



FINANCIAL STABILITY Report
2017



CENTRAL BANK OF BARBADOS

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Preface

Oversight of the financial system is shared between the Central Bank of Barbados (Bank), the Financial Services Commission (FSC) and the Barbados Deposit Insurance Corporation (BDIC) in the form of a Financial Oversight Management Committee (FOMC). The FOMC is responsible for the continuous oversight of the financial system, the assessment of vulnerabilities and the initiation of policies to increase the resilience of the system in the face of possible adverse events.

The Bank and the FSC have collaborated in the preparation of the seventh issue of Barbados' Financial Stability Report¹ which provides an assessment of the risk exposures of banks, insurance companies, credit unions and other depository financial institutions. This report analyses a range of financial stability indicators for financial institutions, as well as balance sheet and income and expenditure trends.

¹ The Central Bank of Barbados will now issue one Financial Stability Report each year covering the January to December period of the referenced year.

Abbreviations

<i>Abbreviation</i>	<i>Meaning</i>
ACH	Automated Clearing House
AFSI	Aggregate Financial Stability Index
ATM	Automated Teller Machine
BACHSI	Barbados Automated Clearing House Services Incorporated
BSI	Banking Stability Index
CAR	Capital Adequacy Ratio
CARIFS	Caribbean Integrated Financial Services Incorporated
CBB	Central Bank of Barbados
DTI	Deposit Taking Institution
ECL	Expected Credit Loss
EMBI	Emerging Market Bond Index
FIA	Financial Institutions Act
FOMC	Financial Oversight Management Committee
FSC	Financial Services Commission
FSR	Financial Stability Report
GDP	Gross Domestic Product
GPW	Gross Premiums Written
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standard
IMF	International Monetary Fund
KYCC	Know Your Customer's Customer
NBFI	Non-Bank Financial Institution
NIS	National Insurance Scheme
NPL	Non-performing Loan
NPV	Net Present Value
NSRL	National Social Responsibility Levy
POS	Point of Sale
ROA	Return on Assets
RTGS	Real Time Gross Settlement
RWA	Risk Weighted Assets
VAT	Value Added Tax

1. Overview

The Barbadian financial system remained stable during 2017, despite a challenging domestic macroeconomic environment. The structure of the financial system was mostly unchanged with commercial banks dominating the financial space. There was modest balance sheet growth across the system but credit unions increased their penetration of the domestic deposit market as a result of the low interest rates being offered by banks. However, the deposits of households in the financial system remained steady during the year. Liquidity in the system remained high, and there was improved asset quality mainly driven by the commercial banks. Institutions continued to be profitable over the period, particularly credit unions whose profits surpassed those of the previous year. Capital levels were adequate for the system, but there was one credit union which did not meet the 10 percent benchmark at December 2017.

The performance of the life and general insurance industries continued to diverge during 2017. Asset growth in the life industry was robust but flat for general insurers whose premium income has contracted over the past three years because of price competition in the sector. In addition, general insurers offering cross-border services across the region suffered from declining income related to hurricane claims.

An assessment of key risks, including credit, liquidity, interest rate and sovereign risk indicated that the system was generally stable and able to withstand a range of adverse shocks. Among the DTIs, stress tests revealed that commercial banks continued to be very resilient, while finance and trust companies and credit unions were also modestly robust, though vulnerabilities were more evident in some institutions when compared to banks. Stress tests for the insurance sector covering recessionary, pandemic and natural disaster shocks indicated overall resilience of the industry, but suggested significant capital losses for some companies under specific (severe) stress scenarios.

The challenging economic conditions are likely to extend into 2018 with the continued efforts to strengthen macroeconomic imbalances. While these efforts may negatively impact the performance of the financial system, it is expected that the sector will continue to remain resilient, given its high capital buffers, particularly in the banking system. However, the implementation of the International Financial Reporting Standard (IFRS) 9², which is applicable to the entire financial sector, is expected to raise the required level of provisioning and result in a slower accumulation of capital. Additionally, the adoption of a debt restructuring³ programme by Government is likely to have adverse consequences for the sector.

² Technical Note 6.4 examines the impact of IFRS 9 on the financial system.

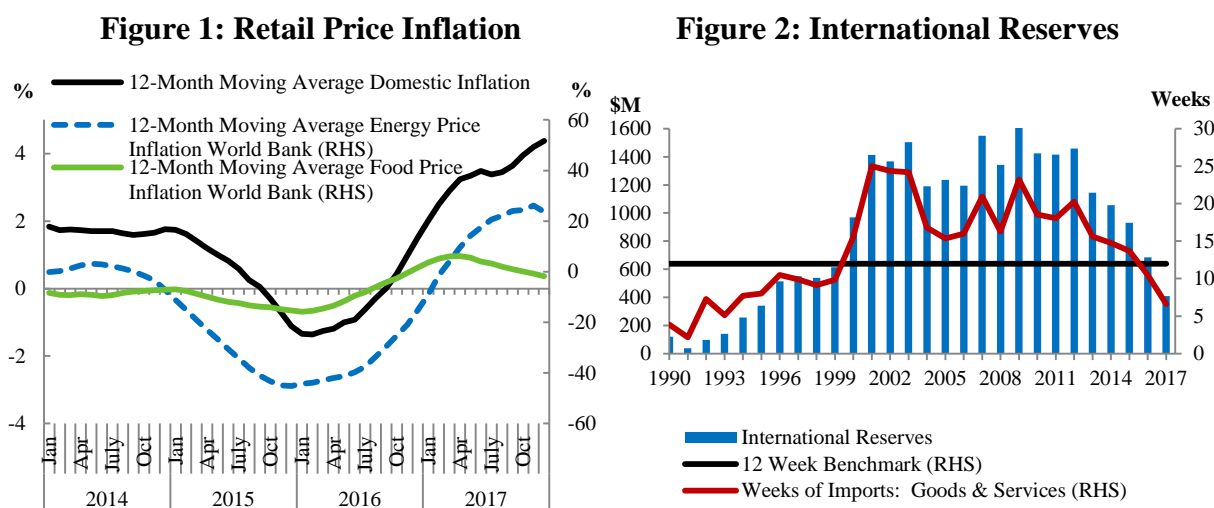
³³ On June 1, 2018, the Government of Barbados announced its intention to restructure its public sector debt.

2. Macro-financial Environment

2.1 Overview of Local Economic Conditions

Economic activity moderated to 0.4 percent during 2017, following a 1.5 percent expansion in 2016. This outturn reflected the impact of contractionary fiscal policy measures implemented during the second half of the year, a slow-down in tourism activity and the delayed implementation of planned investment projects. Higher international oil prices and the increases in the national social responsibility levy (NSRL) and excise taxes on gas and petrol, along with the introduction of the foreign exchange fee, led to the twelve-month moving average rate of inflation increasing to 4.4 percent compared to 1.5 percent at the end of 2016 (**Figure 1**). Additionally, the average unemployment rate increased to 10.0 percent in 2017, from the 9.7 percent recorded in 2016.

The stock of international reserves declined by \$274 million to reach \$410 million at the end of 2017, or 6.6 weeks of import cover (**Figure 2**). This second consecutive year of major decline was largely attributed to slow growth in tourism earnings, high public sector external debt service payments, delayed execution of planned divestment and on-going weakness in public and private sector capital inflows.



Source: Central Bank of Barbados

Government's efforts to reduce the fiscal imbalance resulted in the deficit falling to its lowest level in the last seven years, albeit still above initial targets. During the 2017/18 fiscal year, the deficit declined to reach an estimated 4.2 percent of GDP, compared to 5.7 percent at the end of 2017/18, as higher tax revenues and a decline in capital expenditure offset a modest increase in current expenditure. This overall improvement in the deficit, though smaller than anticipated, together with increases in the security reserve requirement for commercial banks, allowed for a substantial reduction in new credit to Government by the Central Bank. Commercial bank financing did increase⁴ but concerns about the safety of government bonds induced a decline in

⁴ During 2017, the Central Bank increased the securities reserve requirement in two stages from 10% to 18% of domestic deposits. The requirement was further increased to 20% effective January 1, 2018.

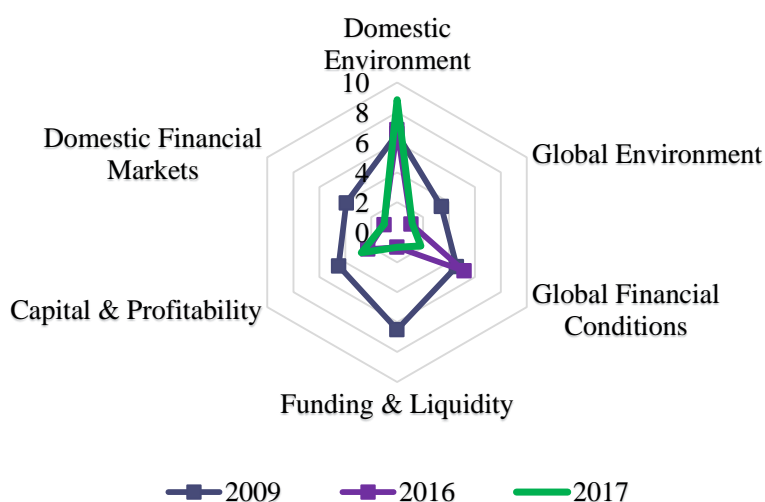
lending to government by private non-bank institutions. At the end of December 2017, the gross central government debt, including borrowings from the Central Bank and the NIS, fell by three percentage points to 145 percent of GDP.

2.2 Macro-financial Risks⁵

The macro-financial environment weakened during 2017, as indicated by the recently derived composite macro-prudential indicators which attempt to quantify risk in the Barbadian financial system (**Technical Note 6.1**). The indicators include a financial stability cobweb and a range of financial sector indices.

The financial stability cobweb⁶ below provides a graphical summary of the risk exposure faced by financial institutions across six dimensions, namely, the domestic environment, domestic financial markets, capital and profitability, funding and liquidity, global financial conditions, and the global environment. Increases in risk are represented by increased values across particular dimensions indexed from zero to ten but the cobweb does not provide an aggregate indicator of risk.

Figure 3: Financial Stability Cobweb



Note: Movement away from the centre reflects an increase in risk, while movement towards the centre reflect a reduction in risk.

The cobweb (**Figure 3**) indicated a mixed performance in 2017 with a marked improvement in the global financial conditions dimension, and a stabilisation of risk across all other dimensions with the exception of the domestic environment. In particular, the global financial conditions dimension reflected a significant strengthening of the international environment as evidenced by

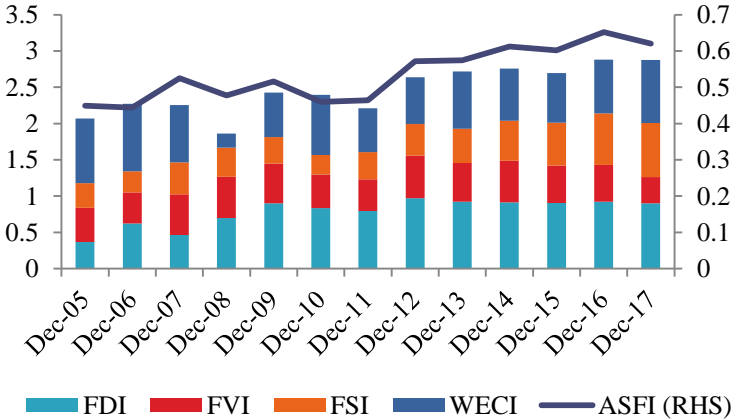
⁵ Financial data encompasses only commercial banks for this section.

⁶ The financial stability cobweb for Barbados includes international conditions given that all banks are foreign-owned and therefore any increased risk to the parent-entities could negatively impact domestic subsidiaries or branches.

improved financial markets, including the narrowing of the global Emerging Market Bond Index (EMBI) spread. However, the increased vulnerabilities witnessed for the domestic environment dimension were due primarily to the declining level of international reserves, a risk dimension that has been elevated since 2009. Since the onset of the global financial crisis, there has been a substantial build-up in liquid assets due to stagnation in new credit, while rising interest spreads have led to recovery in profitability and improved capital positions and reduction in risk across these two areas.

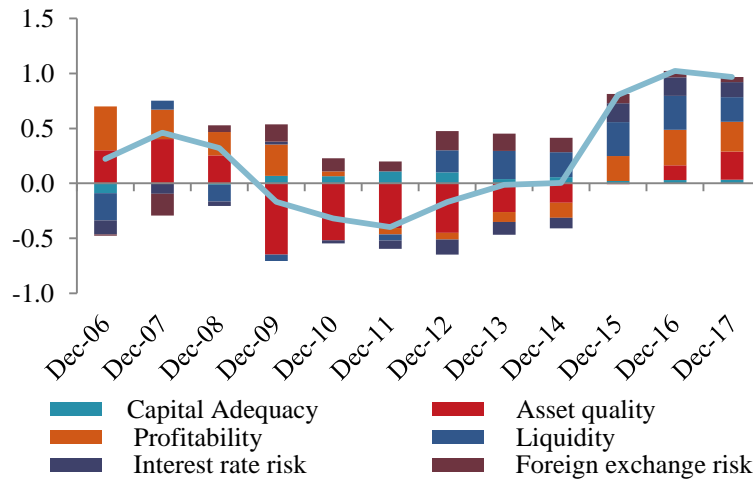
An increase in the aggregate financial stability index (AFSI) represents a decrease in financial risk or an increase in financial stability. This measure weakened during 2017 (Figure 4), mainly due to the financial vulnerability sub-component and, to a lesser extent, the financial development sub-component, which was driven by the slowing of the local economy and a deceleration in credit accumulation relative to GDP, respectively. This deterioration was only partly offset by increases in the financial soundness and world economic climate sub-components. Overall growth in the world economy and improved financial markets led to a more favourable world economic climate, while capital adequacy and asset quality were responsible for the improved financial soundness.

Figure 4: Aggregate Financial Stability Index



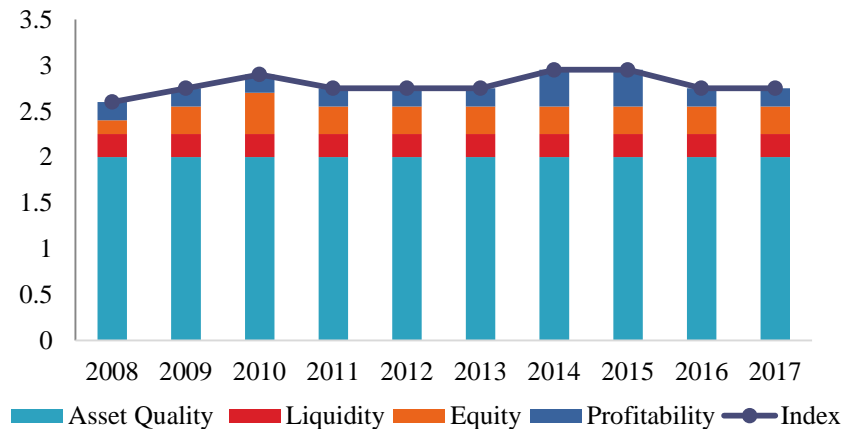
The banking stability index (BSI), a composite indicator of commercial bank stability, declined marginally in 2017, but suggested that the commercial banking system remained stable, despite lower levels of profitability and liquidity (Figure 5). A significant improvement in the NPL ratio was responsible for better asset quality, which is currently at its lowest level since December 2009.

Figure 5: Banking Stability Index



In a similar vein, the consolidated risk index for the credit union sector (**Technical Note 6.2**) is a summary indicator of the financial soundness of credit unions. Credit quality, liquidity, capital and profitability are combined into a weighted average to assess the direction of risk for the sector. **Figure 6** suggests that the sector remained stable despite a pick-up in non-performing loans during 2017, with the notable improvement over the last two years resulting primarily from improved profitability.

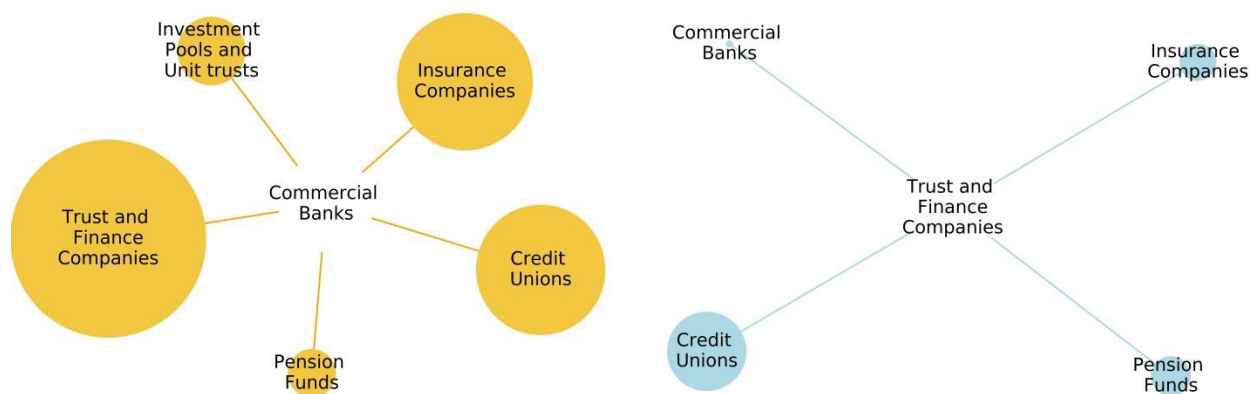
Figure 6: Consolidated Risk Index for the Credit Union Sector



2.2.1 Financial System Interconnectedness

Financial contagion is often transmitted through the gross or net exposures of entities or groups within the financial or real sectors of the economy. Several sectors of the financial system continued to show significant gross exposure to commercial banks and finance and trust companies relative to their assets (**Figure 7**).

Figure 7: Network of Gross Institutional Exposures (to Commercial Banks and F&Ts)



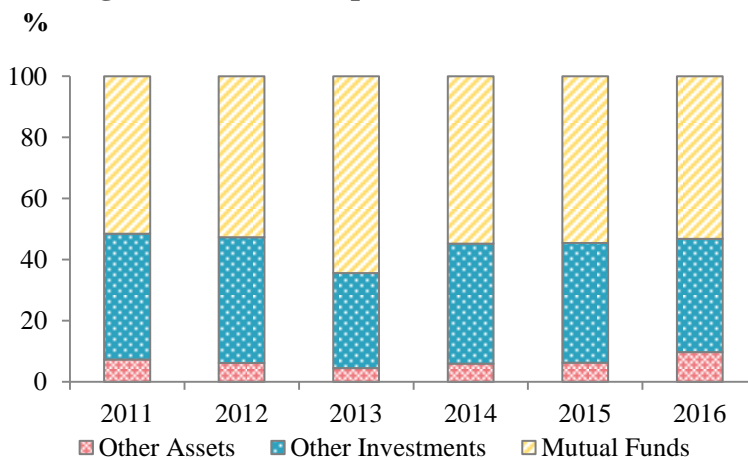
Source: Central Bank of Barbados

Note: Outer nodes represent the gross credit exposure to the centre node and are weighted based on the level of exposure to total assets of that financial sub-sector.

Moreover, credit unions, finance and trust companies, and insurance companies held assets equivalent to 45.8 percent, 27.6 percent and 17 percent of their capital at commercial banks at the end of December 2017. Credit unions also held an additional 17 percent of their capital at finance, trust and mortgage houses.

There is also significant exposure among the non-DTIs. Most notably, pension plans continue to be heavily invested in mutual funds with an estimated 59 percent of pension fund investments held in mutual funds at the end of 2016 (Figure 8).

Figure 8: Asset Composition of Pension Plans



Source: Financial Services Commission

3. Financial Sector Developments

3.1 Structure of the Financial System

During 2017, total assets of the Barbados financial system grew by 2.8 percent to \$25.5 billion (Table 1). Notwithstanding this moderate expansion, assets as a percentage of GDP fell to 271 percent from 275 percent. This growth in the asset base was largely attributed to commercial banks, credit unions and insurance companies.

Table 1: Assets of Financial Services Sector

\$Mil	2012	2013	2014	2015	2016	2017
Commercial Banks	12,137	12,480	12,312	12,829	13,302	13,479
Insurance Companies	3,143	3,011	3,025	3,243	3,635	3,759
Trust & Finance Companies	1,470	1,519	1,563	1,646	1,535	1,571
Credit Unions	1,579	1,683	1,728	1,850	2,035	2,212
Mutual Funds	962*	1,836	1,849	1,860	2,073	2,210
Pension Funds [#]	1820	1985	2,066	2102	2,231	2,231
Total	21,111	22,514	22,543	23,530	24,811	25,463

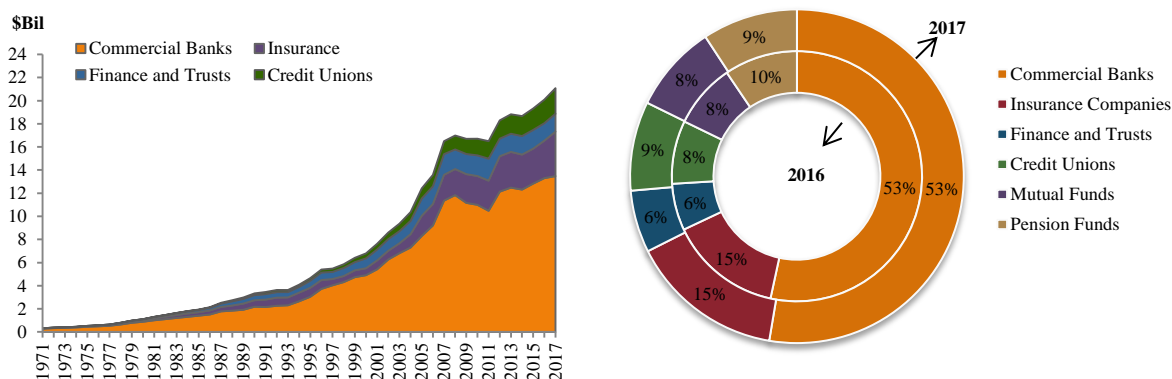
Source: Central Bank of Barbados and Financial Services Commission;

Notes: [#]Pension fund data repeated due to unavailability of 2017 data;

*Increased coverage of mutual funds occurred after 2012.

Commercial banks continued to dominate the financial system representing 53 percent of total financial assets in 2017, which was marginally lower than its contribution in 2016 (Figure 9). The insurance industry accounted for 15 percent, while the credit unions, finance and trusts companies, mutual funds and private pension schemes each held under 10 percent of the system’s assets. However, when compared to 2016, the credit unions continued to gain share during 2017, accounting for an additional 1 percent of the market.

Figure 9: Assets of the Financial System by Institution⁷



Sources: Central Bank of Barbados and Financial Services Commission

⁷ Mutual fund and pension fund data is not available for the entire historical period.

Concentration, interconnectedness and cross-border linkages continued to be key structural characteristics of the financial system. With all five commercial banks being foreign-owned, the distribution of assets remained unchanged with the three Canadian banks holding 75 percent of total bank assets, while the two Trinidadian banks accounted for the remaining 25 percent. Similarly, the largest seven of the thirty-three credit unions accounted for 92 percent of the segment's asset base. The life insurance sector accounted for 71 percent of total industry assets, and was also skewed with the top three life insurers holding 96 percent of life insurance assets. Additionally, the top three general insurers represented 65 percent of the general insurance industry. Also noteworthy is the presence of local, regional and international interlocking financial corporate structures and conglomerates in the financial system, which reflects the high level of connectivity in the sector.

Since all five commercial banks are foreign owned and many insurance companies operate as a branch of a foreign parent, **Table 2** presents a summary of the most recent ratings agencies' perspectives on the parent banks and largest insurance company as well as the ratings of the sovereigns in which they are headquartered. The table indicates that parent entities are well capitalised and, in the event of a crisis, the sovereigns have the capacity to support these entities.

Table 2: Capital Adequacy and Rating of Parent

Domestic Bank/Insurance Company	Majority Shareholder	Majority Shareholder Capital Adequacy (Tier 1-2017)	Majority Shareholder's Rating (Standard and Poor's)	Country Rating (Majority Shareholder) (Standard and Poor's)
Republic Bank Barbados Limited	Republic Bank Limited	24.8*	BBB+	BBB+/Trinidad and Tobago
CIBC FirstCaribbean International Bank	CIBC	10.6**	A+	AAA/Canada
Bank of Nova Scotia	Bank of Nova Scotia	11.5**	A+	AAA/Canada
Royal Bank of Canada	Royal Bank of Canada	10.9**	AA-	AAA/Canada
First Citizens	First Citizens Group	48.3*	BBB	BBB+/Trinidad and Tobago
Sagicor Life⁸	Sagicor Financial Corporation	-	B	A+/Bermuda

Notes: *Tier I & Tier II Capital Adequacy under Basel 1 (Annual Report 2017 - Data as at Sep 2017);

**Based on Basel III Common Equity Tier 1 capital requirements and definitions (Annual Report 2017 - Data as at Oct 2017);

⁸ Sagicor Financial Corporation re-domiciled its headquarters to Bermuda from Barbados in 2016.

