loans to Total Loans

Per Cent				
	2005	2006	2007	2008
Guyana	13.9	11.5	10.6	5.2
Barbados	5.5	4.5	2.9	3.4
Brazil	3.5	3.5	3.0	2.9
Jamaica	2.3	2.2	2.0	2.6
Trinidad & Tobago	2.2	1.6	1.1	1.0
Mexico	1.8	1.4	1.3	1.4

(iii) Return on Assets

Per Cent				
	2005	2006	2007	2008
Barbados	2.1	2.7	2.5	2.2
Guyana	0.4	0.5	0.5	0.5
Mexico	2.7	3.1	2.7	1.8
Jamaica	3.7	3.5	3.5	4.1
Brazil	2.9	2.7	2.9	2.0
Trinidad & Tobago	3.2	3.4	3.4	3.5

(i) Regulatory Capital to Risk Weighted Asset

Per Cent				
	2005	2006	2007	2008
Barbados	13.0	12.0	10.8	13.9
Guyana	14.3	15.4	15.0	14.9
Mexico	14.5	16.3	15.9	15.3
Jamaica	17.9	16.1	14.5	13.9
Brazil	17.9	18.9	18.7	16.6
Trinidad & Tobago	18.2	18.0	19.0	18.8