3.1.1 Deposit Insurance

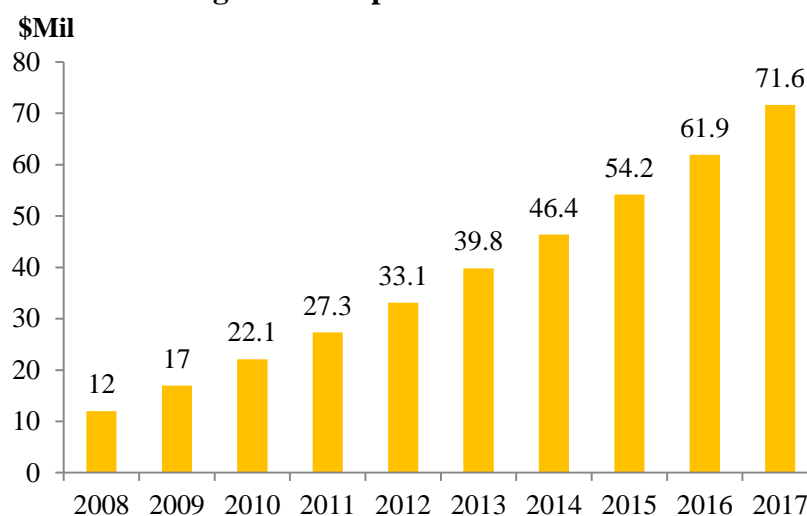
With its decade long existence, the Deposit Insurance Corporation guarantees each depositor at commercial banks and finance and trust companies up to \$25,000 on domestic currency accounts. This insurance is intended to contribute to depositors' confidence and support financial stability. As at December 2017, the number of qualified, insurable accounts carried an estimated value of \$9.7 billion (**Table 3**). Additionally, with no claims on the deposit insurance fund, it continued to grow and was valued at \$72 million at year end 2017, which was almost \$10 million higher than in 2016 (**Figure 10**).

Table 3: Total Estimated Insurable Deposits

(\$ Millions)	2012	2013	2014	2015	2016	2017
Commercial Banks	8,310	8,305	8,119	8,482	8,821	8,836
Non-banks	958	980	958	993	873	907
Total	9,268	9,285	9,077	9,475	9,695	9,743

Source: Barbados Deposit Insurance Corporation

Figure 10: Deposit Insurance Fund



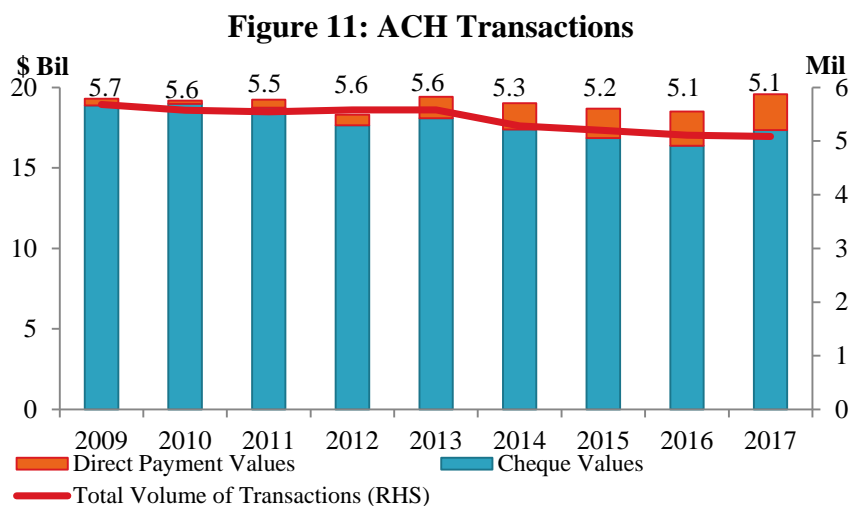
Source: Barbados Deposit Insurance Corporation

3.2 Payment Systems Developments

During 2017, the value of domestic payments continued to trend upward representing 620 percent of GDP. Electronic payments experienced strong growth and were the preferred payment choice but cash based payments were still highly utilised, as evidenced by the value of cash removed from automated teller machines (ATMs) and the increase of currency in circulation.

The increased use of electronic transactions reflects the efficient roles performed by the Caribbean Integrated Financial Services Incorporated (CARIFs) and the Barbados Automated Clearing House Services Incorporated (BACHSI). CARIFs is an ATM network provider which links the ATMs of commercial banks and credit unions to point-of-sale (POS) outlets to allow twenty-four hour access to bank accounts. BACHSI engages in direct payments processing, clearing of cheques and daily inter-bank settlement. The CARIFs and BACHSI transactions are settled through the Central Bank's Real Time Gross Settlement (RTGS) system, which processes large value and/or time sensitive credit transfers between the domestic banking system and the Central Bank.

The RTGS accounted for 63 percent of payments in 2017. The volume of transactions processed through the RTGS increased by one percent only, but the value of transactions grew by 12.2 percent to account for 389 percent of GDP. The volume of cheque payments (across banks⁹ and with Central Bank) and direct credits in the banking system fell marginally but the total value of these transactions was up by 6 percent to \$19.6 billion. Driven by the increase in transaction values, the average value per transaction increased from \$3,601 to \$3,836. Cheque payments continued to be the largest contributor to transactions processed through the ACH at 89 percent, although the trend appears to reflect accelerated use of direct payments (**Figure 11**).



Source: Central Bank of Barbados

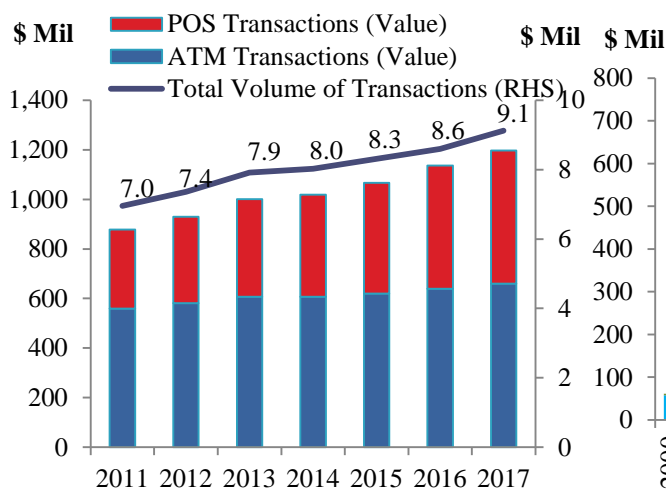
The number of debit card transactions grew to 9.1 million, with an increase in transactional value of 6.1 percent to \$1.2 billion (**Figure 12**). This was driven by an uptick in both ATM and point-

⁹ This does not include cheques which are drawn and settled with in the bank.

of-sale (POS) activity. For 2017, the value of ATM transactions grew by 3.3 percent, which was consistent with the previous year growth of 3.1 percent. Additionally, POS values continued to grow at a faster pace than ATM transactional values, recording an increase of 8 percent. However, this growth rate was lower than the increase of 11.3 percent in POS values one year prior.

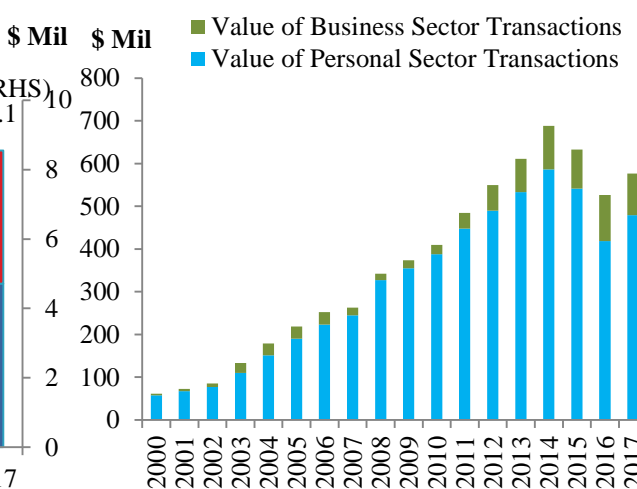
Domestic payments via credit cards¹⁰ were up by 9.6 percent in 2017, relative to a decline of 16.8 percent in 2016 (**Figure 13**). This rebound in transactional value was driven by the personal sector which accounted for 83 percent of total transactions, while the business sector contributed 17 percent.

Figure 12: Debit Card Transactions



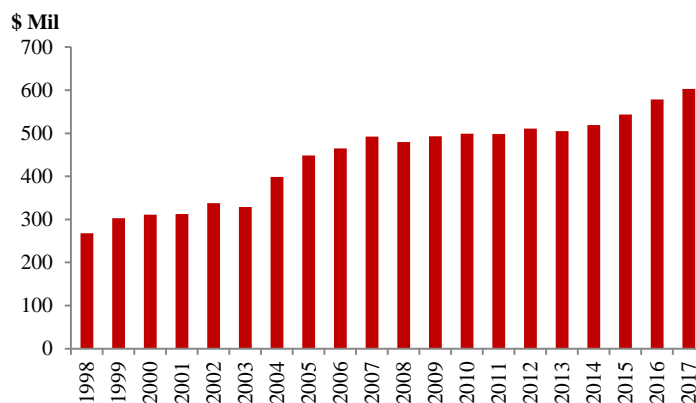
Source: Central Bank of Barbados

Figure 13: Credit Card Transactions



Currency in circulation also steadily trended upward over time (**Figure 14**). During 2017, currency in circulation grew by 4.2 percent to \$602.9 million or 12.5 percent of total money supply, echoing the growth in the value of ATM withdrawals.

Figure 14: Currency in Circulation



Source: Central Bank of Barbados

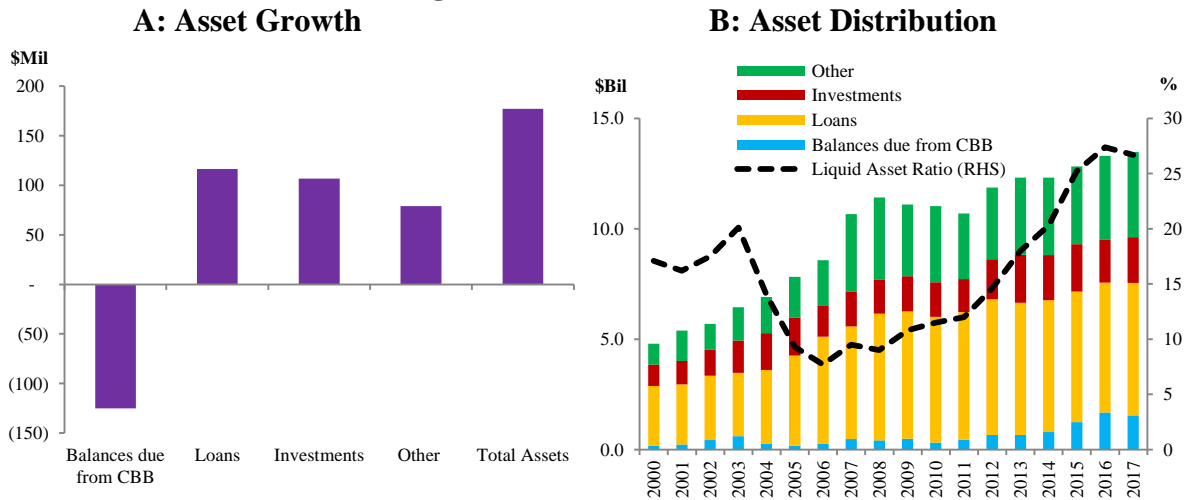
¹⁰ Technical Note 6.3 provides an analysis on credit card developments in Barbados.

4. Analysis of the Financial System

4.1 Commercial Banks¹¹

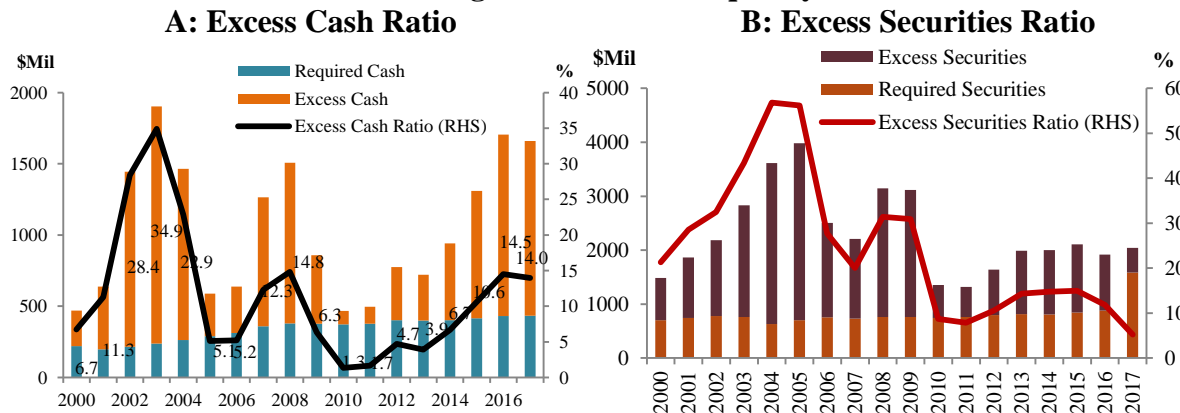
During 2017, the commercial banking system experienced a slowdown in overall asset growth to 1.3 percent, down from 3.7 percent one year earlier. Balances held on reserve at the Central Bank fell (**Figure 15**), following the increases in the securities reserve requirement, but the system remained very liquid, recording an excess cash ratio of 14 percent and an excess securities ratio of 5.2 percent (**Figure 16**). Additionally, liquid assets represented 26.7 percent of total assets.

Figure 15 : Total Assets



Source: Central Bank of Barbados

Figure 16: Excess Liquidity



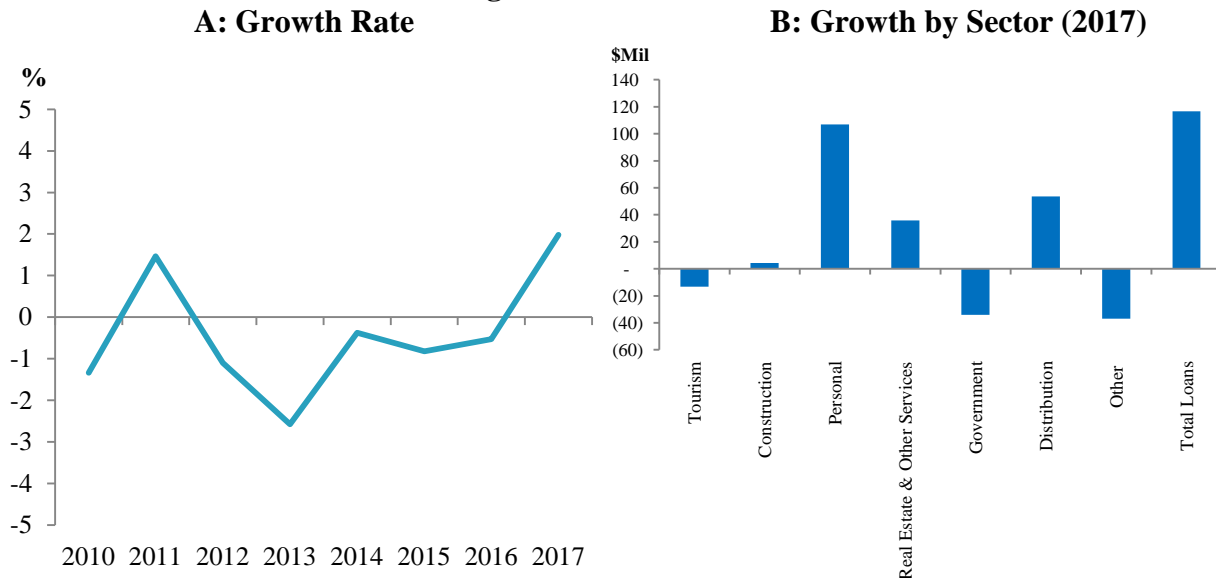
Source: Central Bank of Barbados

Credit activity expanded by 2 percent to \$6 billion or 64 percent of GDP, representing the first underlying growth in credit since 2012 (**Figure 17**). This recovery in loans was driven by a 3.1 percent growth in consumer credit, the result of credit for vehicular purchases and debt consolidation. Personal mortgages also registered a modest uptick of 1.1 percent for the period.

¹¹ All data as at December 2017.

Loans to the distribution sector and the “real estate and other professional services” category had notable increases of 20 percent and 6.5 percent, respectively.

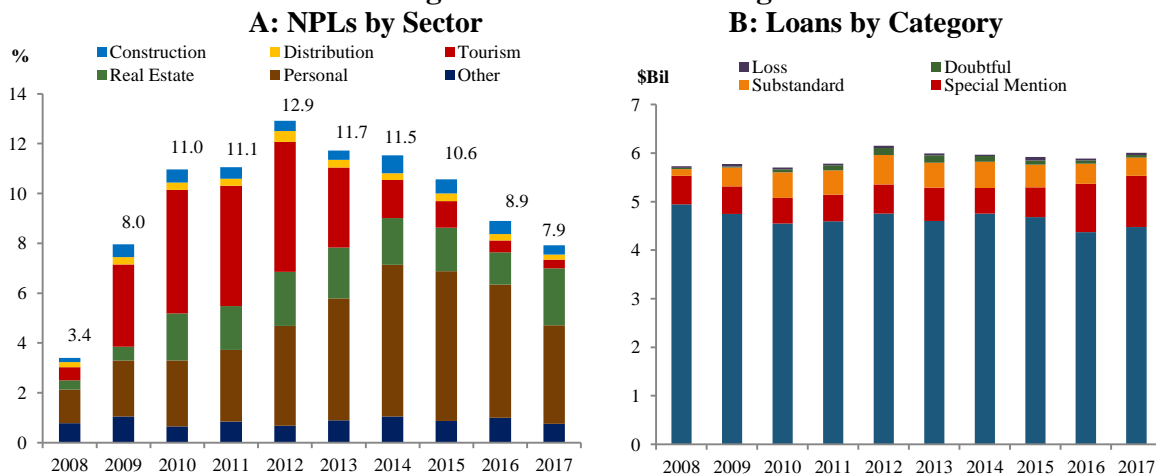
Figure 17: Loan Growth

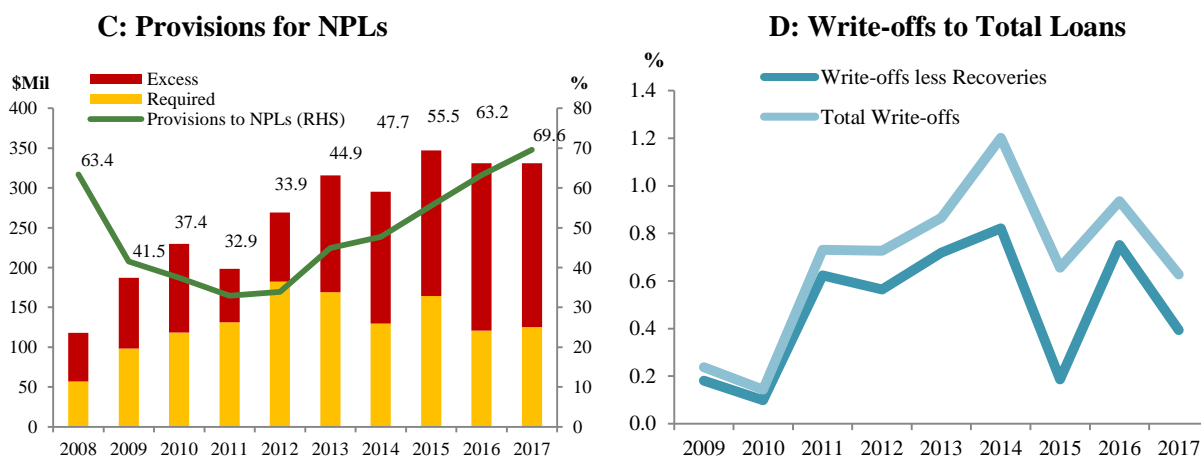


Source: Central Bank of Barbados

Despite a slight increase in the first quarter, banks’ NPLs to total loans ratio continued its downward trajectory over 2017, falling by 100 basis points to 7.9 percent (**Figure 18**). This decline was driven by all categories except the real estate segment which accounted for 2.3 percent of the NPL ratio at the end of 2017, as compared to 1.3 percent one year prior. The substandard category continued to represent the largest share of gross classified debt, accounting for 79.2 percent, while the doubtful and loss categories represented 9.9 percent and 10.9 percent, respectively. The improvement in the loan portfolio led to a strengthening of the provision-to-NPL ratio from 63.2 percent to 69.6 percent. At the same time, write-offs continued to represent a small percentage of total loans outstanding.

Figure 18: Non-Performing Credit Portfolio



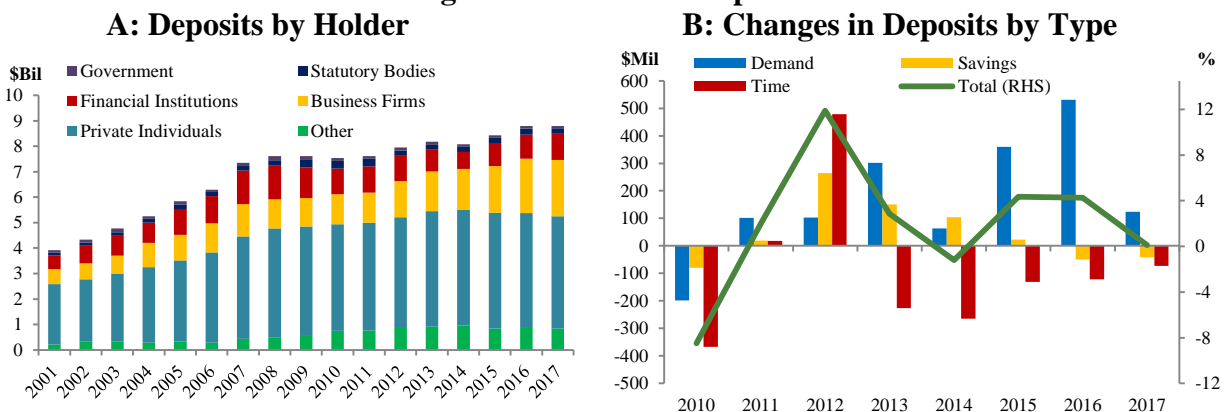


Source: Central Bank of Barbados

Domestic deposits remained relatively flat for 2017, as a 6.3 percent pick-up in the deposits held by businesses and financial institutions (mostly finance and trusts, insurance companies and credit unions) was matched by similar declines in all other categories, primarily personal savings (Figure 19). In the prevailing low interest rate environment, household deposits at banks continued to slide for a second consecutive year, contracting by 2.3 percent. Moreover, while the system continued to register a drawdown on time and savings deposits in response to low interest rates, growth in demand deposits also slowed to 3.5 percent, compared to 17.6 percent in 2016.

Given the relatively stable performance of deposits compared to loans, the loan-to-deposit ratio increased by one percentage point to 63.3 percent.

Figure 19: Domestic Deposits

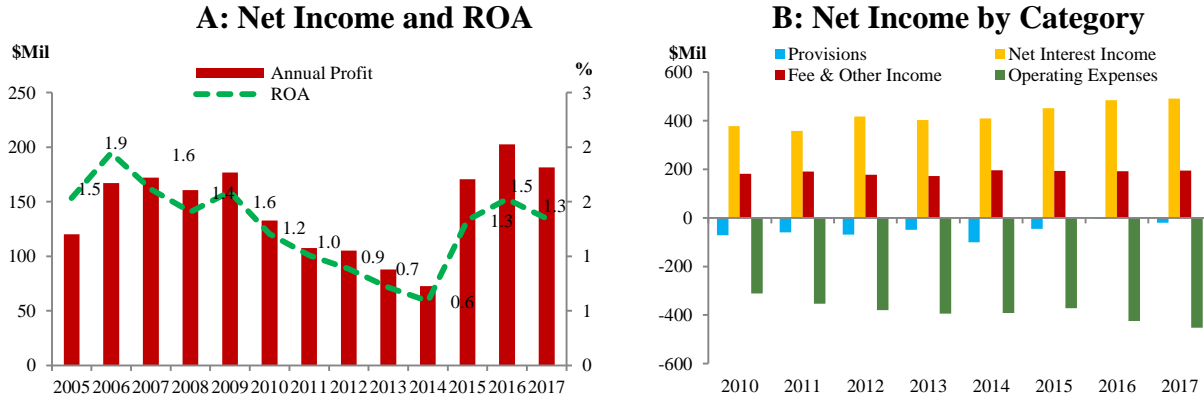


Source: Central Bank of Barbados

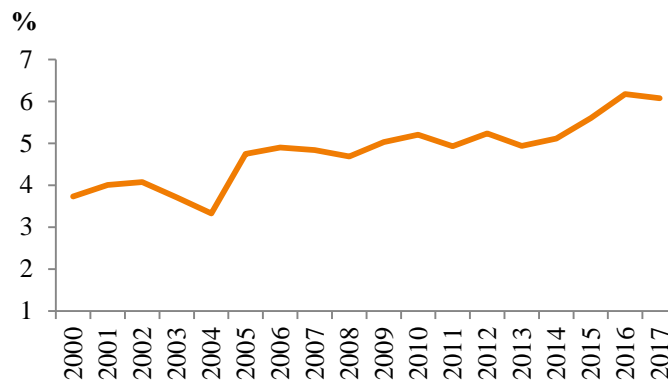
For 2017, the banking sector remained profitable, albeit generating 10.6 percent lower after tax profit than that earned in 2016 (Figure 20). This outturn was driven by higher provisioning and operating expenses which were only partially offset by increases in net interest income and other earnings. Growth in net interest income slowed to 1.6 percent, down from 7.4 percent due to the tapering of the decline in interest rates since 2015. At the end of 2017, the average rate on deposits was estimated at 0.1 percent, while the average loan rate was 7.7 percent, which resulted in a moderate widening of the spread to 7.6 percent (Figure 21). Given a proportionate increase

in net interest income relative to income generating assets, the net interest margin remained at around 6 percent, affirming the system’s profitability. However, the ROA fell to 1.3 percent, compared to 1.5 percent one year prior, as a result of the lower net income and increased assets.

Figure 20: Profitability

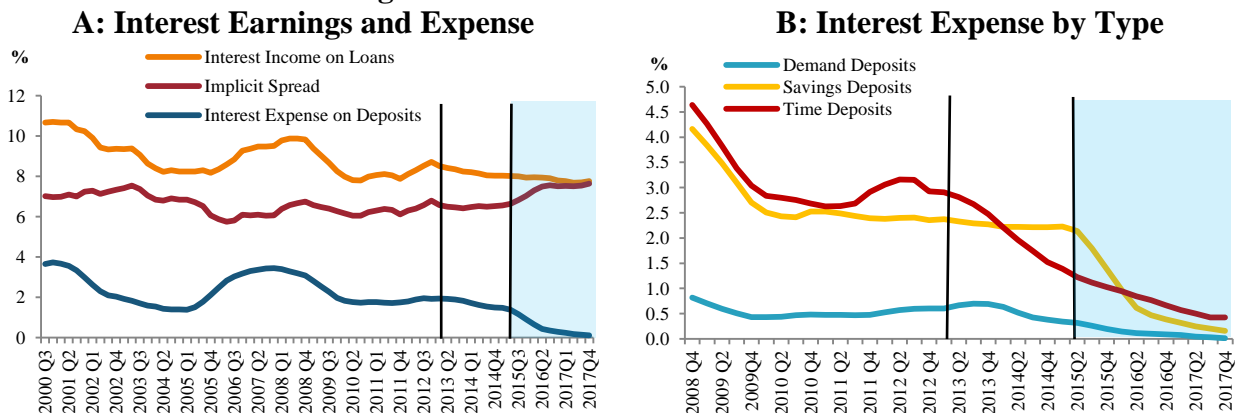


C: Net Interest Margin



Source: Central Bank of Barbados

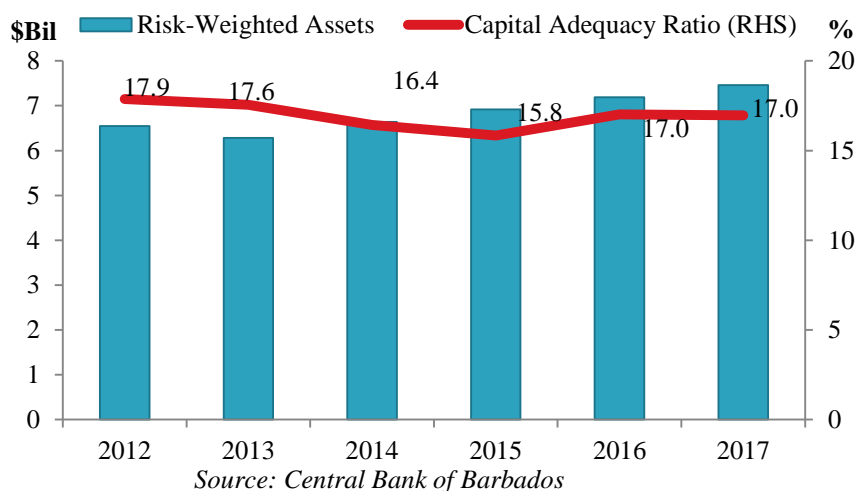
Figure 21: Commercial Banks’ Interest



Source: Central Bank of Barbados

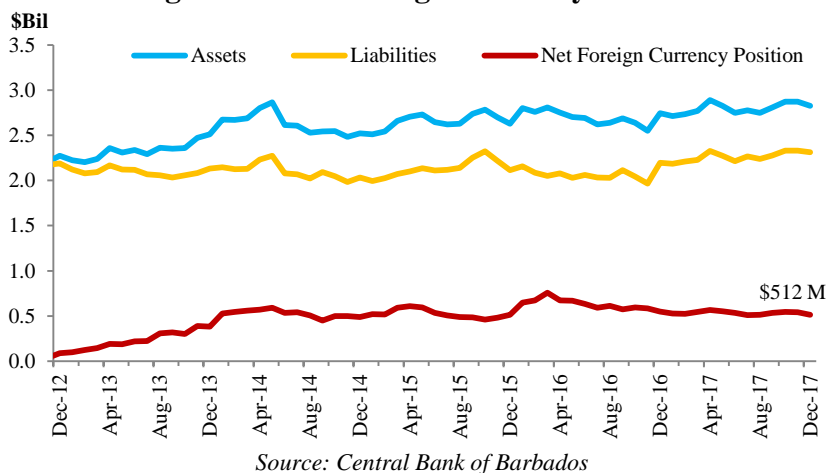
The banking sector continued to be highly solvent, with strong capital buffers well over prescribed levels. Moreover, at the end of December 2017, the systems' overall CAR¹² was calculated at 17 percent (**Figure 22**). Additionally, banks' leverage ratio¹³ was estimated at 9.1 percent, confirming the high level of high quality capital to cushion the system.

Figure 22: Capital Adequacy



For the twelve-month period ending December 2017, banks' liabilities denominated in foreign currency grew at a faster rate than their foreign currency assets resulting in a decline of 6.8 percent in the overall net foreign currency position (**Figure 23**). This accelerated growth of 5.5 percent in foreign currency liabilities was largely attributed to a 45.5 percent increase in the foreign currency deposits of international business companies. Moreover, foreign currency deposits accounted for 8.8 percent of total deposits at year-end-2017.

Figure 23: Net Foreign Currency Position



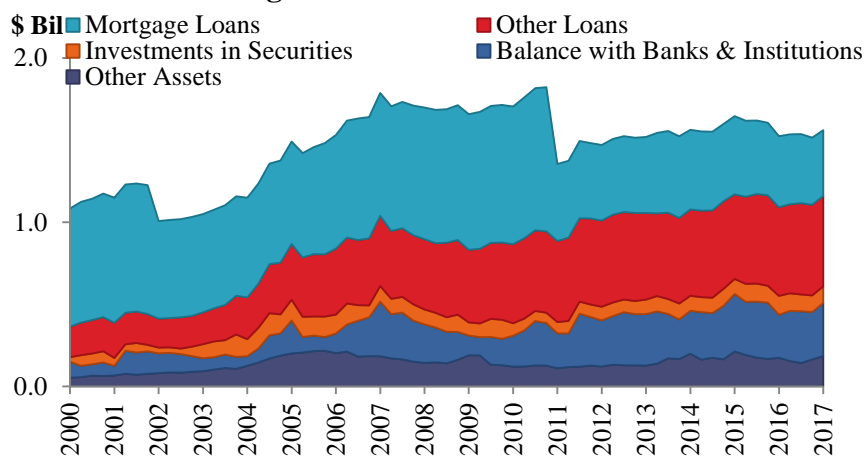
¹² Commercial banks' capital excludes one bank, which operates as a branch.

¹³ The leverage ratio is measured by the banks' Tier 1 capital (which consists primarily of common stock and disclosed reserves) to total consolidated assets (on and off balance sheet items).

4.2 Deposit-taking Finance and Trust Companies

Total assets of the deposit-taking institutions stood at \$1.6 billion at December 2017, an increase of 2 percent since December 2016 (**Figure 24**). Modest compositional shifts occurred within the main asset categories, with declines in mortgage loans and investments in securities, while all other asset categories increased. The general distribution of assets remained similar over the period, with residential mortgages and other loans accounting for 23 percent and 38 percent of total assets, respectively.

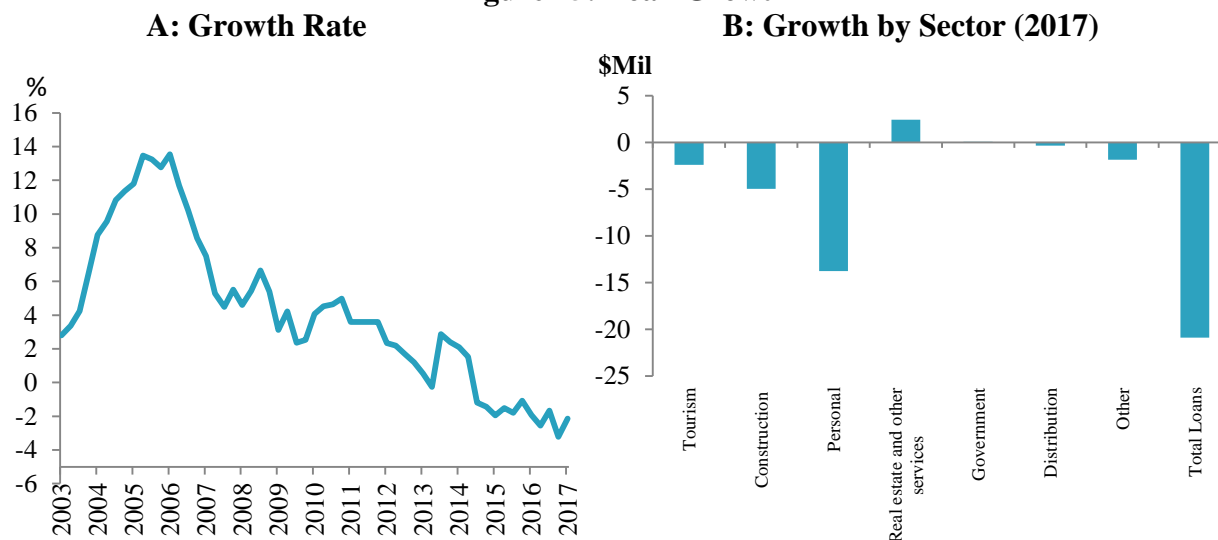
Figure 24: Asset Distribution



Source: Central Bank of Barbados

Lending by these institutions continued to trend downward, declining by 2.1 percent during 2017 (**Figure 25**), reflecting the placement of new mortgage bookings by one institution at its banking sector affiliate. Loan growth in all but one of the sector's other institutions was insufficient to offset the overall decline.

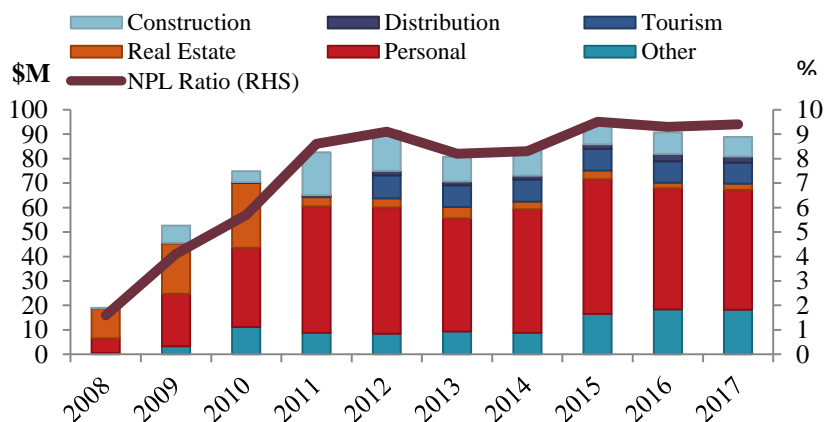
Figure 25: Loan Growth



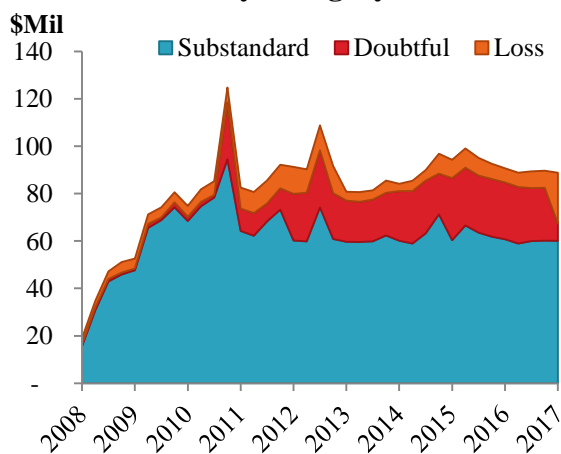
Source: Central Bank of Barbados

The NPL ratio increased marginally to 9.4 percent despite a two percent fall in classified debt (**Figure 26**). This decline reflected improvements across most of the major sectors. The majority of NPLs (66 percent) remained in the substandard category classification, but there was some migration from the doubtful to loss classification, primarily at one institution. As a result, the provisions-to-NPL ratio rose to 44.9 percent from 39.6 percent one year earlier.

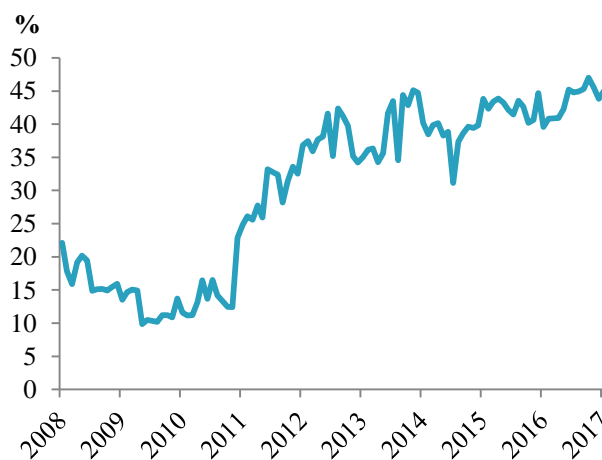
Figure 26: Non-Performing Loans
A: NPLs by Sector



B: NPLs by Category

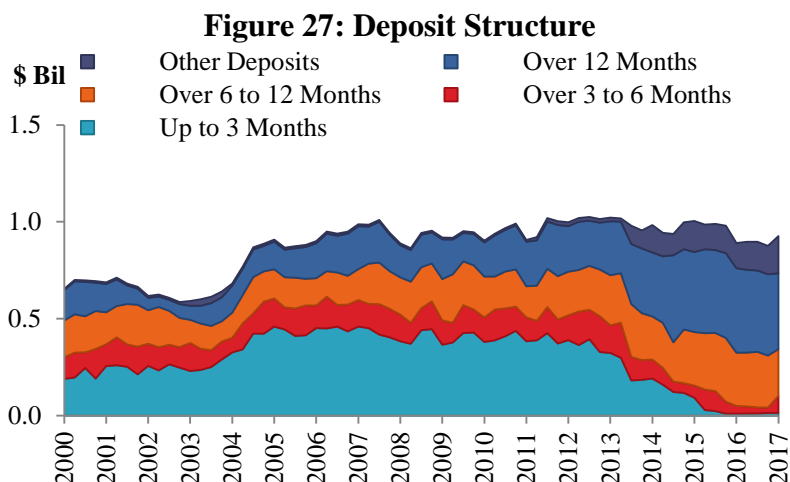


C: Provisions-to-NPLs



Source: Central Bank of Barbados

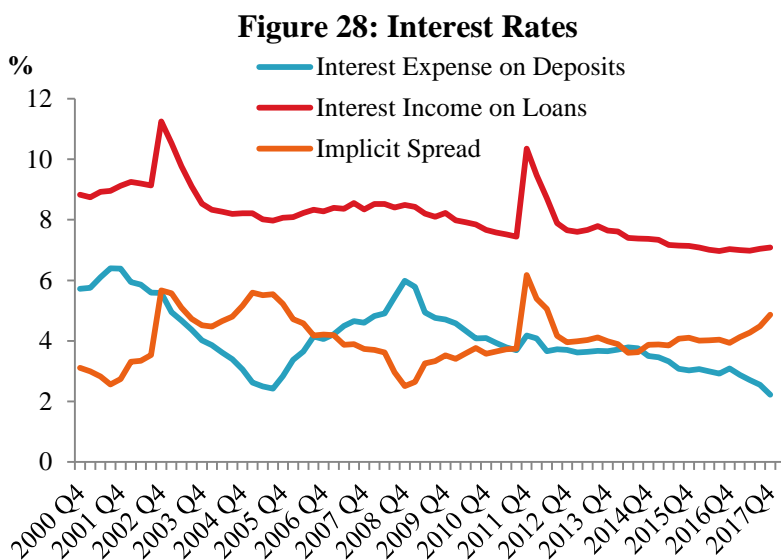
Driven by an expansion by private financial corporations, total deposits increased by 4 percent as customers continued to hold higher deposit balances in the longer time-bands, in an effort to realise greater interest income (**Figure 27**).



Source: Central Bank of Barbados

The increase in deposits enabled liquidity in the sector to improve, as measured by the loan-to-deposit ratio which declined from 109 to 103 percent and the liquid assets percent of total assets which increased from 18 to 21 percent.

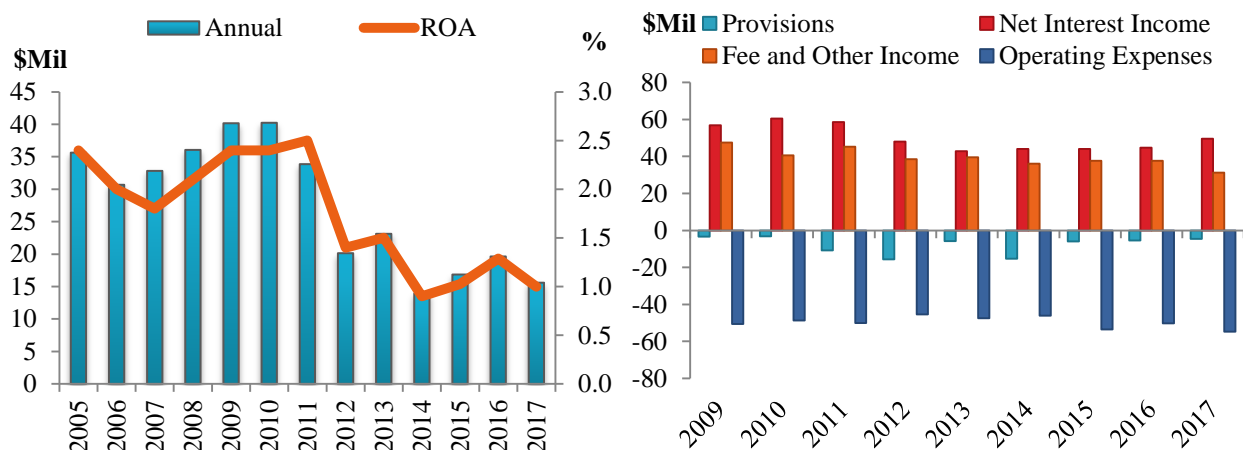
The average loan rates for finance and trust companies remained around 7.1 percent, while average cost of funds continued to mimic the downward trend of commercial banks, falling to 2.2 percent at December 2017. The result was a widening of the spread to 4.9 percent, up from 4 percent one year earlier (**Figure 28**).



Source: Central Bank of Barbados

Even with declining credit and higher deposits, net interest income increased by \$4.7 million, reflecting the favourable move in the interest rate spread for these institutions during the year (**Figure 29**). Despite the higher net interest income and a marginal decrease in provision expense, net income declined, due to a fall-off in fee and other income and increased operating expenses. The ROA declined from 1.3 percent to 1 percent at the end of December 2017.

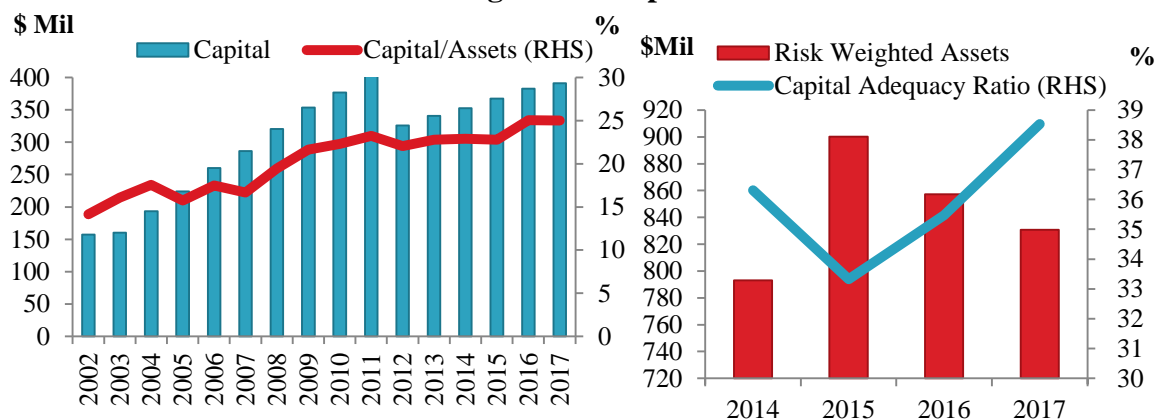
Figure 29: Profitability



Source: Central Bank of Barbados

The capital-to-assets ratio declined marginally but remained adequate at 25 percent (Figure 30). The regulatory capital to risk-weighted assets for this subsector increased over the past year from 35 percent to 39 percent. This high aggregated ratio reflects the influence of one larger institution, but the general range for the other institutions was between 11 percent and 25 percent, which still exceeds the generally accepted industry standard of 8 percent.

Figure 30: Capitalisation

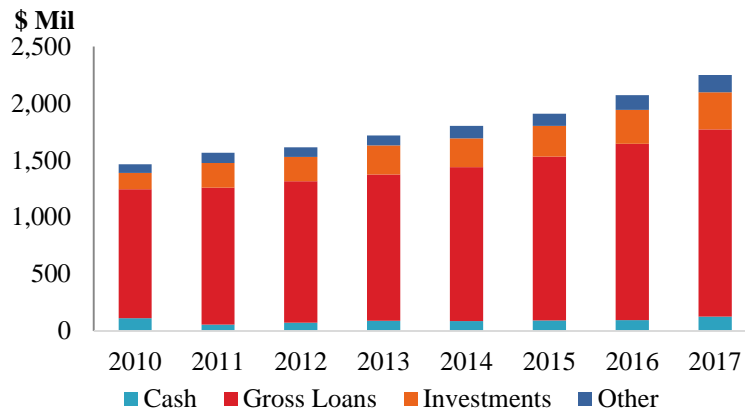


Source: Central Bank of Barbados

4.3 Credit Unions

Total assets of the credit union sector grew by 8.7 percent during 2017 (Figure 31). This outturn was reflected in a 6.3 percent expansion in loans which continued to be the largest component in the asset base, accounting for 74.4 percent of assets at the end of the period.

Figure 31: Asset Distribution

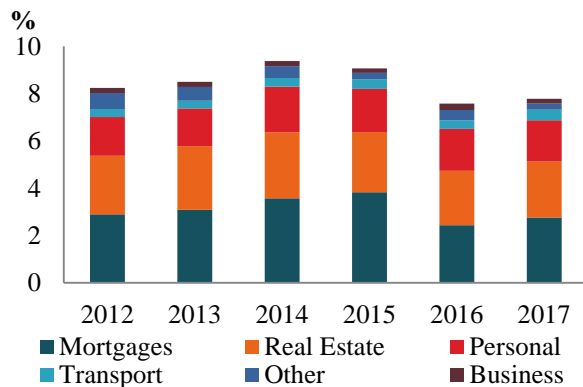


Source: Financial Services Commission

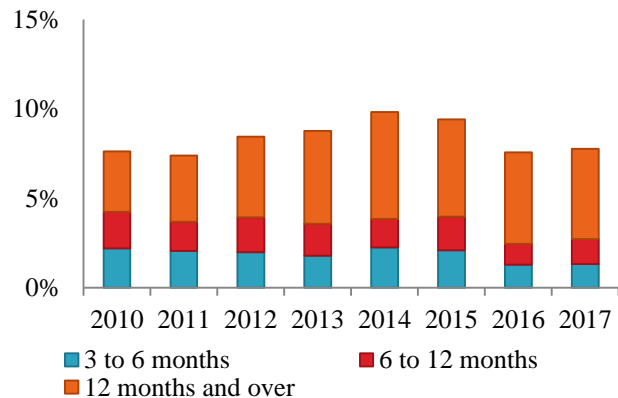
Following significant write-offs during 2016, the level of non-performing loans increased by 9.1 percent, raising the NPL ratio to 7.8 percent from 7.6 percent in 2017 (Figure 32). This increase was led by mortgages, followed by the real estate sector which grew by 20.6 percent and 9.0 percent, respectively. The bulk of NPLs remain in the twelve months and over category which accounted for 65 percent of the total classified debt at the end of the reporting period. The three to six month category and the six to twelve month category accounted for 17.0 percent and 18.1 percent, respectively.

Figure 32: Non-Performing Credit Portfolio

A: NPLs by Sector



B: NPLs by Category



Source: Financial Services Commission

Provisions, however, did not rise in line with NPLs, resulting in a fall in the provisions-to-NPL ratio from 32.6 percent to 30.3 percent (Figure 33). It must be noted that the methodology for provisioning by credit unions incorporates collateral values and the deposit backing of borrowers. While the realisation of the mortgage and real estate values may pose short term challenges, the large credit unions undertake relatively frequent valuations, apply discounting factors and allocate the relevant provisions based on their internal models. The overall provision-to-NPL ratio remained consistent both with the historic average and the FSC's issued guidelines. At the same time, the sector continued to be adequately capitalised surpassing the legislative requirement of 10 percent (Figure 34). However, one entity did not meet the benchmark. The

incremental movements were associated with improved profitability and to a lesser extent, growing membership.

Figure 33: Provision-to-NPL Ratio

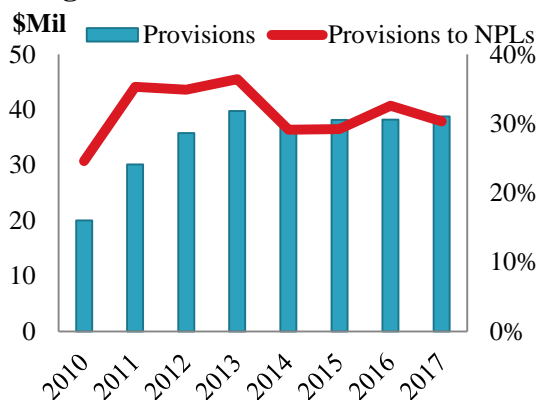
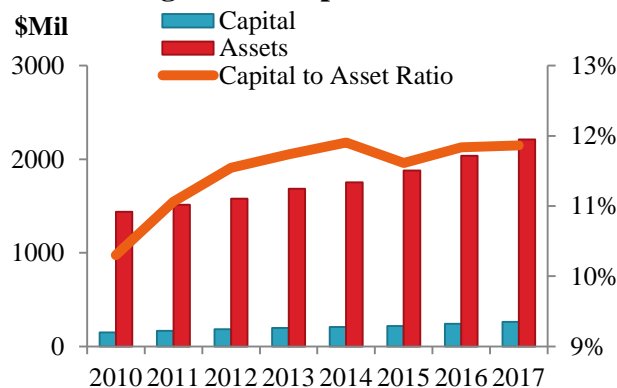


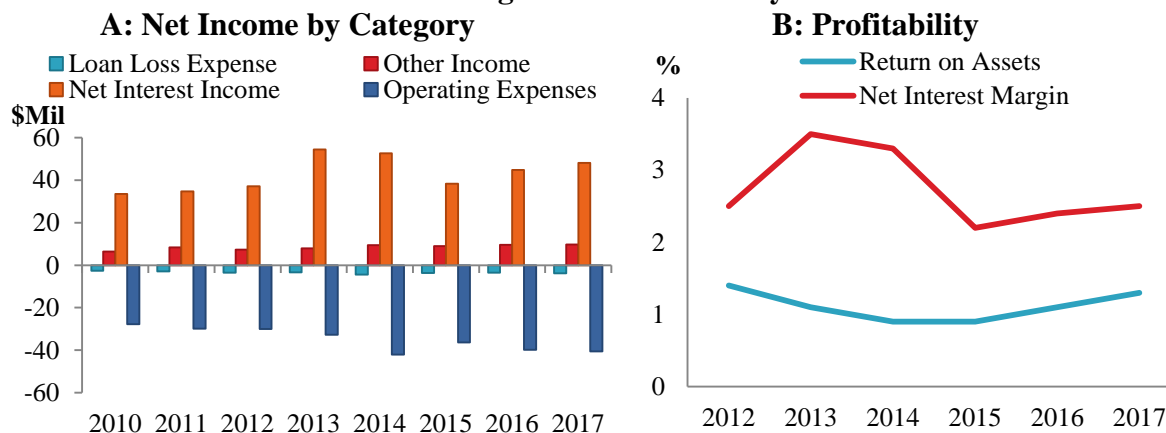
Figure 34: Capital to Assets Ratio



Source: Financial Services Commission

Profitability within the industry continued steadily and was primarily supported by slight improvements in the net interest income. Net interest margin increased by 10 basis points over the period while the return on average assets (ROAA) reached 1.3 percent, a marginal increase over the 1.1 percent recorded one year prior (**Figure 35**).

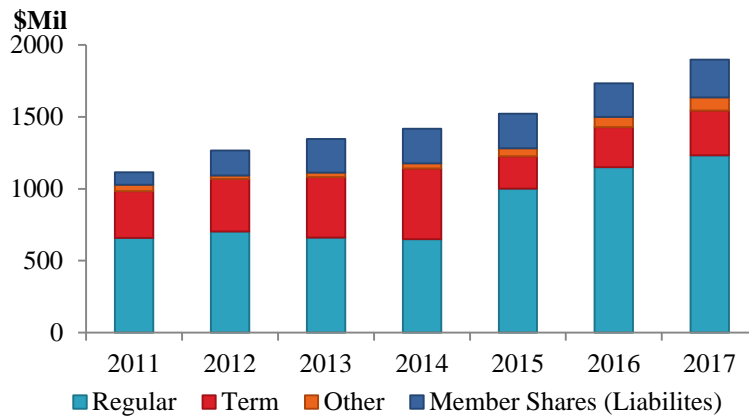
Figure 35: Profitability



Source: Financial Services Commission

Total deposits (including members' shares) were 11.6 percent higher than that recorded during 2016 (**Figure 36**) as deposit rates within credit unions were more attractive than their banking counterparts. Individual deposits accounted for half of the increase while a notable pick-up in corporate deposits has been observed over the last two years.

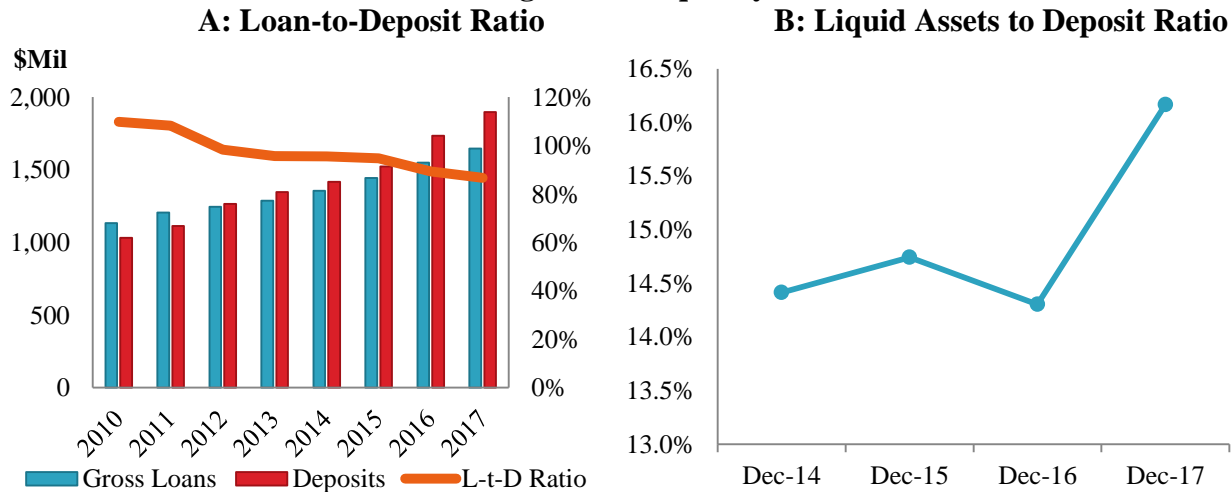
Figure 36: Distribution of Members' Savings



Source: Financial Services Commission

The loan-to-deposit (and shares) ratio declined modestly to 86.7 percent from 89.3 percent as the growth rate of deposits outpaced that of loans (Figure 37). The ratio of liquid assets to deposits (including shares) recorded a sharp improvement, growing from 14.3 percent in 2016 to 16.2 percent at the end of the reporting period and remains well above the 8 percent benchmark.

Figure 37: Liquidity



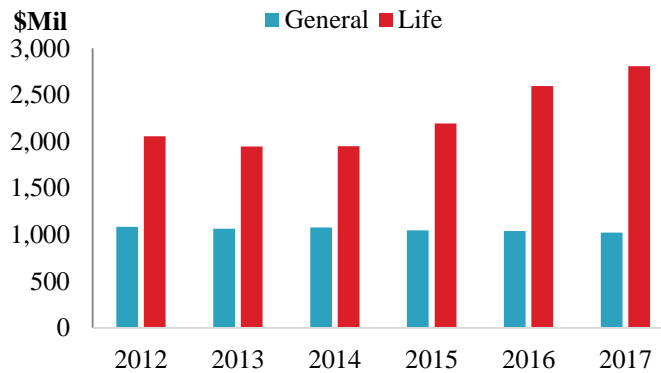
Source: Financial Services Commission

4.4 Insurance Companies

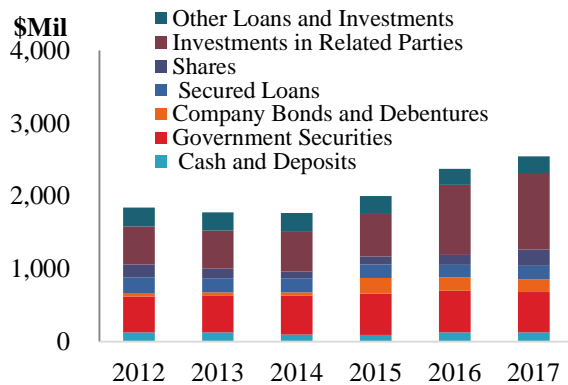
At the end of 2017, total assets for the domestic insurance industry grew 6.2 percent to \$3.9 billion, due primarily to growth in the life insurance sub-sector which rose by 8.8 percent (Figure 38).

Figure 38: Total Insurance Industry Assets

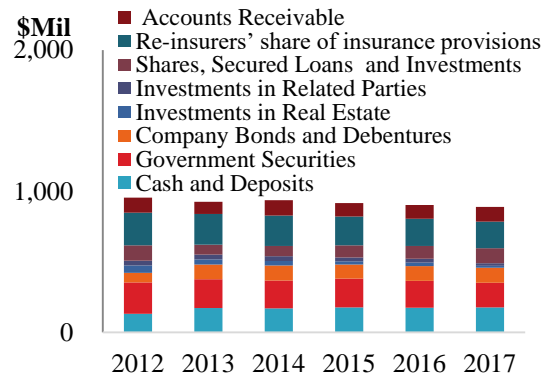
A: Life vs. General



B: Life- Select Investments



C: Non-Life -Select Investments



Source: Financial Services Commission

For the second successive year, the increase in total assets for the domestic life insurance industry was mainly reflected in increased equity investments in associated and subsidiary companies. These assets continued to be concentrated mainly in related party investments (37.1 percent of total assets). However, the relative share of life insurers' investments in government securities have fallen from an average of approximately 25 percent of total assets during the period 2012 to 2015, to 19.6 percent of total assets in 2017.

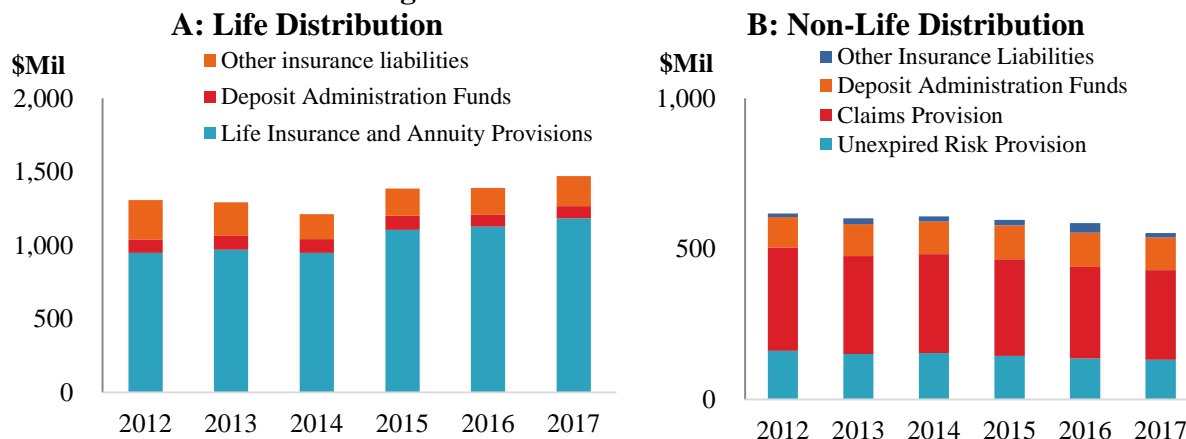
At the end of 2017, general insurers held assets of approximately \$1.02 billion, a decrease of approximately 1.5 percent, as the continued weakness in the industry's underwriting curtailed balance sheet growth. The decline in total assets for the domestic general insurance industry reflected a reduction in the industry's holding of government securities and reinsurance claims. During the period under review, the assets held by general insurance industry consisted of almost equal amounts of re-insurers' share of insurance provisions, cash and deposits, and government securities.

Liabilities

Total liabilities for the domestic insurance sector increased by 5.1 percent in 2017 as a result of an expansion in liabilities in both the life insurance and general insurance sub-sector. Total liabilities for the general insurance segment increased by 3.3 percent, due to an increase in

accounts payable within the subsector. However, insurance liabilities within the industry stagnated. In contrast, the growth in total liabilities for the long-term insurers was driven by core insurance activity with life insurance and annuity provisions rising 4.9 percent over 2016. The liabilities for both the life insurance and non-life insurance industries continue to consist primarily of insurance liabilities. For the life insurance sub-sector these were mainly life insurance and annuity provisions, while for the general insurance sub-sector they were largely claims provisions and unexpired risk provisions (**Figure 39**).

Figure 39: Total Insurance Liabilities

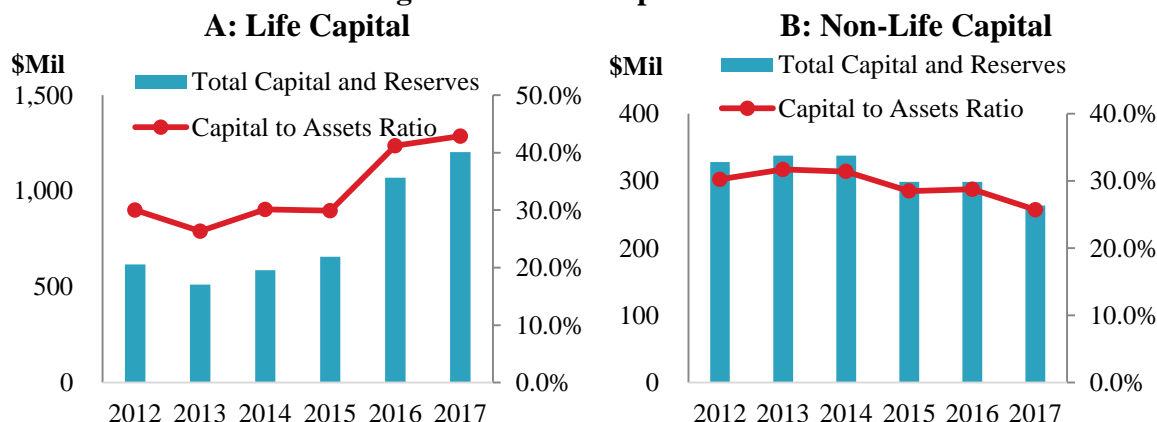


Source: Financial Services Commission

Total Capital and Reserves

The insurance sector remained capitalised in excess of statutory requirements and capital to asset ratios increased for the domestic insurance industry (**Figure 40**). However, total capital and reserves for general insurers fell to \$277 million at the end of 2017, resulting in the capital to asset ratio falling to 26.7 percent at the end of 2017, the lowest ratio in the last five years. In contrast, total capital and reserves for long-term insurers increased by 12.2 percent to reach \$1.2 billion. As a result the capital to assets ratio increased by 1.3 percentage points to reach 42.5 percent at the end of 2017.

Figure 40: Total Capital and Reserves



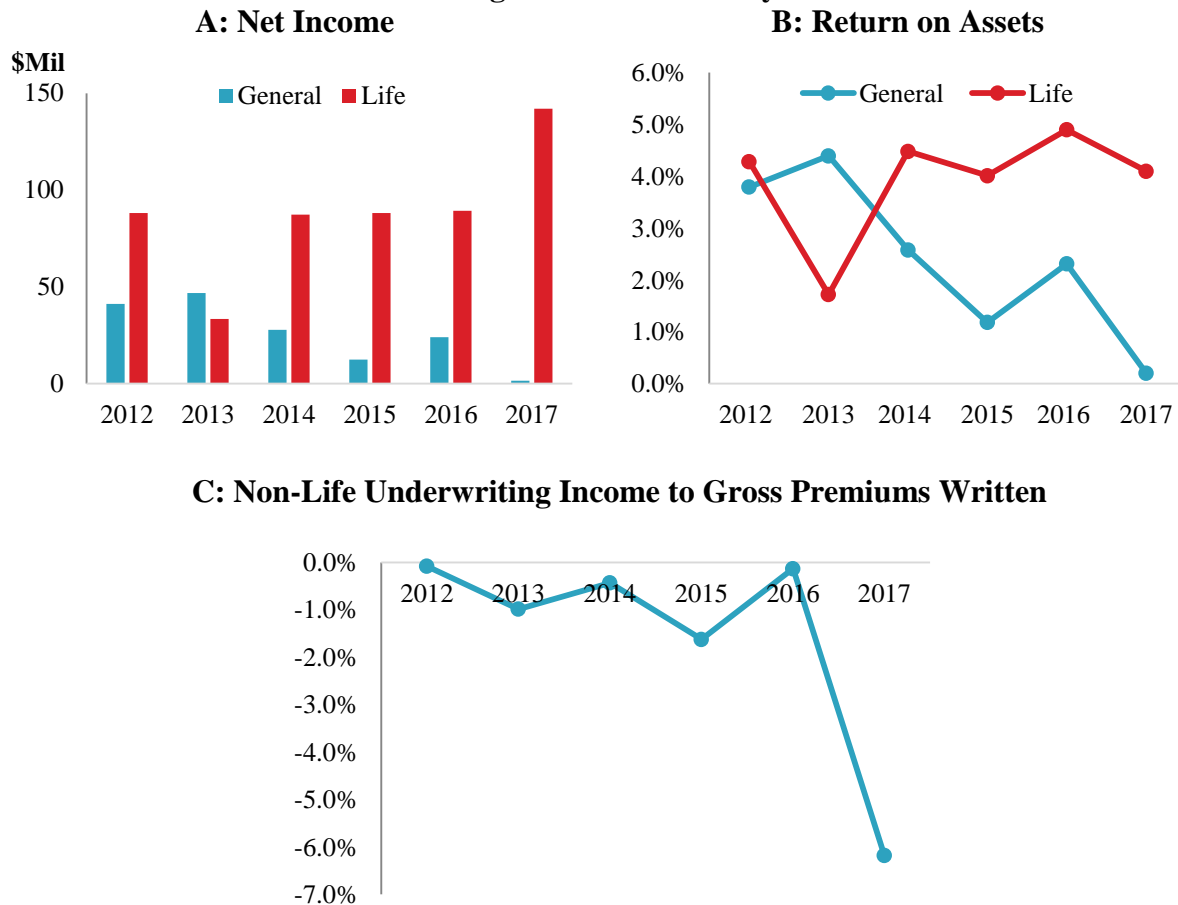
Source: Financial Services Commission

Profitability¹⁴

Provisional numbers indicated a modest decline in profitability for the life insurance sector, reflected in a lower ROA, which fell to 4.1 percent, compared to 4.9 percent in 2016 (**Figure 41**). There was also marginal decline of 0.8 percent in gross premiums written compared to 2016. Over the review period, \$35 million was ceded to reinsurers, which was 12 percent higher than the amount ceded during 2016.

With regard to general insurance, gross premiums have declined continuously since 2014, and the \$444 million in premium revenues for 2017 was the lowest in five years. The industry continued to experience underwriting losses as a highly competitive domestic market, and to a lesser extent, the impact of hurricane-related losses in the Eastern Caribbean resulted in an overall underwriting loss of \$27.4 million in the general insurance sector. Investment income was insufficient to compensate for these losses and consequently net income sector fell for the fifth consecutive year, to \$2 million in 2017.

Figure 41: Profitability

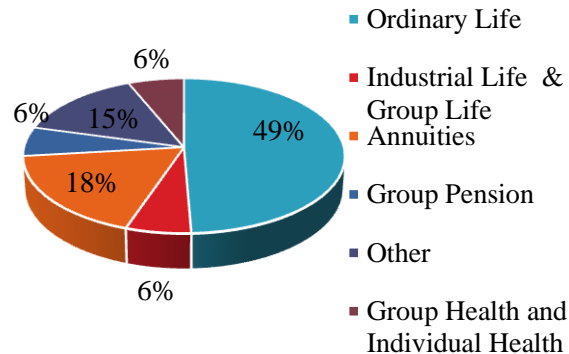


Source: Financial Services Commission

¹⁴ The analysis for the general insurance companies related to net income, gross premium written, reinsurance ceded, underwriting performance and investment income includes the operations of three life insurance companies which also write general insurance business.

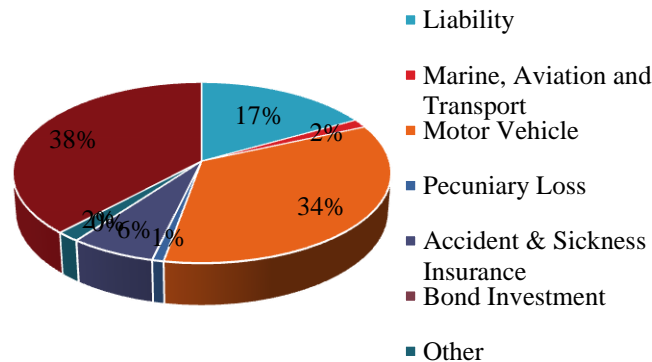
In the life insurance subsector, just under half of the value of gross premiums written were from ordinary life, while annuities was the second largest category accounting for approximately 18 percent of premiums written (**Figure 42**). In the general insurance industry, the two key segments of business written in 2016 were property insurance followed by motor vehicle insurance. These two segments together accounted for approximately 72 percent of the total gross premiums written for the general insurance industry (**Figure 43**).

Figure 42: Life Gross Premiums Written by Type



Source: Financial Services Commission

Figure 43: Non-Life Gross Premiums Written by Type



Source: Financial Services Commission

4.5 Pension Funds¹⁵

The occupational pension plan industry recorded an estimated \$2.2 billion in assets at the end 2016, which represented a 6.1 percent increase (\$129 million) over 2015. This growth in assets was primarily reflected in cash and equivalents (\$99 million), foreign mutual funds (\$26 million)

¹⁵ Pension fund data is only available to 2016.

and local fixed income securities (\$12 million), which were partially offset by declines in foreign fixed income securities (\$12.2 million) and local equity (\$14.9 million) (**Figure 44**).

Investment in foreign mutual funds¹⁶ continued to outstrip other choices of investment as the largest category of assets, accounting for 52 percent (\$1.2 billion) of total assets (**Figure 45**). Investment in local mutual funds and local fixed income investments accounted for 13.1 percent (\$291.3 million) and 15.7 percent (\$350.5 million), respectively.

Figure 44: Assets Distribution for the Pensions Industry

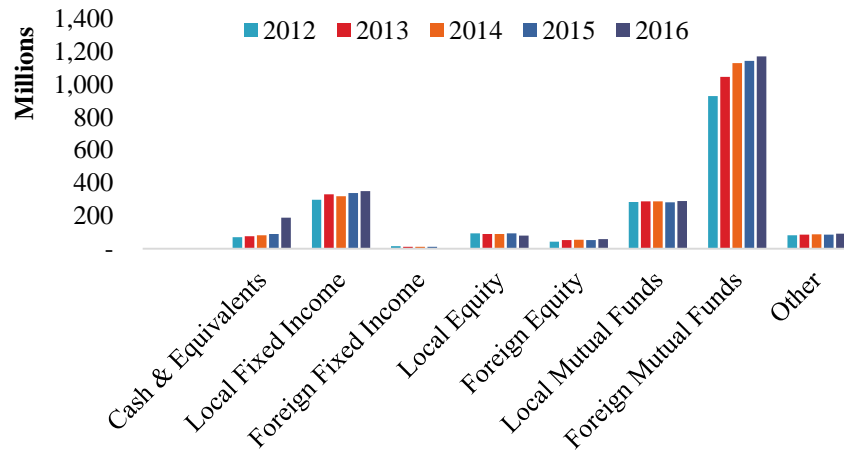


Figure 45: Assets under Management



Source: Financial Services Commission

¹⁶Many of the largest pension plans currently utilise overseas investment managers. In addition, the companies that sponsor these pension plans employ in-house investment managers in an effort to ensure these funds are invested in line with their corresponding investment policies. Some of the largest pension plans are multi-jurisdictional in nature with some of their investments are denominated in United States dollars.

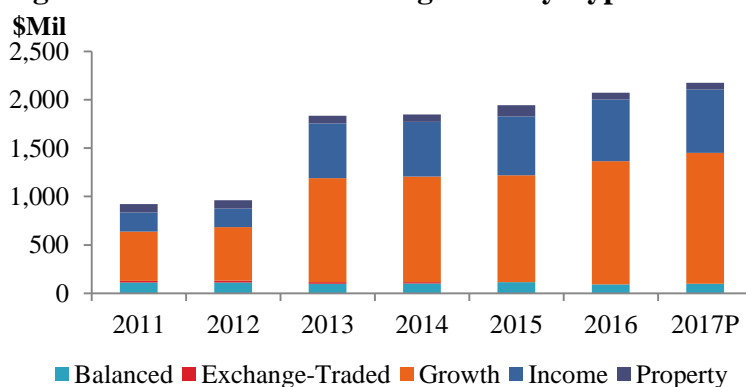
Total income continued to exceed total expenses¹⁷ at the end of 2016, with the total income of pension plans growing by 55 percent to \$182.9 million, and total expenses increasing by 33.1 percent to 95.7 million.

As at September 2017, forty-two pension plans were underfunded to the tune of \$846.9 million. For plans with unfunded liabilities, their respective actuaries would have recommended that the company contributions increase to remediate the shortfall¹⁸. During the 2016 period under review, one of the largest plans made a lump sum contribution of approximately \$40 million, resulting in a significant increase in actual contributions. The plan's rate of contribution recommended by the actuary is approximately 20 percent of pensionable payroll. During the 2016 period, this contribution rate was significantly reduced in an attempt to amortise the surplus over a period of six years.

4.6 Mutual Funds

Total assets under management for the domestic mutual fund sector stood at approximately \$2.2 billion at the end of December 2017, representing an increase of 5 percent (**Figure 46**). This expansion was mainly the result of an increase in the growth fund which continued to represent the largest percentage of assets. Moreover, total assets are concentrated in four funds which accounted for approximately 80 percent of the domestic mutual fund sector. Three of these are growth funds while the remaining one is classified as an income fund.

Figure 46: Assets under Management by Type of Fund¹⁹



Source: Financial Services Commission

¹⁷ This expenditure primarily consists of monthly pensions paid, lump sums, and administrative fees as indicated on the financial statements but does not account for any actuarial liabilities. An actuarial surplus or unfunded liability is only determined when the accrued liabilities are valued by an actuary via an actuarial valuation, which is conducted every three years. In the case where an unfunded liability exists, the actuary makes recommendations for its amortisation. Legislation allows for such to be amortised over fifteen years.

¹⁸ The FSC constantly monitors the rate of contributions to ensure that the pension plans are contributing at or above the rate recommended by the actuary.

¹⁹ The increase in assets under management between 2012 and 2013 was primarily due to the inclusion of two new funds.

The portfolio allocation of assets remained unchanged with approximately 80 percent of the investments of growth funds held in equities and other domestic and international mutual funds. For balanced funds, 54.8 percent of assets were held in equities, and 33.3 percent in fixed income securities (**Table 4**). Income funds were also mostly invested in fixed income securities accounting for approximately 64 percent of assets. Property funds were invested primarily in real estate properties (49.3 percent).

Table 4: Portfolio Allocation by Type of Fund

(%)	Balanced	Growth	Income	Property	Total
Cash and Cash Equivalents	5.9	6.8	8.9	16.1	9.4
Equities	54.8	38.3	1.7	0.2	23.8
Fixed Income Securities	33.3	6.9	63.7	0.8	26.2
Mutual Funds	4.3	40.1	4.8	0.0	12.3
Real Estate	0.0	5.4	0.0	49.3	13.7
Other	1.7	2.5	20.8	33.6	14.7
Total	100	100	100	100	100

Source: Financial Services Commission

Jurisdiction Exposure

Barbados remains the largest jurisdiction exposure to domestic mutual funds, accounting for 53 percent of total exposure at month-end September 2017 (**Table 5**). With regard to the portfolios for the property and income funds categories, the jurisdiction exposure is generally to the Barbados market and to a lesser extent other Caribbean territories. However, the main jurisdiction exposure for the growth fund and balanced fund categories is split between the Barbados and the US/International markets.

Table 5: Jurisdiction Exposure by Fund Type

(%)	Balanced	Growth	Income	Property	Total
Barbados	55.6	43.6	65.9	93.4	52.7
Jamaica	0.1	1.9	0.3	0.0	1.3
Trinidad	6.5	5.3	7.6	0.1	5.9
Other Caribbean	7.9	7.0	12.2	6.5	8.6
US/International	29.9	42.2	14.0	0.0	31.5
Total	100	100	100	100	100

Source: Financial Services Commission

5. Key Financial Stability Risks

5.1 Deposit Taking Institutions

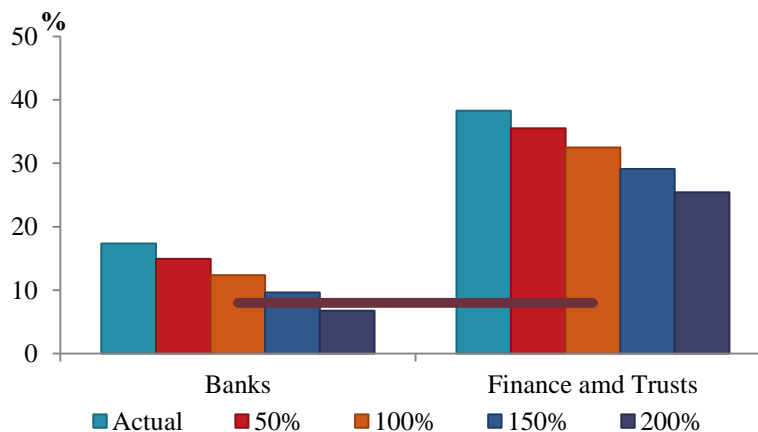
This section evaluates the resilience of commercial banks, deposit-taking finance and trust companies and credit unions²⁰ to macroeconomic and other adverse shocks. The impact of the shocks is directly transmitted to the institutions' capital, and is assessed both on an institution-specific and systemic basis. Therefore, the simulations determined whether existing capital buffers were adequate to absorb potential losses and focused particularly on credit, large exposure, liquidity, contagion and interest rate risk. The results indicated that DTIs can endure a range of negative shocks, though some vulnerabilities emerged under very severe conditions.

5.1.1 Credit Risk

DTIs' overall credit risk continued on its downward path during 2017. The loan quality ratio, as measured by the ratio of NPLs to total loans for the sector declined to 8 percent from 8.7 percent. This was primarily driven by the decline in the banking sub-sector as the NPL ratio of non-banks and credit unions experienced a marginal increase. DTIs' credit exposure was heavily concentrated in consumer credit which makes up roughly 60 percent of their loan portfolios and 51 percent of total NPLs.

Stress tests²¹ indicated that on a subsector level, commercial banks and finance and trust companies can withstand up to a 150 percent increase in NPLs (with 100 percent provisioning), while maintaining adequate CARs (**Figure 47**). However, with a 50 percent increase in NPLs, one finance and trust company's CAR fell below 8 percent. With a 100 percent increase in NPLs, two banks and two finance and trust companies did not meet the benchmark. With an extreme assumption of a 200 percent increase in NPLs, a total of five institutions (two banks and three finance and trust companies) required additional capital, and became insolvent.

Figure 47: CAR Outcomes from Increasing NPLs



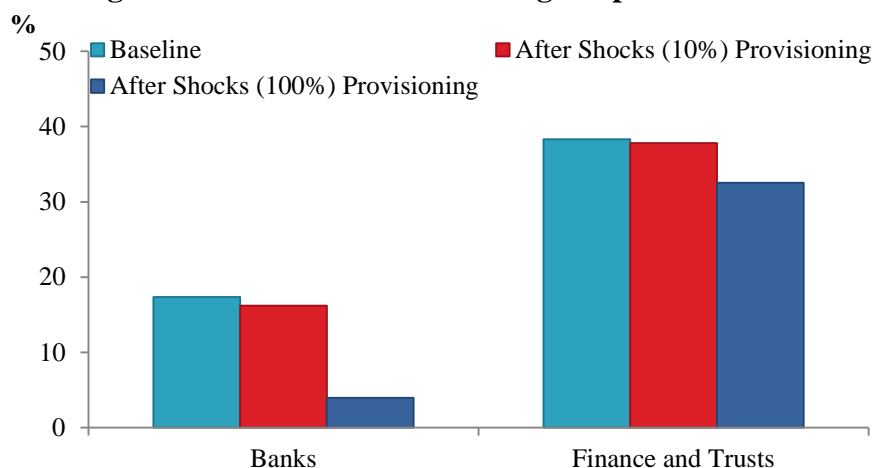
²⁰ Stress tests for credit unions were conducted on September 2017 data.

²¹ Stress tests on credit, liquidity and interest rate risk for commercial banks and trust and finance companies were guided by the framework of Cihak M. 2007. Introduction to Applied Stress Testing. IMF Working Paper WP/07/59

To estimate the impact of an increase in consumer NPLs on capital, the average provisioning rate for 2017 was used. In particular, a rate of 68 percent was used for commercial banks and finance and trusts. Results revealed that commercial banks could withstand up to a 182 percent increase in consumer NPLs before the first institution breaches the threshold of CAR of 8 percent. On the other hand, finance and trusts could only withstand a 78 percent increase in consumer NPLs before the first institution falls below the threshold. On an aggregate level, the commercial banking sector could withstand a shock of up to 226 percent, while the finance and trust sector could withstand up to 508 percent increase.

Large exposure tests indicated that commercial banks' and finance and trusts' capital could withstand defaults from their five largest borrowers with provisioning requirements up to 50 percent (**Figure 48**). It was assumed that the five largest loans sequentially became non-performing, and the impact was assessed under the requirement of 10 percent, 50 percent and 100 percent provisioning. All institutions maintained adequate levels of CAR with 10 percent provisioning. At 50 percent, one finance and trust required more capital after the third round. By the fifth round, one bank and two finance and trusts fell below the prudential requirement, though the aggregate CARs remained adequate. Under 100 percent provisioning, two finance and trusts required more capital after the second round and three banks after the third round. By the fifth round, the same five institutions required more capital, and the aggregate banks' CAR fell below the threshold.

Figure 48: CAR Outcomes of Large Exposure Shocks



Under the FSC's framework, credit unions are expected to have a capital-to-asset ratio of at least 10 percent. For credit unions²², sequential shocks were applied to NPLs assuming a provision level of 20 percent. The first company fell below the minimum with a 22 percent increase in NPLs, while the industry failed to meet the requirement with an increase of 140 percent. With 100 percent provisioning, the first institution fell below the threshold with a 9.5 percent increase, while the industry failed with a 70 percent shock.

²² Stress tests for credit unions were carried out on the seven largest credit unions (92 percent of the industry) individually, and the remainder is aggregated as an entity. Net income was assumed to serve as a first line of defense against all shocks. One credit union was already below the 10 percent requirement at September 2017.

For specific sector shocks to NPLs, the results revealed that the credit union subsector could withstand up to 193 percent increase in consumer NPLs and 217 percent increase in mortgage NPLs (both with 20 percent provisioning). The most vulnerable institution, however, was only capable of withstanding a 75 percent increase in consumer NPLs and 30 percent in mortgage NPLs before it fell below 10 percent.

As it relates to large exposures, a default of the individual top five borrowers would have no significant impact on the credit union industry. As a result, the stress test was expanded to include the top twenty-five borrowers from each credit union. Results show that up to a default of the top 20 borrowers from each credit union, only one entity fell below the regulatory requirement (**Table 6**).

Table 6: Large Exposures Results (Credit Unions)

Borrowers from each credit union	Percentage of total loans	Number of institutions below the regulatory requirement	Industry capital to asset ratio given a 100% default
Top 5	1.1%	1	11.78%
Top 10	2.1%	1	11.73%
Top 15	3.0%	1	11.66%
Top 20	3.8%	1	11.58%
Top 25	4.5%	4	11.50%

In order for the aggregate industry capital-to-assets ratio to fall below the minimum, it would require a default of 18.3 percent of the total loan portfolio.

5.1.2 Liquidity Risk

Given that DTIs funding model is primarily through deposits, maintaining adequate liquidity is of major importance. Overall, DTIs continued to display high levels of liquidity with an approximate liquid assets-to-total assets ratio of 23.5 percent as at December 2017.

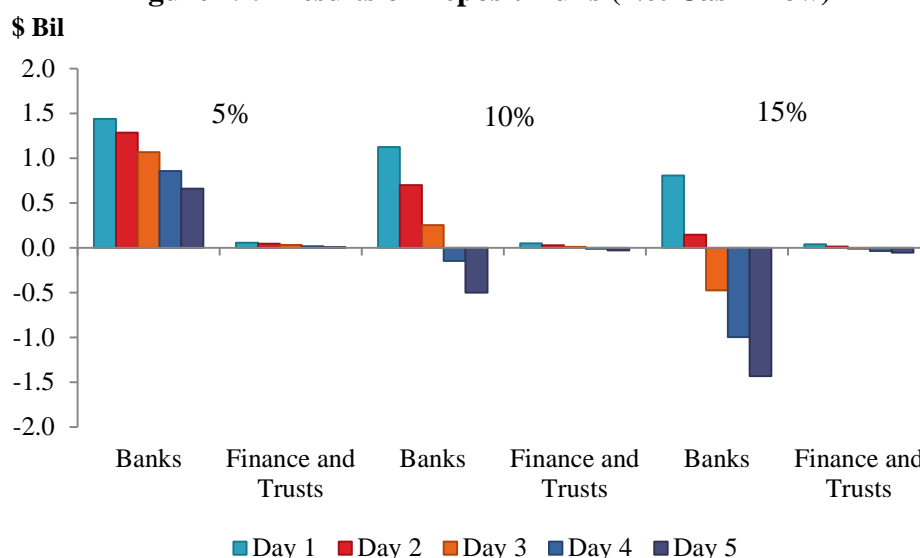
Liquidity stress tests indicated that while commercial banks were quite resilient under most hypothetical scenarios, finance and trusts and credit unions were not as resilient. For banks and finance and trusts, withdrawals on time deposits were fixed at three percent and one percent per day on domestic and foreign accounts, respectively and drawdowns on foreign demand accounts were fixed at five percent per day. Assuming that 95 percent of all liquid assets and 1 percent of all other assets were fully convertible to cash on a given day, 5, 10 and 15 percent runs on domestic demand accounts were examined. The results depicted in **Table 7** indicate that non-banks were more severely affected than banks in terms of the number of institutions that would be unable to meet its obligations. With 5 percent runs per day, three finance and trusts require liquidity support after day two, and four after day five. With 10 percent deposit runs, one finance and trust required support from day one; three by day two, and five by day five. On the other hand, one bank required liquidity support after day three, three after day four, and four after day five. With 15 percent runs per day, two finance and trusts required support from day one, and

this increased to five by day two. Two banks required support from day two and all four by day three. Overall however, the liquidity support required is much higher for banks in the most severe run, given that finance and trust companies funding is primarily through time deposits (Figure 49).

Table 7: Results of Deposit Runs: No. of Institutions Requiring Liquidity Support

	At 5%		At 10%		At 15%	
	<i>Banks</i>	<i>Finance and Trusts</i>	<i>Banks</i>	<i>Finance and Trusts</i>	<i>Banks</i>	<i>Finance and Trusts</i>
Day 1	0	0	0	1	0	2
Day 2	0	3	0	3	1	4
Day 3	0	3	1	4	4	4
Day 4	0	3	3	4	4	4
Day 5	0	4	4	5	4	5

Figure 49: Results of Deposit Runs (Net Cash Flow)



For credit unions, it was assumed that over a five-day period for the first scenario, credit union members withdrew 5 percent of deposits each day with the exception of deposits pledged against loans. For the second scenario, 10 percent of deposits were withdrawn daily. At 5 percent, three fell below the threshold by the second day. At a rate of 10 percent, four credit unions fell below the threshold at the end of the first day. On an aggregated level, the credit union sector can withstand “depositor flight” of around 25 percent in magnitude before their liquid assets are completely exhausted (Table 8 and 9).

Table 8: Results of Deposit Runs (Credit Unions)

Day	Withdrawal	Number of institutions below the threshold
1	5%	0
2	5%	0
3	5%	3
4	5%	4
5	5%	6

Table 9: Results of Deposit Runs (Credit Unions)

Day	Withdrawal	Number of institutions below the threshold
1	10%	0
2	10%	4
3	10%	6
4	10%	6
5	10%	6

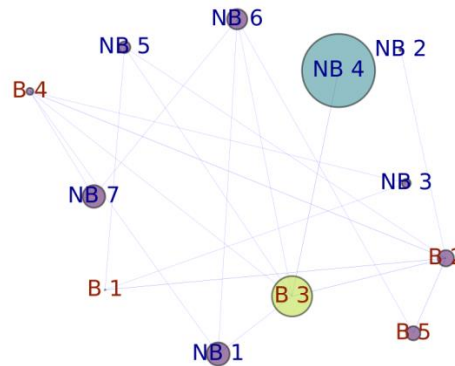
These results are indicative of insignificant changes in vulnerability with respect to commercial banks due to strong capital and liquidity positions. They also indicate that while finance and trusts and credit unions are relatively vulnerable to liquidity funding risk, they have improved over the period in line with the growth of liquidity within the system.

5.1.3 Contagion Risk²³

Given that liquidity among domestic banks continued to be high, activity on the interbank market remained relatively low. Though interconnections exist (**Figure 50**), the average magnitude of the exposures was relatively small and therefore suggested little risk of systemic interbank contagion. The largest exposure node, NB4, represented approximately 30 percent of that entity's assets but was held with a local affiliate bank, B3. The second largest exposure node, B3, represented only 1 percent of its capital, and was held with the same local affiliate finance and trust company.

²³ This section, contagion risk among the DTIs, excludes credit unions.

Figure 50: Interbank Market Exposures



Note: Node size represents the gross total exposure of that entity to the other entities. B = Bank. NB = Finance and trust company. Edges identify the nodes each node is connected to, and do not specify direction.

Banks’ exposures to other regions especially the US, Canada and the wider Caribbean were of a larger magnitude, and hence this test examined the impact of losses (of all foreign investments and balances) from the respective regions on the capital of each bank and identified the number of banks whose capital fell below the 8 percent benchmark.

The results (**Table 10**) suggest that the banking system was most sensitive to its exposures in the US, generally via affiliated institutions, due to capital placements with their parents. Exposures to all other regions were insufficient to erode capital levels below the 8 percent threshold.

Table 10: Results of Default of Individual Banking Sectors and Groups

Shocks	After Shock CAR (%)	Banks with CAR<8%
Baseline	15.0-26.1	0
Europe	15.0-25.3	0
Canada	14.3-25.1	0
USA	0.0-15.5	3
Local Affiliates	9.2-25.4	0
Caribbean Affiliates	11.3-26.1	0
Caribbean Non-Affiliates	15.0-26.1	0

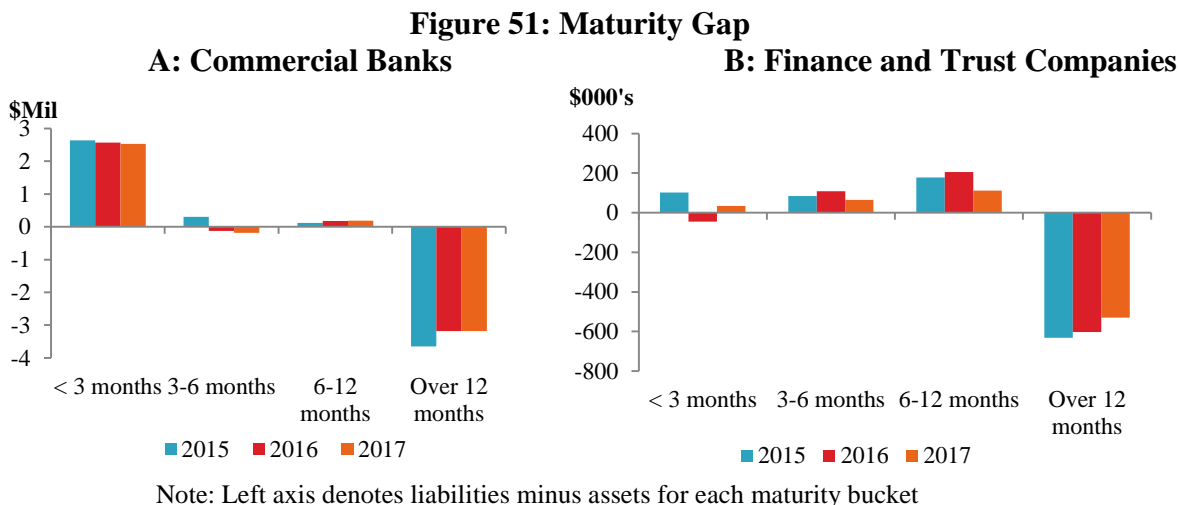
5.1.4 Interest Rate Risk

Domestically, interest rates continued to fall post the deregulation events of 2013²⁴ and 2015²⁵. At the end of December 2017, the weighted average deposit rate stood at 0.12 percent, while the

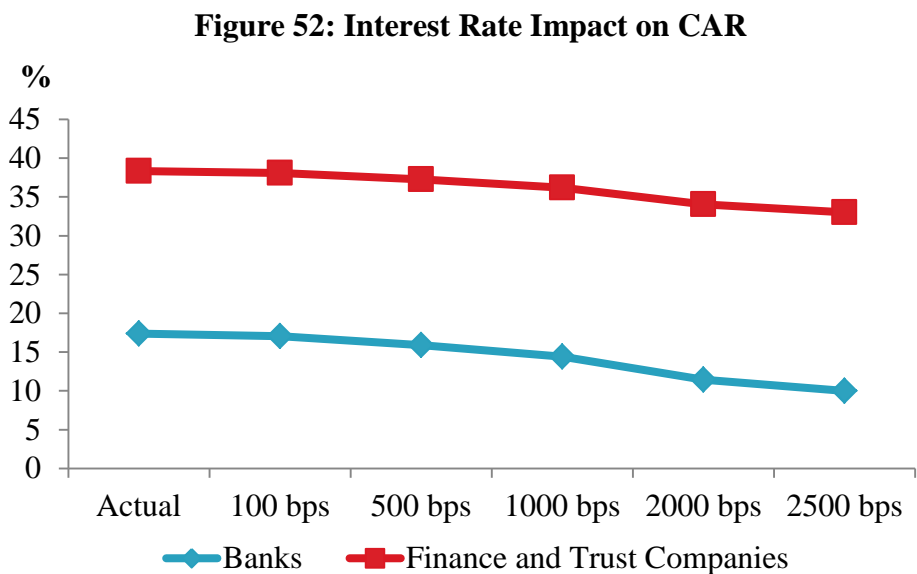
²⁴ Effective April 18, 2013, The Central Bank of Barbados indicated that the minimum deposit rate would no longer be used for interest rate guidance. With the introduction of this policy, the Bank, however, continued to stipulate a ‘minimum savings rate’ to the single purpose saving accounts of private individuals and non-profit organizations.

²⁵ Effective April 21, 2015, The Central Bank of Barbados indicated that it would no longer stipulate a minimum rate of interest on savings deposits at commercial banks. As a result, commercial banks would have the ability to

weighted average lending rate was 6.73 percent. The short-term maturity gap was used to examine the impact of rising deposit rates on institutions' funding costs and ultimately their profitability, given the funding structure of depository institutions is typically mismatched in terms of the relative maturities of deposits and loans (**Figure 51**).



The results revealed that commercial banks and finance and trust companies are relatively well insulated against rising deposit rates (**Figure 52**). With a 1,000 basis points increase, one bank's CAR falls below 8 percent and only under the severe assumption of an increase of 2000 basis points (20 percentage points), would one bank and two finance and trusts institutions fail.



A further interest rate test assumed that that the bonds held by each financial institution are “marked-to-market,” i.e. changes in their market value have a direct impact on the capitalization

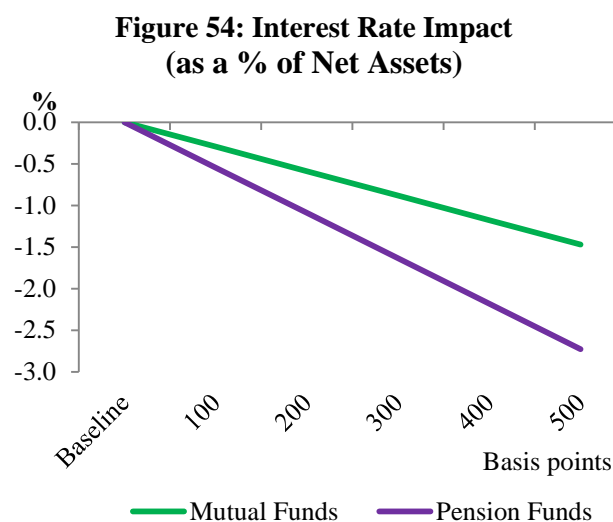
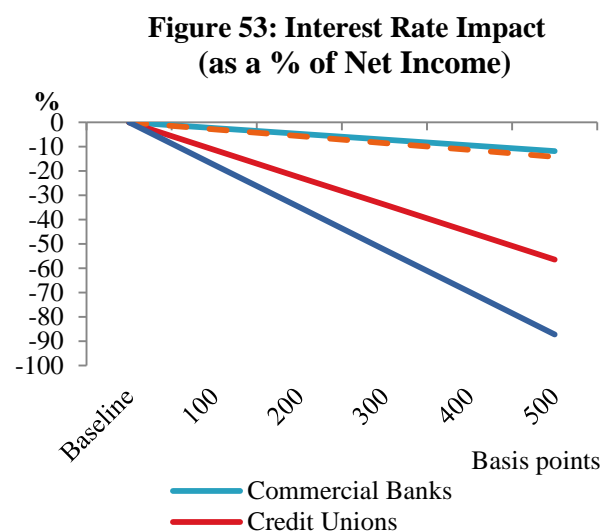
determine the rate to be paid on savings accounts in light of market conditions, in the same way that they could for all other interest rates.

of the institution. The impact of an interest rate change on the market value is approximated using the duration of the bonds held by the institutions and is guided by the FSI Compilation Guide (IMF, 2004). The direct impact of higher nominal interest rates on capital and capital adequacy is typically negative, resulting from the fact that financial institutions operate with a duration gap between their assets and liabilities.

The impact was assessed assuming interest rate shocks ranging from 100 percent to 500 percent, and in this case, also includes insurance companies, mutual funds and pension plans. Under all scenarios, DTIs' CARs were marginally impacted with a decrease in the most extreme scenario of 0.29, 0.50 and 0.27 percentage points for commercial banks, credit unions and non-banks, respectively. Similarly, the insurance subsector's capital to assets ratio declined by 3.22 percentage points with an interest rate shock of 500 basis points.

Given this result, the losses were expressed as a percentage of each institutions net income for the year 2017. The insurance subsector was observed to be the most vulnerable while commercial banks were the least. Under the worst-case scenario of a 500 basis point shock, insurance companies' impact was approximately 87 percent of their 2017 income, while commercial banks' impact was approximately 12 percent (**Figure 53**).

Given the underlying structure of pension and mutual funds, the impact of an interest rate shock was assessed as a percentage of their net assets rather than income. Under the most extreme scenario of a 500 basis point interest rate shock, both subsectors were marginally impacted. Mutual funds' impact was shown to be 1 percent of their net assets while pension funds' impact was 3 percent of net assets (**Figure 54**).



5.2 Insurance Sector

Stress tests were conducted on six life insurance companies and the seven largest general insurance companies (by premium) at the end of 2016. The scale of the imposed shocks was guided by Jobst et al (2014)²⁶ in determining the appropriate levels of each of the relevant criteria considered in the particular “shock”.

It was assumed that the impact of shocks in each scenario was immediate (occurring within the span of one financial year) and that all other factors remained constant over the subsequent three years. Under the “baseline” or “no shock” scenario, the annual net income was projected to remain constant over the three year timespan. For each scenario, it was assumed that the company is either able to make the same level of income as in year zero (“with net income”) or that it makes no income at all following the initial shock (“without net income”). The scenarios did not presume any actions on the part of the company’s management to either improve or worsen the situation of any of the companies being tested. It was further assumed that the shocks were reflected in changes in balance sheet and income variables that are likely to be impacted under each scenario. These resulting assumptions are tabulated below for each scenario.

Scenario 1: Recession

Under the scenario, it was assumed that a recession would generate the declines in asset values outlined in **Table 11**.

Under the baseline scenario, the aggregate industry picture is positive over the three year span with capital growth projected to year three at an average rate of 5 percent per annum. Under the stress scenario with net income buffer, growth is small followed by a dip in year three with capital growth projected on average at 3 percent per annum. And lastly the adverse scenario of stress scenario without net income buffer shows a progressively decreasing capital position. By the end of year three, the industry would likely lose 20.4 percent (or \$220.2 million) of the pre-shock capital by the end of the third year. In the case of life companies, all were at least able to absorb the initial shock at the start and recover before the end of the three-year observation period. One life company was found to be particularly vulnerable to the assumptions made, and lost significant portions of their projected capital by the end of year three. For the general companies, the top seven managed to stay solvent but four companies had significantly less capital at the end of the year three.

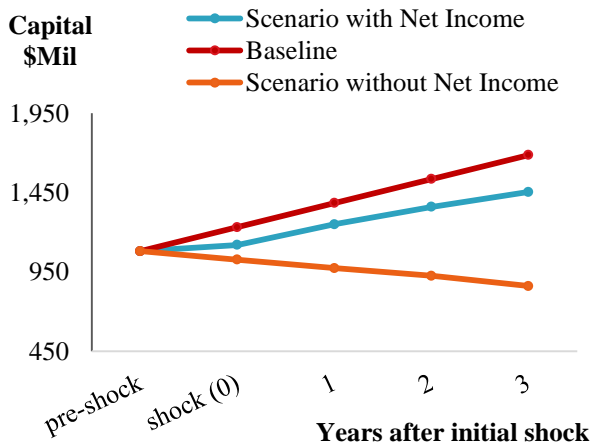
²⁶ Jobst A. N. Sugimoto and T. Broszeit. 2014. Macprudential Solvency Stress Testing of the Insurance Sector, IMF, Working Paper No. 14/133.

Table 11: Assumptions for Recession

Life Sector		General Sector	
Asset Class	Balance Sheet Shock (%)	Asset Class	Balance Sheet Shock (%)
Equity	-18	Equity	-18
Real Estate	-10	Real Estate	-10
Corp Bond Values	-8	Corporate Bond Values	-8
Sovereign Bond Foreign	0	Sovereign Bond Foreign	0
Mortgages	-8	Mortgages	-5
Policy Loans (unsecured)	0	Policy Loans (unsecured)	-8
Cash & Deposits	-5	Cash & Deposits	0
Investment in Related Parties	-5	Investment in Related Parties	-5
Lapse Rates		Premium decline year 1	-10
Premium decline year 1	-10	Premium decline year 2	-10
Premium decline year 2	-10	Premium decline year 3	-10
Premium decline year 3	-10	Loss ratio increase year 1	2
		Loss ratio increase year 2	3
		Loss ratio increase year 3	5

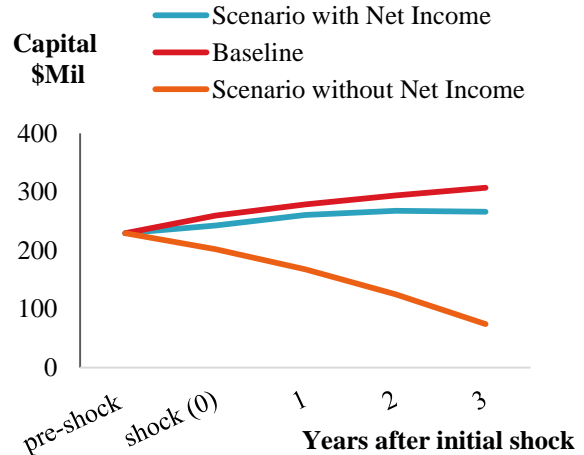
Source: Financial Services Commission

Figure 55: Recessionary Scenario (Life)



Source: Financial Services Commission

Figure 56: Recessionary Scenario (General)



Scenario 2: Pandemic

In light of recent global concerns about certain communicable diseases such as Ebola, SARS, etc., a pandemic scenario was designed. With travel being made more accessible in recent times, there is an increased probability of a visitor bringing a highly communicable disease to the island. One of the most infectious and deadly epidemics of the twentieth century was the 1918 outbreak of Spanish Flu (H1N1 Influenza Virus). This pandemic infected 500 million people worldwide and killed between 50 to 100 million (about 3 – 5 percent of the world’s population at

the time). While the factors which are suspected to have been responsible for the H1N1's rapid spread are not currently present in Barbados (e.g. war, malnourishment, weakened resistance from chemical warfare), this has been used as the worst case scenario for pandemic.

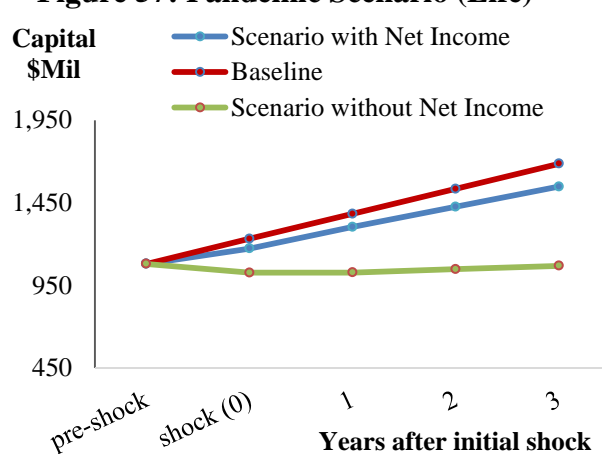
From the results of Scenario 3, the industry showed an improvement in capital position assuming a continuation of net income. Assuming that there is no further net income for the next three years, the industry is likely to take over three years to reach the pre-shock levels. Under the same scenario with income, the gain is estimated to be around 46 percent. Assuming that there is no net income, the industry loses approximately 1 percent of initial capital at the end of Year three of the scenario.

Table 12: Assumptions for Pandemic

Life Sector	
Asset Class	Balance Sheet Shock (%)
Excess Mortality	0.15
Equity	-10
Real Estate	-8
Corp Bond Values	-5
Premium decline year 1	-10
Premium decline year 2	-5
Premium decline year 3	0

Source: Financial Services Commission

Figure 57: Pandemic Scenario (Life)



Scenario 3: Natural Catastrophe

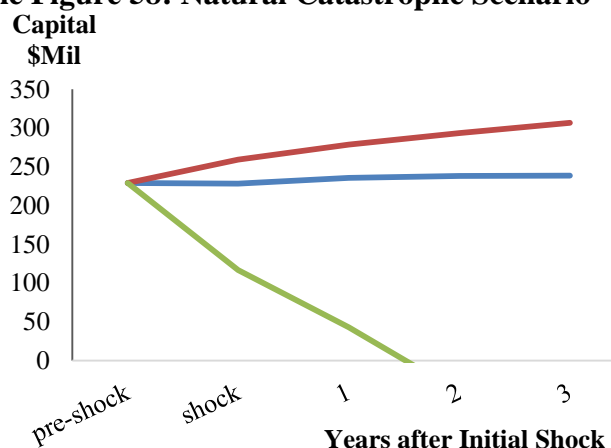
While Barbados has not experienced a direct hit from a hurricane (Category 1 and upwards) since 1955, it is not impossible for the island to experience one in the near future. Therefore an estimated loss ratio of 8 percent (based on the damage sustained in 1955 from Hurricane Janet in Barbados) was determined to be an applicable adverse scenario. In light of an increasing number of super storms and the potential of weather systems to increase in severity due to global warming and changing weather patterns, this assumption can be revised at any time to make the stress more severe.

This scenario was found to adversely affect most of the seven general insurance companies tested. These companies were not able to return to pre-shock levels by the end of the three year observation period. Indeed, one company was found to be insolvent by the end of year two. However, this shock does not take into account reinsurance buffers which the industry possesses.

Table 13: Assumptions - Natural Catastrophe **Figure 58: Natural Catastrophe Scenario**

General Sector	
	Hurricane
Stress Loss	-8%
Commission decline year 1	-20%
Commission decline year 2	0%
Commission decline year 3	0%
Premium decline year 1	-10%
Premium decline year 2	-5%
Premium decline year 3	-3%

Source: Financial Services Commission



5.3 Sovereign Risk

Over the past five years, the weak macroeconomic environment has resulted in an increase in Barbados' sovereign risk, as measured by its external credit rating. From 2012 to 2017, Barbados received several downgrades from Standards and Poor's, and from Moody's (Table 14). In addition, the Government of Barbados recently announced its intention to restructure its debt to mitigate the immediate interest burden, reduce cash flow and place the debt ratio on a downward trajectory. Debt re-profiling could take the form of coupon rate cuts, extension of maturities and/or haircuts, which would impact on institutions net income and by extension their capital positions via net present value (NPV). These developments have heightened local investors' concern regarding sovereign risk²⁷.

Table 14: Barbados' External Credit Rating

Date	S &P	Moody's
6/6/2018	SD	
9/27/2017	CCC	
3/9/2017		Caa3
3/3/2017	CCC+	
9/23/2016	B-	
4/1/2016		Caa1
12/19/2014	B	
6/2/2014		B3
12/20/2013		Ba3
11/20/2013	BB-	

This section assesses the impact of various scenarios on the respective financial institutions' capital and overall financial position. The simulations are focused on the financial institutions'

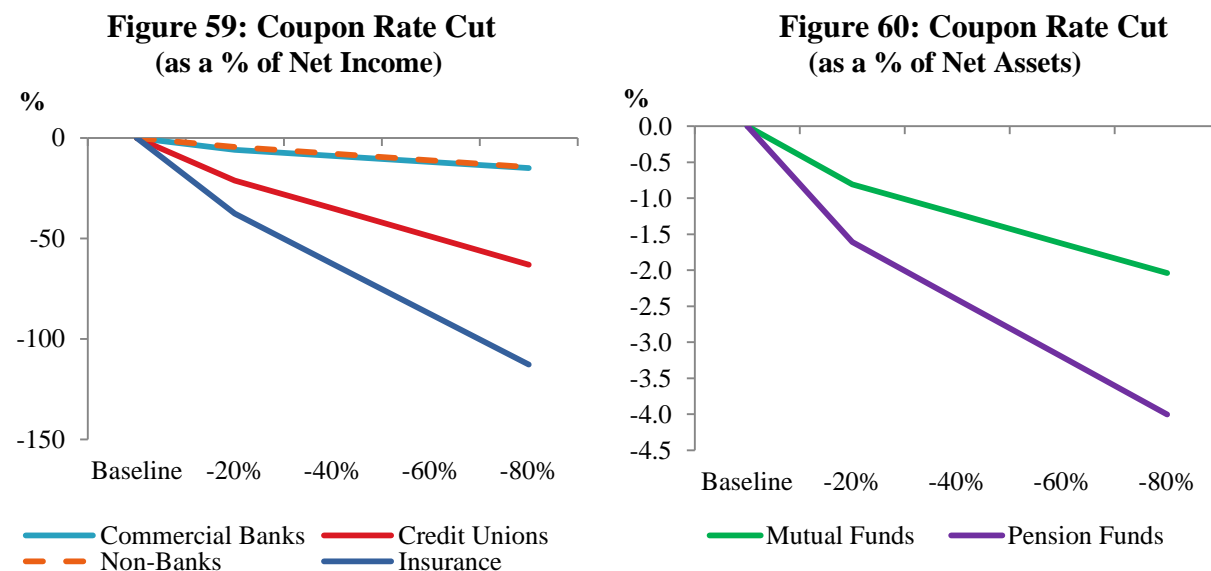
²⁷ A number of Caribbean countries, including Antigua and Barbuda, Grenada, Jamaica, and St. Kitts and Nevis have implemented debt operations in recent years.

long-term securities holdings, given the liquid nature of Treasury bills, and small magnitude of direct loans extended to government²⁸.

Financial institutions' exposures to government were stressed using Jamaica's 2010 debt exchange as a general guide. The test assumed that the coupon rate on long-term debt was cut by 20, 40, 60 and 80 percent and the net present value losses were taken directly from capital. It was found that even with an 80 percent cut in the rate, there was little change in the capital adequacy positions of DTIs. However, the capital to assets ratio of insurance companies fell from 36 percent to 31.8 percent.

Given the modest impact on capital, the losses were expressed as a percentage of each institution's net income for the year 2017. The results revealed that the insurance subsector was observed to be the most vulnerable while commercial banks and non-banks were the least affected. Under the scenario of an 80 percent coupon cut, insurance companies were impacted up to 112 percent of their 2017 net income, while the credit unions' impact was approximately 63 percent of industry's net income. Commercial banks' and non-banks' impact were both observed to be approximately 11 percent of their respective 2017 net incomes (Figure 59).

Results for pension funds and mutual funds were assessed as a percentage of their respective net asset values. Under the most extreme scenario of an 80 percent coupon rate cut, both subsectors were moderately impacted. The mutual funds' impact was shown to be 2 percent of their net assets, while the pension funds' impact was 4 percent of net assets (Figure 60).

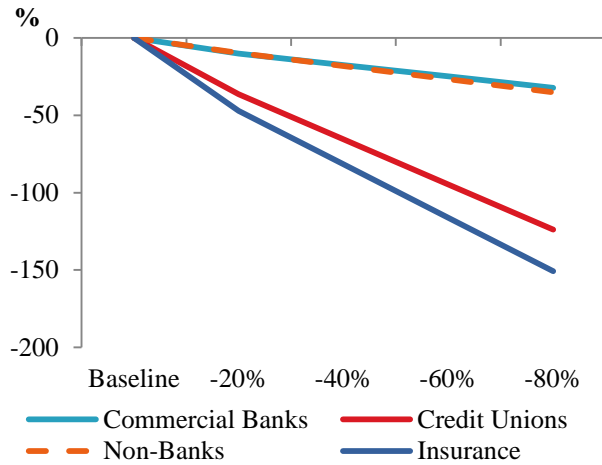


Assuming an extension of five years on all bonds in addition to the coupon rate cut, the impact on banks, credit unions, and finance and trust companies' capital ratio remained modest, while the capital to assets ratio of insurance companies fell from 36 percent to 30.5 percent with an 80 percent cut. These losses grew to represent 123.9 percent and 150.7 percent of credit unions and insurance companies' net income for 2017, respectively (Figure 61). For banks and finance and trust companies, the impact was close to 35 percent, while the loss for the pension fund and

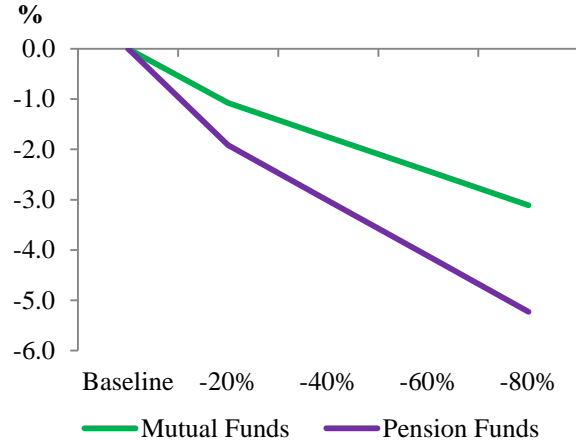
²⁸ Technical Note 6.5 assesses the financial sector's exposure to the government of Barbados.

mutual fund sectors was approximately 5.2 percent and 3.1 percent of their net assets, respectively (Figure 62).

**Figure 61: Coupon Cut and Extension
(as a % of Net Income)**



**Figure 62: Coupon Cut and Extension
(as a % of Net Assets)**



6. Technical Notes

6.1 Macro-prudential Indicators

*Financial Stability Cobweb*²⁹

The Financial Stability Cobweb map provides a graphical summary of the risk exposure of financial institutions to potential systemic shocks including the build-up of cyclical imbalances.

Vulnerability sub-index scores were developed across six dimensions to reflect comparable assessments of the intensity of underlying risks contained in the various indicators. Within each partial indicator the variables were equally weighted. Vulnerabilities were made comparable by converting weighted statistically standardised indicators into empirical cumulative probability distributions. These distributions were then converted into ordinal rankings based on percentiles and then graphed on a spider-gram.

Table 1: Partial Indicators for Financial Stability Cobweb

Partial Indicator	Variable	Systemic Risk Impact
<i>Domestic Environment</i>	Inflation rate	+
	Total Fiscal Deficit to GDP	+
	Total Sovereign Debt to GDP	+
	M2 to International Reserves	+
<i>Domestic Financial Market Conditions</i>	Barbados T-Bill Rate	+
	Return on Barbados Stock Exchange Main Index	-
<i>Global Financial Market Conditions</i>	MSCI Global Index of Equity Returns	-
	Global VIX Index	+
	EMBI Global Bond Index Spread	+
<i>Global Environment</i>	MSCI World Growth Index	-
	Crude Oil (petroleum) simple average Brent, West Texas Intermediate, and the Dubai Fateh	+
<i>Capital & Profitability Quality</i>	Capital Adequacy Ratio	-
	Return on Assets	-
<i>Funding and Liquidity</i>	Spread between Commercial Bank Average Lending Rate to Average Deposit Rate	+
	Liquid Assets to Total Assets	-

²⁹ i Developed under the guidance of the Caribbean Technical Regional Assistance Centre (CARTAC) which conducted a workshop on Identifying and Developing Measures of Systemic Risk for Barbados in January 2016.

Aggregate Financial Stability Index

The Aggregate Financial Stability Index (ASFI) is a weighted average of normalised balance sheet and macroeconomic partial indicators which measures the overall level of stability of the financial system.

It is a single measure of financial stability comprised of various variables reflective of different aspects of the macro-financial environment. Four sub-indexes were developed, namely financial development, financial vulnerability, financial soundness, and world's economic climate. Each variable was normalised using an empirical standardisation technique in order to attain the same variance. All individual variables were then converted so that an increase indicates an improvement in financial stability. Sub-indexes were generated using equal weights and the ASFI is a weighted sum of these variables.

Table 2: Partial Indicators for Aggregate Financial Stability Index

Partial Indicator	Weight	Variable	Systemic Impact of Financial Stability
<i>Financial Development</i>	0.1	Total Credit to GDP	+
<i>Financial Vulnerability</i>	0.4	Inflation Rate	-
		Current Account Balance to GDP	+
		Net Foreign Assets to Total Assets	-
		M2 to International Reserves	-
		Fiscal Balance to GDP	-
		Real Effective Exchange Rate	-
<i>Financial Soundness</i>	0.4	Capital to Total RWA	+
		Liquid Assets to Total Assets	+
		NPLs to Total Loans	-
<i>World Economic Climate</i>	0.1	World Economic Growth	+
		Market Volatility Index	-
		World Economic Climate Index	+

Banking Stability Index

The Banking Stability Index (BSI) embodies the level of stability of the banking sector in a single measure and is a weighted average of banking sector indicators, namely capital adequacy, profitability, asset quality, balance sheet liquidity and sensitivity to market risks.

Each variable was normalised using statistical standardisation. Averages and standard deviations were computed for a 10-year period and all variables that comprise each partial indicator were

converted so that a higher value means an improvement in financial stability and a decrease means a deterioration relative to the prior periods. Arithmetic averages of the relevant variables were taken to determine the values for the corresponding partial indicator. The BSI was then calculated by taking the weighted average. The weights of the partial indicators presented in the table below were set by expert judgement and are specific to the Barbadian context.

Table 3: Partial Indicators for Banking Stability Index

Partial Indicator	Weight	Variable	Systemic Impact of Financial Stability
<i>Capital Adequacy</i>	0.05	Regulatory Capital to RWA	+
		Tier 1 Capital to RWA	+
		Tier 1 Capital to Total Assets	+
<i>Asset Quality</i>	0.3	NPLs to Total Gross Loans	-
		NPLs (net of provisions) to Tier 1 Capital	-
<i>Profitability</i>	0.25	Return on Assets	+
		Return on Equity	+
<i>Liquidity</i>	0.2	Liquid Assets to Total Assets	+
		Liquid Assets to Short-term Liabilities	+
		Loans to Total Deposits	-
<i>Foreign Exchange Rate Risk</i>	0.1	Net Foreign Assets to Tier 1 Capital	-
<i>Interest Rate Risk</i>	0.1	Spread between Commercial Bank Average Lending Rate to Average Deposit Rate	+

6.2 Consolidated Risk Index for the Credit Union Sector

The FSC utilizes a comprehensive suite of ratios along with other quantitative tools to assess the financial soundness of credit unions. On a quarterly basis, the FSC focuses its ratio analysis on four (4) key areas of financial performance which include Equity, Asset Quality, Liquidity and Earnings. As shown in the table 1 below, four key ratios serve as indicators of the level of risk associated with these areas of financial performance. The ratings of risk comprise five (5) risk classifications ranging from high to low as indicated in **Table 1**. Each of these risk rating categories is represented by a numerical value with a higher value corresponding to a higher level of risk. Additionally, the FSC developed weights for each indicator, which reflect the relative importance of each area to financial soundness.

A risk score for each indicator is calculated as a function of the numerical value of the risk category and the assigned weight. These scores are aggregated to determine the overall level of risk for the credit union. As shown in **Table 2**. The overall risk score is assigned to one of the five (5) risk categories determined by the FSC. This risk score is then used to inform the intervention required for a credit union.

Table 1: Indicators and Risk Ratings

Indicator	Ratio	Weight	Risk Rating				
			High	Medium	Medium	Medium	Low
Equity	<i>Total Capital/Total Assets</i>	15%	<8%	≥8% - <10%	≥10% - <11%	≥11% - <12%	≥12%
Asset Quality	<i>Delinquent Loans >90 days/Total Loans</i>	40%	>5%	≤5% - >4%	≤4% - >2.5%	≤2.5% - >1%	≤1%
Liquidity	<i>Liquid Assets/Short-term Liabilities</i>	25%	<6%	≥6% - <8%	≥8% - <9%	≥9% - <10%	≥10%
Earnings	<i>Net Profit/Total Assets (annualized)</i>	20%	<0.25%	≥0.25% - <0.5%	≥0.5% - <0.75%	≥0.75% - <1%	≥1%

Table 2: Overall Risk Score

Overall Risk Score				
High	Medium-High	Medium	Medium-Low	Low
≥4.5 - ≤5	≥3.5 - <4.5	≥2.5 - <3.5	≥1.5 - <2.5	≥1 - <1.5

6.3 Credit Card Developments in Barbados

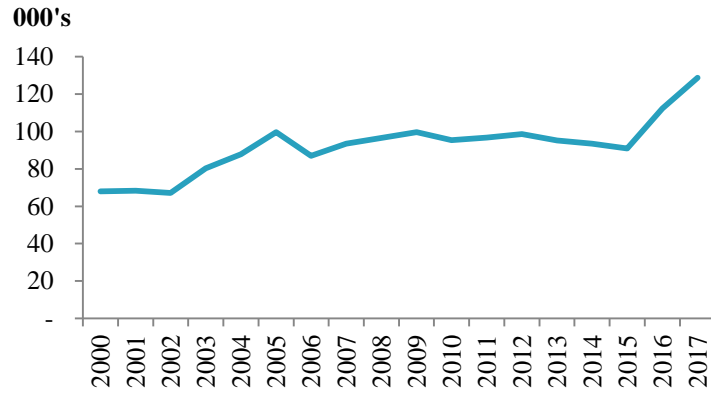
The evolution of financial technology has influenced the growing capabilities of the payments sector, the processes and procedures of which have diversified. The speed and volume of payments within the banking industry has accelerated and the increased efficiency of cross-border payments has reduced costs and increased the reliability of financial services. One of the most significant innovations in the 20th century was the development of payment cards, substantial use of which contributes to the overall household debt and can impact financial stability. Higher household debt is associated with a greater probability of banking crises, lower GDP growth in the long run and higher unemployment (International Monetary Fund, 2017). As quoted in The Central Bank of Barbados Financial Stability Report 2016, “household debt in Barbados steadily increased to reach \$5.7 billion at the end of 2015, from \$1.9 billion in 2000”. At the end of December 2017, household debt was \$6 billion accounting for approximately 64 percent of GDP.

Prior to the 1950s, consumer credit generally took the form of mortgages or instalment loans from banks and credit unions. However, this pattern began to change with the introduction of credit cards in 1966, since credit cards provided unsecured lines of credit that consumers could use at any time for any purpose (White, 2007). This global use of credit cards increased rapidly but, according to Stavins (2000), high rates of credit card delinquency and bankruptcy generated much discussion about their causes, and their link to credit card default rates, lenient lending standards and the moral hazard behaviour of borrowers. Stone and Maury (2006) found that demographics, as well as financial, institutional, psychological, and situational factors impact on people’s money usage. Additionally, Bellotti and Crook (2009) found that bank interest rates, unemployment rate, account balance and credit limits had significant impacts on credit card default. Despite these concerns, smart card technology continues to evolve and impact the growth of financial services.

The use of credit cards in Barbados was introduced in the late 1990’s and was led by commercial banks. The volume of credit cards issued fluctuated over the period 2000 to 2017, but followed a general upward trend (**Figure 1**)³⁰. During 2016 and 2017, in particular, issues of credit cards increased substantially partly due to the entrance of new market participants.

³⁰ Credit card data includes commercial banks, Globe Finance and Cave Shepherd and covers the VISA and Mastercard platforms.

Figure 1: Total Number of Credit Cards Issued



Total credit card debt outstanding grew at an annual average of 8 percent, increasing from approximately \$93 million in 2000 to \$347 million in 2017. However, while it accounts for only 5.8% of total loans (Figure 2), credit card debt outstanding and total loans generally exhibited a similar progression over the period (Figure 3). During the period, total loans grew gradually at an annual average rate of 5 percent increasing from approximately \$2.7 billion to \$6.1 billion.

Figure 2: Total Credit Card Debt Outstanding Portion of Total Loans and Advances

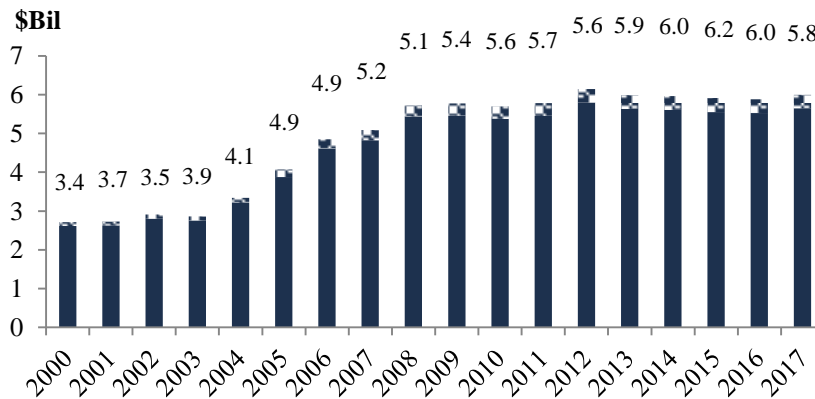
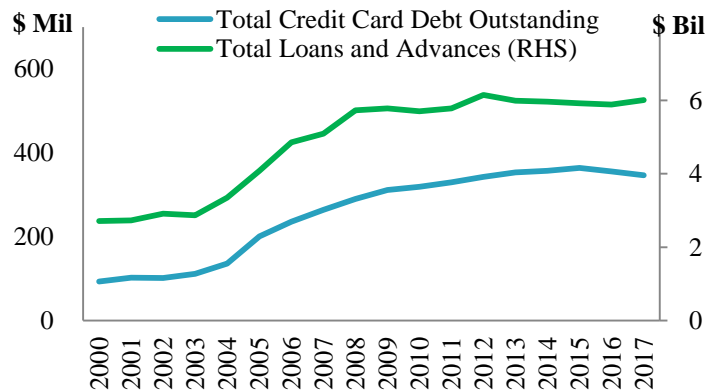
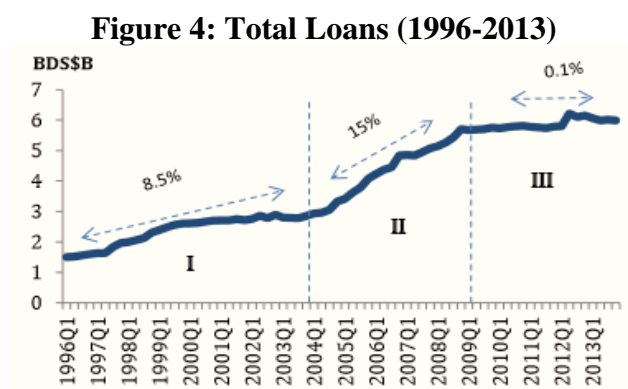


Figure 3: Total Loans vs. Total Credit Card Debt Outstanding



Credit card debt outstanding rose substantially in 2005 in particular, increasing by 48 percent from the previous year, the largest increase for the period examined. Interestingly, loan growth also registered a significant expansion in 2005 of 22 percent. In addition, Lowe and Grosvenor (2014) highlighted the 2004 to 2008 period as one of robust growth estimated at an annual average rate of 15 percent, compared to the 1996 to 2003 and 2009 to 2013 periods (**Figure 4**).

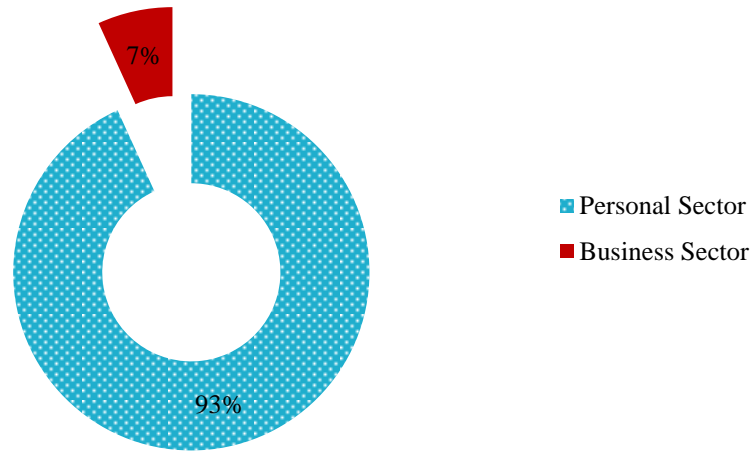


Source: Lowe and Grosvenor (2014)

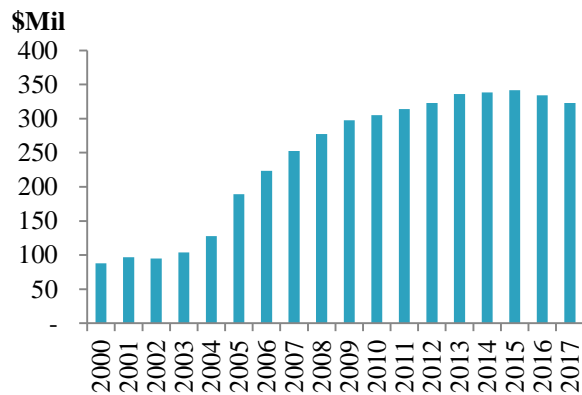
The magnitude of growth of credit card debt and by extension overall loans during the 2005 to 2006 period reflects overall economic activity during that period. In 2005, real GDP within the Barbadian economy increased by 4 percent, the highest growth achieved during the period of 2000 to 2017. Credit to the Barbadian private sector during 2005, increased to a significant \$730 million, also the highest change during the period observed.

When disaggregated by customer type, the personal sector accounts for 93 percent while the business sector accounts for the remaining 7 percent (**Figure 5**). This is not surprising since, credit card debt is unsecured credit which makes it more feasible for households with short-term financing needs and without available collateral to acquire credit compared to a personal loan. Businesses, on the other hand, usually acquire loans to finance the long-term needs of their companies to create more profit. Loans can be secured with the assets of the business, which act as collateral in the case of a loan default. Even though the personal sector significantly outweighs the business sector, lending to both has increased over the period.

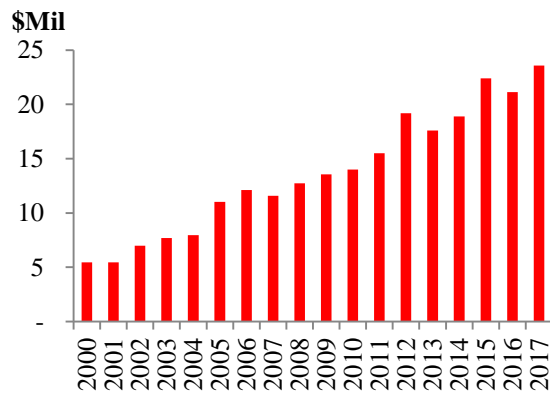
Figure 5: Total Credit Card Debt Outstanding: Personal vs. Business Sector



Total Credit Outstanding: Personal

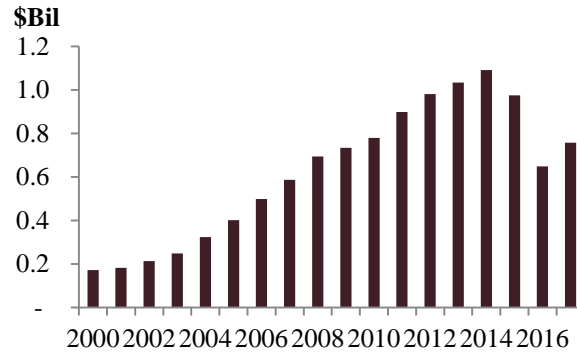


Total Credit Outstanding: Business

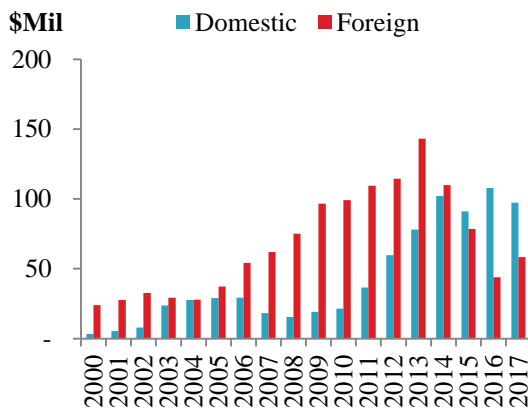


Total credit outstanding may not adequately capture the entire usage of credit cards as these loans are typically repaid within a short time frame, sometimes within a couple days or weeks. Analysis of gross expenditure revealed an overall upward trend in the volume of credit card spending until 2014, after which there was a fall-off (**Figure 6**). A gradual annual average increase of 13.7 percent was measured between 2000 and 2014, while expenditure decreased by 9 percent between 2015 and 2017. In 2016, new credit extended decreased by a significant 33 percent, despite the new entrants to the market during that period. A similar trend is also shown in the analysis of new credit extended by sector.

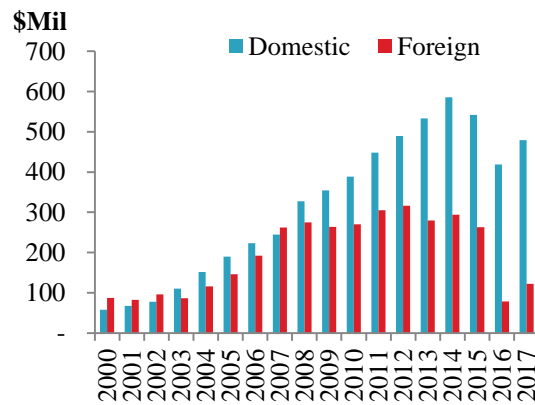
Figure 6: New Credit Extended



New Credit: Personal

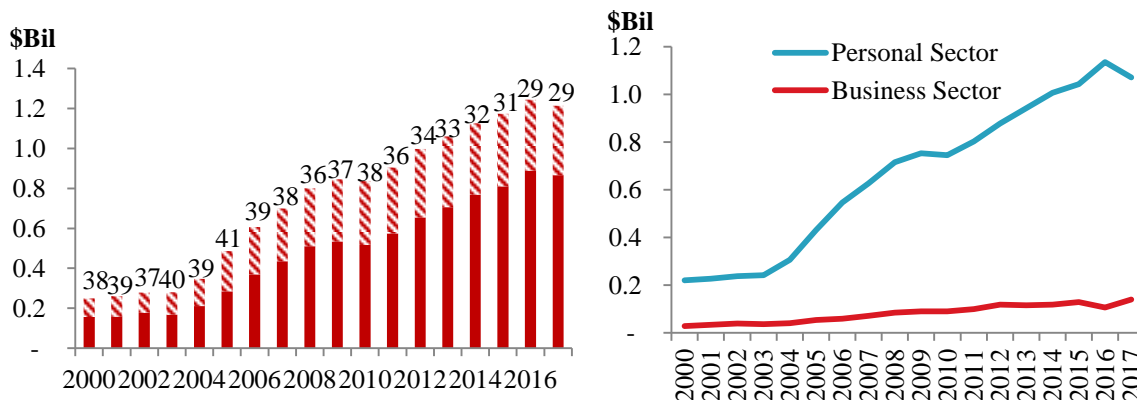


New Credit: Business



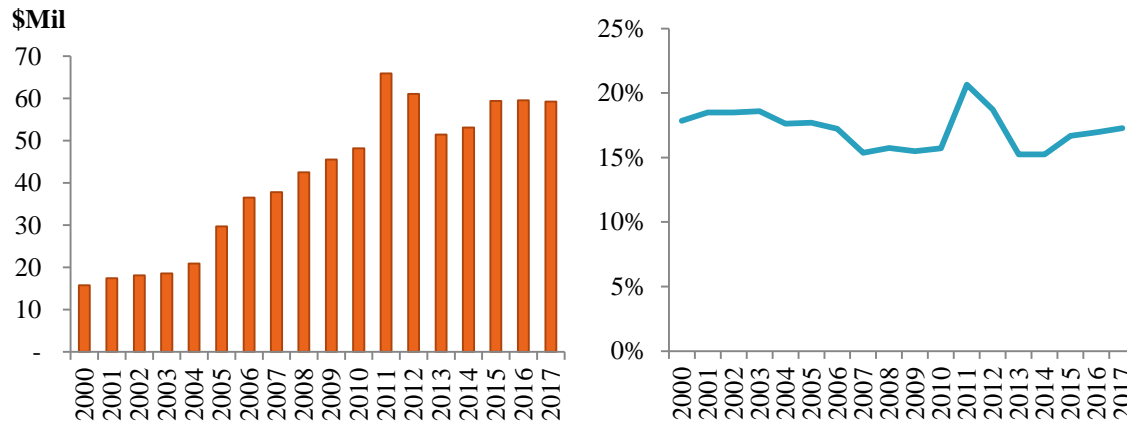
The total value of credit card limits extended within the financial system increased at an annual average of 10 percent over the period. The credit boom in 2005 was facilitated by the surge in credit limits extended by financial institutions to cope with the increased demand for credit by both households and businesses. In 2005, credit limits increased by 40 percent compared to the previous year. Analysis by sector demonstrated that credit limits increased by 41 percent in the personal sector and 33 percent in the business sector. **Figure 7** also illustrates that total credit card debt outstanding accounted for an annual average of 36 percent of total credit limits over the period.

Figure 7: Credit Card Limits Extended



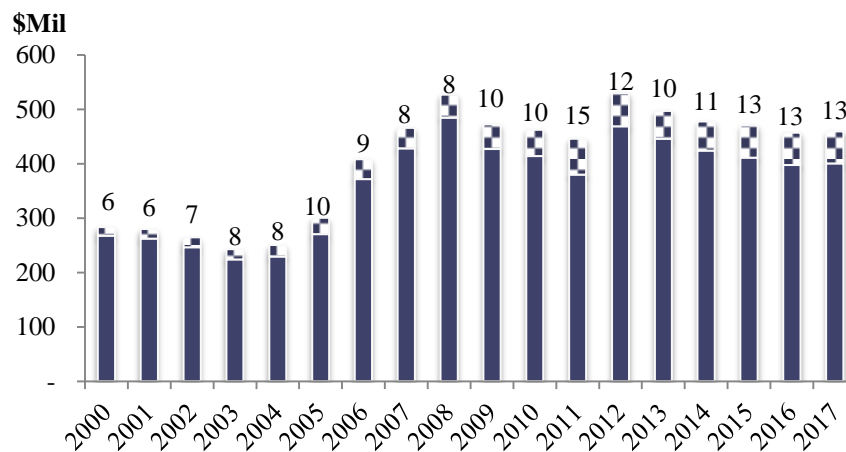
Given the movement in credit extended and the associated limits, it is expected that interest earned by the financial institutions on credit card transactions would follow a similar pattern. Increased lending is positively correlated with increased interest revenue from debtors. Interest earned increased by 42 percent from 2004 to 2005 (**Figure 8**), reflecting the increases in credit outstanding and credit limits during the year. There was also a 37 percent increase in interest earned by the reporting institutions in 2011. Additionally, interest income earned was approximately 17 percent of total credit card debt outstanding at the end of 2017.

Figure 8: Interest Income Earned on Credit Card Debt



As a proportion of interest income on total loans, interest earned on credit card transactions averaged 10 percent over the period of 2000 to 2017. Interest earned on credit card debt was 6 percent in 2000; however, the proportion of credit card interest reached 15 percent in 2011, before levelling off at an average of 13 percent in 2017 (**Figure 9**).

Figure 9: Interest Income on Credit Cards Portion of Total Interest Income



The credit card industry within the Barbadian financial system has evolved and grown significantly over the past almost two decades. Given the correlation between credit card debt and economic activity and the potential implications for general household indebtedness, and by extension financial stability, the Bank will continue to monitor credit card trends.

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6.4 IFRS 9 – Impact on the Barbados Financial System

On January 1st, 2018 International Financial Reporting Standard 9 (IFRS 9), the new accounting standard issued by the International Accounting Standards Board (IASB) came into effect globally. IFRS 9 governs the reporting of various types of financial instruments and investments and applies to commercial banks, finance companies, insurance companies, mutual funds and credit unions. The new standard replaces IAS 39 Financial Instruments: Recognition and Measurement and seeks to address many of the shortcomings identified worldwide by financial regulators and the investment community following the 2008/09 financial crisis.

The key change introduced by IFRS 9 is the move away from an incurred loss model towards a forward looking expected credit loss model (ECL). Under the new ECL model, financial institutions are required to hold loss provisions against all exposures with inherent credit risk, rather than against only those assets that have actually defaulted. This new approach requires financial institutions to make provisions for loan or investment assets from the date of origination. Additionally, the impairment provisions against these assets may evolve over time, dependent on the past, current and expected future conditions of the borrower, which also may consider the impact of relationships with other factors such as macroeconomic variables. IFRS 9 utilises three distinct credit stages to categorise exposures. This categorization also determines the level of provisions required and details are as follows:

- Stage 1 – Performing assets that have not experienced any significant deterioration in credit quality since origination. The provisions required under IFRS 9 for these exposures are based on a 12 month expected credit loss;
- Stage 2 – Assets which continue to perform against the agreed terms but there has been a significant increase in the associated credit risk since origination. Financial institutions are required to incur a lifetime expected credit loss against stage 2 exposures; and
- Stage 3 – Assets where a loss event has occurred. This category aligns with the previous IAS 39 incurred loss model where a provision was only made when there was objective evidence of impairment. Stage 3 assets are also required to incur a lifetime expected credit loss provision.

The transition from stage 1 to stage 2 assets and the associated change in provisioning methodology for such assets is driven by whether or not the exposure has experienced a significant increase in credit risk. However, IFRS 9 does not explicitly define what can be considered a significant increase in credit risk. This leaves such determination to each financial institution and creates the possibility for nuanced approaches. Generally, financial institutions worldwide have indicated intentions of using various factors such as changes in borrower probability of defaults, changes in internal risk grades or in applicable cases changes in external credit ratings.

The requirement for financial institutions to move from 12-month to lifetime credit loss provisions is hinged on when the exposure was first originated by the financial institution and the credit risk of the exposure at that time. The ECL model requires financial institutions to have a comprehensive understanding of their exposures and to be rigorous in their analyses when seeking to determine if a significant increase in credit risk has occurred. The outcome of these analyses will influence required credit loss provisions, in turn affecting profitability, shareholder equity and ultimately capital adequacy and solvency ratios.

Transitioning to the ECL model and the potential increased reliance on data to support estimation of forward looking credit provisions will be challenging for many domestic financial institutions. Taking into consideration the requirements of the IFRS 9 standard, potential challenges which Barbados institutions may encounter include:

- **Data Availability and Quality** – This is applicable at both the level of the institution as well as wider macro-economic variables. At the institution level, particularly in the case of longer dated credits such as mortgages, these older credits may lack the historic data on the level of credit risk at the time of origination. This could create a significant challenge on adoption of IFRS 9 when seeking to determine how an exposure should be categorised. Under the new IFRS 9 accounting standard, where a financial institution is unable to determine the level of credit risk that existed at the time of origination, a lifetime credit loss estimate is required. Therefore, without this data, institutions may be required to incur materially higher credit loss provisions, ultimately impacting their level of capital adequacy.
- **The use of various macroeconomic variables and their relationship with institution credit quality** is a logical connection for institutions to make when seeking to incorporate forward looking factors into their ECL calculations. However, the current forecasting frameworks of these entities may be inadequate for developing models to support their ECL provisioning process under IFRS 9.
- **Potential Costs of Standard Implementation** – IFRS 9's ECL model will require the implementation of a robust information system capable of capturing multiple data points and manipulating relevant information to determine an appropriate ECL calculation periodically as the business cycle evolves. Notably, the cost of implementing sophisticated systems capable of housing and manipulating the data in order to calculate IFRS 9 compliant credit provisions may prove prohibitive to some smaller financial institutions given their limited resources.
- **Access/availability of skilled resources** – The quantitative aspects of IFRS 9 and the integration of forward looking indicators to calibrate the credit risk modelling is a new aspect of operations for some institutions. The implementation of this tool will likely require institutions to invest significant sums in training and equipping their accounting and risk management staff to cope with the rigours of the ECL model.

The new ECL methodology outlined above is likely to result in financial institutions experiencing an increase in provisioning. Notably, on initial adoption of the new standard, institutions are required to make a one time adjusting entry to retained earnings in order to account for the increase in credit provisions. In the case of the banking and credit union sectors, this reduction in retained earnings, is likely to result in lower levels of capital. In addition, international accounting and consulting firms have estimated that globally, banks who utilize the Basel II standardized approach are likely to face a capital impact on adoption of IFRS 9 that is twice as large as their internal ratings-based (IRB) approach counterparts. This estimation is based on the fact that IRB banks already incorporate some of the same credit risk measures and forward looking approaches such as probabilities of default and loss given default that are now required under IFRS 9.

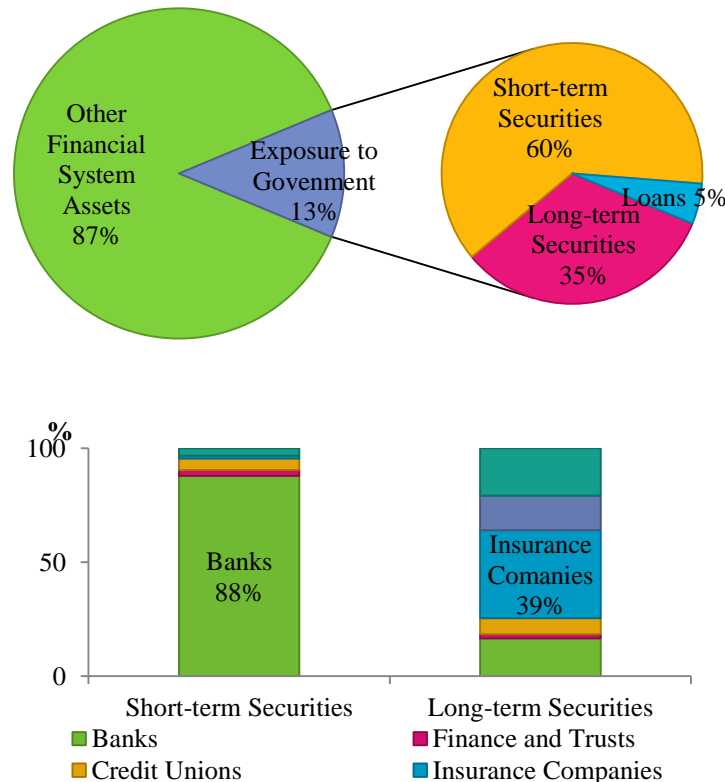
Domestically, implementation of IFRS 9 continues to be a major priority for the financial sector. The Bank and the FSC have engaged financial institutions in order to understand this potential impact. In the case of the banking sector, the Bank has sought to understand the nature of preparations for IFRS 9 implementation at domestic banks and, where available, obtain projections of the quantitative impact on adoption of the standard. Based on some preliminary analysis performed internally by the Bank all domestic institutions remained in excess of the minimum CAR, even in severe scenarios such as a 70% increase in provisions. This resilience in the capital base is primarily attributable to the generally highly capitalized nature of the domestic banking sector, primarily with Tier 1 capital instruments. The Bank recognizes that the new ECL model employed under IFRS 9 requires the exercise of significant judgement in certain areas and has committed to issuing industry guidance during 2018 to support licensees through the implementation process, where possible.

6.5 Sovereign Debt Exposure of the Financial System

In the Caribbean, financial institutions tend to be fairly exposed to their sovereign due to statutory requirements, capital controls or the intricacies of the domestic social and economic landscape. Consequently, any heightening of sovereign risk can have implications for the financial system through contagion, and hence threaten financial stability. Lewis (2015), by way of a multivariate stress simulation using data between 2008 and 2009 for Jamaica, found that a credit rating downgrade to default status of the sovereign would result in Jamaican banks being unable to cover write down losses on the value of their government securities. Correspondingly, Düll et al (2015) observed a similar sovereign risk impact on insurance companies when examining cross sectional data. Therefore, it is important to monitor the level of sovereign debt exposure of the financial system to assess any risk to financial stability.

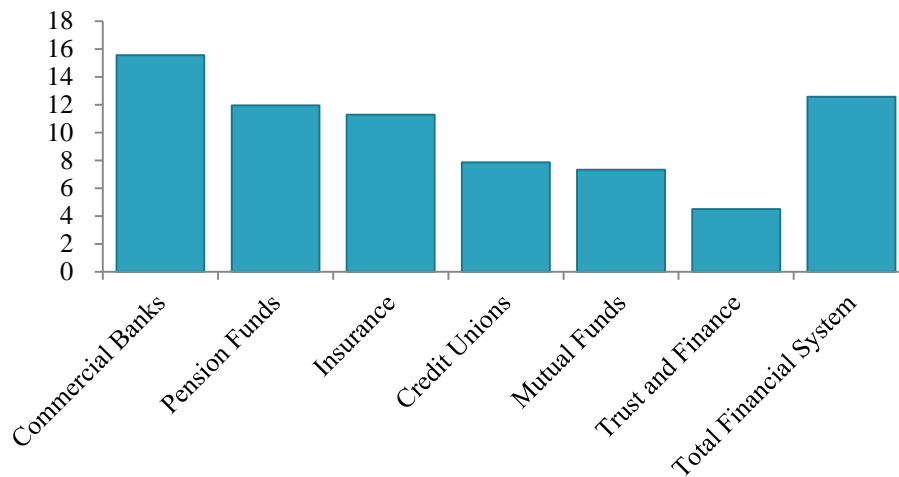
At December 2017, the aggregate financial sector's total exposure to central government stood at \$3.2 billion (13 percent of total financial sector assets) with commercial banks accounting for over 60 percent of the total exposure. The overall structure of the financial sector's government exposure however, is split into 60 percent short-term (Treasury Bills: 3-months and 6-months) securities and 35 percent in long-term securities, and the remaining 5 percent in loans to central government, held solely by commercial banks. Additionally, commercial banks accounted for approximately 88 percent of the short-term securities held by the financial system, while insurance companies represented 39 percent of the long-term securities at the end of 2017 (Figure 1).

Figure 1: Financial System's Exposure to the Government of Barbados



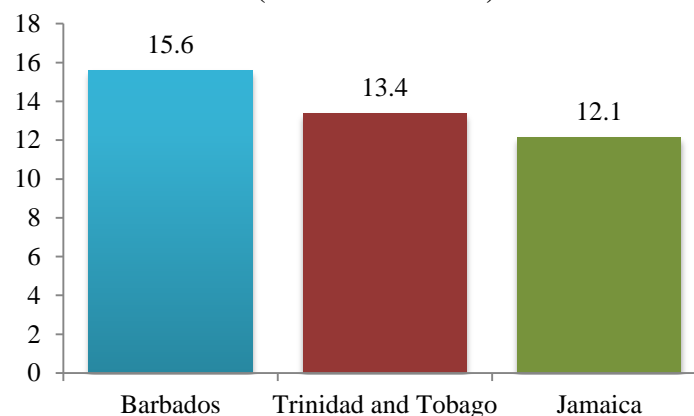
By sector (**Figure 2**), commercial banks had the greatest exposure to the Barbadian government, mostly owing to a minimum government securities reserve requirement of 20 percent of domestic deposits. Compared to its regional neighbours, Trinidad and Tobago and Jamaica, the Barbadian banking system had a large percentage of sovereign exposure relative to its assets (**Figure 3**). The pensions and insurance sectors followed with a total exposure ratio of 11.9 and 11.3, respectively, of which consisted mostly of long-term government securities (debentures). The credit unions, mutual funds and non-banks all held sovereign debt equivalent to less than 8 percent of their assets.

**Figure 2: Total Exposure by Financial Institution
(% of Total Assets)**



Source: Central Bank of Barbados

**Figure 3: Comparison of Banking System Total Exposure to Government
(% of Total Assets)**

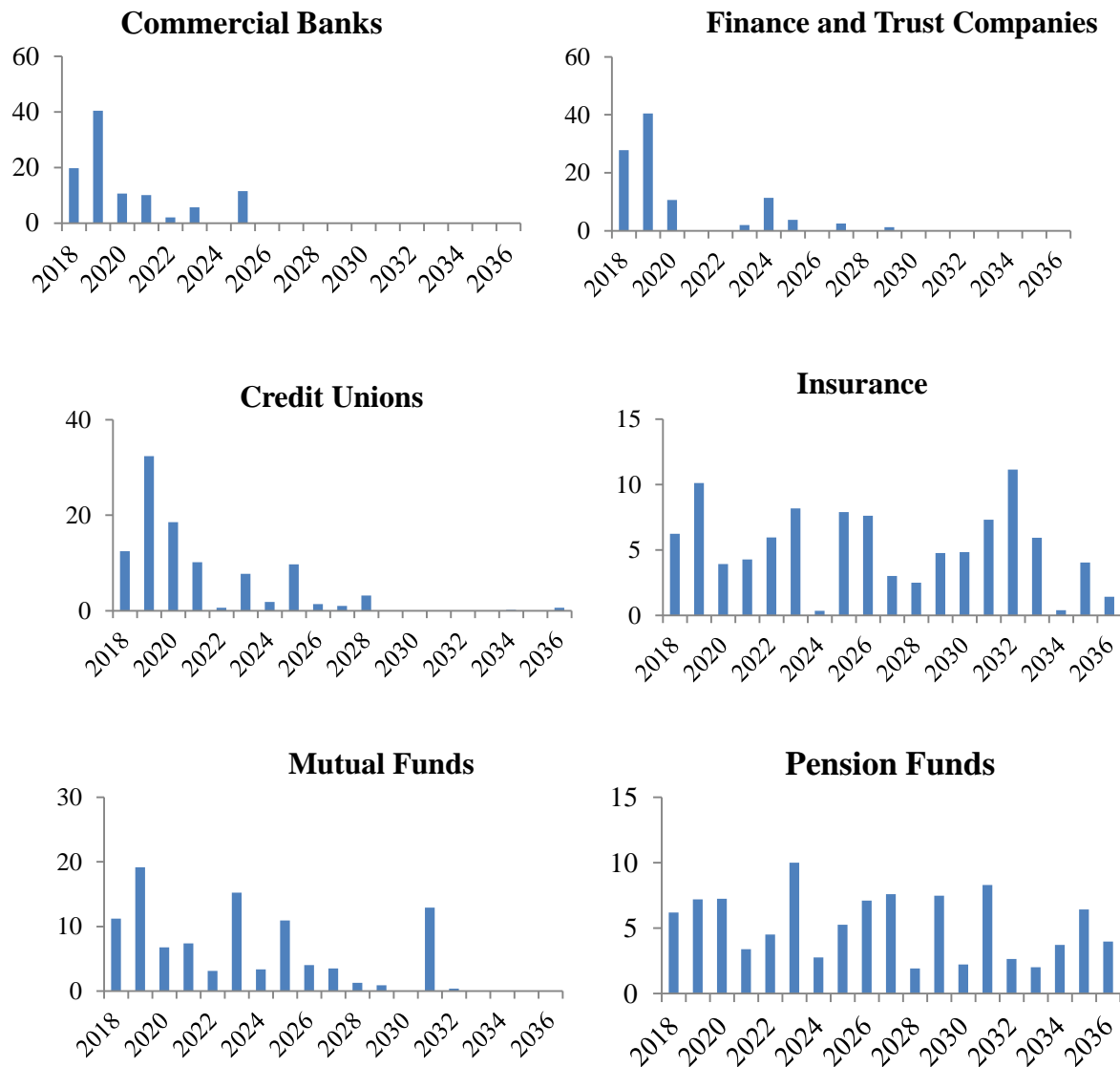


Source: Central Bank of Barbados, Central Bank of Trinidad & Tobago, Bank of Jamaica

Given the nature of life insurance (which represents 71 percent of the total insurance assets) and pension fund business, these sectors tend to hold longer-term investments to match the maturity of their liabilities. Hence, these industries hold longer term Government debentures (**Figure 3**).

However, commercial banks, non-banks and credit unions which have shorter term obligations tend to hold shorter term government debentures, while mutual funds seek to match investments with customers risk appetite and time specifications.

**Figure 3: Maturity Profile of Government Debentures by Sub-Sector
(% of Total Government Debentures Outstanding)**



Source: Central Bank of Barbados

In conclusion, while banks have the largest nominal exposures to domestic Government securities, the relatively short term nature of these investments reduces their underlying risk. However, the longer term holders, particularly the insurance and the pensions industries, would tend to have a higher risk exposure.

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Appendix A: Financial Development Indicators

Table 1: Keys Indicators of the Structure of the Financial System

	2012	2013	2014	2015	2016	2017
Number of:						
Total DTIs	48	48	48	47	47	46
Commercial Banks	6	5	6	5	5	5
Finance, Trust and Mortgage	7	8	7	8	8	8
Credit Unions	35	35	35	34	34	33
Non-DTI Trust Companies	5	5	5	5	5	5
Insurance Companies	26	26	23	21	24	23
Life ³¹	9	9	7	6	8	7
Non-Life	17	17	16	15	16	16
Pension Plans	298	302	304	300	303	310
Mutual Funds	18	21	20	19	16	16
Assets to Financial System Assets (%)						
Total DTIs	71.8	69.6	69.1	69.3	67.9	67.7
Commercial Banks	57.4	55.4	54.5	54.5	53.6	52.9
Finance, Trust and Mortgage	7.0	6.7	6.9	7.0	6.2	6.2
Credit Unions	7.5	7.5	7.7	7.9	8.2	8.7
Non-DTI Trust Companies	0.1	0.1	0.1	0.1	0.1	0.1
Insurance Companies	14.7	13.4	13.4	13.8	14.6	14.7
Life	9.7	8.6	8.6	9.3	10.5	10.7
Non-Life	5.1	4.7	4.8	4.4	4.2	4.1
Pension Plan	8.6	8.8	9.2	8.9	9.0	8.8
Mutual Funds	4.6	8.1	8.2	7.9	8.3	8.7
Assets to GDP (%)						
Total DTIs	163.1	170.0	169.3	178.1	186.3	182.8
Commercial Banks	130.3	135.3	133.6	139.9	146.8	142.7
Finance, Trust and Mortgage	15.8	16.5	17.0	18.0	16.9	16.6
Credit Unions	17.0	18.2	18.7	20.2	22.5	23.4
Non-DTI Trust Companies	0.3	0.3	0.3	0.3	0.3	0.3
Insurance Companies	33.7	32.6	32.8	35.4	40.1	39.8
Life	22.1	21.1	21.1	23.9	28.7	28.8
Non-Life	11.7	11.5	11.7	11.4	11.5	11.0
Pension Plans	19.5	21.5	22.4	22.9	24.6	23.6
Mutual Funds	10.3	19.9	20.1	20.3	22.9	23.4
Memo:						
Credit Union Membership (000's)	149	161	168	176	186	195
Pension Plans Membership (000's)	28	30	29	31	29	29

³¹ Three life insurers conduct significant general insurance business.

Table 2: Key Indicators of the Payment System

\$ Millions	2012	2013	2014	2015	2016	2017
RTGS Transactions	15,039	24,168	27,334	30,731	33,561	36,781
ACH Transactions	18,309	19,415	19,028	18,689	18,501	19,584
Cheques	17,642	18,090	17,387	16,847	16,385	17,343
Direct Payments	667	1,325	1,641	1,842	2,116	2,241
Debit Card Transactions	930	1,001	1,019	1,067	1,136	1,197
ATM Transactions	581	607	607	620	639	660
Point-of-Sale	349	394	412	446.7	497	537
Credit Card Transactions	550	661	688	633	526	576
Personal Sector	490	533	586	542	418	479
Business Sector	60	78	102	91	108	97
Currency in Circulation	511	505	519	543	578	603

Source: Central Bank of Barbados

Table 3: Key Indicators of the Domestic Mutual Funds Sector

	2012	2013	2014	2015	2016	2017
Number of Funds	18	21	20	19	16	16
Balanced	3	3	3	3	2	2
Exchange Traded	4	4	3	2	0	0
Growth	5	6	6	6	6	6
Income	4	5	5	5	5	5
Property	2	3	3	3	3	3
Total Assets (\$Millions)	961.9	1836.0	1849.3	1859.6	2073.0	2210.1
Balanced	110.2	98.6	100.2	88.2	89.9	101
Exchange Traded	19.5	15.3	14.1	4.9	0	0
Growth	553.8	1076.9	1092.5	1104.7	1275.5	1386.9
Income	193.8	565.9	567.1	589.1	638.9	656.6
Property	84.7	79.3	75.4	72.7	68.7	65.6
Fund Assets to Total (%)						
Balanced	11.5	5.4	5.4	4.7	4.3	4.6
Exchange Traded	2.0	0.8	0.8	0.3	0.0	0.0
Growth	57.6	58.7	59.1	59.4	61.5	62.8
Income	20.1	30.8	30.7	31.7	30.8	29.7
Property	8.8	4.3	4.1	3.9	3.3	3.0

Source: Financial Services Commission

Table 4: Key Indicators of the Pension Funds Sector

	2012	2013	2014	2015	2016
Total Assets	1,819.9	1,985.4	2,065.9	2,102.4	2,231.1
Equities	137.9	145	144.9	148.5	138.7
Government Bonds	299.2	331.4	320.4	338.4	350.5
Local Mutual Funds	285.3	289.3	289.3	282.7	291.2
Foreign Mutual Funds	929.4	1045.2	1129.6	1143.1	1169.4
Liquid Assets	70.4	76	81.6	90.6	189.6
Total Income	181	244	187.3	118	182.9
Total Expenses	73.7	79.7	65.2	71.9	95.7
Actual Contributions	76.7	77.4	72.9	66.9	158.3
Required Contributions	71.8	72.6	70.5	65.6	73.1

Source: Financial Services Commission

Appendix B: Key Financial Soundness Indicators

Table 1: Commercial Banks' Financial Soundness Indicators (FSIs)

	2012	2013	2014	2015	2016	2017Q1	2017Q2	2017Q3	2017Q4
Solvency Indicators (%)									
Capital Adequacy Ratio (CAR)	17.9	17.6	16.4	15.8	17.0	17.0	17.3	17.0	17.0
Leverage Ratio	9.0	8.5	8.3	8.1	8.8	8.8	9.0	9.1	9.1
Liquidity Indicators[#] (%)									
Loan to deposit ratio	73.6	70	70.3	65.5	62.3	62.8	62.3	63.2	63.3
Demand deposits to total deposits	29.3	32.3	33.9	39.6	44.0	43.4	44.4	44.5	44.8
Domestic demand deposits to total domestic deposits	26.8	29.3	30.9	35.7	40.3	39.5	40.6	40.7	41.6
Liquid assets to total assets	14.6	18	20.3	25.3	27.4	26.3	27.8	27.1	26.7
Credit Risk Indicators (%)									
Total assets	15.8*	2.8	-1.3	4.0	3.7	1.3	2.8	1.7	1.3
Domestic assets	11.2*	6.5	-0.6	3.3	2.7	1.5	2.4	1.3	-0.1
Loans	6.3*	-2.6	-0.4	-0.8	-0.5	0.0	0.8	2.7	2.0
NPL ratio	12.9	11.7	11.5	10.6	8.9	8.7	8.8	8.2	7.9
Substandard loans/ Total loans	9.9	8.6	9.0	8.0	7.2	7.0	7.0	6.7	6.3
Doubtful loans/ Total loans	2.3	2.5	2.0	1.5	1.0	1.0	1.0	0.8	0.9
Loss loans/ Total loans	0.8	0.6	0.5	1.1	0.7	0.7	0.8	0.7	0.8
Provisions to NPLs	33.9	44.9	47.7	55.5	63.2	65.1	64.1	67.4	69.6
Foreign Exchange Risk Indicators (%)									
Foreign Currency Loans to Total Loans	n.a	5.4	5.5	6.2	5.9	5.6	5.2	5.3	5.1
Deposits in Foreign Exchange to Total Deposits	4.9	6.0	5.7	8.6	8.6	8.7	8.7	9.2	8.8
Profitability Indicators (%)									
Return on Assets (ROA)	1.1	0.8	0.7	0.9	1.0	1.5	1.5	1.4	1.3
Net Interest Margin	5.2	4.9	5.1	5.6	6.2	6.3	6.1	6.0	6.1
Interest Rate Spread	6.7	6.5	6.5	7.1	7.5	7.5	7.5	7.5	7.6

Source: Central Bank of Barbados

*Reflects the financial consolidation of a finance and trust company with its parent bank.

Includes foreign components unless otherwise stated

Table 2: Finance and Trust Companies' Financial Stability Indicators (FSIs)³²

	2012	2013	2014	2015	2016	2017Q1	2017Q2	2017Q3	2017Q4
Solvency Indicators (%)									
Capital Adequacy Ratio (CAR)	n/a	n/a	36.3	33.3	35.5	n/a	n/a	n/a	38.5
Leverage Ratio	n/a	n/a	19.9	20.1	20.7	n/a	n/a	n/a	22.6
Liquidity Indicators (%)									
Loan to deposit ratio	109.9	99.0	105.5	98.8	109.2	108	108.9	119.1	102.7
Liquid assets to total assets	17.8	19.8	16.0	22.4	17.7	20.3	21.0	19.5	21.2
Credit Risk Indicators (%)									
Total assets	-18.1*	3.9	2.6	3.0	-6.7	-4.5	-4.4	-5.6	2.4
Loans	-28.8*	0.5	2.1	-1.9	-1.9	-2.6	-1.7	-3.2	-2.1
NPL ratio	9.1	8.2	8.3	9.5	9.3	9.2	9.2	9.4	9.4
Substandard loans/ Total loans	6.0	6.1	6.0	6.1	6.2	6.1	6.1	6.3	6.3
Doubtful loans/ Total loans	2.0	1.8	2.1	2.6	2.5	2.5	2.5	2.3	0.8
Loss loans/ Total loans	1.1	0.4	0.3	0.8	0.6	0.6	0.6	0.8	2.3
Provisions to NPLs	36.8	35.1	40.2	43.8	39.6	40.9	40.9	47.0	44.9
Profitability Indicators (%)									
Return on Assets (ROA)	1.2	1.9	0.9	1.0	1.3	1.3	1.3	1.2	1.0
Net Interest Margin	3.4	4.0	3.8	4.1	4.0	4.1	4.3	4.6	4.9
Interest Rate Spread	4.7	4.0	3.8	4.1	4.0	4.1	4.3	4.6	4.9

Source: Central Bank of Barbados

*Reflects the financial consolidation of a finance and trust company with its parent bank.

³² Indicators capture DTIs only.

Table 3: Credit Unions' Financial Stability Indicators (FSIs)

	2012	2013	2014	2015	2016	2017Q1	2017Q2	2017Q3	2017Q4
Solvency Indicators (%)									
Reserves to Total Liabilities	7.0	8.1	8.6	8.5	8.7	8.8	9.0	9.0	8.7
Capital to Assets	11.6	11.7	11.9	11.6	11.8	11.9	11.8	11.8	11.9
Liquidity Indicators (%)									
Loan to Deposit Ratio	96.2	92.3	92.8	90.8	89.3	87.6	86.5	87.5	86.7
Liquid Assets to Deposits & Shares	n.a	n.a	14.4	14.7	14.3	16.7	17.0	18.7	16.2
Credit Risk Indicators (%)									
Total assets	4.3	4.2	6.2	7.2	8.3	7.9	8.1	8.4	8.7
Loans	3.2	3.7	7.3	7.2	6.9	7.9	6.7	6.0	6.3
NPL ratio	8.2	8.4	9.4	9.0	7.6	7.1	7.8	8.2	7.8
Arrears 3-6 months/ Total Loans	1.9	1.7	2.2	2.0	1.3	0.8	1.6	1.8	1.3
Arrears 6 – 12 months/Total Loans	1.9	2	1.5	1.8	1.2	1.3	1.3	1.3	1.4
Arrears over 12 months/Total Loans	4.4	4.1	5.7	5.2	5.1	5.0	4.9	5.1	5.0
Provisions to NPLs	34.9	36.4	29.1	29.2	32.6	34.1	29.7	29.2	30.3
Profitability Indicators (%)									
Return on Assets (ROA)	1.3	1.4	0.6	0.9	1.1	1.1	1.3	1.3	1.3
Net Interest Margin	2.5	3.5	3.3	2.2	2.4	2.5	2.5	2.5	2.5

Source: Financial Services Commission

Table 4: Life Insurance Performance Indicators

\$Millions	2012	2013	2014	2015	2016	2017^P
Assets	2057	1946	1948	2195	2596	2825
Government Securities	495	501	536	566	570	554
Equities	178	134	93	110	136	194
Real Estate	106	104	100	89	87	89
Gross Premiums Written*	171	198	232	459	258	256
Net Premiums*	158	191	213	430	227	222
Reinsurance Ceded*	13	10	19	29	31	35
Net Reinsurance Ceded*	13	7	19	29	31	34
Expenses*	221	249	229	457	297	287
Net Income	88	33	87	88	126	117
Capital	617	512	587	656	1070	1201
Ratios (%)						
Capital to Assets	30.0	26.3	30.1	29.9	41.2	42.5
Reinsurance Ceded to GPW	7.6	5.1	8.2	6.3	12.0	13.7
Risk Retention Ratio	92.4	96.5	91.8	93.7	88.0	86.7
Expenses to Net Premiums	139.9	130.2	107.5	106.2	130.7	129.3
Return on Assets	4.3	1.7	4.5	4.0	4.9	4.1

Source: Financial Services Commission

P-provisional

*Excludes the general insurance business of life insurers.

Table 5: General Insurance Performance Indicators

\$Millions	2012	2013	2014	2015	2016	2017^P
Assets	1086	1065	1076	1048	1039	1037
Government Securities	221	205	197	204	189	179
Shares	30	26	21	21	29	47
Real Estate	51	35	32	23	23	19
Gross Premiums Written*	475	470	492	458	446	444
Net Premiums*	207	205	220	214	220	225
Net Claims*	130	127	122	136	132	130
Reinsurance Ceded*	279	273	279	251	233	227
Net Reinsurance Ceded*	268	265	272	244	226	219
Expenses*	206	212	214	226	222	206
Net Income	41	47	28	12	24	2
Capital	328	338	338	299	299	277
Ratios (%)						
Capital to Assets	30.2	31.7	31.4	28.5	28.8	26.7
Net Premiums to Capital	63.1	60.7	65.1	71.6	73.6	81.2
Reinsurance Ceded to GPW	58.7	58.1	56.7	54.8	52.2	51.1
Risk Retention Ratio	43.6	43.6	44.7	46.7	49.3	50.7
Expenses to Net Premiums	99.7	103.2	97.4	105.8	101.1	91.6
Return on Assets	3.8	4.4	2.6	1.1	2.3	0.2
Loss Ratio	62.8	62.0	55.5	63.6	60.0	57.8

Source: Financial Services Commission

^P-provisional

* Includes the general insurance business of life insurers

